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COMPUTERWORLD

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OS/2 LAN pact lacks IBM seal

BY PATRICIA KEEFE
CW STAFF

NEW YORK — Microsoft Corp. and 3Com Corp. joined forces last week to position the OS/2 LAN Manager as "the open platform for advanced computer networking," but analysts said the strategy lacks one crucial component: an IBM endorsement.

The two vendors announced an agreement to jointly develop and market Microsoft's OS/2 LAN Manager, the next generation of the Microsoft Networks protocols [CW, June 29].

However, without IBM's blessing and significantly more technical detail on the LAN Manager, skeptical analysts were inclined to dismiss the joint venture as premature positioning.

A lot can happen in nine months, they said, noting that the OS/2 LAN Manager is slated to ship in the first half of 1988.

Microsoft and 3Com "are operating from the premise that the LAN Manager is already a standard and IBM will have no choice but to support it," said Thomas White, president of The Seybold Group, Inc., a market research firm in Santa Clara, Calif. But, he continued, "How can you call something that isn't even in the market a standard?"

The presidents of both companies — 3Com's William Krause and Microsoft's Jon Shirley — expressed confidence that the OS/2 LAN Manager will be accepted as a standard. "IBM's support would, of course, be overwhelmingly beneficial," conceded Krause, who nonetheless rejected arguments that IBM's backing was a prerequisite for success.

"OS/2 LAN Manager will be

Continued on page 4

Multitask option on Mac menu

Apple's Juggler could upstage OS/2 by skirting application rewrites

BY DOUGLAS BARNEY
CW STAFF

CUPERTINO, Calif. — Apple Computer, Inc. may beat both Microsoft Corp. and IBM to market with a large-memory microcomputer operating system that provides a form of multitasking and a group of enhanced data-sharing capabilities.

An extension, dubbed Juggler, to the Apple operating system will run the bulk of existing Apple Macintosh applications, according to several developers who are currently testing the product.

For OS/2, the operating system due out from IBM and Microsoft next year, applications must be rewritten to take advantage of added capabilities. Existing IBM Personal Computer applications will run in OS/2's compatibility box, but they will not take advantage of multitasking and will run slowly, Microsoft has said.

Low cost/no cost?

Juggler, expected to ship later this year, is aimed squarely at current Macintosh users and is expected to be distributed aggressively. Both users and developers contacted last week said they believe, based on indications from Apple, that Juggler will be available at no cost or for a minimal charge.

The number of applications open at one time and the size of individual applications and data sets are limited only by the amount of random-access memory the machine contains, developers said. The Macintosh II, for example, is expandable to 8M bytes of RAM on its logic board, and more memory can be added using expansion slots.

The product will run on most versions of the Macintosh, including the Macintosh 512KE, Macintosh Plus, Macintosh SE and Macintosh II, according to a developer briefed by Apple. Because of the limitations of the Macintosh 512KE, Juggler is not expected to run effectively on that machine, the developer said.

Another developer said he found his firm's Macintosh software to be "instantly compatible." The first developer cautioned, however, that

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Competition thriving despite lessor buy-outs

BY CLINTON WILDER
CW STAFF

The increasing dominance of the computer leasing industry by a small number of large, acquisition-minded lessors will not slow competition or increase lease rates, according to corporate computer users.

The rapid pace of industry consolidation, evidenced by a series of acquisitions within the past year, is reshaping the industry into two tiers: very large lessors and very small, specialized ones. But in contrast to users' negative impressions of major acquisitions in the hardware and software industries, computer lessees say the consolidation will maintain or even increase the leasing industry's traditionally fierce competition.

"Smaller firms that have been acquired are coming on more aggressively," says William Dean, director of technical services at Pepsico, Inc. in Purchase, N.Y. "They can go after business they wouldn't have been able to be-

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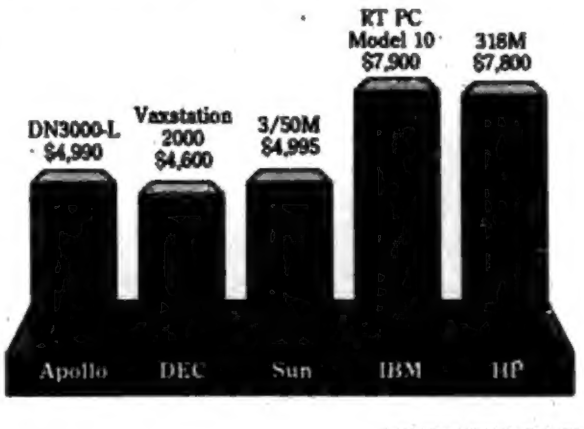
Apollo answers price challenge

Apollo last week joined DEC and Sun with entry-level systems priced below $5,000. **See story page 6.**



CW CHART: MITCHELL J. HAYES

Judge Greene wrong number for the Bells?

BY MITCH BETTS
CW STAFF

WASHINGTON, D.C. — In three days of hearings last week on the future of the regional Bell holding companies, U.S. District Judge Harold H. Greene appeared highly skeptical of arguments that the Bell companies should be given complete freedom from the AT&T divestiture judgment.

The 1983 Modified Final Judgment prevents the Bell companies from entering the long-distance, manufacturing and information service businesses. But the regional holding companies and the Department of Justice are urging the court to remove those barriers on grounds that growing competition and enhanced regulation by the Federal Communications Commission make them unnecessary.

In the case of long-distance

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> *"God forbid you lose market share. It's cutthroat out there."*
>
> HARVEY KINZELBERG
> CHAIRMAN
> THE MERIDIAN GROUP
> ON THE COMPUTER
> LEASING INDUSTRY
>
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Toshiba fears boycott

Execs resign after Senate reaction to USSR sale

BY MITCH BETTS
CW STAFF

The top two executives of Japan's Toshiba Corp. abruptly resigned last week in hopes of appeasing angry U.S. legislators who voted to ban Toshiba imports because a company subsidiary sold advanced submarine technology to the Soviet Union.

Despite the resignations, the vote in the U.S. Senate and a threatened U.S. boycott of Toshiba products are jeopardizing "our continued existence in the American market," said Nobuo Ishizaka, chairman and chief executive officer of Toshiba America, Inc., the firm's U.S. subsidiary, which sells a line of laptop computers and consumer electronic products.

While claiming that Toshiba Corp. had no involvement or awareness of the Soviet sale by Toshiba Machine Co., the resigned executives accepted "personal responsibility" in a move characterized by Ishizaka as the highest form of apology in the Japanese business world.

Senate votes to ban

The Senate voted Wednesday to ban Toshiba imports for at least two years; the House of Representatives is expected to vote on a similar provision to a pending trade bill. Toshiba Machine, which is 51% owned by Toshiba Corp., had previously acknowledged that it and a Norwegian firm sold computer-controlled milling machines that will enable the Soviets to manufacture quieter submarine propellers that will make it more difficult for U.S. monitoring equipment to detect Soviet submarines [CW, June 29].

In an interview with *Computerworld*, Ishizaka said that technically, Toshiba America could continue its microcomputer business because of an exemption contained in the bill. But he said it would not make good business sense to continue the U.S. operation if there is a consumer backlash against Toshiba.

The Senate bill contains an exemption allowing the importation of parts for U.S. production. Toshiba America's Information Systems Division imports parts from Japan and assembles the microcomputers at its plant in Irvine, Calif.

Recently, Toshiba America has been hobbled by a punitive 100% import tariff on its 16-bit laptops [CW, April 27], which Ishizaka confirmed has caused some product shortages.

"The Senate bill, if it is enacted, will affect our business totally . . . all across the line. We have to consider how we can cope with the situation as a whole matter of our continued existence in the American market," Ishizaka said. He said he hopes that last week's resignations of two top executives — Shoichi Saba, chairman, and Sugiichiro Watari, president — of the Japanese parent firm will lessen the U.S.'s anger.

The resignations came shortly after the Senate passed an amendment, by a vote of 92 to 5, to the omnibus trade bill that would ban most Toshiba imports, thus reflecting congressional outrage over the damage to national security. Similar legislation has strong support in the House of Representatives, but the Department of State is opposed to the sanctions.

Designed to punish

Sen. Jake Garn (R-Utah) said the amendment was designed "to punish those companies and to send a message around the world that we are finally tired of talking about it. We wish to penalize them where it really hurts — in their pocketbook."

Garn's amendment requires the president to impose the import ban for a period of two to five years. It allows the president to limit the scope of the sanctions if the company or the Japanese government makes substantial improvements in export controls.

In addition, the measure prohibits Toshiba from making sales to U.S. government agencies, although there are exemptions for certain defense equipment. The sanctions affect Toshiba Corp. and its subsidiaries and affiliates.

Cases for exemptions

The amendment states that the president may also grant exemptions in the following cases: imports shipped under contracts signed before May 1; spare parts and components essential to U.S. production; and routine service and maintenance of products already supplied to the U.S.

Garn acknowledged that the sanctions against Toshiba could be considered unconstitutional because they apply retroactively to export-control violations dating back to 1980. But he said if that part of the amendment is stricken, other parts of the measure would apply sanctions against future violators.

Sen. Richard C. Shelby (D-Ala.) had previously offered an unsuccessful amendment to ban Toshiba imports permanently, but Garn suggested that such an approach would probably put the firm out of business and harm U.S. interests. "It really is a matter of degree. Emotionally . . . I would like to kick them out of the country permanently," Garn said. But the two-year ban "will have the impact we want: It will scare them to death."

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New models of 3090 head for user sites

BY JAMES CONNOLLY
and STANLEY GIBSON
CW STAFF

KINGSTON, N.Y. — The first shipments of IBM's newest high-end and mid-range 3090 models left IBM's factory here late last week, destined for user sites.

IBM officials announced that the first 3090 Model 600E system was being shipped to the American Express Co. data center in Phoenix.

The Model 600E is a six-processor system that was introduced in January as IBM's most powerful machine. The Model 600E claims a performance rating of about 75 million instructions per second (MIPS).

IBM said the first 3090 Model 300E, a three-CPU system, was shipped to the Aetna Insurance Co. in Hartford, Conn.

The Model 300E, also introduced in January, is rated at about 46 MIPS and fits in between the 3090 Models 200E and 400E in IBM's product lineup.

Early delivery

The deliveries occurred earlier than originally scheduled, according to IBM. When announced, the Models 300E and 600E were slated for third-quarter availability.

However, in June, IBM said the deliveries would begin by the end of that month. Field upgrades to the Models 300E and 600E also began shipping last week, IBM said.

George DiNardo, executive vice-president of Mellon Bank, said he has signed up to have his 3090 Model 400 upgraded to a 3090 Model 600E. That upgrade, which entails adding two uniprocessors and changing all the existing Thermal Conduction Modules in the Model 400, is in the process of being scheduled, DiNardo said.

The changeover, although a complex one, will take only one day and will be done on a weekend, he added.

Up to six-way processor

DiNardo said he has learned from recent discussions with IBM personnel that the 3090 will grow to no more than a six-way processor.

Another industry source said he had been told the same thing by IBM. Some observers have speculated that the 3090 will grow to an eight-way machine.

DiNardo said that going from four to six processors created significant software complexities that would make going to an eight-way machine extremely difficult.

"We're having a hard time going from four to six processors," DiNardo said. He added that this difficulty made it apparent to him that a six-way machine is the 3090's upper limit.

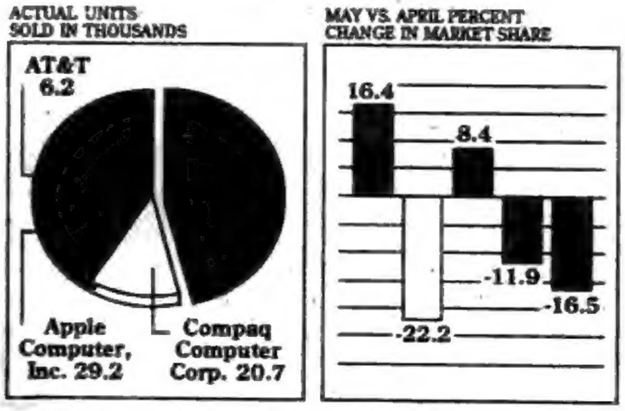
In signing documents for the Model 600E upgrade, DiNardo noted that transportation charges had been eliminated by IBM. On June 16, IBM announced the new billing procedure in what it called a "business simplification."

Last week, an IBM spokesman confirmed that the charges were eliminated entirely and not simply combined with other billing items. As a result, all IBM products that must be shipped are less expensive now, compared with one month ago, by the amount of the shipping charge, the spokesman said.

Data View

IBM comes on strong

Survey of computer stores indicates strong demand for IBM products in May; the PS/2 Model 30 accounted for one-third of IBM's PC sales



INFORMATION PROVIDED BY STOREBOARD, INC.
CW CHART

OS/2 LAN

FROM PAGE 1

to PCs what [IBM's] SNA is to mainframes," Krause said, referring to the Systems Network Architecture. He noted that 3Com has assigned 20 to 30 engineers to the project.

Analysts were significantly less optimistic. White called the announcement "the biggest bunch of hooey I ever read in my life." He and other analysts compared the joint announcement to IBM's initial unveiling of the Token-Ring network amid a tidal wave of product promises. "In IBM's case, it didn't help them a lot. Users got very [angry]," White said.

IBM support doubtful

In fact, few analysts expect IBM will embrace Microsoft's LAN Manager, predicting it will develop similar software on its own. Although IBM remained silent on the issue, analysts said IBM will rely on its OS/2 Extended Edition instead. "OS/2 Extended Edition is strategic for IBM, which refers to it as the lowest rung on the SAA ladder," said Barbara Isgur, a principal with D. H. Brown Associates, Inc. in Tarrytown, N.Y. She was referring to IBM's Systems Application Architecture.

One Wall Street analyst who follows Microsoft noted the glaring absence of IBM representatives from the announcement, in contrast to IBM's hearty endorsement of Microsoft's MS-DOS.

As for users, corporations are expected to standardize on OS/2, focusing in particular on OS/2 Extended Edition, which will feature proprietary Data Base and Communications Managers, said David Thomas, an analyst with Hambrecht & Quist, Inc. in New York. Microsoft and 3Com denied reports that they are working with Digital Communications Associates, Inc. on a Microsoft version of OS/2 Extended Edition.

'Full of holes'

White echoed the disappointment of others who attended a briefing session on the OS/2 LAN Manager. "They couldn't do a technical briefing because they don't know what they are doing yet," he said. The OS/2 LAN Manager, he charged, "is a nice marketing concept, but it's full of holes." According to 3Com and Microsoft, the project is on schedule.

3Com also announced 3+Open, the next generation of its 3+ network software, and reannounced a series of hardware upgrades migrating users of its file servers to Intel Corp.'s 80386 chip.

Under the nonexclusive agreement, 3Com will aid LAN Manager development in several areas, including:

- Protocols. 3Com will provide the underlying protocol support, including support for IBM's Netbios, Xerox Corp.'s Network System, XNS Open Systems Interconnect and 802.3.
- Network-specific applications and software tools. Microsoft and 3Com will jointly develop distributed network applications, including a windowing interface, distributed data base services and extensions to allow standard programmatic interfaces for message handling, directory and gateway services.
- Security. Security and network administration capabilities will be boosted significantly to include built-in error logging, audit trails, remote program executions and network statistics.

Not planned is support for IBM's Netview under the LAN Manager, although LU6.2 support is being considered. Analysts said the OS/2 LAN Manager must support key IBM connectivity schemes such as Netview, LU6.2 and Advanced Peer-to-Peer Networking.

Separately, 3Com will merge the LAN Manager with its 3+ software. Also available in the first half of 1988, 3+Open will feature MS-DOS, OS/2 and Apple Computer, Inc. Macintosh integration.

3Com will provide upgrades to 3+Open for current users and announce a series of hardware upgrades for current users of 3+ software and 3Server3 file servers.

3Com is not the only network vendor adding OS/2 LAN Manager support to its software. Novell, Inc. may well remain a significant factor in the race for control of the network market.

Not yet a has-been

Because IBM's support is still uncertain, some analysts were not willing to dismiss Novell, a rival developer of network software and the acknowledged leader in the PC network market today, as a has-been. By the time the LAN Manager ships in the first half of 1988, Novell will have a formidable installed base of more than one million users, claimed Craig Burton, Novell's vice-president of corporate development.

Burton took exception to comments by Microsoft and 3Com that Novell will find it difficult to provide support for the LAN Manager. "They don't understand what it is that we do," Burton added. While it is true that Novell will not license the LAN Manager, Novell does plan to support both OS/2 and the LAN Manager extensions, Burton said.

If Novell can successfully provide this support, some analysts said it will be better positioned than the OS/2 LAN Manager by providing users with the widest range of support for the jumble of existing and future networking alternatives.

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Managers hatch plans for still-distant ISDN

Although widespread implementation is still years away, show-goers prep for network's use

BY DAVID BRIGHT
CW STAFF

ATLANTIC CITY — Although widespread Integrated Services Digital Network (ISDN) implementations may be five years away, managers attending a communications conference here last week said they are eagerly awaiting ISDN's acceptance and, in some cases, have already begun making long-range plans to use the network at their corporations.

"You have to be looking toward ISDN," said a data communications manager from a large bank who attended the Association of Data Communications Users annual conference here.

ISDN is a digital method of integrating a wide variety of computer equipment into local- or wide-area networks. It was designed to provide high-capacity, highly reliable data, voice and video transmission. Some trial ISDN networks, including one at McDonald's Corp., have already been set up. But many potential users say the lack of standards and the huge capital investment required prohibit a fast transition to the new technology.

> "IBM IS sitting back and waiting to see what the carriers are going to do. The carriers are waiting for the users. It's a circle."
>
> CALVIN O'HIDY
> CHESEBROUGH-POND'S, INC.

Calvin O'Hidy, telecommunications services manager at Chesebrough-Pond's, Inc. in Trumbull, Conn., said it will probably take up to five years before vendors, carriers and users are able to coordinate their ISDN efforts. He likened ISDN's progress to that of IBM's Systems Network Architecture (SNA). SNA was introduced in the mid-1970s but did not catch on in a big way until just three or four years ago, he said.

What is needed to make ISDN successful is a single standard, O'Hidy and other managers said. O'Hidy said IBM, with the help of its Rolm Corp. subsidiary, might be the vendor to offer that standard. "But IBM is sitting back and waiting to see what the carriers are going to do," he added. "The carriers are waiting for the users. It's a circle."

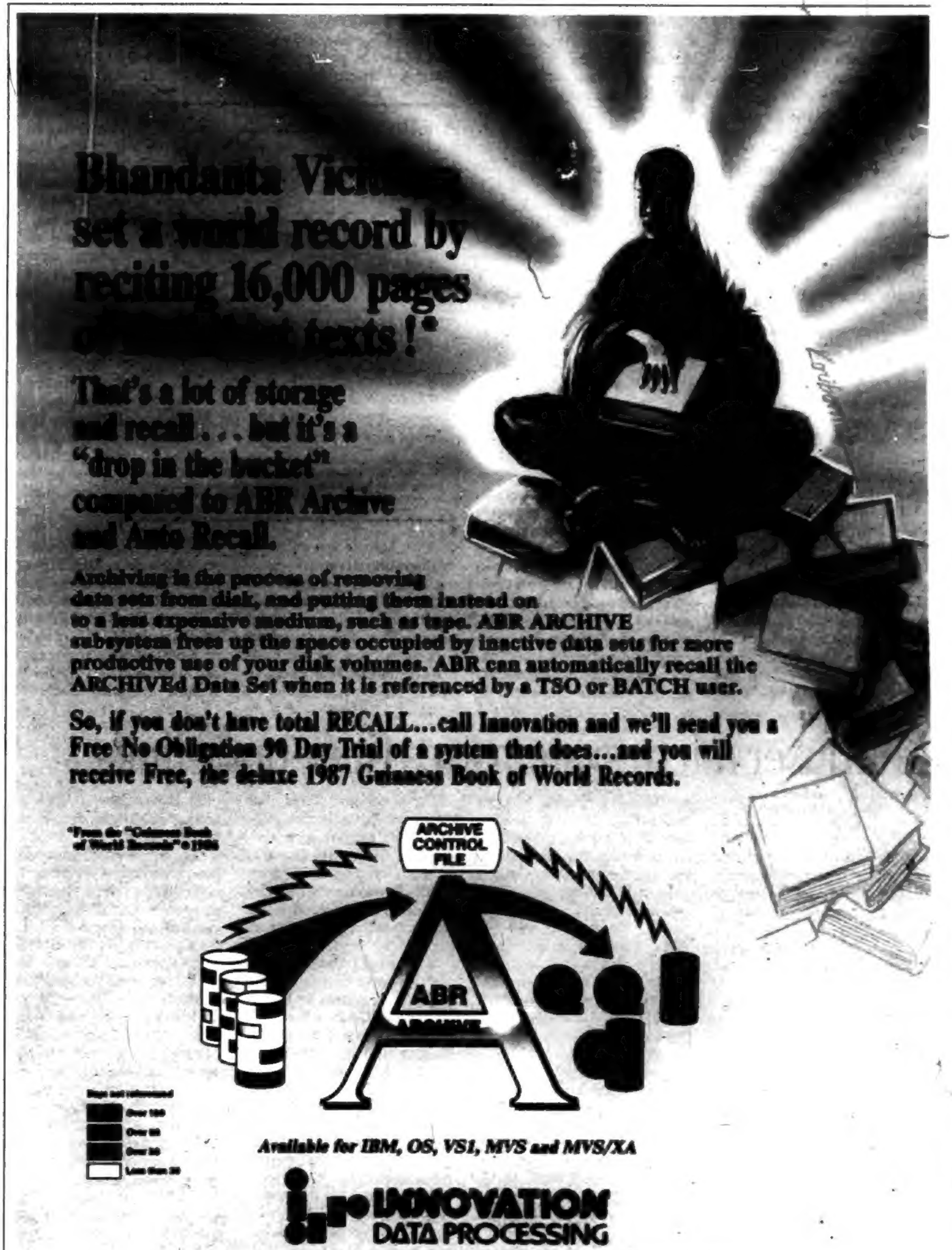
Offering ISDN products is "like giving a party and seeing who shows up," said Stagg Newman Jr., division manager of Bell Communications Research, Inc. in Red Bank, N.J., who was a featured speaker at the conference. "You may not see anybody for a while."

Newman reminded attendees that ISDN is a technology for the mid-1990s. One reason for the delay is the "tremendous capital investment" in both hardware and software, he said.

For instance, he said, before ISDN can come into widespread use, there are thousands of switches throughout the country that will have to be changed. Some of the switches currently in use were installed 50 years ago.

A manager from a large university agreed with Newman. He said that given the size of the required investments in ISDN, his organization cannot afford to make any rash decisions.

The university is now carefully plotting its networking course for the next five or 10 years, he said, and every decision will have a far-reaching impact. For example, he said that one new switch will initially handle as many as 15,000 to 20,000 stations.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Apollo continues push into new markets

Adds mid-range workstation, expands connectivity and slashes prices in burst of activity

BY JAMES CONNOLLY
CW STAFF

BOSTON — Apollo Computer, Inc. continued the thrust of workstation vendors into new markets and price/performance ranges last week with a series of low-priced hardware platforms and connectivity options.

Apollo slashed the entry-level price for its DN3000 series by 50%, introduced the mid-range DN4000 series and added personal computing features such as personal computer connections to its network and PC emulation software running on Apollo's Motorola, Inc. 68020-based workstations.

The introduction of a $4,990 DN3000 and the DN4000, with a base price of $13,900 for a monochrome, diskless workstation, came two weeks after Digital Equipment Corp. drove the entry-level point for its Vaxstation 2000 line from $10,500 down to $4,600. Two months earlier, rival Sun Microsystems, Inc., which is expected to announce high-performance workstations this week, cut its entry-price to $4,995.

The DN4000 is aimed at the high-performance needs of the electrical- and mechanical-design markets, in which Apollo is already strong. But that system and the DN3000 family are also intended to build on Apollo's limited presence in areas such as computer-aided software engineering (CASE), technical publishing, financial services, artificial intelligence and imaging.

Cheryl Vedoe, Apollo's group manager for personal workstations, said the DN3000 is aimed at price-sensitive markets, including CASE and technical publishing.

Apollo also expects to build on its office automation capabilities within those markets through agreements with vendors such as Wang Laboratories, Inc. and Phoenix Technologies Ltd.

However, one analyst, Marcia Brooks of Framingham, Mass.-based research firm International Data Corp. (IDC), said she was impressed by how Apollo is broadening its base but cautioned that if Apollo ventures too far into the general computing field, the firm will find stiff competition in head-to-head battles outside of its traditional markets with companies such as IBM and DEC.

"I don't think we're going to go out immediately and start selling the DN3000 as a general computing system in the OA marketplace. . . . At the same time, we are starting to move into market areas such as financial services, and, as we get into those markets, OA will become more important," Vedoe said.

Phoenix and Apollo developed Domain/PC Emulator, which is the IBM Personal Computer software emulator announced last week. The $500 package allows an Apollo user to run PC applications in a workstation window. According to Apollo, the emulator runs at the speed of an IBM PC XT.

Apollo also offers DN3000 and DN4000 users a hardware option, which runs at the speed of an IBM PC AT but costs $2,400.

Products such as the emulator could drive workstation vendors into the general office automation market, said officials at Motorola, which supplies its 68000 microprocessors to numerous workstation makers.

"People say personal computers are going to migrate up into the office automation marketplace, but I don't see that happening," said Jack Browne, manager of 68020 products. He said the lack of a multitasking operating system for the Intel Corp. 80386 microprocessor will limit PC use in multiuser environments for at least a year. He claimed Unix-based workstation vendors have the communications needed to build networks and mainframe links and $2 billion worth of OA software written for the 68020.

IDC's Brooks said Apollo, once reliant on the proprietary Domain network, is showing a commitment to open architectures and standards such as Ethernet and offers networking options unavailable elsewhere.

Brooks noted that Apollo chose not to undercut DEC in pricing.

"Even though they announced two weeks after DEC, they didn't play the game of saying they're going to be at the bottom end in price," said Brooks, noting that Apollo justified keeping its price $390 above DEC's by saying the DN3000 is more expandable than the Vaxstation 2000.

The diskless DN3000 costs $4,990 with 4M bytes of memory, a floating-point coprocessor, one serial port, an Apollo Domain/IX operating system license, an Apollo token-ring or Ethernet interface and a 15-in. monochrome monitor with 1,024- by 800-pixel resolution.

Apollo also enhanced the DN3000 family with an 8 bit-plane graphics controller providing simultaneous display of up to 256 colors and an engineering change that frees two slots in the PC AT-compatible bus.

Apollo claimed that 20,000 DN3000s have been shipped since the system was introduced in February 1986.

In a competitive analysis, Apollo claimed a price per seat of $12,340 for the DN3000 and DSP4000 server in a four-user configuration, compared with $17,870 for a Sun 3/50M and 3/260S configuration.

Apollo claimed DEC and Sun have no systems comparable with its DN4000, which Apollo said is a PC-type desktop machine with high-end workstation power.

The DN4000 is based on a 25-MHz 68020, which Apollo said processes 4 million instructions per second. A system with a 25-MHz 68881 coprocessor, 16M bytes of memory, a 19-in. color monitor with 1,024- by 800-pixel resolution, 8 bit-planes, a network interface, Domain/IX and Apollo Aegis licenses, a 348M-byte disk drive and a 60M-byte cartridge tape drive costs $45,400.

Shipments are scheduled for August.

A DSP4000 server with 4M bytes of memory costs $12,400.

The company also announced Domain/PCI-Ring, which connects a PC to the Apollo token-ring and costs about $1,150, and plans to offer an Ethernet connection next year.

Apollo's new lineup

DN4000 series compared with repositioned DN3000

	DN3000	DN4000
MIPS[1]	1.4	4
Processor speed	12 MHz	25 MHz
Memory [illegible]	[illegible]	[illegible]
Virtual address space	64M bytes	1G bytes
Bit-planes	4 or 8	8
Base price (Diskless, monochrome)	$4,990	$13,900
Typical price[2]	$14,990	$33,900

[1] Millions of instructions per second, based on vendor claims

[2] Price includes 155M-byte disk drive, color display Motorola, Inc. 68881 coprocessor, IBM PC AT-compatible bus, serial parts, network interface and Apollo's Domain/IX license

CW CHART

Multiuser micro system uses fiber-optic links

BY ALAN ALPER
CW STAFF

NEW YORK — A start-up company last week unveiled what it claimed is a new concept in workgroup computing, combining Intel Corp. 80386-based systems with high-speed fiber-optic links for use with multiuser, multitasking operating systems.

Jackson, Miss.-based Sunriver Corp.'s approach entails linking diskless workstations via fiber-optic cable to an 80386-based microcomputer to enable each to function as a separate 386-based personal computer as much as 1,000 feet from the host. By using a fiber-optic link, the diskless workstation can exchange data with the host at 32M bit/sec., Sunriver claimed, an order of magnitude greater than the 1.92K bit/sec. data rate of conventional dumb terminals.

The firm said its tack lends itself well to a variety of multiuser applications in which speedy interaction between host and workstation is required and that it is particularly well suited to generating business graphics — an application that depends on the greater processing power and larger memory capacity of 386-based micros.

"Our approach allows the 386 to distribute its processing power over the user base, providing for true multiuser and multitasking functionality," noted William Long, Sunriver's president and chief executive officer.

Operating systems

A 386-based host in a Sunriver system reportedly supports a variety of multiuser, multitasking operating systems, including the following: VP/IX and Merge 386, in which Unix runs as a task under Microsoft Corp.'s MS-DOS; Flexos 386 and PC-MOS/386 — multiuser operating systems that emulate Microsoft's MS-DOS — and 386/IX and System V/386, Unix implementations for the 80386.

On a per-user basis, Sunriver's multiuser system is between 25% and 50% less expensive than either conventional PC networks or Intel 80286-based multiuser micros, claimed Gerald Youngblood, executive vice-president and chief financial officer.

A Sunriver system with Compaq Computer Corp.'s Deskpro 386 as its host costs $4,528 per user vs. $6,018 for a three-user network or $4,723 for an IBM Personal System/2 Model 30 or 60, the firm claimed.

Those systems all run a multiuser version of MS-DOS and are equipped with IBM's Enhanced Graphics Adapter (EGA)-capable workstations, the firm noted.

Van Weathers, director of Dataquest, Inc.'s Business Computer Systems Industry Service, said Sunriver's approach facilitates the speedy generation of business graphics, one of the fastest growing applications by users of business computers. "For that reason, I think the product has tremendous potential," he added.

The firm is offering four diskless workstations featuring 14-in. displays; a variety of color bit-mapped graphics support capability; one parallel and two serial ports; a 101-key IBM Personal Computer AT-style keyboard; and an AT sound chip and speaker.

. The entry-level station supports IBM Color Graphics Adapter (CGA) color graphics, while the high-end family member offers resolution of 640 by 480 pixels, the ability to display up to 16 colors and CGA color, EGA and EGA+ and Hercules Computer Technology, Inc. graphics boards, the firm said.

Scheduled to be available in October, the workstations range in price from $1,599 to $2,299.

Adapter board available

An adapter board for a 386-based micro with an AT bus facilitates the attachment of up to four of the diskless workstations via fiber-optic cable. Since AT-class machines offer three 16-bit slots, up to 13 workstations, including the host, can share the resources of the 386-based micro, the firm said.

Priced at $799, the board will reportedly be available in October.

The firm is also offering an adapter card to allow an IBM PC or compatible to function as a 386-based microcomputer. It too is priced at $799 and will reportedly be available in October.

Sunriver said it intends to offer an adapter for IBM's PS/2 family that uses IBM's Micro Channel bus and will develop fiber-optic links for systems using the Multibus and VMEbus architecture.

The company said it plans to sell its products through OEMs and value-added resellers. It already has an OEM deal with SCI Systems, Inc. in Huntsville, Ala., and is negotiating with PGI Corp., a reseller affiliated with Tempe, Ariz.-based Micro Age Computer Stores, Inc., according to Sunriver's Youngblood.

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IBM, Locus to co-develop PS/2 AIX system

BY PATRICIA KEEFE
CW STAFF

SANTA MONICA, Calif. — IBM and Locus Computing Corp. last week announced plans to jointly develop the IBM Personal System/2 AIX operating system, which was first announced during IBM's April 2 unveiling of the PS/2 line.

The Unix-based PS/2 AIX has been characterized by some industry observers as a strategic, multiuser, multitasking operating system designed to encourage corporate users to purchase the soon-to-be-released PS/2 Model 80, which is based on Intel Corp.'s 80386 microprocessor.

Locus President Gerald Popek stressed the significance of IBM's categorization of a 386-based Unix — specifically, its PS/2 AIX — as a strategic Program Product. "In IBM parlance, this means, 'Mr. Customer, you can base strategic plans on PS/2 AIX, because we'll support and maintain this product for years,' " he said.

Popek claimed that previous Unix-based products from IBM have been offered at the other extreme as if IBM were saying, "Here's some software; use it, but don't call us about it."

Partnership public

The announcement was also the first public acknowledgement of a now 4-year-old development agreement between Locus and IBM. PS/2 AIX is the first product to result from that partnership, Popek said.

"You might imagine there are more to come," he said, adding that Locus will unveil more details next week.

The new operating system is based on AT&T's Unix System V, Release 2 and will run on the PS/2 Model 80. PS/2 AIX will support Microsoft Corp.'s MS-DOS 3.3 as a task under Unix and includes LX Windows capability, a new Locus product based on the X-Windows standard, Popek said.

IBM has said it will announce pricing and availability in the fourth quarter. LX Windows allows most personal computer-compatible applications to run in a window without modification, Popek said. LX Windows is neither Microsoft Windows compatible nor a clone, he said, adding that "the right environment to track is IBM's Presentation [Manager] layer." Popek hinted at future support for IBM's OS/2 running as a task under Unix. While he said that "nothing is being said about OS/2 support," he did point out that OS/2 is an important part of IBM's strategic plan.

The PS/2 AIX software is a subset of, and compatible with, its predecessor, AIX RT Personal Computer, which was co-developed by IBM and Interactive Systems Corp., a Locus rival and neighbor in Santa Monica. However, PS/2 AIX reportedly will not run just as it is on IBM's RT Personal Computer.

Buy while you wait

But to analysts, the key to PS/2 AIX, or any 386 Unix port, lies in its ability to provide users with a multiuser, multitasking virtual operating system — and, hence, a reason to buy the PS/2 Model 80 — while they wait for delivery of applications designed for IBM's OS/2.

For example, Xenix 386 is available immediately from Microport Systems, Inc. in Scotts Valley, Calif. "That's the whole point of Xenix [or any versions of Unix] right now," said Bruce Steinberg, director of marketing communications for Xenix developer Santa Cruz Operation in Santa Cruz, Calif. His company said it will announce PS/2 ports of Xenix this week.

There is also speculation that OS/2 will be late and that IBM is trying to cover its bets. "Is IBM announcing [PS/2 AIX] because they are behind Unix or because OS/2 is going to be real late?" asked David Fiedler, publisher of Infopro Systems' "Unique," a Unix newsletter. "IBM might be saying, 'Do we want to end up in the position of having all these great products [in the PS/2 series] but no software to take advantage of it?' "

This is critical, 'said Brian Boyle, an analyst with Novon Research in Berkeley, Calif. "The only reason you'd buy a 386 PS/2 is for multiuser — multitasking at the very least," he said. "People have to have some reason, other than just faster Intel 80286-based MS-DOS, to buy a 386 machine."

PS/2 AIX is also said to be positioned against Microsoft's VP/IX, which was recently licensed from Interactive Systems. Interactive Systems has agreed to customize VP/IX, which supports MS-DOS as a task under Unix, to support MS-DOS under Xenix.

The Locus-IBM partnership also raises questions about IBM's long-standing public relationship with Interactive Systems. IBM has co-developed or licensed four Unix products from Interactive Systems: IX/370 and VM/IX for IBM mainframes, PC/IX for IBM's PC and AIX for the RT PC. When asked whether Locus was replacing Interactive Systems as IBM's Unix supplier, Popek said, "This release sure shows where IBM stands." Efforts to reach Interactive Systems President Ronald Fisher and Vice-President Bernie Hill for comment were unsuccessful.

Competition

FROM PAGE 1

fore with the rates that Fortune 150 companies require. Granted, there will be fewer players, but the competition is there."

Life after tax reform

The leasing industry's consolidation (see chart) has hastened dramatically since the U.S. Congress repealed the investment tax credit last year.

Parent leasing firms, financial institutions or regional Bell holding companies provide formerly medium-size lessors with the substantial capital needed to keep their hardware portfolios stockpiled. After tax reform, the smaller firms lost much of their ability to raise capital by selling the tax advantages of lease deals to investors.

Notable examples of this trend include the sale of UK-based United Leasing PLC and its U.S. subsidiary, Unilease Computer Corp., to The Meridian Group; Bell South Corp.'s acquisition of Dataserv, Inc.; and the proposed buy-out of CMI Corp. by Continental Information Systems Corp., which faces a court challenge from CMI President Edward Cherney [CW, June 1].

"Computer leasing is shifting from a very entrepreneurial industry to an oligopolistic one," says Harvey Kinzelberg, chairman of The Meridian Group. The top 10 lessors — currently controlling 35% to 40% of the U.S. leasing market — will claim an 80% market share within four years, according to Richard Kazan, president and chief executive officer of Capital Associates International, Inc. But unlike other industries, in which a shrinking vendor community can result in higher prices, the traditionally aggressive competition in computer leasing is expected to continue even after a major shakeout.

"God forbid you lose market share," Kinzelberg says. "It's cutthroat out there."

The competitive arena in leasing is shaped by many other factors in addition to the number of lessors competing for a given deal. Lease rates have not increased as much as feared after tax reform, lessees say, because residual values — the forecasted resale price of a used CPU or peripheral when its lease expires — have gone up. Since the lessors' profit margin is a combination of the lease rate and the remarketing value of the equipment, a lessor using higher residual forecasts can set rates more aggressively.

IBM Credit Corp., which sets market parameters at the high end, is fueling competition with that residual-rate formula, according to Al Schwanter, manager of computer operations analysis at United Technologies Corp.

"IBM Credit is turning up the heat; I'm amazed at the residual positions they take," Schwanter says. "As a result, I've seen much more creative leasing deals being talked about by major independent leasing companies."

Most lessors and industry watchers say that regardless of industry consolidation, there will be plenty of lucrative niche opportunities for small regional or specialized lessors. "There are firms doing good business on leases for the IBM 8100," says Wally Papciak, senior vice-president of market research firm Computer Intelligence Corp. "That may not be something that a real large company wants to bother with."

"The little guys will survive with what I call 'economies of small' — lower overhead," says Bill Fleischman, assistant vice-president of Equitable Bank. Large corporate accounts that solicit many lease bids from both large and small lessors, however, may see a negative impact from the industry consolidation.

"I would rather see more people out there to deal with, as long as they're reputable," says Randy Henning, senior purchasing agent for McDonnell Douglas Aerospace Information Services. "We're not really typical; we have shunned IBM Credit to do business with $1 million companies that were able to win the bid. I think those companies will get swallowed up, and it will be harder to cut good deals with large leasing conglomerates."

Consolidation and shakeout

Acquisitions in U.S. computer leasing industry, 1987

Acquired company	*Price*	*Buyer*	*Seller*
CMI Corp.	**$50 million**	**Continental Information Systems Corp. (pending outcome of lawsuit by CMI executives)**	**Torchmark Corp. and Stephens, Inc.**
Equitable Life Leasing Corp.	**About $290 million**	**Lomas & Nettleton Financial Corp.**	**Equitable Investment Corp.**
Thomas Nationwide Computer Corp.	**$25 million to $40 million**	**Pacificorp**	**Thomas Nationwide**
First National Capital Corp. (certain assets)	**Undisclosed**	**McDonnell Douglas Finance Corp.**	**First National Capital**
United Leasing PLC/Unilease Computer Corp. (U.S. subsidiary)	**$80 million**	**The Meridian Group**	**United Leasing**
Huron Leasing, Inc.	**$4 million**	**Investor group headed by former Huron executive**	**Neti Technologies, Inc.**
Michael K. Vargo, Cos.	**Undisclosed**	**Econocom-USA**	**Michael K. Vargo, Cos.**
Greyhound Capital Corp. (October 1986)	**$140 million**	**Bell Atlantic Corp.**	**Greyhound Corp.**

CW CHART

Fortune renamed

BELMONT, Calif. — The seven-year life of Fortune Systems Corp. came to an end last Wednesday when the firm completed the sale of its supermicrocomputer hardware business and officially renamed itself Tigera Group, Inc.

Fortune Systems said it has completed the previously announced sale of its hardware operations to SCI Systems, Inc. for $15.5 million.

SCI Systems is a supplier of components and electronic equipment based in Huntsville, Ala.

Tigera Group reportedly will continue to market and support Fortune Systems' line of office automation software. That line includes products such as Fortune:Word, which will now be marketed under the name Word Era.

Former Fortune Systems President James S. Campbell, who will serve as president of Tigera Group, said in a prepared statement that the new company will attempt to expand its line of office software through acquisitions.

CORRECTION

Version 3.1 of Jnet from Joiner Associates, Inc. in Madison, Wis. [CW, June 29], is priced from $7,000 to $23,500.

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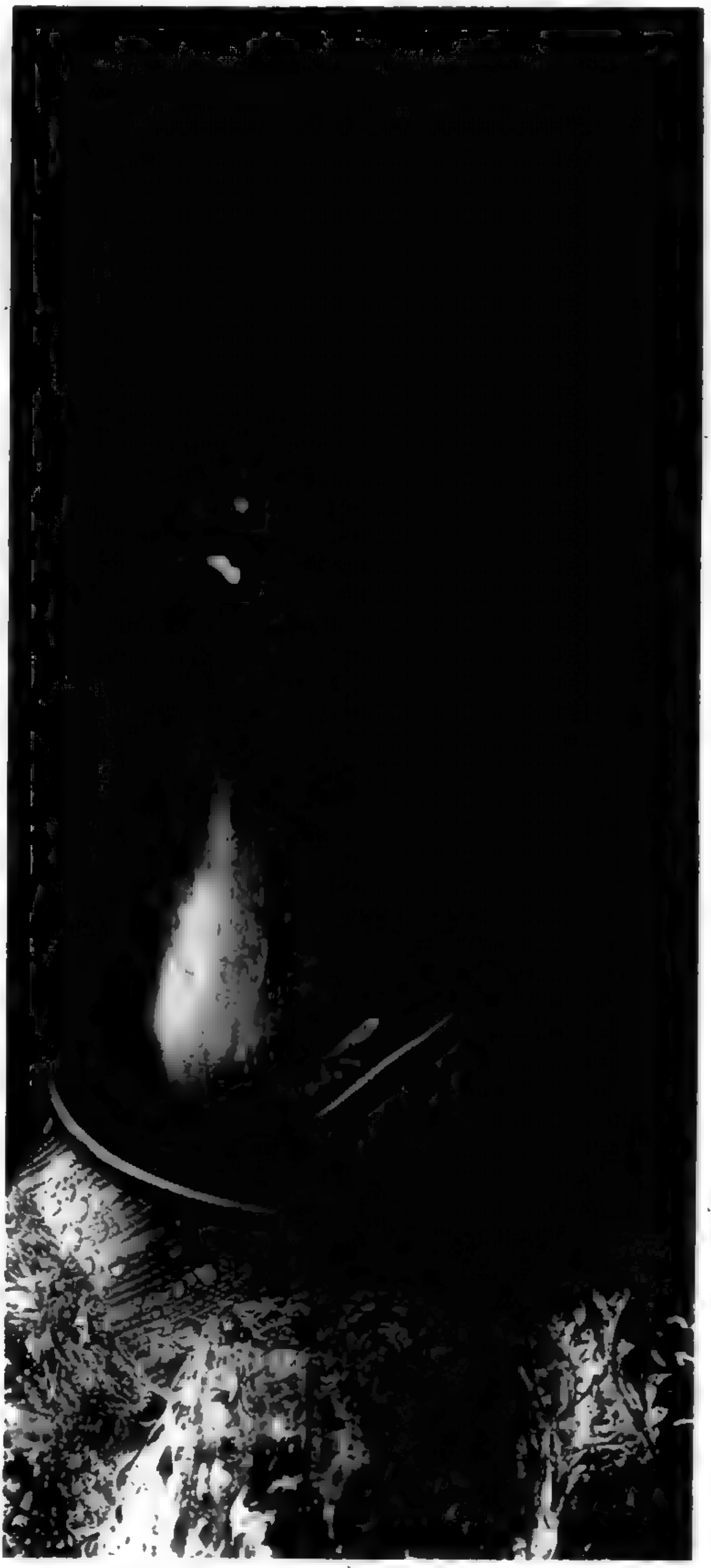

It's not easy for a company to put a lid on a manufacturing system purchase decision. Continental Container Systems certainly knows that. Before they settled on Cullinet's Manufacturing System (CMS) software, they analyzed over 200 vendors.

Continental Container Systems is a large multinational company that manufactures the closing equipment to put lids on scores of major-brand canned items. Everyone in the division knows how important it is to be a viable, long-term supplier. And a viable, long-term supplier of information management technology was what Continental Container Systems' end-user selection committee saw in Cullinet.

CMS is an advanced MRPII system that's based on Cullinet's single relational database product, IDMS/R. It delivers the discipline and the flexibility to allow companies to readily adapt to changing business needs. And scheduling becomes pro-active rather than reactive.

At Continental Container Systems, CMS has already improved inventory turns by an average of 40%. Overall lead-time is down by almost 43%. On-time delivery has doubled. And the shop-floor has been streamlined. The division uses all eight CMS modules including Bill of Materials, Master Production Scheduling, Inventory and Cost Control. Virtually all of their workforce interfaces with the system every business day. They know that CMS is productivity – perfectly packaged.

For more information on how you can access Cullinet through CMS software, call toll-free 1-800-551-4555. Or write to Cullinet Software, Inc. 400 Blue Hill Drive, Westwood, MA 02090-2198.

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DMS 100 architecture to open

Northern Telecom counts on Bells offering info services

BY ELISABETH HORWITT
CW STAFF

Anticipating that the regional Bell holding companies will eventually receive regulatory approval to offer information services, Northern Telecom, Inc. is expected this week to open up its DMS 100's architecture so that local carriers can develop their own software for the central-office switch.

A Northern Telecom spokesman told *Computerworld* that the DMS 100's proprietary architecture, which currently runs only the vendor's internally developed software, will be changed "to allow the telephone companies to develop their own applications" that will support future information services.

U.S. District Judge Harold H. Greene last week heard comments from industry and users groups on whether to lift the ban on the regional Bell holding companies offering such services (see story page 1).

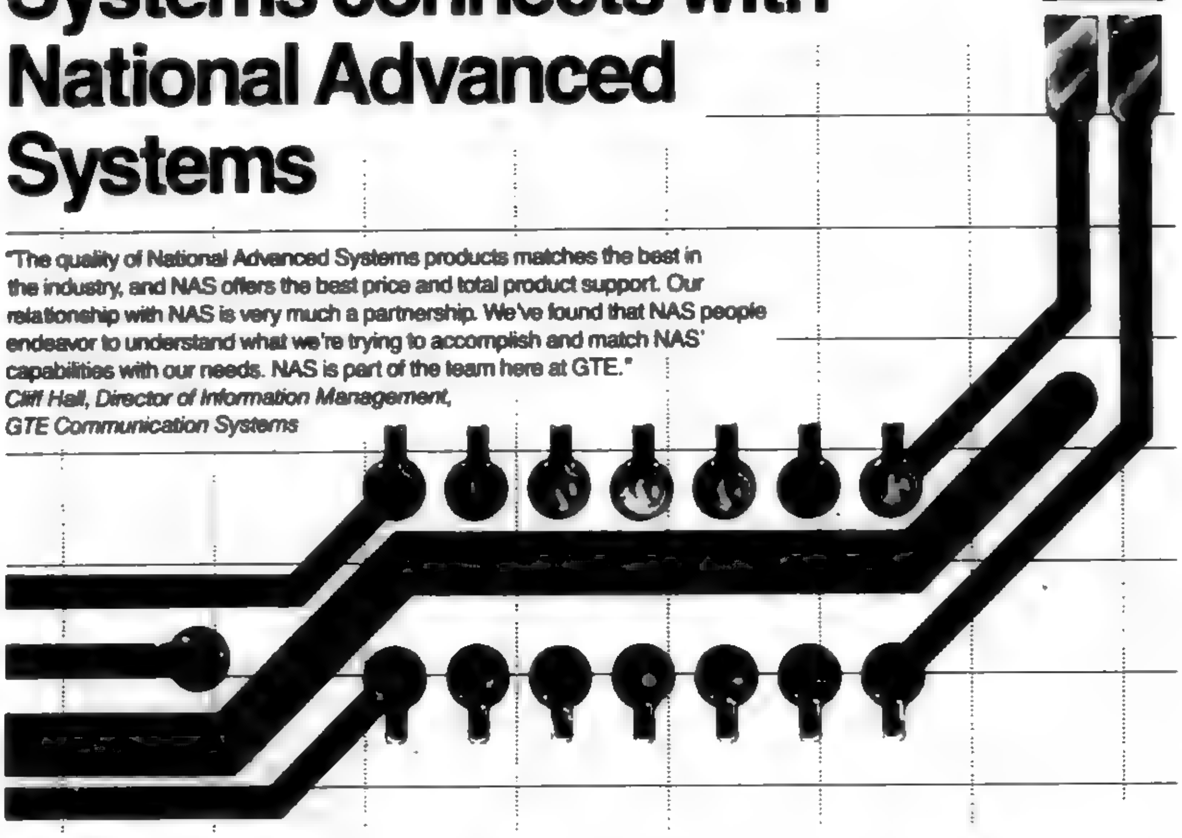
While Northern Telecom has revealed that it intends to open the DMS 100's architecture, the company is said to be announcing products that will make this happen and to be "keeping a lid on" the nature of such offerings, according to Peter Bernstein, senior research analyst at Probe Research, Inc.

Bells wary

The regional Bell holding companies may be leery about committing their information processing systems to a central-office switch from Northern Telecom or any other vendor, Bernstein said.

Ameritech, for example, is reportedly working with Digital Equipment Corp. on a separate computer-based "feature node" that would "give smarts to the central-office switch" for information processing purposes, he said. By implementing intelligence apart from the switch, the firm would be able to develop information-service offerings without being dependent on what protocols and features a company like Northern Telecom or AT&T decides to offer, he noted. Ameritech already has the facilities for developing feature-node software through its subsidiary ADR Services, Inc., he added.

A next step for carriers will be to link their central-office information services with existing applications on customers' on-site computers, said John Walsh, managing director of New York consulting firm Integrated Strategies Group, Inc. "I think the next-generation private branch exchange will be a hybrid that perhaps runs Unix or [DEC's] VMS and communicates with the central-office switch," Walsh said.



National Advanced Systems

GTE Communication Systems connects with National Advanced Systems

"The quality of National Advanced Systems products matches the best in the industry, and NAS offers the best price and total product support. Our relationship with NAS is very much a partnership. We've found that NAS people endeavor to understand what we're trying to accomplish and match NAS' capabilities with our needs. NAS is part of the team here at GTE."
Cliff Hall, Director of Information Management,
GTE Communication Systems

When it comes to quality and reliability, GTE Communication Systems knows what it takes. Its GTD-5 EAX digital central office switch is the most sophisticated, reliable, and feature-rich telecommunications product ever built in the company's 97-year history.

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Hitachi adds two supers

BY YASUKO YOSHIMI
and LORI VALIGRA
IDG NEWS SERVICE

TOKYO — Hitachi, Ltd. last week announced two high-end supercomputers that it said are faster than the most powerful Cray Research, Inc. models.

The Models S-820/80 and S-820/60 operate at up to 2 billion floating-point operations per second (GFLOPS) and 1 GFLOPS, respectively. The performance is more than double the speed of Hitachi's existing Model S-810 supercomputers.

Hitachi positioned the products against top-of-the-line models from Fujitsu, Ltd. and NEC Corp., claiming that the fastest Cray-2 supercomputers, whose peak performance is also estimated at 2 GFLOPS, are slower.

A Hitachi spokesman said the company expects to book 60 orders in Japan for the S-820s during the next five years. Meanwhile, the company has already shipped 14 of its 18 orders for the S-810s. Hitachi said it is interested in marketing the new models overseas but did not disclose details. Fujitsu and NEC have made agreements with Amdahl Corp. and Honeywell, Inc. to distribute Fujitsu and NEC supercomputers in the U.S., although only one of those systems — a NEC SX-2 at the Houston Area Research Center — has been installed in the U.S.

Included in the S-820 machines are technologies designed to boost system speed, such as vector-register large-scale integration parts that boast 2.5-nsec access times. The system reportedly includes two integrated extended storage units that hold 3G to 12G bytes of information.

The primary applications for the models are semiconductor design, structural analysis and weather forecasting. The object code from the three existing S-810 models will run on the S-820s, according to the vendor.

The Hitachi spokesman said the S-820 models will be available in the first quarter of 1988. Monthly leases for the S-820/80 and S-820/60 reportedly will begin at $552,000 and $393,000, respectively. Even though there have been orders for 65 supercomputers in Japan, International Data Corp. of Japan noted, only a small percentage of those orders will ever actually be installed.

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AZ	Phoenix	Jul 14, Aug 27, Sep 24
	Tucson	Aug 26
CA	Lafayette	Jul 30, Sep 24
	Los Angeles	Jul 16, Aug 13, Sep 8, Sep 30
	Newport Beach	Jul 21, Sep 17
	Sacramento	Aug 13
	San Diego	Jul 30, Sep 10
	San Francisco	Jul 21, Aug 18, Sep 15
	San Jose	Jul 9, Aug 6, Sep 2
CO	Colorado Springs	Jul 16, Sep 17
	Denver	Jul 14, Aug 13, Sep 15
CT	Hartford (Farmington)	Jul 23
	New Haven	Jul 28
DE	Wilmington	Jul 9, Sep 1
FL	Ft. Lauderdale	Jul 16
	Jacksonville	Sep 9
	Orlando	Jul 15
	Tampa	Sep 10
GA	Atlanta	Jul 8, Sep 16
	Macon	Aug 13
HI	Honolulu	Sep 17
IA	Des Moines	Jul 15, Sep 17
IL	Chicago	Jul 14, Aug 19, Sep 15
	Springfield	Aug 11
IN	Indianapolis	Jul 21, Aug 12, Sep 24
KS	Wichita	Aug 4
KY	Louisville	Sep 10
LA	Baton Rouge	Jul 23
	New Orleans	Aug 21
MA	Boston	Jul 16, Aug 25, Sep 10
	Burlington	Sep 30
	Springfield	Sep 16
	Worcester	Aug 5
MD	Baltimore	Jul 28, Sep 3
	Bethesda	Jul 28, Aug 6, Sep 8
MI	Detroit	Jul 14, Aug 11, Sep 15
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	Traverse City	Jul 28
MN	Minneapolis	Jul 28, Aug 26, Sep 29
MO	Kansas City	Jul 23, Sep 22
	St. Louis	Jul 16, Aug 18, Sep 16
NC	Charlotte	Jul 22, Sep 23
	Raleigh	Jul 15, Sep 16
	Winston-Salem	Aug 12
NE	Omaha	Jul 9
NH	Manchester	Aug 27
	Nashua	Aug 13
NJ	Cherry Hill	Jul 30, Sep 9
	Iselin	Jul 15, Jul 23, Aug 5, Aug 18, Sep 16, Sep 29
	Princeton	Jul 9, Aug 12, Sep 22
NM	Albuquerque	Jul 7, Sep 22
NV	Las Vegas	Jul 9, Sep 9
NY	Albany	Jul 14
	Buffalo	Aug 6, Sep 29
	Long Island	Sep 15
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	Rochester	Jul 30, Aug 20, Sep 22
	Syracuse	Jul 7
OH	Cincinnati	Aug 5
	Cleveland	Jul 16, Aug 13, Sep 17
	Columbus	Aug 4, Sep 30
	Dayton	Jul 21, Aug 18, Sep 22
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	Tulsa	Aug 11
OR	Portland	Jul 21
PA	Harrisburg	Aug 4, Sep 15
	King of Prussia	Jul 16, Sep 17
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	Pittsburgh	Sep 8
RI	Province	Jul 8
SC	Charleston	Aug 12
TN	Memphis	Jul 29
	Nashville	Aug 6
TX	Austin	Aug 12
	Dallas	Jul 14, Sep 9
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‡ Gartner Group currently available research.
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Harris boosts power on supermini line

BY JAMES CONNOLLY
CW STAFF

FORT LAUDERDALE, Fla. — Harris Corp.'s Computer Systems Division last week extended its H Series of real-time superminicomputers with multiprocessor versions that reportedly provide up to three times the power of earlier H Series high-end systems.

The H Series is a family of 48-bit systems that was designed for use in real-time simulation and precision scientific and engineering applications such as aerospace engineering, trainer simulation, compute-intensive research and process control.

The multiprocessor models are the dual-processor H-1500, which the company has rated at 10 million instructions per second (MIPS) using Whetstone benchmarks, and the triple-processor H-1600, which Harris has rated at 15 MIPS. The previous high end of the H Series was the 5-MIPS H-1200.

Compacts stand alone

The company also announced two compact uniprocessor models that can be used as stand-alone systems or in combination to form an H-1500 or H-1600.

The H-900 and H-1100 were designed to provide comparable power while occupying one-half the footprint of the earlier H-1000 and H-1200.

The systems utilize emitter-coupled logic technology-based gate arrays and memory subsystems. They support up to 12M bytes of memory per CPU and feature dual memory buses.

They run Harris's RT-VOS, VOS and VUE operating systems.

In addition, the systems run RT-VOS/MP, which Harris announced last week.

According to Rick Maule, director of product marketing for Harris, RT-VOS/MP includes scheduling tools and tracking and maintenance functions that are intended to allow users to concentrate on their applications.

RT-VOS/MP also reportedly provides a single point of control for a closely coupled multiprocessor complex of up to 12 CPUs. That control allows centralized system loading, configuration, task scheduling, synchronization and diagnostics from a single operator console, Maule said.

The H-1500 is priced from $555,000. The H-1600 has a starting price of $795,000. Entry-level prices for the H-900 and H-1100 are $240,000 and $260,000, respectively.

California computer bill stalled

BY JEFFRY BEELER
CW STAFF

SACRAMENTO, Calif. — A proposal to toughen the state's computer crime statutes failed last week, at least temporarily, to clear what its proponents regard as its most crucial legislative hurdle en route to ultimate enactment or rejection.

By only one vote, Senate Bill 255 (SB 255) fell short of winning approval in the California Assembly's Public Safety Committee.

During a June 29 hearing, the committee granted a continuance to SB 255's author, state Sen. Ed Davis, and directed his staff to rephrase the bill by July 13 to address last-minute objections by a labor union representing office employees.

"We have reasonable prospects of being able to devise some language that would amend the bill to make it acceptable both to its opponents and supporters," said Charles Fennessey, Davis's legislative consultant. "The problem is to satisfy everybody's concerns without requiring a redefinition of embezzlement and petty larceny under the state's penal code."

Even if it survives its next encounter with the Public Safety Committee, SB 255 still must go before the full California Assembly and then the governor before it can be signed into law.

If the bill becomes law, almost any systems security breach would be deemed a felony — and punished accordingly — even if no assets were stolen during the attack and its data remained undamaged [CW, June 22]. Under existing California law, violations are considered illegal only if intended to cause harm.

During hearings last week, the Teamsters union, which represents a variety of clerical employees, raised the possibility that the proposed law would make illegal common office practices that are seldom condoned but which it said are too trivial to warrant prosecution.

Barry Broad, the union's legislative counsel, cited the example of employees who use their companies' mainframe resources to draft personal resumes. "To treat such misconduct as a felony is absurd because nothing of value is taken," Broad said.

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Microsoft loses Taiwan piracy battle

BY TOM MCHALE
and BEN LIM
IDG NEWS SERVICE

TAIPEI, Taiwan — Microsoft Corp. suffered a major setback recently in a bid to end alleged counterfeiting of its MS-DOS operating system by Taiwanese manufacturers. Taipei District Court handed down a verdict of not guilty in June to three defendants in the vendor's case against Evergood International.

The court's decision sets a precedent for other cases that are pending, and Microsoft is expected to appeal the ruling in Taiwan's High Court. The case has broad implications for Taiwan's computer industry, as Microsoft is reported to have warned more than 200 companies of impending legal action.

The District Court concluded that Microsoft had licensed MS-DOS technology to U.S.-based Falcon International, which had, in turn, licensed manufacturing rights to a Hong Kong company referred to in court as M.U.L. The Hong Kong company is said to have received permission from Falcon to authorise the manufacture of the operating system software in Taiwan, Singapore and Australia.

Documents verifying the contracts were produced in court, and the judge maintained that they prove an absence of criminal intent by Evergood.

Sources said Microsoft did not seek damages from the Taipei company but that it had asked the judge for severe punishment of Evergood if that company did not cease production of the operating system.

Microsoft reportedly also will petition other courts in Taiwan and the U.S. to continue impounding copies of MS-DOS from Evergood and other allegedly unauthorised Taiwan makers while the appeal is in progress.

IBM typing system out

BY ALAN J. RYAN
CW STAFF

NEW YORK — IBM announced last week its Personal Typing System, which it described as "the merger of the typewriter and computer," and an application package that reportedly gives its Personal System/2 Model 30 computer the capabilities of the typing system.

Analysts said the system amounts to little more than a packaging variation that targets the PS/2 Model 30 at the secretarial market and expressed doubt as to how much demand there will be for such a product.

"Historically, personal computers aimed at secretaries are not something people have lined up to buy," said William Zachmann, vice-president of research at International Data Corp. in Framingham, Mass.

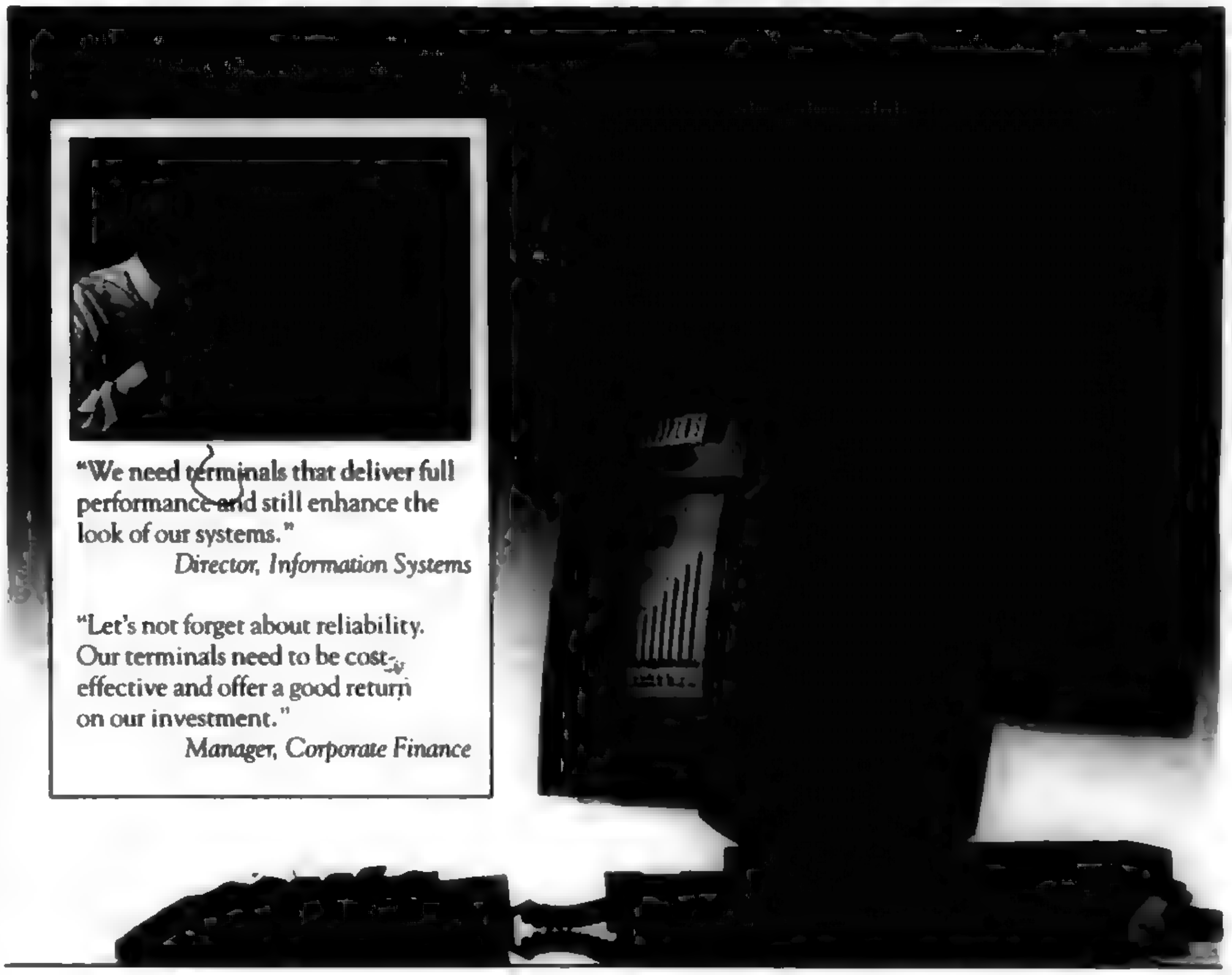
"It seems to us that the day of dedicated word processing has passed," said Bruce Jenkins, an editor at Daratech, Inc., a market research firm in Cambridge, Mass. The Personal Typing System "is going to be a tough sell," Jenkins added.

Four models of the typing system were announced. Each model reportedly consists of a system unit with an Intel Corp. 8086 microprocessor, keyboard, color or monochrome display, impact or nonimpact printer and software.

The new system is "basically a way for IBM to sell the Model 30s through its typewriter dealers," Zachmann added.

The suggested single-unit purchase price for the Personal Typing System Model 1, which includes a system unit and keyboard, software, a monochrome display and an impact printer, is $2,895.

Solutionpac Personal Typing is scheduled to be available later this month and will sell for $1,575 with the Correcting Wheelwriter Printer and $1,975 with the Correcting Quietwriter Printer.



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Millenium to offer DB2-CICS tie

Version bridges system gap, allows flexibility in development and use

BY CHARLES BABCOCK
CW STAFF

NATICK, Mass. — McCormack & Dodge Corp. is preparing a version of its Millenium SDT development environment that it claimed will allow users to develop and run production applications for IBM's DB2 under CICS.

Current users of DB2 must rely on IBM's TSO if they want to use IBM's Query Management Facility or run on-line interactive queries.

To run transaction processing, they must switch into CICS, according to John Birch, vice-president of M&D's Distributed Systems Business Unit.

A combination

"In effect, we combine both. You need to use only one development environment to fully develop any production application," said Barrett Williamson, director of DB2 development efforts at M&D.

Company officials disclosed the nature of the $110,000 product in a background briefing last week. In effect, what is now known as M:SDT DB2 will be a Millenium application that will support DB2 application development around the existing Millenium platform, the firm said.

That platform includes the procedural definition fourth-generation language called PDL and nonprocedural facilities to define data, screens, queries and other system elements, create data base records, paint screens, create windows and impose multilevel security.

M&D said it has about 400 licensed customers of the 3-year-old SDT technology.

The applications developed with SDT DB2 will also be able to use IBM's VSAM files, a feature that Birch said will help ease the transition to DB2 by many large users. Other features include the following:

- Use of eight screens in SDT DB2 to develop SQL-based applications.
- A query answer screen to allow a programmer to set up SQL statements behind a screen to answer English-like questions raised by a user's prompts.
- An interactive SQL screen to help a programmer compose SQL statements.
- A report-formatting screen that allows a programmer to preformat the rows and columns of a report; up to 32K bytes of data may be placed in a row.

The programmer can select a column and shift it to the left or right until it sits alongside another column with which it must be associated for a particular report, Williamson noted.

The report formatter can also employ control breaks, totaling a set of numbers at a predesignated point or highlighting minimums or maximums.

Tightly integrated

The SDT development system is tightly integrated with DB2, M&D officials claimed. "We populate our control tables and dictionary straight from DB2," Williamson said.

PDL is an interpretive fourth-generation language with which an application prototype may be constructed.

For efficiency purposes, most of a finished SDT production application built with the Millenium facilities will be composed in assembler and Cobol, with a few customized programming parts employing PDL, according to Birch.

M&D used the original Millenium to develop its integrated set of accounting applications and later offered Millenium SDT as a development environment.

Applications developed with Millenium SDT are able to share data and files with other M&D applications, the firm said.

The Millenium platform itself is provided at no cost to any customer of the vendor's applications.

HP hikes prices by 2%

BY JEFFRY BEELER
CW STAFF

PALO ALTO, Calif. — Hewlett-Packard Co. last week raised by an average of 2% the list prices for a broad assortment of the company's storage and output devices.

The price hikes affected HP's cartridge tape subsystems, reel-to-reel tape units, system printers, disk modules, terminals and 1000 series factory-automation processors, according to a company spokesman.

Not affected by the adjustments were the vendor's personal computer family, third-party PC software, ink-jet printer line and 3000 series commercial processors, including HP's Precision Architecture machines, the spokesman said.

The increases are already reflected in the firm's latest price lists, but any user who orders equipment before August will still be charged under the old pricing structure, HP said.

Last week's development coincided with a preholiday lull, when many users customarily take their vacations. It ended a protracted period of HP pricing stability.

"The last time we announced a wide-ranging increase of this kind was in late 1984," the spokesman recalled. Since then, he added, "the business climate has been fairly sluggish. But recently, general economic conditions have improved to the point where we now feel we can afford to pass along a modest price increase that reflects our growing expenses."

For reasons not directly related to the rest of its July 1 announcement, HP said, the vendor also boosted prices for its Laserjet Series II and Laserjet 2000 printer families by an average of 1%.

In the wake of the price hikes, a Laserjet Series II that formerly cost $2,495 will now sell for $2,595. Prices for the $21,495 Laserjet 2000 Model P and $24,995 Model D were raised to $21,995 and $25,695, respectively.

Unaffected by the price changes were the Laserjet 2000 Model A and the mid-range Laserjet 500 Plus, which still costs $4,495.

Falling dollar to blame

The factor that is said to have necessitated the increases in the Laserjet families' prices is turmoil on the international currency front. The falling value of the dollar, relative to the yen, has increased the cost of the Laserjet's Japanese-made parts, the HP spokesman said.

Although the rise in the printer line's prices will do nothing to engender goodwill within the vendor's customer base, the move is unlikely to have serious repercussions, according to HP user Charles Shimada, systems manager for Account-a-Call Corp. in Los Angeles.

"On the Laserjet 2000 side, in particular, a price increase of only $500 to $600 may make purchases a little harder to justify," Shimada said. "But it's not enough to upset any planned acquisitions." Shimada's comments about the Laserjet family applied equally to the rest of HP's repriced products.

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FBI info system expansion assailed

Civil libertarians call planned data base growth, other agency links a threat to privacy

BY MITCH BETTS
CW STAFF

WASHINGTON, D.C. — The Federal Bureau of Investigation is mulling over a recent proposal to dramatically expand its criminal information system, while civil libertarians charge that the plan is a "major threat to citizen privacy."

The Advisory Policy Board to the FBI's National Crime Information Center (NCIC) recommended that the NCIC be modernized to include on-line links to data bases at the Securities and Exchange Commission, the Social Security Administration and other federal agencies.

In addition, the board's preliminary NCIC 2000 plan would create a new data base to help law enforcement authorities track the movements of criminal suspects across state lines. The data base could include anyone under investigation by police.

High-tech detection

Law enforcement officials said the FBI should apply the latest computer technology to improve the NCIC's capabilities in order to meet public demands for catching criminals.

Jerry J. Berman, chief legislative counsel to the American Civil Liberties Union, however, said the proposal would allow authorities to create "electronic dossiers on citizens" and could easily be abused.

According to Berman, "The FBI used the NCIC in this way to track antiwar and civil rights demonstrators in the early 1970s until it was disclosed to the public and condemned by members of Congress."

He urged Congress to enact legislation restricting the NCIC to information already on the public record, such as arrest warrants, stolen property reports and criminal history records.

Rep. Don Edwards (D-Calif.), chairman of the House Subcommittee on Civil and Constitutional Rights and a frequent opponent of expanding the NCIC, is planning to hold hearings on the issue in the fall, an aide said.

Under consideration

In response to the criticism, the FBI issued a statement that said the advisory board's recommendations "will be reviewed at the highest level of the FBI, to include review by Acting Director John Otto, prior to any final decisions being made. Congressional concern regarding these issues will be fully considered."

The FBI said it hopes to finish the NCIC 2000 system design and issue a request for contract bids next year.

Lloyd A. Smith, manager of Oregon's criminal justice information system and a member of the NCIC advisory board, said the interests of police and privacy advocates will have to be balanced, "if the public expects the police to do investigations and be efficient and catch criminals.

"Most of the things we're talking about are relatively innocuous compared to what other government agencies already know about us," Smith said. But the NCIC system should be subject to appropriate data-integrity controls and access controls, he added.

The latest controversy about the NCIC was touched off last month when the 30-member advisory board approved a preliminary plan for modernizing the center's 20-year-old information system through the year 2000.

Longer arm of the law

Among the approved recommendations was one to create a new data base for tracking the movements of individuals on parole or probation, convicted terrorists, foreign spies, vehicles "of investigative interest" and those who are the subjects of any criminal investigation.

The board's proposal for NCIC 2000 would also establish on-line linkage to numerous federal data bases, including Social Security records, immigration and passport records, the FBI's fingerprint files and files on financial securities, registered weapons and federal prison inmates.

In addition, the board supported the following recommendations for the expanded NCIC:

- List the "known group membership" of wanted individuals.
- Add misdemeanors and juvenile crimes to its criminal history files.
- Improve the search capabilities of its data base software to increase the number of "hits" from a query, such as by permitting inexact matches and allowing searches by nickname and by modus operandi.
- Add the ability to transmit photographs, fingerprints, signatures and other images.

Apparently aware of the privacy concerns, the advisory board rejected a proposal to track "associates" of criminal suspects. It also rejected a proposal to obtain on-line access to private data bases, such as credit bureaus, airline passenger lists and telephone records.

DATELINE: NEW YORK

Executive confesses to computer collaboration using In-Synch!

John Merson, noted microcomputer industry executive, has confessed to using IN-SYNCH for the purpose of computer collaboration. This is the first public statement in what appears to be the rapid proliferation of IN-SYNCH-based co-computing throughout industry and government.

Collaborating the Easy Way

In an exclusive interview, Merson recounted his actions, from his first co-computing session to his full-blown use of IN-SYNCH. "It started innocently enough," Merson said. "My partner, who was working in our branch office, needed help drafting a proposal for a prospective new client. With IN-SYNCH, we were able to work together, in real-time, on a WordPerfect document as well as a 1-2-3 spreadsheet. We even developed an AutoCAD drawing and threw in some ChartMaster graphs to spice up the proposal. IN-SYNCH made co-computing easy and quick—just as if we were sitting side-by-side. No fax machines. No overnight mail. No special networking. Just our modems and the regular phone lines."

Collaborators Get Carried Away

According to Merson, the computer collaboration didn't stop there. "I guess I got carried away," admitted Merson, "but it was amazing what we could do with IN-SYNCH." Apparently, Merson and his partner next used IN-SYNCH to prepare a slide presentation, using screens selected from the proposal they had developed. These sequenced "slides", including text, drawings, graphs and spreadsheet data, were then shown PC-to-PC (again using IN-SYNCH) to their prospective client. "The prospect had IN-SYNCH on his PC too," continued Merson, "so we dialed him up and delivered our sales pitch online. He loved it! Said it was just the kind of state-of-the-art stuff he needs in today's fast-paced business world. We beat out the competition and got the job."

Collaborating and Proud of It

Merson showed little remorse. "You'd do the same thing if you saw IN-SYNCH. This co-computing is going to catch on like crazy. The possibilities are too hot to ignore. You can co-run all the popular PC software packages. You can transmit and annotate "snapshots" of screen displays. Develop, save and present "slide shows." And IN-SYNCH keeps "minutes" so you've got a complete audit trail of everything you've done. Managers, engineers, programmers, sales people—they're all going to be co-computing with IN-SYNCH. I just did it first. And I'll certainly do it again. And again!"

Poll Shows Collaboration Spreading

Results of an unofficial poll taken by this reporter show Merson's prediction to be proving true. An inside source at MCI stated, "We use IN-SYNCH all the time to analyze important revenue data. It eliminates the need to express diskettes between headquarters and remote branches." And according to a highly-placed source at Rockwell International, "We're using IN-SYNCH for software development as well as for the training of new PC program users." In perhaps the most stunning admission, the president of Engineering Computer Services, Inc. said, "We're using IN-SYNCH with AutoCAD to help designers and clients review architectural drawings, thereby expediting schedules and cutting costs."

Cheers for Collaborators

According to a spokesman for AVTC, producer of IN-SYNCH, the company will not press charges against Merson. "We knew when we released IN-SYNCH that it was the first and only product to bring teleconferencing to the desktop of every PC user. With an innovative product, you've got to expect innovative uses. Off the record, well, frankly we're delighted and we'd just like to say: keep on collaborating!"

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Micro Channel card rings up $2.5M

BY JAMES A. MARTIN
CW STAFF

FREMONT, Calif. — Orchid Technology, Inc. last week claimed it has won the first victory in the IBM Personal System/2 Micro Channel enhancement board competition with some $2.5 million in orders for its Ramquest 50/60, the first such board to hit the market.

Orchid jockeyed to beat formidable competitors such as AST Research, Inc. and Quadram Corp. into the market created by IBM's PS/2 announcement in early April. Orchid said that entering the PS/2 market first was of paramount importance in obtaining a strong position in the market.

The company said interest in its card has created record sales for a single product in its first month on the market. Orders for the product are 15% higher than Orchid had anticipated, and manufacturing efforts have been doubled to meet demands, according to Bill Berkman, product manager.

Ramquest has been exceeding expectations because of its position as the first add-in memory card for the PS/2 Micro Channel models, Berkman said. AST and Quadram reportedly have similar products scheduled to begin shipping this summer.

Analysts disagreed over the importance of Orchid's being first to market. "It can give them a pretty strong opportunity," said Tim Bajarin, executive vice-president of Creative Strategies Research International, a Santa Clara, Calif., microcomputing consulting firm. "The noise made about the first product has great public relations value, and it can build momentum that will carry over into other products."

"Being first to market with a Micro Channel add-on memory board doesn't mean that much," said Richard Shaffer, a microcomputer industry analyst and editor and publisher of "Computer Letter" in New York. "Memory is a commodity, and although Orchid might make a little profit on it for a while, the real opportunities will be in the area of communications and graphics enhancement cards."

The current lack of a sizable installed base for the PS/2 Models 50 and 60 and the expected competition from AST and others will soon lessen demand for Ramquest, Shaffer added.

Although Orchid would not say how many units have been shipped, Berkman said about 90% to 95% of the Ramquest orders will be shipped. Ramquest retails for $995 but is being discounted by as much as 42%, which means that between 2,500 and 4,000 will be shipped from current orders.

The announcement came two weeks after IBM's move to counter widespread skepticism about the success of the PS/2 series. IBM told analysts that approximately 250,000 PS/2 units have been shipped, along with a backlog of orders for 500,000 more units.

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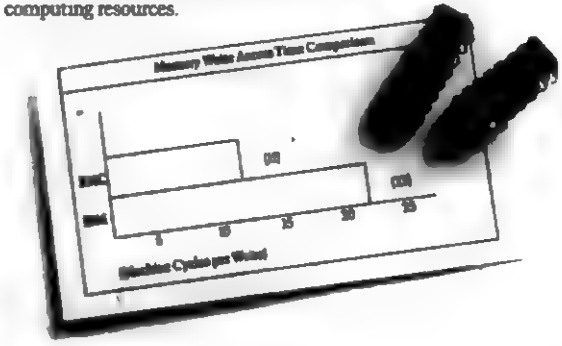

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EDITORIAL

Keeping on top

Vendors are salivating over projections of a $40 billion market in the early 1990s; their customers — manufacturing executives — are thrilled about the prospect of greatly improved productivity and the revival of export might. Yet, we are told, the promise of drastically revamping and modernizing the U.S. industrial base through computer-integrated manufacturing has generally failed to excite the imagination of MIS.

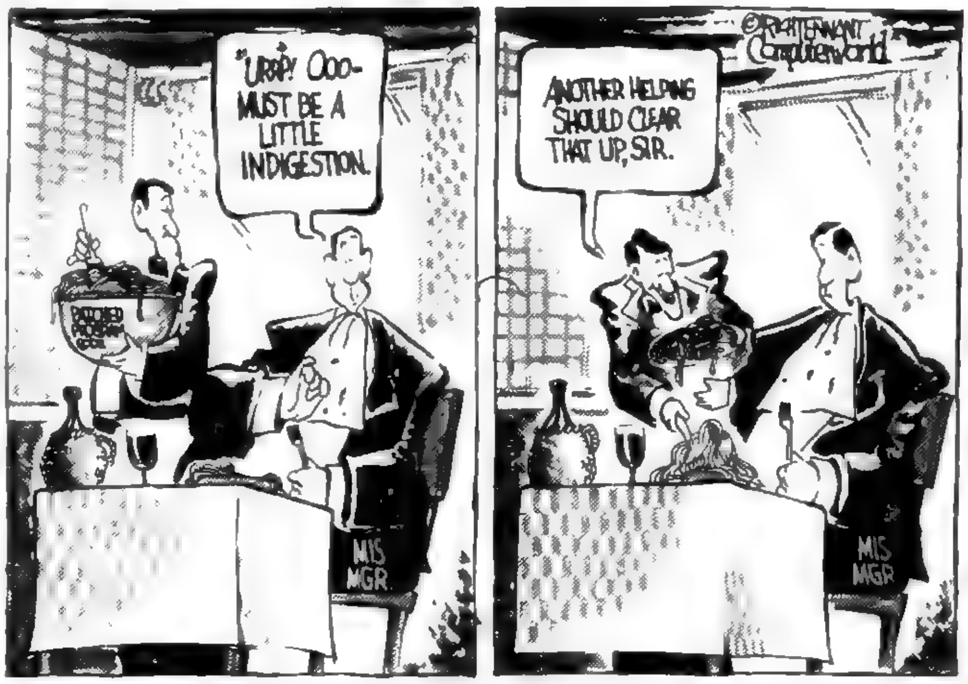
There are isolated cases where MIS has, willingly or otherwise, become closely involved in developing CIM strategies and processes, but it is clear to observers that, for the most part, engineers and manufacturing executives have played the leading role to date in automating the factory. That is both sad and perilous.

The likely revival in the next decade of the U.S. industrial giant holds for the creative MIS manager the potential to create a challenging career path, along with the opportunity to become a key player in mapping out corporate strategy. For MIS managers in manufacturing to overcome the obstacles barring most from the executive career ladder, it is imperative that they become involved in solving the top crisis facing their companies — production modernization through the use of computer technologies.

The danger that ignorance of CIM holds for MIS careers is the inevitable prospect that information systems personnel will, at a later point, be pressed into action to deal with the millions of lines of software code that will be required in the modern factory. Waiting to be called, rather than volunteering now, means dealing with the documentation and maintenance problems inherent in systems designed by professionals from other callings. These professionals may be more inclined toward one-stop solutions and less cognizant of the need for integration that MIS has abruptly and belatedly had to deal with due to the mass influx of the personal computer.

Technology has been a stumbling block to implementation of CIM, but it seems clear from recent demonstrations and the comprehensive overview of manufacturing software in this week's Spotlight section that technological hurdles are rapidly falling. The MIS manager who dreams of someday attaining that ever-elusive chief information officer status cannot stand idly by while his counterparts in the engineering and production departments grab avidly for the leading role in applying information systems technologies to the factory floor.

It may be comforting for many to beg off, claiming that there is still much work to be done in the automation of accounting systems. But for the manufacturing company that is unable to adapt automation to stave off competition, accounting systems will no longer be required. The CEO who is determined to lead his manufacturing concerns into the next century will turn to those managers most willing to trot along the unlighted path of automation, and it will be those managers whose stars will shine, whether they are from MIS or other departments.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LETTERS TO THE EDITOR

Premature piece

You recently printed two letters from readers pointing out your pro-IBM bias [CW, May 25]. One said that announcements of future products should not be treated as existing prototypes, and the other reminded you that companies other than IBM pioneered various fields that the giant later entered.

In the same issue, you had an article (page 108) not about existing products or planned products or announcements but about possible plans for announcements — by IBM, of course. And learned people vied to be the first to describe what will be announced.

If any other company made an announcement that it would later announce products that will come out in two years' time, you would not give that company a single column inch — unless it was to wonder whether it will be around that long.

Harlan Rosenthal
Syncsort, Inc.
Woodcliff Lake, N.J.

Wait to divest

On paper, lifting restrictions on the divested Bell operating companies may look good. They already have a direct link to customers, so why not let them use it to provide enhanced information services? Why not let them expand into the business of manufacturing information technology products?

The fundamental problem is timing. Right now, there is no accounting system in place that addresses the coexistence of competitive and regulated businesses within the operating companies.

Given the current structure of the divested Bell companies, which use formulas involving profits and costs of business to set base rates for phone service, the introduction of an unregulated, competitive activity could have a profound effect on the existing regulated phone service.

The divested Bell operating companies could easily raise the consumer's phone bill to get the capital required to stray out of the local phone-service business and into long-distance, high-tech manufacturing and other related high-risk businesses.

In other words, the operating companies could cross-subsidize new, competitive operations with revenue from the local calling service.

At this time, there is no assurance that the divested Bell operating companies have laid the groundwork to move into competitive areas without disrupting their other basic services. Consumers should ask the courts to exercise restraint in lifting any restrictions on the Bell operating companies until there is such assurance.

Oliver R. Smoot
Executive Vice-President
Computer and Business
Equipment Manufacturers
Association
Washington, D.C.

Unequal dollars

In 1960, when I graduated with a liberal arts degree, I entered the computer world with an excellent salary of $123 per week. An excellent salary in 1987 for the same education might be $723 per week.

If I were to use the logic you exhibited in the 20th anniversary edition [CW, June 1], I would be outraged that today's graduate is paid 487% more than I was. But of course, today's graduate is not — in purchasing power. One of your charts implied that the average cost of hiring a data processing professional today is 3½ times that in 1967. The numbers are meaningless.

You would have given meaning to the charts by indicating how many hours an average company operated and now operates to earn enough profit to hire a DP professional or how many company cars would be equivalent to 10 DP professionals or expense lunches or rolls of newsprint — but not dollars.

My 1947 5 cent candy bar is now 40 cents, but it is the same candy bar. It is the dollar that has changed. That is called inflation.

Edward C. Caudill Jr.
Product Marketing Manager
Emulex Corp.
Costa Mesa, Calif.

This week in history

July 4, 1977
The first legislation aimed specifically at computer crime is introduced in the U.S. Senate by Sen. Abraham Ribicoff (D-Conn.). The bill would make it a crime to misuse the computer systems of the federal government, certain financial institutions and interstate commerce organizations and would punish offenders with up to 15 years in prison and/or a fine of up to $50,000.

July 5, 1982
A federal grand jury indicts Hitachi Ltd. and 14 of its employees on one count of conspiring to transport stolen IBM property — namely, IBM trade secrets.

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D Communications Systems
E Office Automation Systems
F No Computer Involvement

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Missing: Outer Join, referential integrity

SHAKU ATRE

IBM has come a long way as far as its relational data base products are concerned. In 1981 the company announced SQL/DS. Of course, that announcement didn't create much of a stir because SQL/DS supports only DOS/VSE and VM/CMS. Even if VM/CMS is inching toward MVS, the real revenue maker for IBM today is MVS.

Many of IBM's customers using MVS are Fortune 100 companies. With SQL/DS, IBM was putting its toe in the water to see whether the relational data base market would give the company a chill. It took IBM two years to deliver SQL/DS.

In the early 1980s, IBM was losing many data base product sales to competitors such as Cullinet Software, Inc. and Applied Data Research, Inc. IBM had to do something. After researching the possibility of providing a relational front end to IMS and announcing that capability as IMS/R, IBM realized that wouldn't work. Major IBM customers had already invested close to five billion dollars in IMS application development. The grand old lady IMS needed a face lift, which was provided by Fast Path.

WITH about 1,300 installations in a two-year time frame, DB2 is here to stay. But IBM still has a long way to go to implement all the functions.

However, the market was asking for relational. People were looking for some spiritual experience. In 1983, finally, IBM announced DB2. Why DB2 and not DB1? Was IMS DB1? What about SQL/DS — was it DB1? I'm not sure anyone knows, even inside IBM.

In 1985, IBM announced DB2 Release 1's debut — again very carefully, so as not to upset its customers' IMS investment — but how clever to say that IMS was still the production data base management system, and DB2 was just the information center tool. Of course, DB2 Release 1 wouldn't have passed the muster of the transaction rates needed in a number of organizations for the production applications.

Slowly IBM moved DB2 to center stage with Release 2 in 1986. IMS was orchestrated to take on, with its Fast Path Transaction Processing Facility (a reincarnation of the Airline Control Program, which was the guts of the American Airlines' Sabre system), the high-volume transaction environment.

However, a number of items were still missing in Release 2. What about the on-line performance monitor? What about referential integrity? What about an integrated and active data dictionary/directory that would support text, too? What about updates made to the views being transferred to the data base tables? What about the support of the date and time fields? What about a better integration of application programming tools? Of course, Release 3 must be imminent within a year.

Sure enough, on May 19, Release 3 was announced. VSAM transparency is provided. Time and date fields are supported. Performance is improved. A data base relational application directory that fulfills some functions of the many features in the catalog was announced.

But a number of features still remain to be supported. Referential integrity, an integrated and active data dictionary/directory, distribution capabilities of the data dictionary/directory, support of updates of the views passed on to the data base tables, reporting of matches with Join (but reporting mismatches with Outer Join) and, of course, a better integration of the application development tools, such as IBM's Cross Systems Product, Query Management Facility and Application System.

Does it mean the Information Center/1 and The Information Facility are put on hold? And what about interconnecting all of these with OS/2, extended with SQL and interfaced with Enhanced Communications Facility? Does that represent a piece in the crossword puzzle of Systems Application Architecture? How about all of these features, plus a performance improvement with Release 4 by end of this year, or at least early 1988?

With about 1,300 installations in a two-year time frame (a number expected to rise to 2,000 by the end of the year), DB2 is here to stay. But IBM still has a long way to go to implement all the functions.

Atre is president of Atre International Consultants, Inc. in Rye, N.Y., which provides consulting and training in data base and end-user computing environments.

Let your talking do the talking

The conclusion drawn from presentation graphics: Less is more

NAOMI KARTEN

Sometimes it is difficult to know which is the problem and which is the solution.

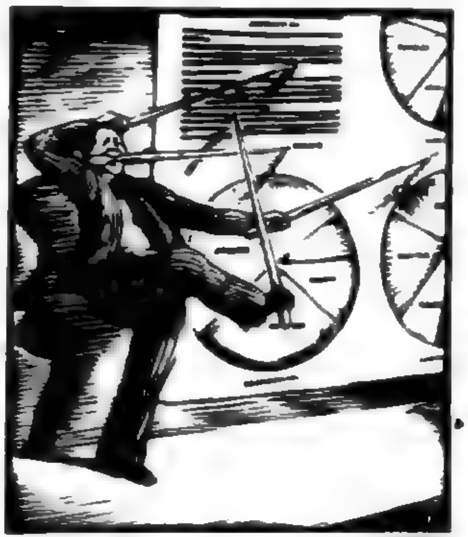
Presentation graphics software makes it a breeze to create visuals. But in an increasing number of business presentations, especially at conferences, the visuals *are* the presentation — the talk is an afterthought.

Although a picture may be worth a thousand words, too many of these computer-generated visuals require a thousand extra *spoken* words to make sense out of them.

Ease of use, it seems, is not an unqualified advantage. The downside is that the easier graphics software becomes to use, the easier it becomes to pump out slide after garish slide that incorporates every conceivable feature simply because it's there.

In a recent presentation, a speaker displayed a slide that included three pie charts describing the company's success relative to its competitors. To say the slide was snazzy is an understatement. But was it readable? Was the company's message clear? Did the chart add anything to the narrative? No. The slide didn't highlight the company's success; it masked it.

To begin with, pie charts in turquoise, pink and magenta may be a decorator's delight, but they did not enhance this company's business image by one pixel. The pie charts were presented in three dimensions, which was at least one too many. Each pie was sliced into about a dozen sectors.



BOB DAHM

The labels were dark, squeezed onto the chart and generally undecipherable. When the speaker tried to explain the slide, *he* got confused. So the slide displayed to clarify the presentation first had to be clarified itself.

Visual wordiness is another consequence of the Personal Computer Age. At a conference at which sessions were offered twice, I listened to a speaker whose slides consisted of line after tiny line of text. For the audience, reading a detailed slide and simultaneously listening to a speaker can be difficult.

So I tried an experiment. I listened carefully to the speaker and ignored his slides. Then I sat through the repeat session and looked at the slides. Even knowing exactly what he was going to say, I was unable to both read the slides and absorb his spoken message.

Another speaker at this conference apparently assumed we were speed readers — not one slide was displayed long enough to read it.

Vision tests

Too many visuals look like a test for 20/20 vision. In setting up for a presentation at a recent conference, a speaker projected a test transparency. As he was asking whether to reposition the projector to increase the size of the image, an attendee wandered in and emphatically said, "Yes! I can't stand another day of squinting."

One of the best presentations I've ever heard was a kind that is rare these days: a speaker who simply spoke. No slides, no "as you can see on this chart . . .," no picture-perfect pizzazz. She talked. We listened. She was lively, dynamic and articulate. The presentation was informa-

Continued on page 22

Karten, president of Karten Associates in Randolph, Mass., is a consultant, trainer and lecturer in the management of end-user computing. She is editor of the monthly publication "Managing End-User Computing," published by Auerbach Publishers, Inc.

No cause for gloom and doom in MIS education

READER'S PLATFORM

The two-part series, "Crisis in Education" [CW, June 15 and 22], paints too gloomy a picture of enrollments in business school-based MIS programs.

It is true that the number of students enrolled as undergraduate or graduate MIS majors has leveled off or may have declined at some schools. However, this plateau has occurred after a 10- to 15-year period of very high growth. Today, as stated in the articles, more than 70% of business schools have established an area of concentration in MIS. Other programs are under development, with a substantial number preparing to begin operation in the coming school year.

Management information systems is a challenging area that requires a blend of formal academic courses. MIS majors must usually complete about one-third of their course work in information systems and the remainder in general business topics. The need for this mix of skills and broad background is well established. Certainly, most information processing managers realize technical expertise is not enough and that managerial knowledge and communication skills are important ingredients for success.

In our experience, the demand by industry for MIS majors at both the undergraduate and MBA levels has never been stronger. Salaries paid to MIS graduates are comparable to, or exceed, those of graduates in other business functions, except, perhaps, for finance graduates from some institutions. Some firms do prefer to hire MIS MBAs with work experience, but this preference holds true for graduates from all academic areas. Many companies are paying tuition fees to help their employees major in MIS.

The total demand for MIS courses by both MIS majors and nonmajors is increasing. All accredited business schools are required to offer MIS courses for non-MIS majors. Such courses familiarize students with computer and communications technology and introduce students to management issues relating to

Continued on page 22

This commentary was written by David Naumann, University of Minnesota; Jay Nunamaker, University of Arizona; James Senn, Georgia State University; Ted Stohr, New York University; and James Wetherbe, University of Minnesota.

Talking

CONTINUED FROM PAGE 21

tive and interesting. No one seemed bored or confused by the absence of mystifying charts and rainbow-colored gibberish.

But in this age of instant graphics, speakers hardly ever just speak anymore. Visuals to accompany every 34 words have become de rigueur. You look at a chart with circles and arrows and listen to the paragraph describing each one.

If you were to see the text of a prepared speech, chances are you would see a reference to a slide for every paragraph. More and more, the intent of the presentation seems to be to view the slides; the talk itself is simply an embellishment.

Do visuals add anything to a business presentation? Sure they do. If they are designed and presented properly, they can help the listener understand, consolidate and remember what is presented. But that "if" is a big one.

Making the point

One step in the right direction would be to scrap word and graphic slides and use pictorial or whimsical slides, which make the point without needing to be read. I've been sold on this approach ever since I prepared a presentation for a company that had assigned a graphic designer to develop the slides that were to accompany my talk. This guy was a creative genius. I described my objectives for each chunk of the presentation, and as fast I talked, he drew. He came up with cartoons, drawings and clever ways of conveying my message that were much more memorable than tiny text, bulleted items, boring numbers, cryptic charts or multicolored glare.

It is easy to fall victim to the "I'll run off some slides on my way out the door" syndrome. We need to resist the laziness ease of use can cause and put more thought into overall effect. We need to get the wordiness and muddled graphics out of our visuals. We need to let our own words do more of the talking.

For business presentations, visuals should enhance the talk, not the other way around. On the other hand, for a trip to the Galapagos . . .

Gloom and doom

CONTINUED FROM PAGE 21

the use of information technology in organizations. Students from other functional areas (marketing, finance and accounting, for example) are enrolling in MIS electives such as systems analysis and design, telecommunications, end-user computing and artificial intelligence at an increasing rate.

This demand translates into a need for additional faculty. Conservative estimates say the demand for MIS Ph.D.s exceeds supply by a ratio of at least six to one.

MIS as an area of research is too young to have established an overall theoretical model or a set of research paradigms such as those characterizing older fields. This fact sometimes makes it hard for tenure committees to evaluate MIS research.

However, the situation is improving because of the obvious importance of information technology in organizations and the many opportunities for interesting and important research projects. The high quality of the new Ph.D.s entering the field also contributes to the improving image of MIS.

The articles correctly state that information systems programs and facilities are under continual revision and enhancement. Huge sums of money have been invested by all major universities to build the infrastructure of equipment, laboratories and wide- and local-area networks that will be at the heart of the educational delivery process in tomorrow's university. Such investments are proving to be both sound and effective.

> THE situation is improving because of the obvious importance of information technology in organizations and the many opportunities for interesting and important research projects. The high quality of the new Ph.D.s entering the field also contributes to the improving image of MIS.

Many MIS programs also have boards of advisers from industry that meet regularly to help faculty update their curricula. Just as information systems departments in industry struggle to keep up with the changes in technology, the challenges of end-user computing and the shifting of user constituencies, so, too, do MIS faculties struggle to keep their curricula up-to-date and relevant.

For example, the chief information officer concept implies that MIS programs need to broaden the domain of study to include multiple information technologies — end-user computing and telecommunications — as well as traditional data processing.

In summary, there is no need for gloom about the future of MIS programs. MIS is still in its infancy and has some shortcomings. But the achievements to date have been impressive, and we are in a good position to make a valuable contribution to industry in the foreseeable future.

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SOFT TALK

Jordan S. Wouk

Cobol 85 revisited

I've changed my mind. In the May 18 issue of *Computerworld*, I was correctly quoted as being unenthusiastic about the proposed addition of intrinsic functions to the 1985 Cobol standard. Since then, I have studied the addendum in greater detail and have discussed it with others. I now feel that the proposed addition contains some excellent features, a few of which I list below. I urge those interested to get copies of the document, read it thoroughly and let the ANSI X3 Committee know what they think. Comments must be in by August 10.

To me, the most significant productivity enhancement is the ability to do certain functions against one or more entire tables without a loop. The feature can be used in the following functions:

- Determine the greatest or least value.
- Add up all the values.
- Point to the greatest or least value.

Several functions make the processing of input from terminals easier to handle. They include the following:

- Set all letters to uppercase or lowercase.
- Obtain the numeric value of an input string that may contain a combination of digits, spaces,

Continued on page 26

Unix OA import invades U.S.

Europe-developed, multifunction package gains 35% share of market

BY MITCH BETTS
CW STAFF

SAN ANTONIO — A previously little-known office automation package for Unix systems has developed a loyal following among MIS managers on its way to capturing a 35% share of the U.S. market for Unix-based office systems, according to users and market analysts.

"The software developers are located in England and therefore [the package] is not too well known [in the U.S.] But it's catching on like wildfire in city offices here," said Robert Kay, director of information resources for the City of San Antonio, referring to Uniplex-II Plus.

The product, a multiuser office automation package for Unix systems that debuted in February 1986, is offered in the U.S. by Dallas-based Uniplex Integration Systems, Inc., a unit of British firm Redwood International, Ltd. According to Dataquest, Inc. researchers, Uniplex leads the U.S. market in installed Unix OA software licenses with a 35% share, in close competition with R Systems, Inc. in Dallas and Quadratron Systems, Inc. in Sherman Oaks, Calif.

Taking the city

The city government of San Antonio plans to make Uniplex-II Plus the standard OA package for all 27 city agencies, Kay said. Because of limited funding, the package is being implemented on an agency-by-agency basis, beginning with the public works and police departments, he said.

"The departments that are using it have been quite impressed, and the other departments are asking, 'When can we get on?' " Kay added. So far, the software runs on AT&T 3B2 and Plexus Computers, Inc. P/75 systems.

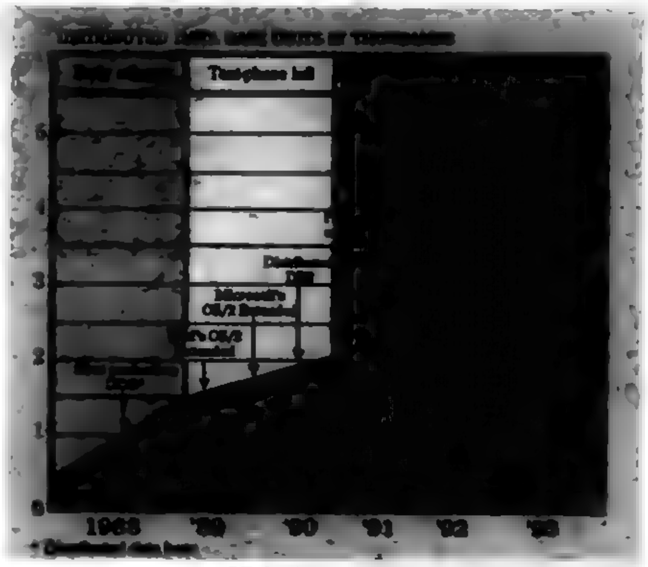
The product features word processing, spreadsheet, financial modeling, relational data base, electronic mail, a screen generator and graphics in an integrated package that employs productwide data sharing and

Continued on page 25

Study: Distributed DBMSs to grow

Distributed data base

Projected market growth, 1988 to 1993



INFORMATION PROVIDED BY FORRESTER RESEARCH, INC.
CW CHART

CAMBRIDGE, Mass. — Fortune 1,000 firms are finding disparate computer systems invading their offices — despite MIS attempts to prevent it — and will turn to distributed data base management systems to tie them together, according to a Forrester Research, Inc. report released recently.

"Data on these systems must be linked into a coherent corporate resource. Forrester believes this technology will become the applications 'glue' for distributed systems," the report states.

Company mergers, the downsizing of computer systems and increased data base needs will push the growth of distributed data base systems, Forrester says, although the real growth will not begin until 1988 or later, despite vendors' claims.

Among the early vendors, Or-

Continued on page 25

Factory software revamped

BY ROSEMARY HAMILTON
CW STAFF

CHICAGO — A number of manufacturing software vendors rolled out revamped packages for Digital Equipment Corp. and IBM hardware at the Advanced Manufacturing Systems Exposition and Conference held here last month.

System Software Associates, Inc. (SSA) in Chicago announced a file-conversion tool to lure users away from IBM's Manufacturing, Accounting and Production Information Control System (MAPICS) to SSA's Business Planning and Control System (BPCS). BPCS competes with IBM's MAPICS in the IBM System/36 and 38 arena.

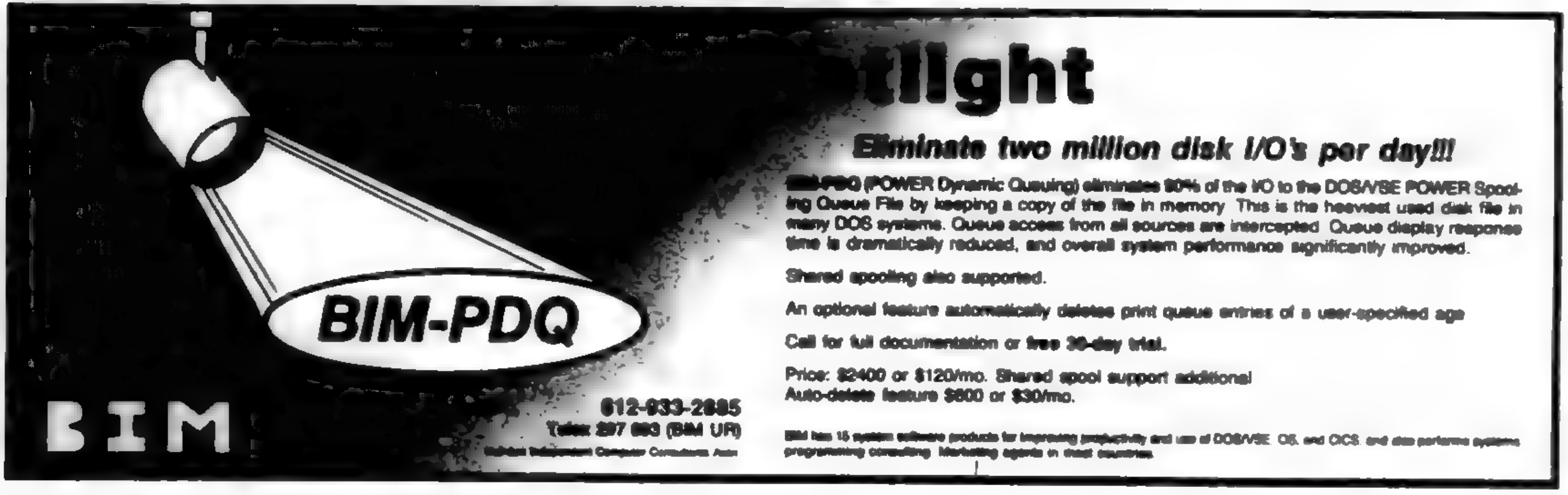
The utility, scheduled for availability later this month, will be offered to new BPCS users at no charge, SSA said.

The vendor said its manufacturing system assists users in converting both static and dynamic data from MAPICS I files to BPCS. It reportedly allows users to create cross-reference files that match equivalent characters with differing key lengths between systems. Audit trails are generated for verification before making the conversion, the vendor said. After the conversion, the audit trail describes

Continued on page 26

Inside

- IBM joint marketing program offers independents' applications. Page 24.
- Micro Data Base Systems ports Guru to VAX. Page 27.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IBM sales reps to offer other vendors' software

BY CHARLES BABCOCK
CW STAFF

RYE BROOK, N.Y. — IBM recently launched a joint marketing program that will allow its salesmen to offer selected software applications from independent suppliers as part of a sale of its own hardware and software.

Called the Cooperative Software Program, the 13 initial selections include applications in accounting, manufacturing and construction.

IBM spokesmen said the prices listed were the same as those charged by the software suppliers.

Big-name software suppliers were notably absent from the list. There were no names equal to Hogan Systems, Inc., with which IBM signed a 20-year product licensing agreement for banking applications last year.

Sam D'Angelo, general manager of special products at Cadam, Inc., said his firm anticipates increased sales of its CADG Plus FM with the implicit IBM endorsement of its product. He said entering into the cooperative marketing agreement allows IBM to supply its customers quickly with products that have been proven in the marketplace. IBM collects a fee every time one of its salesmen makes a sale, he noted.

Use for Infowindow

Three laser videodisk instructional courses were included in the group of applications selected by IBM, indicating that third-party suppliers have been able to come up with useful implementations of IBM's Infowindow system, a personal computer-based videodisk system using a touch-sensitive screen.

Intelligent Images, Inc. in San Diego, for example, is supplying a library of videodisk courses on hospital emergency and critical care, called the Dxter Clinical Simulator System, at $1,695 per module.

Cadam is supplying CADG Plus FM, a host-based multiuser product for strategic planning and facilities management. It is priced at $100,000 for the base module. The firm is also providing Basicad, an $11,500 tool to allow user-defined macroinstructions to be written, executed and debugged from a Cadam terminal.

The state of Kentucky is supplying Project Vision, a $1,995 interactive presentation of mathematical skills for first- and second-grade students.

R. C. Houlihan Associates, Inc. in Bayville, N.J., is supplying CMAS/Plus, a $2,250 package for construction-management accounting that runs on a System/36.

Linton Shafer Computer Services, Inc. in Frederick, Md., is supplying the $3,850 Financial Reporting/General Ledger System for IBM's System/36 PC and the System/36 5360 at a price of $5,200. Linton Shafer is also providing the Time Management System, a $4,600 System/36 PC package for accounting firms to track staff time and expenses by client. The same package is available on the System/36 5360 and 5362 for $6,300.

Prism, a plantwide manufacturing planning and control system for the System/38 from Marcam Corp. in Needham, Mass., includes three modules ranging in price from $22,000 to $28,000.

ON/2 is a set of on-line transaction processing modules for the IBM System/88 that supports many electronic funds-transfer and message-switching applications. It is supplied by Shared Financial Systems in Dallas and costs $75,000.

Action 2000 is a line of transaction-processing software for financial services and retail industries supplied by the Irving, Texas-based Mtech Electric Banking Division of Momentum Co. The mainframe-based package is priced at $275,000 for a package driving automated teller machines and at $200,000 for a switching package.

DBMS

FROM PAGE 23

acle Corp., Relational Technology, Inc., Sybase, Inc. and Tandem Computers, Inc., "No one is shipping products," the report claims.

In addition, the Forrester report predicts that what it calls the early four firms will not be able to meet their aggressive delivery schedules.

"The greatest growth for distributed data bases will be the 1990 to 1992 period, sustained by the announcement of IBM's distributed DB2 product late in 1990," the report claims.

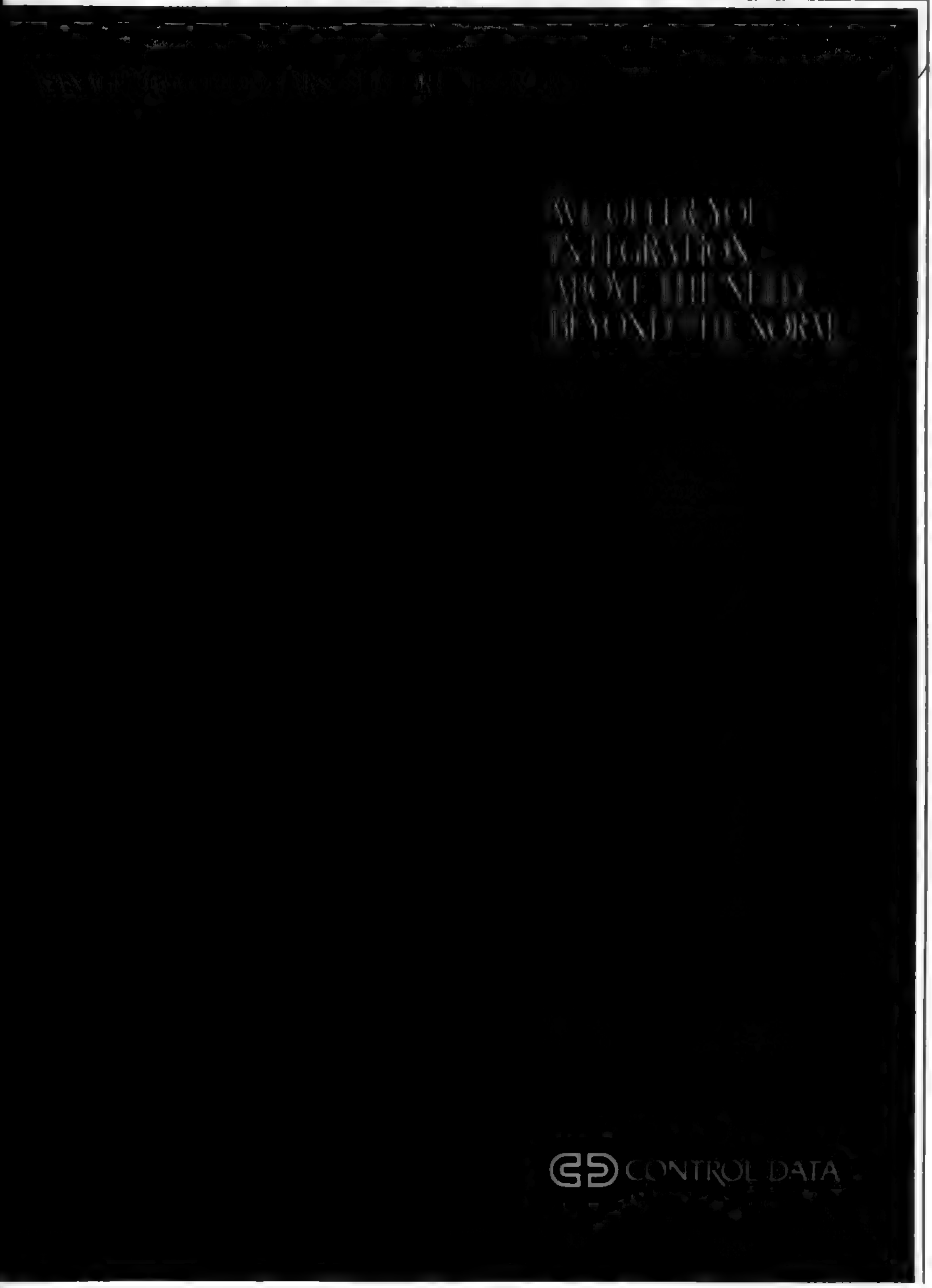
At the same time, a third-generation IBM Personal Computer operating system for machines based on Intel Corp.'s 80386 microprocessor will improve the viability of distributed data bases on PCs and local-area networks, the report says.

Slow but steady

The Forrester report contends that the remainder of the 1990s will see a steady but slow increase in the use of distributed data bases.

This increase will be fueled by companies that are attempting to build corporatewide information architectures using distributed data bases.

The increase in the use of distributed data bases will, in addition, be driven by late adopters that are resorting to distributed data bases to handle large data bases and multivendor environments, the Forrester report concludes.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CONTROL DATA

Unix OA

FROM PAGE 23

windows. In addition, the package uses a generic command system, soft keys and pop-up menus to make it easy for office workers to use.

The relational data base manager uses the C-ISAM data structure from Informix Software, Inc. in Menlo Park, Calif., and is fully compatible with data bases developed under Informix-SQL, a relational data base management system (DBMS) for application building, and Informix-4GL, a fourth-generation programming language.

The price of Uniplex-II Plus is based on processor size; the price for the AT&T 3B1 version is $1,500.

Data integration cited

Kay cited the product's data integration and user interface as key reasons for his choosing Uniplex-II Plus as San Antonio's standard office automation package.

Likewise, Andrew Bennett, director of MIS for the Regional Transit Authority of New Orleans, said he has adopted the Uniplex package for use on AT&T 3B1 and 3B2 and Plexus P/75 systems that will soon support 98 terminals.

Bennett said earlier versions of the product had several software bugs and integration problems, but the Uniplex-II Plus version introduced at the Uniforum 1986 trade show had eliminated the problems.

But Bennett said that the user manuals still need improvement. "The manuals are the weakest part of the package. I understand they've been rewritten, but I haven't seen the new version," he said.

Data base access

One attractive feature of the DBMS in Uniplex-II Plus, Bennett said, is its compatibility with Informix-SQL and Informix-4GL. In essence, the interface gives users direct access to Informix data bases through their familiar Uniplex screens and menus, he said.

"I like the ability to modify the menus and change them to meet user needs for access to particular types of data," Bennett added.

The OA software also runs under Unix-like operating systems for the IBM 370 IX, IBM Personal Computer AT and RT PC, as well as several other hardware lines.

Uniplex recently announced modules that allow users to exchange documents with systems that employ IBM's Document Content Architecture and the U.S. Navy's Document Interchange Format and is expected to announce additional document-exchange programs this year.

Cobol 85

CONTINUED FROM PAGE 23

commas, decimal points, dollar signs and plus or minus signs.

- Reverse the contents of a field to help count the number of trailing blanks and determine the trailing delimiter.
- The Modulo function, sometimes used as a remainder function, makes it simple to test for odd or even.
- Date and time of compilation and current date and time are important for control and audit.
- Four date-manipulation functions support both year/month/day and Julian calendar formats. The functions can help with date calculations, particularly with those related to the year 2000.

Other functions include annuity, factorial, pseudorandom numbers and trigonometric and logarithmic functions. And there are more.

Adding these functions to Cobol will result in increased productivity for at least two reasons. First, while some of the facilities are available in existing environments, making them part of standard Cobol will enhance the portability of programs and reduce the learning curve when programmers go to different environments.

Second, the addendum defines a group of commonly used general-purpose routines. By having the routines widely available, debugged and well documented, a programmer can spend a greater portion of effort on the application-specific logic.

My strongest objection to the proposed additions is that they are limited in scope. Many completely compatible enhancements and features have been developed for Cobol but are not addressed in the addendum. A brief sampling includes the following:

- Comments on the same line as source code.
- A concatenation operator for literals, instead of the awkward continuation.
- Set 88-level condition name TO FALSE.
- Dollar signs and commas in numeric literals to enhance readability.
- Floating-point data.

Other facilities have been developed that are compatible except for the addition of one or more reserved words. Some are listed here:

- EXIT PARAGRAPH and EXIT SECTION, which are part of a structured language.
- A very powerful validation facility.
- Boolean operators.
- Defined intermediate results, which are desperately needed to ensure correct and consistent results in arithmetic expressions.

Those who want to find out what has been developed for Cobol can contact the chairman of the Conference of Data Systems Languages' Cobol Committee, Don Nelson, at Tandem Computers, Inc., MS 100-05, 10555 Ridgeview Court, Cupertino, Calif. 95014.

Wouk is vice-president for quality assurance at the Bank of New York and observer of the X3J4 Cobol Committee of the American National Standards Institute.

Factory

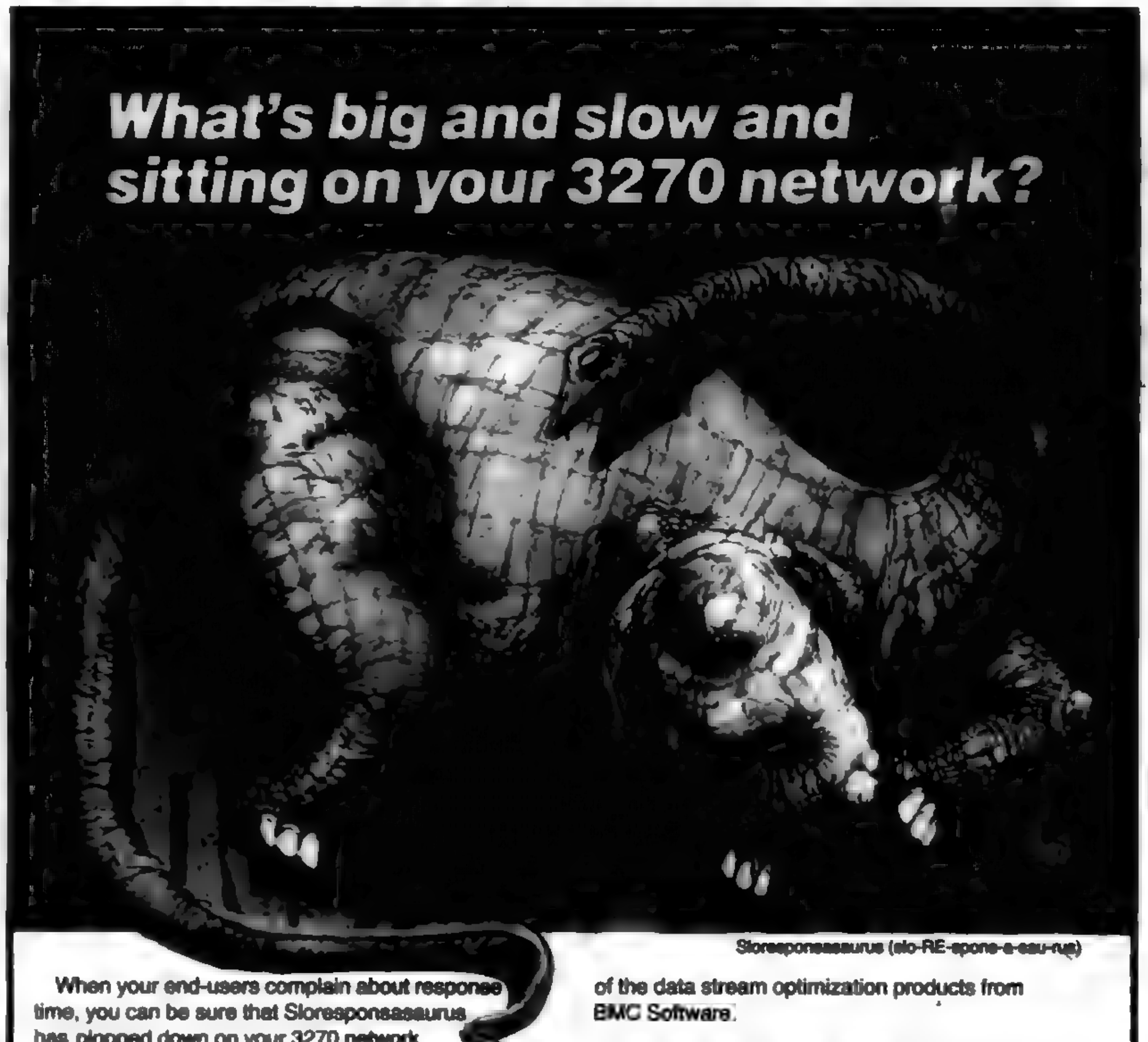
CONTINUED FROM PAGE 23

the fields that were converted and their equivalents in BPCS.

SSA also added two modules to BPCS that it said will be available this month. BPCS/BIR is a report generator that the vendor said can be licensed for $8,000 for the System/38 and $3,500 for the System/36. BPCS Payroll will be offered as a stand-alone financial package or as a component of the manufacturing system, SSA said. It costs $12,000 for a System/38 license or $6,000 for a System/36 license.

Ask Computer Systems, Inc. in Los Altos, Calif., added a lot-tracking and reporting module to its Manman Information System for DEC VAX systems. Manman/Tracker is said to provide users with information on where materials are located through the various phases of the manufacturing process and to alert users when materials expire. In addition, it provides three levels of security: open, restricted and no access. Prices range from $16,875 to $37,500, depending on the DEC hardware, the vendor said, and it is currently available.

MCBA in Glendale, Calif., said it will begin shipping the job-costing module of its VAX Cobol series for DEC hardware this month. The vendor currently offers three modules — Shop Floor Control, Bill of Materials and Inventory Management — as its manufacturing resource planning system, which it said will eventually consist of 18 modules. The software was designed to track and analyse manufacturing costs and compare actual costs with estimated costs. Licenses start at $4,000.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A software system for Digital Equipment Corp. VAX/VMS environments said to provide customized multilevel authorization, monitoring and resource accounting and chargeback functions has been announced by **Ergodic Systems, Inc.**

According to the vendor, **Overseer** provides the ability to organize and manage a VMS system by customers, project and subproject groups, tasks and other site-defined entities. Features include live data capture and reporting of royalty program execution, disk space and batch and print jobs and interactive sessions. Network communication servers provide automatic network job accounting and a checkpoint-restart capability prevents the loss of any accounting data in the event of a system crash.

Overseer costs from $2,500 to $10,500.

Ergodic Systems, Suite 105, 3900 Birch, Newport Beach, Calif. 92660.

Applications packages

A scheduling system for the IBM System/38 said to feature the ability to operate multiple programs while working with multiple dependencies has been unveiled by **Macro Business Services.**

Scheduler/38 also features multiple calendars, schedule logging with an audit trail, automatic schedule recalculation and user-defined accounting chargeback.

Scheduler/38 is priced at $2,500.

Macro Business Services, Suite 380, 2107 N. First St., San Jose, Calif. 95131.

Languages

Version 2 of Waterloo Modula-2, a full-function compiler for the Modula-2 programming language, has been announced by **Watcom Products, Inc.**

Modula-2 is said to provide a load-and-go capability. Programs can be compiled directly from the CMS text editor Xedit into memory for immediate execution, eliminating the need for separate edit, compile, link and execute steps. Once a program has been debugged, Waterloo Modula-2 can be run in production mode to generate optimized code in standard CMS object-file format.

Version 2 includes additional programming library modules said to facilitate I/O tasks and integration into the VM/SP CMS environment.

The annual license fee for Modula-2 is $1,800.

Watcom Products, 415 Phillip St., Waterloo, Ontario, Canada N2L 3X2.

Utilities

DB/Access, Inc. has developed **Access/Star**, a data-sharing software product.

Access/Star is said to extract data from dissimilar computers and data bases, route the extracted data over existing networks and deliver the data to the user's application.

Access/Star is installed in VM/CMS and Digital Equipment Corp. VAX/VMS departmental systems. It is available for files and data bases on MVS, CM/CMS, VAX/VMS, Tandem Computers, Inc. and Hewlett-Packard Co. HP 3000 systems. Extractors are available for IBM's DB2 and SQL/DS; Information Builders, Inc.'s Focus; On-line Software International, Inc.'s Ramis; DEC's Rdb; Tandem's Encompass; and seqential files.

A typical configuration is priced from $5,100 to $25,500.

DB/Access, Suite 200, 20111 Stevens Creek Blvd., Cupertino, Calif. 95014.

BMC Software, Inc. has announced **Loadplus for DOS/VSE**, a utility said to reload DL/1 data bases two to six times faster than the HD Reorganization utility.

Loadplus is said to create data bases identical in structure to those of the DL/1 utility. It supports current versions of DL/1 and DOS/VSE. According to the vendor, Loadplus space-search algorithms provide user control over the placement of segments in the data base, resulting in a reduction in the number of I/Os required to retrieve data and better utilization of the available direct-access storage device space. Ten reports are generated.

Loadplus for DOS/VSE is priced at $7,500 or $420 per month.

BMC, P.O. Box 2002, Sugar Land, Texas 77487.

Version 2.02 of V/Copy, a utility for copying CMS files that replaces the CMS Copyfile command, has been announced by **VM Systems Group, Inc.**

V/Copy is said to replace command sequences with a single, intuitive command, provide immediate commands to monitor or modify long-running commands, run as a self-loading nucleus extension and handle all Copyfile, file-processing and selection options.

V/Copy is available for all releases of VM/SP and HPO. Prices start at $3,625 for a three-year license.

VM Systems Group, 901 S. Highland St., Arlington, Va. 22204.

Development tools

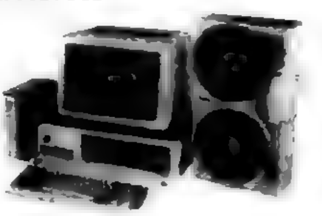
Micro Data Base Systems, Inc. has ported its Guru expert system environment featuring such information management tools as relational data base, spreadsheet and forms management to the Digital Equipment Corp. VAX series of computers.

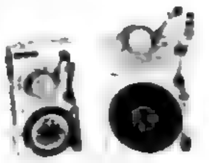
The VMS and Ultrix versions of Guru support full-record and file-locking capabilities. Guru is compatible with Decnet, allowing remote consultations and data base access. According to the vendor, applications can be transported between minis and micros.

Guru Tutor, which contains on-line instructions and the capability for developing a 30-rule expert system, is provided as part of Guru.

The DEC VAX versions of Guru are priced from $17,000 to $60,000.

Micro Data Base Systems, P.O. Box 248, Lafayette, Ind. 47902.





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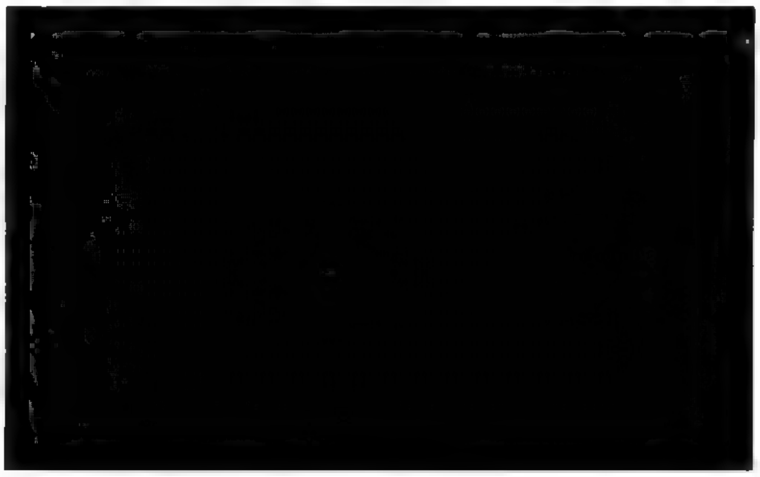
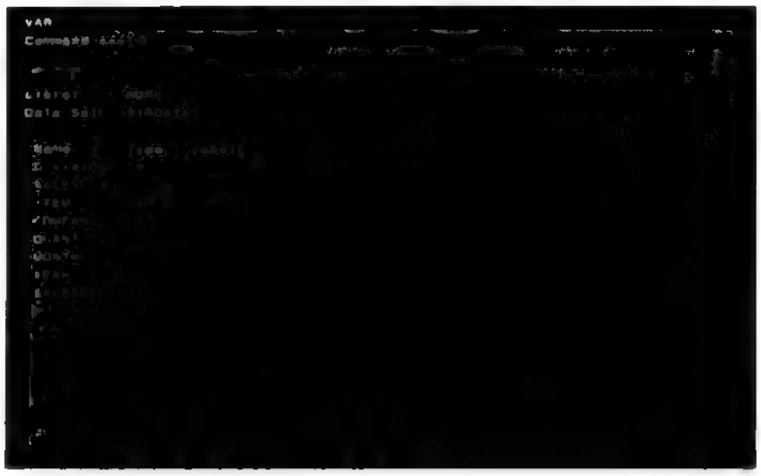
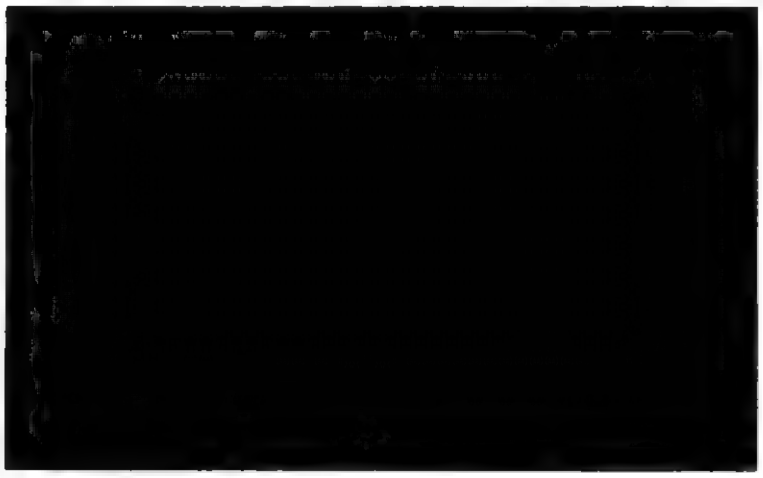


2 **Connectivity.** With the SAS System for personal computers, you get a built-in link to your host SAS System. You can download corporate data; develop, test, and run applications on your PC; or move data and applications back to the host for execution. Plus the SAS System reads data from any kind of file, including dBASEII,® dBASEIII,® and Lotus® 1-2-3.®

3 **Integration.** The SAS System runs on mainframes, minicomputers, and personal computers. The language and the syntax are the same. The full-screen text editor is the same. You only have to learn one software system no matter what hardware your company has installed.



4 **Expandability.** As your needs grow, the SAS System grows with you. We're committed to supporting all the capabilities of our mainframe software system for your PC. Whether you license one product or several, you'll enjoy the same high-quality software, training, documentation, and support we've offered for 10 years. It's all part of our site licensing plan.



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The SAS System runs on the IBM PC XT and AT, IBM 370/30xx/43xx and compatible machines, Digital Equipment Corporation's VAX™ and MicroVAX II,™ Data General Corporation's ECLIPSE® MV series, and Prime Computer, Inc.'s 50 series. Not all products are available for all operating systems.

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MICROCOMPUTING

SMALL TALK

William Zachmann

A pocketful of miracles

One of the best kinds of innovation is an idea that is so good that, afterwards, it hardly seems possible everybody wasn't doing it already. Plus Development Corp.'s hard-disk-on-a-card products are an excellent example.

The Pocket Modem from Incline Village, Nev.-based Migent Software, Inc. is another. Weighing in at only 9 ounces, the Pocket Modem offers 300 to 1,200 bit/sec. Hayes Microcomputer Products, Inc.-compatible modem capabilities in a 1.3- by 2½- by 5-in. unit that looks like it ought to be on display at New York's Museum of Modern Art.

With surface-mount internal engineering to match its exterior industrial design, the Pocket Modem is not only a terrific product for use with portable systems, but also a first-class alternative for stationary personal computers. It plugs directly into a 25-pin RS-232 communications port or can be connected to a nine-pin IBM Personal Computer AT-type port

Continued on page 33

Microsoft marketeer speaks out

Brings to fore push for applications turf, common graphics interface

As director of applications marketing for Microsoft Corp., Jeff Raikes is responsible for that company's highly aggressive push into the applications market.

Microsoft, best known for its languages and operating systems, is preparing to go after areas currently staked out by its rivals, including dominant data base vendor Ashton-Tate and spreadsheet kingpin Lotus Development Corp.

Computerworld Senior Editor Douglas Barney recently spoke with Raikes about the still-unannounced IBM Personal Computer and compatible version of its Excel integrated spreadsheet, along with its strategies for the applications marketplace and the hoped-for emergence of a common graphics user interface for PC software.

What advantages will PC Excel have over a graphics-based version of Lotus's 1-2-3?

That is pretty hard to say, given that there hasn't been any announced information on what 1-2-3/G would be.

One of the advantages Microsoft will have is that since that we believe in the move toward a graphics user interface, we are supporting it right away.

Lotus is actually putting people off and trying to get them to go to another character-user interface version, the old user interface, before they go to the new interface.

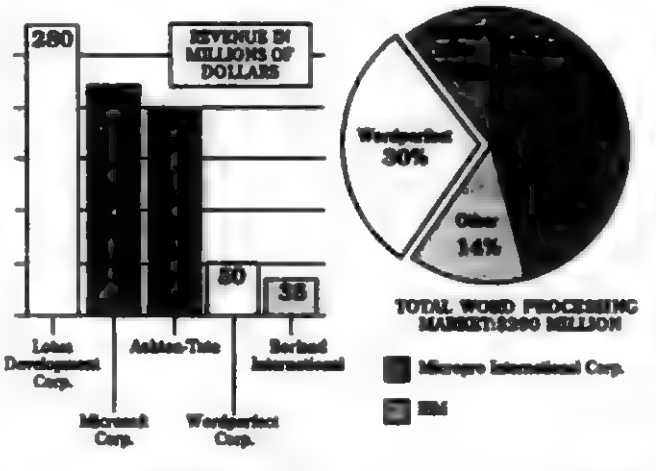
We will be on the new standard user interface long before Lotus will with our Windows version, and then move to the Presentation Manager. These products will have the same look and will be [IBM] Systems Applica-

Continued on page 32

Data View

Wordperfect's rise to the top

Wordperfect pulled into fourth place among software companies in 1986 and gained the top spot among word processing vendors



INFORMATION PROVIDED BY COMPUTER TECHNOLOGY RESEARCH CORP.
CW CHART

Slow that PC down!

BY ALAN J. RYAN
CW STAFF

DEDHAM, Mass. — While most new microcomputer hardware products hype vast increases in processing speed, a utility from Soft-Sense appears to be bucking that trend by putting the brakes on the fast processors.

The product, called Pacer, was designed to slow the speed of fast microcomputers like the IBM Personal Computer AT and compatibles operating under Microsoft Corp.'s MS-DOS. The utility reportedly can make the Intel Corp. 8088, 80286 and 80386 processors operate as

Continued on page 33

Business decisions disclosed

BY ALAN J. RYAN
CW STAFF

PHILADELPHIA — The business decisions of America's top corporate leaders are something few of us are privy to, but a new software package from Reality Technologies is aimed at changing this situation.

The software, called Business Week's Business Advantage, is said to allow users to make business decisions based on actual case studies that have been reported in *Business Week* magazine.

Through the simulation software, the user reportedly faces the same decision-making situations as industry giants, according to company President Mark Goldstein.

The software program provides the user with information about the company's operating environment, which includes facts on competitive products, market share and strategic positioning and economic and industry trends.

Continued on page 30

Inside

- Micro Focus ships Cobol development kit for PC-DOS, OS/2. Page 30.
- 20/20 Data Systems sees its way clear to adding slide package for Mac. Page 34.

VS COBOL Workbench always delivered applications in half the time. New version speeds development even more.

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Micro Focus launches Cobol development kit

BY ALAN J. RYAN
CW STAFF

PALO ALTO, Calif. — To help launch its new generation of Cobol technology, Micro Focus, Inc. last week began shipping its Cobol/2 Software Development Kit, targeted at IBM PC-DOS and OS/2 applications.

Included in the kit are a Cobol/2 compiler, a visual debugging tool, an extended-memory program for writing protected-mode applications under PC-DOS and an editor.

With the tool kit, users with applications running on IBM Personal Computers and compatibles now who want to convert them to OS/2 stand a good chance of having the applications completed when IBM rolls out OS/2, Micro Focus said. It is unlikely, however, that entirely new applications would be available to run on OS/2 that quickly.

"It's not impossible, but it would be difficult to get the application coded, tested and out on time," said John Beggs, market development manager at Micro Focus.

Key to the technology is the kit's compiler, which supports nine Cobol dialects, according to Beggs. The compiler reportedly offers maximum flexibility to a developer who wants to bring existing Cobol code from a non-PC-DOS environment.

By using Micro Focus Cobol standards as a vehicle, programmers can migrate Cobol source code from the mainframe to the personal computer and on to Unix- and Microsoft Corp. Xenix-based machines running Micro Focus Cobol, the vendor said.

Cobol/2 compiles ANSI-standard Cobol 74 and Cobol 85, IBM mainframe OS/VS and VS Cobol II, Micro Focus Level II Cobol, Ryan-McFarland Corp. M/Cobol, Data General Corp. Interactive Cobol, IBM PC Cobol Version 1 and IBM's Systems Application Architecture.

The compiler eases the task of migrating Cobol source code through its 32-bit addressing architecture, the vendor claimed. As a result, large mainframe programs that have been unusable on personal computers without extensive reworking can now be transferred to the micro and compiled intact.

Another component of the tool kit is XM, which the vendor said adds the ability to use extended-memory facilities to reach beyond the 640K-byte boundaries of PC-DOS.

The Software Development Kit can be ordered by developers through July 31 for $1,500, Micro Focus said. The compiler with the Animator debugger sells separately for $900.

Business

FROM PAGE 29

By manipulating the information, Reality Technologies said, the user attempts to strategically manage the company for a period of one year, as simulated by the program.

Business Advantage incorporates a 400-rule expert system, posting results and explanations so the user can see how his strategy affected sales, return on investment and profits.

Goldstein said the lessons in competitive strategies and management can be applied to any business. The program is currently available for use on IBM Personal Computers and compatibles and is scheduled to be available for Apple Computer, Inc.'s Macintosh later this summer.

The software is available through Reality Technologies and will be distributed to retail channels by Broderbund Software.

List price is $49.95, and case studies include Lee Iacocca, chairman of Chrysler Corp., and Rod Canion, chairman of Compaq Computer Corp. A one-year subscription featuring a new study each month costs $299.95.

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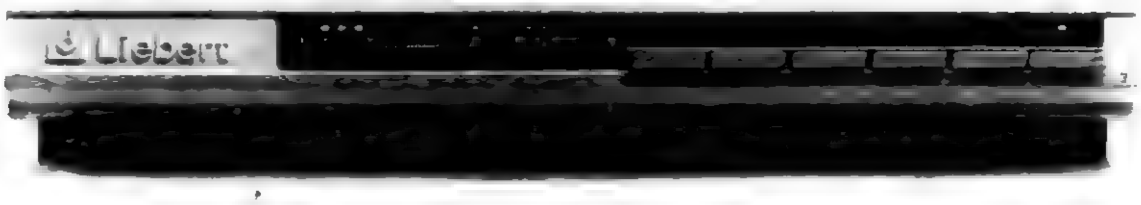

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CONTINUED FROM PAGE 29

tion Archiecture [SAA] user interface-compliant.

Should users consider PC Excel as part of their purchasing plans?
Just as people are considering IBM PS/2s and that kind of high-performance hardware, they should also be looking at the high-performance spreadsheet, Excel, that will take advantage of that hardware to provide a new level of performance in spreadsheets.

What do you think about 1-2-3/M, the mainframe version of 1-2-3, which may be an effective way to consolidate data?
One of the overlooked weaknesses in the 1-2-3/M strategy is that it is not an SAA user interface-compliant product. It is a little weird to have Big Blue out there selling the user interface anarchy as opposed to SAA. I think what is likely to happen is that the companies that are already strong in mini and mainframe spreadsheets will move quickly toward SAA user-interface compliance. Then what advantage does Lotus 1-2-3/M really have?

Customers are particularly interested in things like consolidation, and there may be be superior ways to consolidate information. In some sense, you can say PC Excel is likely to work just as well, maybe even better, in terms of being consolidated by 1-2-3/M. We supported the .WKS format, both read and write, in Microsoft Excel for the [Apple Computer, Inc.] Mac, where [Lotus's] Jazz didn't even support that.

What do you think IBM's goal is in the applications market? Do you expect to compete with them?
Today, they have not been a force in the applications side of the business. They have really focused in on the systems side of the business, and that makes sense. I expect that they might try to change that at some point in the future, but it is pretty hard to compete with this young, aggressive, independent software community.

Are there any advantages to also being a languages and systems software company?
Absolutely. Our strength in those areas does help the applications side of the business.

In particular, what helps is the close working relationship we have with hardware manufacturers — the fact that we are working with them and sometimes even influencing the directions that they are going in. That kind of vision helps us a great deal. But a lot of it is not so much knowing it, but putting it together.

Why haven't we seen Windows applications from Microsoft?
Software development is a little bit like a production process — not like hard goods, where you can see the smokestacks. We have a major investment in graphics user-interface software, and sometimes it isn't as visible as you might expect.

Is Microsoft interested in true multiuser applications in the style of minis and mainframes, or is local-area network [LAN] the way to go?
We feel that the 386 in particular provides a very strong foundation for a server. You will see LAN enviroments where the 386 is a server, a [Digital Equipment Corp.] VAX or Microvax is a server or an [IBM] 9370 is a server. In the long run, some of the advantages of the 386 — in particular its open architecture — will make that the dominant server.

Microsoft's Raikes

You will see these other environments, in particluar the VAX and 9370, but beyond that, I wouldn't paint a bright future for minicomputers as servers. They will continue to have their role as small host computers. That is part of the reason why Microsoft is oriented toward the networked environment as opposed to the host-software approach.

How are you going to tie all your applications together? Are you planning a common data structure?
We are looking at supporting common data-exchange protocols, in particular DDE, which needs to be extended to work across networks. The problem with trying to have common data structure underlying all applications is that the data structure required to build a great spreadsheet is different from that required to build a great data base or word processor.

Will you write for the OS/2 kernel and then the Presentation Manager, as many vendors are planning?
The ones writing for just the kernel are doing it backwards. The winning approach is to do the Windows applications and then take them to the Presentation Manager.

If you just try to go for OS/2 — for example, just introducing a spreadsheet that has the same interface — you are continuing in the world of user-interface anarchy. What corporate accounts want to move toward is the standard user interface, which is Windows 2.0 and OS/2 Presentation Manager.

Nick

Karl

Now you know four of our most innovative people on a first name basis.

Karl, Edwin, Nick and Paul were recently honored for their accomplishments by being made IBM Fellows. For the next five years they'll be given the freedom to pursue projects of their own choosing.

Karl Hermann improved the manufacturing techniques of printed circuit boards, and created methods for assembling and testing computer circuits that ensure the quality of IBM products.

Edwin R. Lassettre conceived efficient software designs that

Pocketful

CONTINUED FROM PAGE 29

with a short adapter cable.

The phone line plugs into the other end of the Pocket Modem via a standard RJ11 modular phone jack. A second RJ11 extension jack on the back of the Pocket Modem can be used to attach a telephone. The Pocket Modem can be run for up to 12 hours powered by a 9V transistor radio battery or, alternatively, can plug into a wall socket through an AC/DC power converter.

The $259 list price for the Pocket Modem includes the converter, a 25- to 25-pin extension cable, the 25- to nine-pin adapter, a 7-ft. RJ11 to RJ11 telephone cable and a 9V battery.

The Bitcom communications software bundled with the Pocket Modem gives you everything you need for personal computer data communications. Included are ANSI color and graphics, Digital Equipment Corp. VT100 and VT52 terminal emulation and IBM 3101 emulation capabilities.

Being Hayes compatible, the Pocket Modem also works with widely used communications software for IBM and compatible systems such as Microstuf, Inc.'s Crosstalk and Hayes' Smartcom.

I did encounter minor initial glitches in using the Migent Pocket Modem. The SETUP program that came with it wasn't working properly, and neither it nor its problems were documented. This program was intended to be used in setting switches in the nonvolatile enhanced erasable programmable read-only memory of the Pocket Modem. These are used instead of physical DIP switches.

Going to work

Initially, I had some problems getting the Pocket Modem to work with Hayes' Smartcom in my office. The problem was a result of the factory default on the Pocket Modem being set for pulse dialing. Although I had told Smartcom, via its configuration screen, that I wanted tone dialing, it wasn't happening.

Once I realized that Smartcom's modem-initialization routine expected a tone-dialing default setting, the path to the solution was clear. I simply needed to change the soft switch in the nonvolatile memory of the Pocket Modem. The question was, How?

The nonfunctional character of Migent's SETUP program didn't help matters. By talking to the Pocket Modem through Migent's Bitcom program, I eventually figured out how to configure the Pocket Modem so that it would work with Hayes' Smartcom.

Despite the glitches, which I suspect might lead a traditional reviewer to chalk up some bad marks for Migent's documentation and technical support, I have no hesitation recommending the Pocket Modem for anyone who wants a good buy in a remarkably portable and usable 300 to 1,200 bit/sec.modem. The basic product is excellent and, once I figured out how to use it, did its job very well.

Companies relatively new to a market don't always get it perfect the first time around. Although Migent still has a bit of sorting out to do, the product looks to be a winner, and I expect that Migent will have no difficulty in correcting its prob[illegible]

Migent's Pocket Modem has already bred a number of imitators, just as Plus Development's Hardcard did one year ago. In both cases, imitation is undoubtedly a testament to the excellence of the innovative idea behind the product.

Zachmann is vice-president of research at International Data Corp.

Slow down

CONTINUED FROM PAGE 29

much as 600 times slower than normal, according to the vendor.

The usefulness of this type of utility comes into play when running software written for slower personal computers that will not perform properly on faster machines, the firm said. Some software copy protection schemes, in particular, wreak havoc when run at faster clock speeds.

Other uses, the vendor claimed, include debugging and reverse-engineering graphics screens, windows and menus by running them in slow motion to see their formation pixel by pixel, allowing programmers and reviewers to see how software will run on all classes of machines without actually having those machines and playing games written for 4.77-MHz machines that are not playable at 8 MHz.

Pacer occupies 3.4K bytes of active memory and was written in machine language. Speeds can be changed by using a hot-key sequence, and the keyboard can be run at normal speed while the processor runs at another, according to a Soft-Sense spokesman. Pacer will sell for $49.95 and is available through the vendor.

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Paul

simplified data processing on many of IBM's larger computers.

Nicholas J. Pippenger invented the theory used to identify problems that can be solved efficiently by parallel processing.

And Paul A. Totta made possible many advances in semiconductor metallurgy that significantly contribute to the reliability and performance of IBM computers.

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NEW PRODUCTS

Systems

Advanced Logic Research, Inc. (ALR) has announced four models of its **ALR 386/2** IBM Personal Computer AT-compatible system based on the Intel Corp. 80386.

The Model 10 features an ALR-designed 386 system board with 1M byte of 32-bit random-access memory (RAM) expandable to 2M bytes, 1.2M-byte floppy disk drive, one serial port, one parallel port and a 101-key expandable keyboard. The ALR 386/2 Models 40, 80 and 130 all feature hard disk drives of 40M, 80M and 130M bytes, respectively; 2M bytes of 32-bit RAM; and a hard-disk controller with on-board full-track disk caching.

Prices for the ADR 386/2 family range from $1,990 to $7,299.

Advanced Logic Research, 10 Chrysler, Irvine, Calif. 92718.

Software applications packages

A color slide software package that is said to allow users of the Apple Computer, Inc. Macintosh personal computer to create 35mm slides and overhead transparencies from Macdraw files has been introduced by **20/20 Data Systems, Inc.**

Carousel is a free-form slide creation package featuring a selection of 256 colors, gradient color-ramping techniques and simplified text placement. Once the slides are designed, turnkey processing is handled via a 24-hour modem connection to Stokes Slide Services, Inc. in Austin, Texas. Slides with 2,000-line resolution are available for $7 per slide, slides with 4,000 line resolution cost $14 per slide.

The Carousel package costs $249.

20/20 Data Systems, 7000 Cameron Road, Austin, Texas 78752.

Software utilities

A hard-disk backup utility for the Apple Computer, Inc. Macintosh has been announced by **Design Software, Inc.**

DS Backup is said to permit users to copy the contents of a Macintosh hard disk to a set of floppy disks or to another hard disk drive. The utility runs on all Macintosh computers and most Macintosh compatible hard disks. According to the vendor, it can backup data from one Macintosh to another across Apple's Appletalk network.

Users can backup and restore an entire hard disk, selected directories and files, or just files that have been changed since the last backup session.

DS Backup is priced at $79.95.

Design Software, 1275 W. Roosevelt Road, W. Chicago, Ill. 60185.

Software enhancements

Mortice Kern Systems, Inc. has enhanced its **MKS Toolkit**, software designed to provide the personal computer user with the power of Unix commands within a Microsoft Corp. MS- or IBM PC-DOS environment.

The tool kit is a package of more than 110 utilities. Version 2.2 features a complete implementation of the VI/EX full-screen Unix editor with the capability of handling international character sets including French, German and Spanish.

Other features include an implementation of AT&T's Unix System V Korn shell and an enhanced version of the AWK fourth-generation language as well as utilities for data compression and file encryption.

MKS Toolkit Version 2.2 costs $139.

Mortice Kern Systems, 43 Bridgeport Road E., Waterloo, Ont., Canada N2J 2J4.

Printers/Plotters/ Peripherals

Cordata Technologies, Inc. has reduced the prices of its **Intellipress** electronic desktop publishing systems, its **Desktop Printshop** laser printers and its line of **80286-based personal computers.**

The Intellipress, fully integrated systems offered with either Xerox Corp.'s Ventura Publisher or Aldus Corp.'s PC Pagemaker preinstalled on hard disk, now cost $8,995. An optional scanner costs $1,495. The LP-300 Desktop Printshop laser printer was reduced by 27% from $2,995 to $2,195. The LP-300X was reduced by 30% from $3,895 to $2,695.

The PCs now cost from $1,895 for the ATD-8-Q to $2,495 for the ATP-8-Q20.

Cordata, 20001 Corporate Center Drive, Newbury Park, Calif. 91320.

Board-level devices

STB Systems, Inc. has introduced the **Color/Mono** video adapter.

The dual-purpose Color/Mono adapter is said to support IBM Color Graphics Adapter modes as well as IBM Monochrome Display Adapter modes. The switch-selectable adapter also provides an IBM-compatible parallel-printer port and an optional battery-operated clock/calendar.

The adapter supports graphic resolutions to 640 by 200 pixels in two colors and 320 by 200 pixels in four colors.

The Color/Mono adapter is priced at $149. The clock/calendar option costs $29.95.

STB Systems, Suite 210, 1651 N. Glenville, Richardson, Texas 75081.

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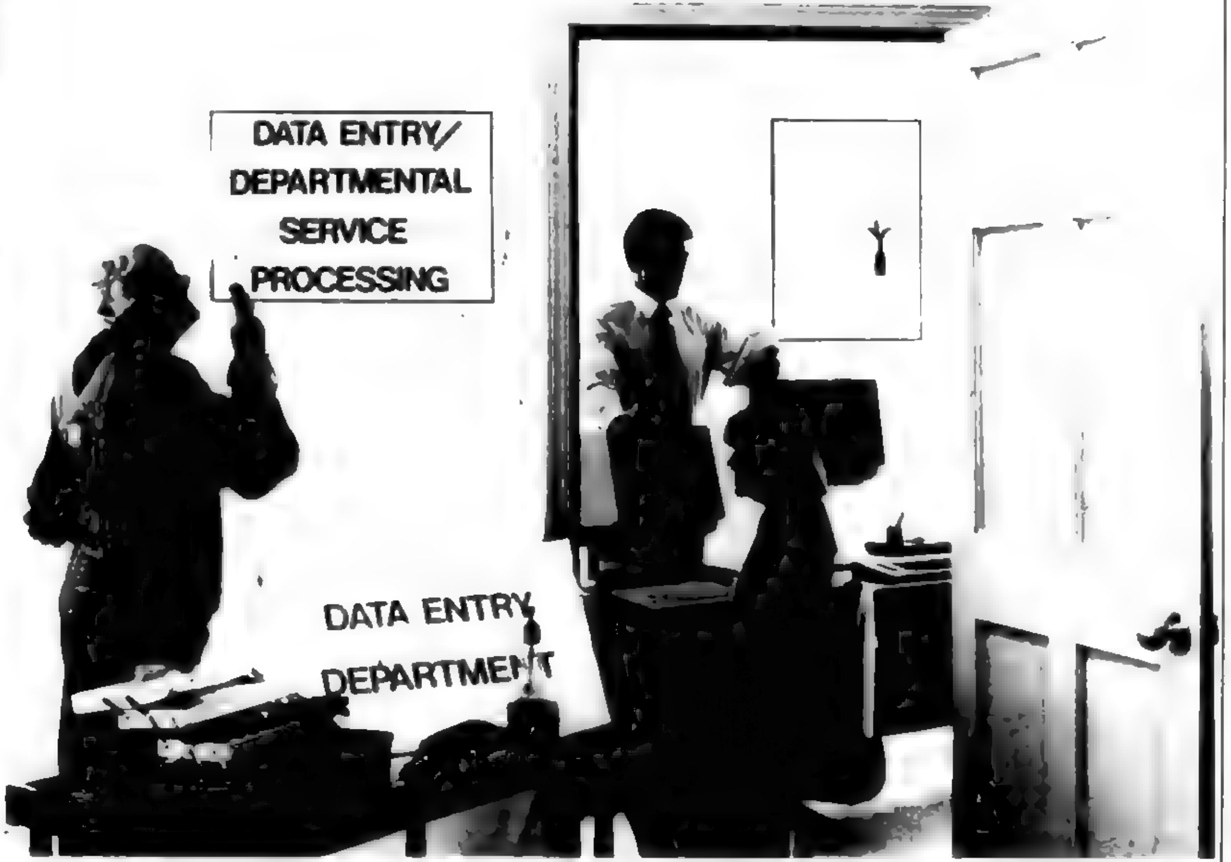

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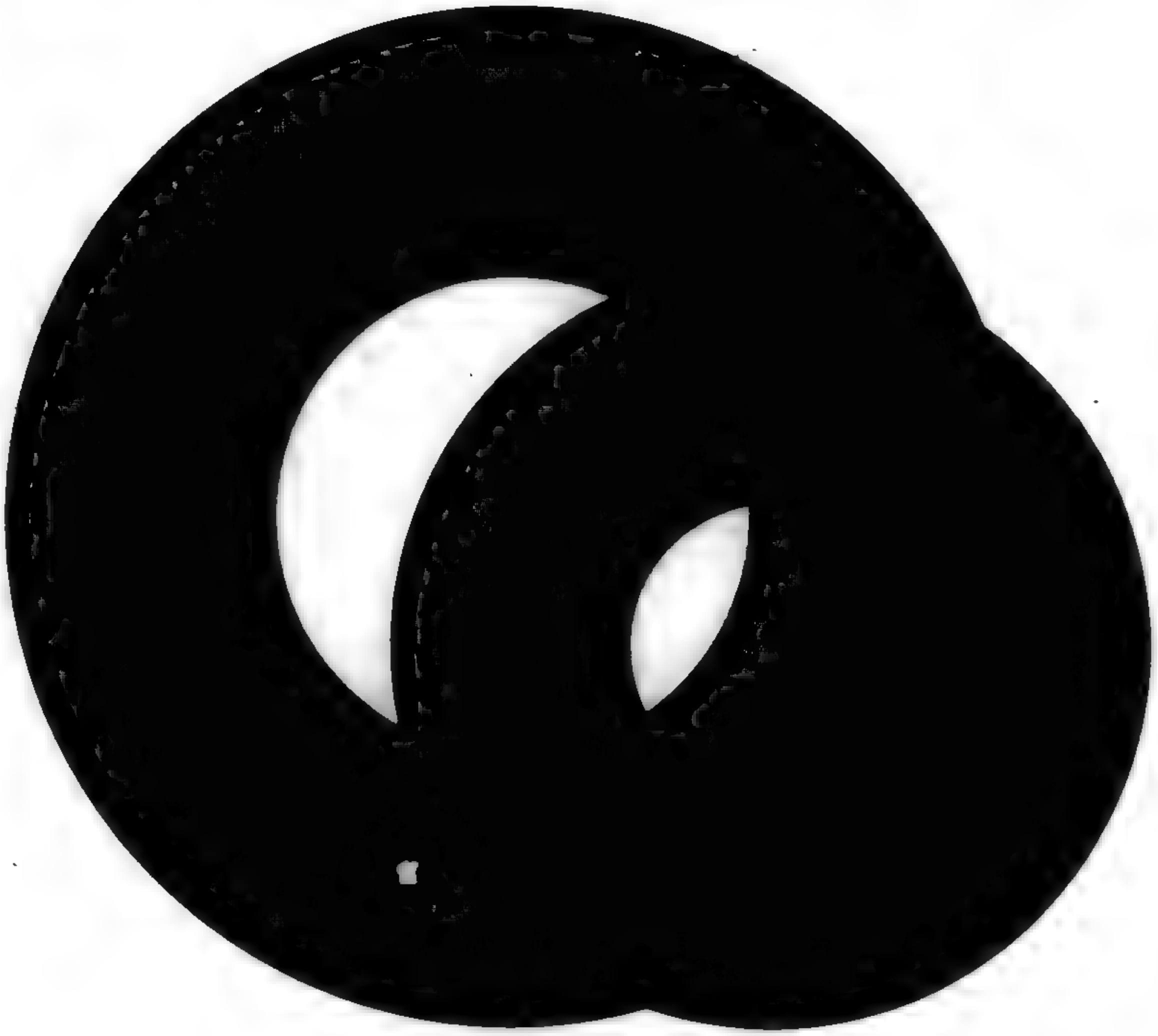

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The Turbo EGA Color System

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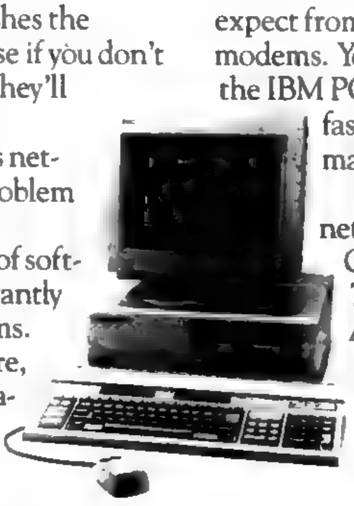

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NETWORKING

DATA STREAM

Marvin Chartoff

X.25 nets to come of age

Products in the CCITT X.25 packet-switching market will undergo major changes in the next few years in order to respond to the growing sophistication of data communications managers and the evolving networking requirements of the user community.

These changes include the integration of packet-switched networks with other wide-area networking media as well as with higher level communications protocols, such as IBM's Systems Network Architecture (SNA) and the Open Systems Interconnect (OSI) communications standard. Behind these developments is users' growing desire to manage all components of their wide-area networks as one system and to use packet-switched networks as a cost-effective link between local, intrasite networks.

More and more corporations are using X.25 networks as a way to link SNA systems with devices that use asynchronous and other non-SNA communications protocols. And while OSI implementations are primarily local-area networks now, wide-area packet-switch networks such as the Defense Data Network (DDN) and other government networks will be required

Continued on page 42

The ABCs of networking

MIS battles budget constraints, product overkill on first LAN project

BY ELISABETH HORWITT
CW STAFF

DALLAS — In the throes of its first local-area network (LAN) installation, Dallas Market Center Co.'s MIS department is finding out how tough it can be to explain to vendors what exactly it wants, especially when it has an economy-minded senior management looking over its shoulder.

Michael Winter, vice-president of the firm's information services group and Microsystems Consultant Cookie Myers are using a cautious — bordering on sneaky — approach to purchasing a LAN for their company. "We don't have needs that are flashy enough to convince top management about big savings; printer sharing is our only justification right now," Winter says. "Executives do not use PCs and are not technology-minded, so we have to find our own funding."

This means tacking a LAN purchase onto an already-approved word processing acquisition — which in turn means keeping costs to a minimum, at least initially. Once the network is in place, however, Winter says his group hopes to add other useful applications such as moving documents between dedicated word processors and IBM Personal Computers, micro-to-mainframe access, simple file sharing and electronic mail.

Reportedly the world's largest wholesale merchandise market, Dallas Market Center holds a number of trade shows "that require a huge amount of direct mail," Myers notes. Users in charge of mailings for a given show could use the network for shared access to files and a laser printer so that the company could start doing the mailings in-house "instead of having to farm them out to direct services for thousands of dollars, as we do now," Myers explains.

The network could also pro-

Continued on page 43

Study: VSAT numbers, features grow

BY ELISABETH HORWITT
CW STAFF

The very small-aperture terminal (VSAT) satellite networking market is undergoing a shakeout as it moves into a new generation of value-added products, according to a recent report by New York research firm Link Resources Corp.

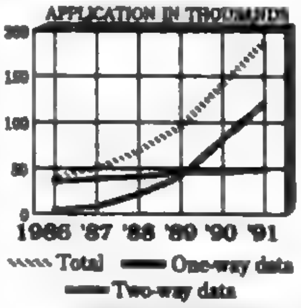
VSATs are small satellite earth dishes that approximately two years ago helped revitalize the satellite communications market by providing corporations with a cost-effective way to link a central site to remote offices. Other contributing factors to an upswing in satellite networking sales were a glut of satellite transponder space, resulting in lower bandwidth prices, and climbing leased-line rates that forced users to seek inexpensive alternatives.

According to the Link report, VSATs are the fastest growing segment of the data broadcasting equipment market, which supplies low-cost alternatives to leased-line and dial-up services for one-way, point-to-multipoint data delivery. Two other segments are digital microwave dishes and equipment for transmitting over the FM-Subsidiary Communications Authority frequency. The total market, currently $1.5 billion, will grow more than 25% annually to $5

Continued on page 43

Satellite networks going interactive

Two-way satellite terminal installations are expected to take off in the late 1980s



INFORMATION PROVIDED BY LINK RESOURCES CORP./INTERNATIONAL DATA CORP.

CW CHART

PCs can do LU6.2 on Irma

LAGUNA HILLS, Calif. — Network Software Associates, Inc. recently introduced software products said to allow IBM Personal Computers and compatibles equipped with Digital Communications Associates, Inc.'s Irma boards to communicate via IBM's LU6.2 and RJE protocols.

Adapt3274 LU6.2/I is said to allow the PC to communicate with a mainframe using LU6.2/Advanced Program-to-Program Communications functions via an IBM 3274 or 3174 cluster controller.

Adapt3274 RJE/I emulates an IBM 3770 RJE workstation. It reportedly allows Irma-equipped PCs attached to a 3274 or 3174 controller to communicate with an IBM mainframe running JES, Power or another VTAM operating system.

Adapt3274 LU6.2/I costs $485; Adapt3274 RJE/I costs $985. Both products are available now.

Inside

- Synoptics adds 10M bit/sec. Ethernet to Lattisnet family. Page 42.
- Laserdata announces Ethernet-compatible document-management net. Page 44.
- Applied Voice Technology rolls out modular voice- and call-processing system. Page 44.

COBOL with network support now a standard feature. Complete networking syntax in new Micro Focus products.

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X.25 nets

FROM PAGE 47

by the Government Open Systems Interconnection Procurement specification to provide full support of OSI protocols in the future.

However, packet switches may need added throughput and bandwidth capacity to meet these demands. SNA adds control overhead, and the steady-stream nature of synchronous communications puts an added load on a switch, as does the additional overhead represented by OSI packet headers.

Some vendors, such as Telenet Communications Corp. and BBN Communications Corp., are moving toward integration of packet switches with T1 switches that support 1.5M bit/sec. data rates. One emerging application is for a packet assembler/disassembler (PAD) to be hooked up to a T1 multiplexer so that X.25 packets can be sent along one or more subchannels within a T1 link.

Packet switches are being integrated with a variety of other networking devices, including satellite terminals and low-speed modems. But while users gain functionality, they also need a system that provides access and error control, monitoring, dynamic bandwidth allocation, statistics gathering and other network management functions across disparate communications devices.

Today, many corporate networks consist of a wide variety of vendors' multiplexers, modems and switches — each with its own proprietary network management system. As a result, the network control center quickly becomes a data center itself. With the addition of a packet-switch network, another network management system is added.

Because the packet switches are the most ubiquitous components of the network, the X.25 packet-switching network management system should be the central core of a network control center, integrating the network management information from modem-diagnostic and performance-monitoring systems and host-based network management. With all relevant network status information being collected at a central point, finger-pointing is reduced and the opportunity to incorporate artificial intelligence into the network control center becomes a very real possibility.

The broadening role of the packet switch in corporate networking is both a potential boon and a threat to vendors, whose products will have to support the increased throughput, bandwidth and network management integration. As systems integrators, vendors will need expert knowledge of a wide variety of transmission and network management systems. Thus, we can expect a weeding-out of many smaller packet-switch vendors that will not have the resources to meet the demands of an increasingly sophisticated market.

Chartoff is a group manager at Fairfax, Va., consulting firm Network Strategies, Inc.

Firm extends premises-wiring family

MOUNTAIN VIEW, Calif. — Synoptics Communications, Inc. has broadened its Lattisnet product family to include a 10M bit/sec. Ethernet over fiber optics and a concentrator for small work groups.

The expanded Lattisnet product family provides a flexible, cost-effective premises-wiring scheme that allows the use of both fiber optics and twisted-pair wiring to connect large and small work groups within a building, the company said.

The wiring system provides up to 32 connections in a Synoptics Premises Concentrator. The smaller Departmental Concentrator, which connects small work groups to an existing Lattisnet, supports up to 12 fiber connections or up to 18 connections of shielded twisted-pair cabling conforming to the IBM Cabling System specifications. Both products are available now.

VSATs

FROM PAGE 41

billion by 1990, Link estimated.

Last year, the VSAT market lost two major potential customers when Federal Express Corp. pulled out of Zapmail and the IBM-Merrill Lynch & Co. Imnet venture folded. However, "the current woes in the VSAT market point less to a lack of legitimacy than to necessary growing pains in a very competitive market for carrying data traffic," the report states.

With the "virtual saturation" of the market for one-way VSAT dishes, vendors are moving into interactive and value-added niches, according to the report. Interactive VSAT networks emerged last year as cost-effective vehicles for applications such as credit- and debit-card retail systems and hotel and travel reservation services.

Interest growing

Equatorial Communications Co., a pioneer in one-way VSAT networking services that suffered heavy losses when the demand for those services declined, recently announced several sales of two-way VSAT offerings. Federal Express has purchased a stake in Tridom Corp., an Atlanta-based two-way satellite networking company that targets the financial service market.

The VSAT market recently received the mixed blessing of two powerful entries: AT&T, with its Skynet service, and GTE Corp. subsidiary GTE Spacenet Corp., which recently won a $40 million contract to build a 2,000-site system for K Mart Corp. AT&T, whose low-priced initial offering drew accusations of cross-subsidization from its competitors, has had comparatively little impact on the market, according to Link. GTE Spacenet, however, is becoming the preferred provider of VSAT transponder capacity, Link said.

ABCs

FROM PAGE 41

vide a shared mainframe host gateway for financial analysts on PCs, according to Winter. The group currently is leaning toward a network based on RS-232 ports, handling data rates in the 1M to 4M bit/sec. range that costs between $100 to $300 per workstation. A twisted-pair network is the preferred medium, since "I can't justify coaxial cable-based networks . . . as a way for someone to get at a printer," Winter notes. Currently under consideration are AT&T's Starlan and Western Digital Corp.'s twisted-pair network.

Since the company currently is looking to either Xerox Corp. or CPT Corp. for its new word processing system, Winter says he was interested to learn that both of those vendors' products provide file sharing across a network. Having to buy "a big, expensive server" separately would be hard on his budget, Winter says.

However, not all vendors were as encouraging when Winter explained his needs. One told him that he would need $50,000 just to start. Failure to find one source for his company's networking needs has not discouraged Winter, however: "Everything is gateways; we'll just have to tie several vendors' products together," he says. "We're not expecting one-button functionality to get from a PC to a word processor or to a mainframe, but neither are we going to settle for something that requires 50 manuals."

The number of networking products and options available is a serious problem for Myers. "Every time I read about yet another LAN introduction, I want to scream," she says.

While the company is an IBM mainframe shop, and Winter has talked with IBM about networking, he says he feels confused about the company's networking direction. "I have a Systems Network Architecture network with terminals all over, but it's hard to see where the new SNA products fit into the picture," Winter says. "The need for true peer-to-peer communications for us could be five or 10 years away. I figure we'll make a small investment today in twisted-pair and let the big guys fight out the standards."

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NEW PRODUCTS

Local-area network hardware

An Ethernet-compatible electronic document management network, **I/Net**, has been introduced by **Laserdata, Inc.** for use with its Laserview electronic document management system.

I/Net provides multiuser access to optically stored electronic document images and uses a single high-resolution monitor to display both documents and data. It is Ethernet-based and compatible with personal computing networking hardware from 3Com Corp.

I/Net is implemented using dual file servers. The data base files reside on a magnetic-disk server. The digitally stored document images reside on an optical-disk server.

Laserview systems start at $50,000.

Laserdata, 10 Technology Drive, Lowell, Mass. 01851.

Network management

A secondary-channel data service unit (DSU) said to provide network management capability has been introduced by **Universal Data Systems**.

The **DDS-2 96**'s primary channel provides a user with full-duplex, synchronous, end-to-end digital transmission at rates of 2,400, 4.8K and 9.6K bit/sec. It accepts both synchronous and asynchronous data. An independent, asynchronous secondary channel operates at data rates of 300, 150 or 110 bit/sec.

The DSU is connected to the network over a four-wire unloaded twisted-pair cable. It can be used in point-to-point or multipoint applications.

The DDS-2 96 costs $750.

Universal Data Systems, 5000 Bradford Drive, Huntsville, Ala. 35805.

Network services

Western Union Corp. has instituted a communications and information service for the insurance industry, targeted at users served by IBM's Information Network service.

Inslink provides communications between insurance companies and agents as well as messaging and information retrieval capabilities. The service automatically reformats policy data transmissions originating in the Agent Company Organization for Research and Development format. Agents using Inslink can transmit one message to a variety of company systems.

The cost of using Inslink is approximately 45 to 55 cents per page. A one-time fee of $10,000 to $40,000 is charged for each customer's data translation table.

Western Union, One Lake St., Upper Saddle River, N.J. 07458.

Customer-premise equipment

A modular voice- and call-processing system called **Callxpress** has been announced by **Applied Voice Technology, Inc.**

Callxpress is available in four- and eight-port models. The four-port model accommodates up to 200 users and can store up to 6½ hours of messages. The eight-port model can accommodate 500 users and 13 hours of voice storage. According to the vendor, any combination of voice mail and automated attendant modules is available.

Modules include automated attendant, voice mail, transaction and audiotex. Features include automatic call answering and call routing.

Callxpress is priced from about $7,500 to $14,500.

Applied Voice Technology, 2445 140th Ave. N.E., Bellevue, Wash. 98005.

Links

A gateway software product said to provide IBM mainframe users with access to 10 Western Union Corp. messaging services has been introduced by **Wizard Computer Products**.

Wizard Link connects IBM mainframes to Western Union's Easylink service. Messaging services available include telex, mailgram messages, cablegrams, computer letters, telegrams, overnight express documents, priority letters and mail to other Easylink mailboxes.

Wizard Link runs under CICS. Transmission is through an AT&T 201C or compatible modem running at 2400 bit/sec. The stand-alone system costs $3,000. As an add-on to Wizard Mail, it costs $1,900.

Wizard Computer Products, P.O. Box 1867, Greenville, S.C. 29602.

Cabling

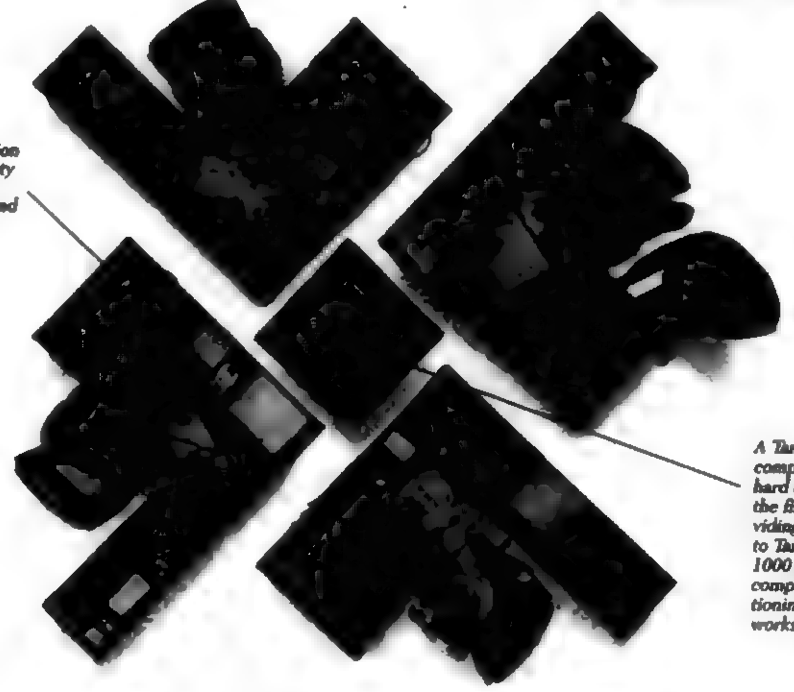
Trans-M Corp. has introduced the **Universal Connector RS-232-RJ12**, designed for configuring two or more computers, workstations and peripherals.

The Universal Connector is sold in pairs with a 25-ft plug-in telephone cable. It is said to multiplex eight wires to six wires.

The vendor said each connector has two switches that can be switched between Transmit Data and Recieve Data.

A pair, including telephone wire, costs $24.95.

Trans-M, 28 Blacksmith Drive, Medfield, Mass. 02052.



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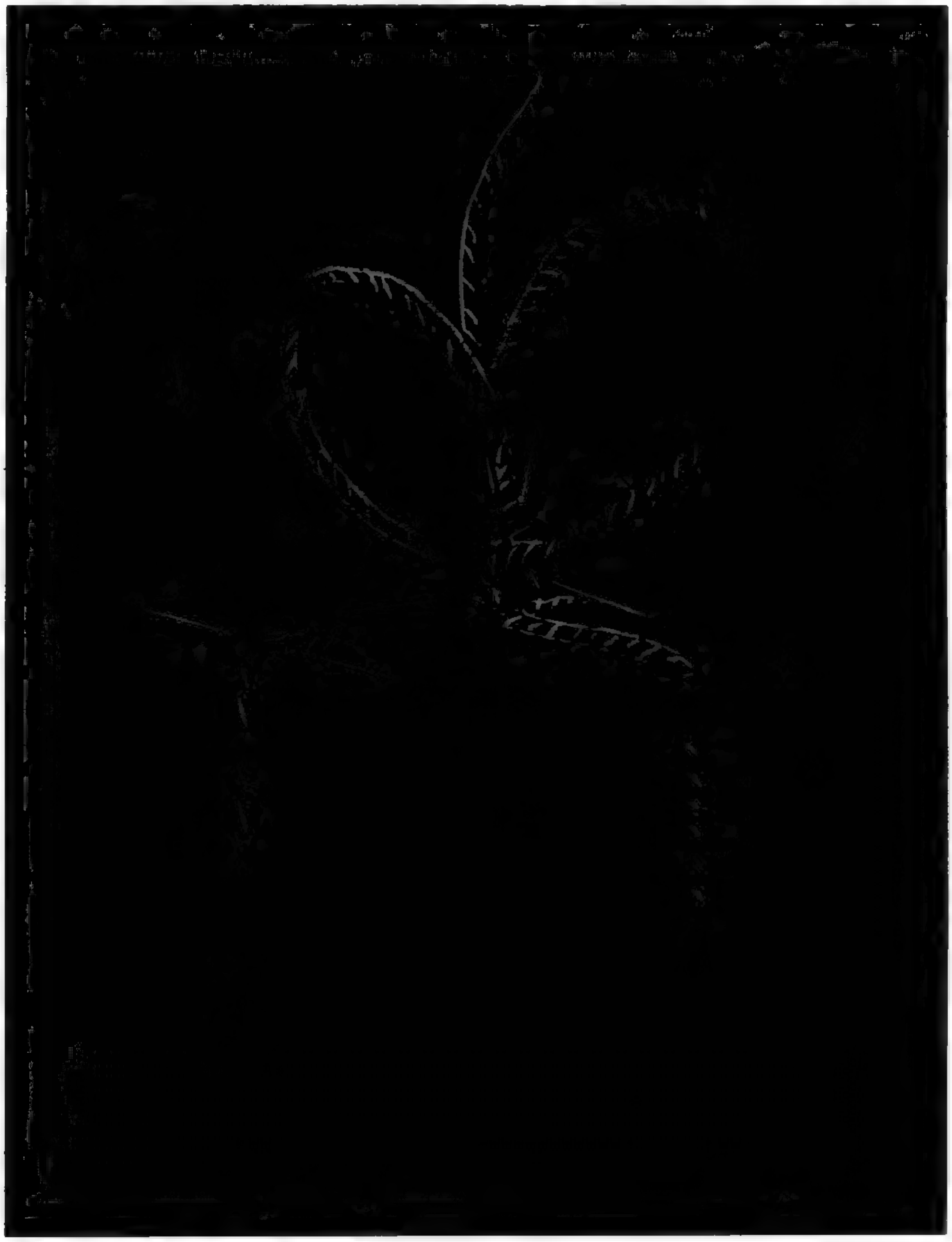

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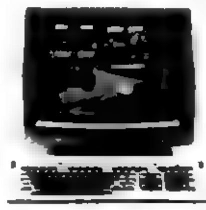

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INSIDE

Mind Sets
Commercial, customizable expert systems are increasingly finding their way onto the factory floor. Page S3.

Recipe for Success
Following a set of tried and true guidelines can help a company sidestep the common pitfalls encountered during MRP II implementation. Page S4.

CIM-plification
By tackling the tough problems up front, you can greatly ease the introduction of CIM into your manufacturing environment. Page S4.

Human Factors
The degree to which a company addresses people issues can mean the difference between success and disaster in the shift to advanced manufacturing technology. Page S7.

Vendor Viewpoint
Pick has all the right attributes for a relational data base management system in an advanced manufacturing operation. The trouble is that no one knows about it. Page S10.

Product Charts
A detailed guide to MRP II software. Page S11.

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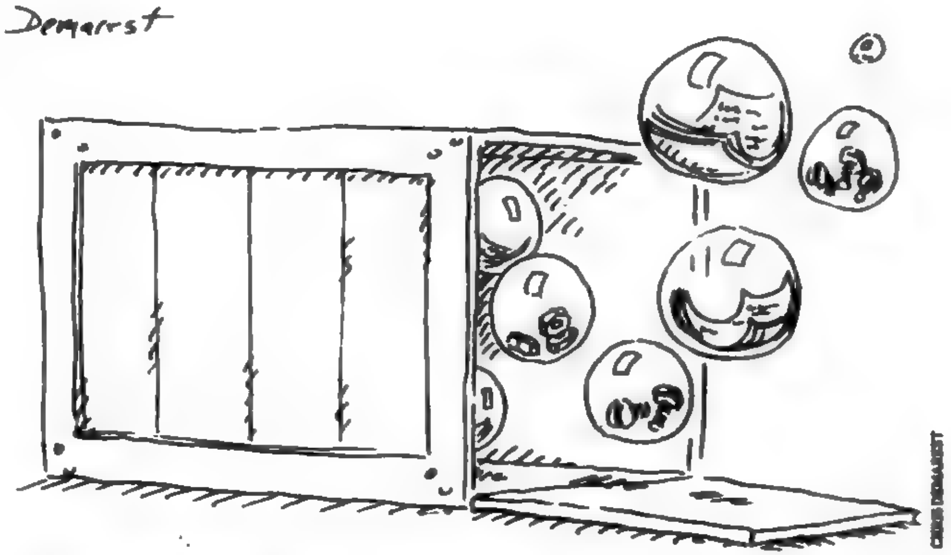
What makes CIM elusive is that it isn't a product that can be put into a box. Its real core is not equipment but process.

IN PURSUIT OF INTEGRATION

MICKEY WILLIAMSON



Stripped of all the fancy talk, computer-integrated manufacturing (CIM) is nothing more than superlative system design. The system, in this case, is an entire manufacturing enterprise: from computer-aided design (CAD) through finished product, from administrative offices to factory floor and even, in the ideal, from a manufacturer's suppliers to its customers.

That may be easy to say, but creating a truly integrated manufacturing system is extremely difficult to do. So difficult, in fact, that no U.S. manufacturer has done it yet. According to Julie Pingry, editor of the "CIM Strategies" newsletter, "You can't find a single company anywhere that has what people think of as a comprehensive CIM operation." The technology exists, a sufficiently comprehensive methodology exists, but, experts say, a massive change in attitude will have to occur before truly integrated factories develop in this part of the world.

The term "computer-integrated manufacturing" suggests various things to various people. Just as CIM in this country is unlikely to ever be as all-inclusive as it is in Japan, where some manufacturers are linked to their suppliers and customers in a single system, the concept takes on different shapes when viewed in light of individual company situations.

To some, CIM is a way of linking already-automated pieces of factory equipment; to others, it means connecting the shop floor with corporate financial management systems. CIM can also mean coupling design engineering stations with flexible manufacturing systems or hooking into a supplier's order entry system as part of a just-in-time inventory management program or being part of a customer's just-in-time scheme on the other end of the production cycle.

It is a mistake, however, to think of CIM as just a set of technologies. "One of the shortcomings of CIM as a buzzword is that it sounds like something you can go out and buy," Pingry says. Actually, the components of a fully integrated manufacturing system are too numerous and too varied to ever be supplied by a single vendor, and organizations intending to embark on a CIM program must be prepared to do some of their own integration and customization to get the system to work. And, at its heart, CIM is not machinery but an expression of a corporate philosophy and strategy.

Charles Savage, a Wellesley, Mass.-based manufacturing automation consultant and principal at D. Appleton Co., distinguishes between two levels of CIM, which he designates "CIM I" and "CIM II." CIM I, he says, is actually computer-interfaced manufacturing. It concentrates on building physical connections among the various functional departments in an organization so that they can pass files back and forth among themselves. Taken only to this level, CIM can create more problems than it solves.

Each department, Savage explains, has its own way of looking at the world and its own language. "Words that have one meaning in one [departmental] context often mean something different in another," he says. Without interfaces between departments, people make translations as a matter of course. "If you bypass the people and try to send digital information directly from one department to another," he warns, "chances are you're going to have problems."

In order for the integrated manufacturing concept to work, Savage says, there must also be

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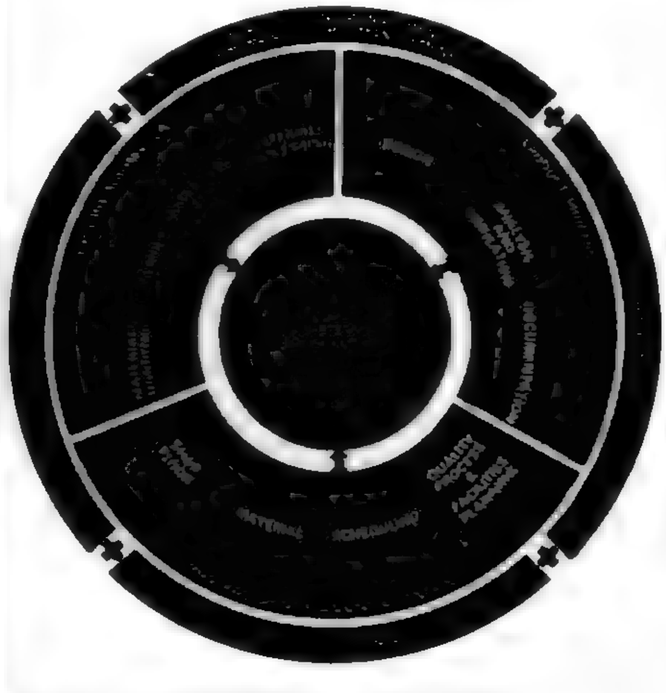
Williamson is a technical journalist based in Warwick, Mass. She writes frequently on advanced computing techniques.

Computer-Integrated Manufacturing
A cross-sectional view of enterprise elements



CIM "Wheel" developed by the Technical Council of the Computer and Automated Systems Association of SME (CASA/SME) — Copyright 1985 CASA/SME Second Edition, Revised November 5, 1985.

Integration

FROM PREVIOUS PAGE

"computer-integrative management of the manufacturing enterprise," or what he calls CIM II. "It isn't as though one day you're not integrated and the next day you are," he says. Integration is an ongoing process with management at its core.

Three infrastructures

Savage describes three infrastructures that make up a CIM system: the technological infrastructure that creates the connection among working units in the manufacturing enterprise; the referential infrastructure in which a data item has the same meaning regardless of the data base in which it resides; and an attitudinal infrastructure in which everyone in the organization shares a vision of where the enterprise is headed and how to get there.

It is pointless, for example, to integrate engineering · design workstations with equipment on the manufacturing floor if design engineers have no interest in designing for manufacturability and consider the suggestions of manufacturing engineers as the whims of an inferior caste. Savage says the sharp divisions between functioning units in a manufacturing organization and between workers and managers are at the core of America's industrial malaise. "If we built buildings like we define jobs, the ceilings would be four feet high, and people would have to walk around in a stooped mode," he says.

The need for revitalization of the manufacturing sector is a theme repeatedly sounded by CIM proponents. If the U.S. is to remain competitive in the global marketplace, proponents say, the country must rethink its methods.

Joel Orr of Orr Associates, Inc. in Great Falls, Va., attributes the focus on CIM to concern over the "radical erosion" of the U.S "post-World War II position of kingship in the world manufacturing economy." He disputes the common prediction that the U.S. will soon become a service economy. To remain viable, Orr explains, a nation must create wealth, not just move money around as it does when providing services. And the only ways to create wealth are through agriculture and manufacturing. "We're not going to become a nation of service industries," he says. "If we go too far along that path, the U.S. as we know it will cease to exist. Somebody will simply walk in and take over."

We need to build more flexibility into our system. When gasoline prices soared in the 1970s, demand intensified for economy automobiles. It took U.S. automakers five years to catch up with the marketplace, largely because of the lack of integration among automotive design, tooling and manufacturing functions. Meanwhile, overseas automakers virtually walked away with the American car market.

We also need to cut costs. "We're in terrible shape if we compare ourselves with the Japanese just in the area of overhead," says George Sibbald, a principal in the consulting firm Genovation, Inc. in South San Francisco, Calif. "We have four times as many middle managers as the Japanese, and we pay them four times as much. That's a sixteenfold deficit when we go out in the marketplace."

Planning for CIM, Sibbald maintains, often leads to a simplification of the manufacturing process — even if the company never implements its integration plan. In fact, he says, the need for automation itself, as well as the need for integration, often decreases when an organization takes a good hard look at the way it does things and decides to streamline and simplify its operations.

In a forthcoming book, *Organismic Management*, Orr describes the engineering and manufacturing departments in a typical organization as "a pair of pyramids that meet only at the level of the organization's president. There is a gap between them from the ground up to the top." Orr, also coauthor of *The CIM Handbook* (McGraw-Hill Book Co., 1987), says there would be no such gap in a fully integrated company. "There would be a single structure. Whether it would be pyramidal is another question entirely. I'm not certain that the pyramidal structure is well suited for the implementation of CIM," he says.

> "WHAT YOU want to do is create one view of the product and process and then use that view at each stage of the operation."
>
> CHARLES SAVAGE
> D. APPLETON CO.

Building bridges

In most American organizations, then, cultural change will be a necessary part of integrating the manufacturing enterprise. So, too, will be building bridges between all of the activities that combine to form the business. In his book, *Cimplan, The Systematic Approach to Factory Automation* (Cutter Information Services, 1986), Lee Hales, manager of the Systecon industrial consulting division of Coopers & Lybrand, identifies five major stages of manufacturing operations and 15 functions within them that would be linked in an internally integrated manufacturing system:

- **Engineering.**
  - Design.
  - Analysis.
  - Documentation.
- **Planning.**
  - Parts planning.
  - Production and inventory planning.
- **Control.**
  - Process, shop and materials control.
  - Inspection, testing and quality.
- **Production.**
  - Parts and tool production.
  - Assembly.
  - Handling and storage.
- **Support.**
  - Facilities engineering and maintenance.
  - Personnel management.
  - Data processing.
  - Order processing.
  - Accounting.

Associated with these functions are the hardware and software that must be linked to form an integrated whole — mainframes, minicomputers and micros, programmable controllers, automatic test equipment, robots, data collection equipment such as bar code and laser beam readers, applications for manufacturing resource planning, simulation, quality assurance, control of individual manufacturing tools and processes, administrative applications such as accounting and human resource management, decision support and data base management software. Add to these the office and factory networks and their associated servers and software, and you have the daunting picture that so often keeps companies from tackling a CIM planning project.

And building bridges is not enough. If the information that is coming across those bridges is not in a language that all parts of the system can understand, confusion is often the result.

Savage tells of one company that has seven different ways to list the same parts, each way determined by the needs of a different department. "What you want to do," he says, "is create one view of the product and the process and then use that view at each succeeding stage of the operation."

One means for doing this is being pioneered by the aerospace industry in a project called Product Data Exchange Specification (PDES), funded by the U.S. Air Force.

PDES is a standard way of describing parts and processes used in a variety of industrial organizations.

This kind of standardization facilitates dialogue among functional units within a company. It also eases communications between organizations, allowing a company to place orders with its suppliers and fill orders from its customers by communicating digitally rather than through hard-copy purchase orders.

PDES, Savage says, provides "a common reference model so that when companies cut the part, service the part or price the part, they'll all be talking about the same thing."

Driven by the desire for accurate digital communications, the most forward-looking companies are beginning to treat data as a corporate asset — to the extent of creating a data administrator's position, whose job it is to create standard definitions for items of data, regardless of the

CASA/SME awards

1986

Martin Marietta Energy Systems, Inc.
Y-12 Plant
Oak Ridge, Tenn.

The Y-12 Plant was credited by the Computer and Automated Systems Association of the Society of Manufacturing Engineers (CASA/SME) as an example of a comprehensive computer-integrated manufacturing (CIM) program that reflected top-level strategic planning and grass-roots implementation. Starting in 1978 with a commissioned study of the still-nascent computer-aided design and manufacturing technologies, the Y-12 Plant moved forward to implement a state-of-the-art CIM installation.

1985

Cone Drive Operations of Ex-Cell-O Corp.
Traverse City, Mich.

Labor and material costs, a high inventory investment and foreign competition compelled Cone Drive to adopt CIM, according to CASA/-SME, and the results were, and continue to be, impressive. Among the benefits attributed to CIM technology and practices are reduced manufacturing costs, improved quality and increased efficiency in both manufacturing throughput and integrity of deliveries.

1984

General Electric Co.
Steam Turbine-Generator Operations
Schenectady, N.Y.

General Electric's CIM system in Schenectady was, according to CASA/SME, formulated in recognition of a changing marketplace. In essence, the company devised a master plan that would link the total operation — from price quotation through engineering and manufacturing and all the way to finance — in a common, integrated data base.

location or architecture of the data base in which they reside. "I'll know we've made it when finance puts an asset number on a datum the same way it puts one on a table or a computer," Savage says.

Control over the corporate data dictionary, Savage adds, is "a new and burgeoning field," which he refers to as computer-aided data engineering, or CADE. "It's going to emerge in the 1990s," he predicts, "and that's when we're going to hit some pay dirt. It will make truer integration possible."

Less paper, less cost

Other pieces of the CIM puzzle are starting to fall into place. One is group technology, a method of coding engineering drawings according to parts families so that the drawings can be retrieved when another engineer is to design a similar part.

> "IF YOU focus on body count or insist that every project in the plan show a 22% internal rate of return, you're not going to get CIM."
>
> LEE HALES
> SYSTECON

Today, most engineering drawings are handled as though they were done in a paper-based system. So, instead of looking through a library of shafts when a new one is needed, the engineer is likely to find it easier to start from scratch. The results, in addition to time wasted in redesign, include large inventories of similar parts that must be kept in stock for repairs, confusing and inaccurate parts lists and erroneous documentation — much of which could be avoided if an engineer were freed from the need to reinvent the wheel on each assignment.

Getting CAD-generated engineering drawings to communicate with other parts of the manufacturing system is another tricky hurdle. Just finding the starting point in a drawing can be difficult, especially for a machine shop that serves a number of customers.

An attempt to iron out the problems with this interface is being made in another Air Force-funded project being developed by LTV Corp. in Dallas and McDonnell Douglas Aerospace in St. Louis. McDonnell Douglas is a prime contractor to the Air Force in building B-1 bombers. LTV is a subcontractor. To date, LTV has succeeded in sending the design for a B-1 part created on its Automation Technology Products' Cimplex CAD system directly to McDonnell Douglas's computer-aided design and drafting system. There, the drawing is used to write a program for a numerical controller, which then produces and inspects the part.

All of this is performed digitally — a significant change from the more familiar practice of producing the design on a blueprint at McDonnell Douglas and then having people at LTV interpret the blueprint, write the numerical controller program, punch the program tape and proofread it.

The next part of the program, which will cost hundreds of thousands of dollars, calls for the two companies to reverse the process, with McDonnell Douglas sending the design to LTV and LTV using the digital data to produce the part.

According to Don Norwood, CIM programs manager at LTV, the companies anticipate a 90% reduction in design-to-production time. "The real payoff is that this can all be done and tested on a computer screen without ever making a part," Norwood says.

Justifying the costs

In this way, piece by piece, forward-looking companies are moving to eliminate the remaining obstacles to fully integrated manufacturing systems. But the process will always be a slow one, according to Systecon's Hales. "To achieve significant levels of integration is typically a four- to five-year program," he says. That is one reason, he says, that management must pay close attention to rigorous cost justification.

"To sell it to the board of directors," Hales says, "you have to focus on what it's going to do for you in the marketplace. Will it increase sales or retain sales you might otherwise lose? Does it improve cost structure so that you can increase margins when sales are flat?"

Management, he continues, must take a long-term view of competitive position. "If you focus on body count or insist that every project in the plan show a 22% internal rate of return, you're not going to get CIM. Not all projects show those kinds of tangible returns. You have to be thinking strategically. You don't really know what return you've achieved until you have the integration in place and operating."

But Hales says he has no doubt the benefits exist. "We're not talking about 10% improvements," he says. "In some cases, we're talking about tenfold improvements in things like cycle time, time to market or time to implement introduction of a design change. Those results are real."

CIM at DEC

Digital Equipment Corp. is a vendor of CIM building blocks that practices what it preaches.

Continued on page S5

Artificial intelligence takes a stand on the factory floor

Artificial intelligence on the factory floor is usually equated with robotics, but that concept is much more limited than reality.

The fact is there are more commercial applications of AI technology in manufacturing than in any other field, including finance. Most recently, vision systems have been incorporated into the inspection process. And voice technology, sometimes coupled with natural language processing systems, is now being employed for hands-busy tasks such as physical inventory.

Until recently, the most advanced of these systems have been developed in-house and were proprietary. Companies that made the large investment necessary to develop them did so either to fix problems they would prefer the public knew nothing about or to give themselves a competitive edge that might evaporate if the competition knew the tools existed. Consequently, specifics about these advanced systems were usually embargoed.

But now a growing number of knowledge-based, or expert, systems are coming into public view as some companies lift the veils off their proprietary technology and as customizable commercial systems begin to hit the market.

> EXPERT systems technology was developed to tackle . . . the kind of situation that brings algorithmic programs to their knees.

The best known in-house expert system is Digital Equipment Corp.'s configuration expert, called R-1 during development at Carnegie-Mellon University and renamed Xcon when DEC assumed responsibility for its continued development. Working from customer orders, Xcon develops the configuration specifications for about 90% of all VAX computer systems that DEC ships and is reported to be saving the company some $18 million each year by reducing the number of components manufactured unnecessarily.

What AI can do for you

Other companies are putting expert systems to work in scheduling, troubleshooting, decision support and quality inspection as well. Some of these tasks, of course, are already being handled by traditional applications built on a data base, so it is logical to ask why adding AI technology makes the jobs any better than using what exists now.

One answer is that expert systems technology was developed to tackle problems in which some information may be inexact or entirely missing — just the kind of situation that brings algorithmic programs to their knees. Another is that expert systems can take a great many factors into account in reaching a conclusion; human experts typically can handle only three or four considerations at a time. In addition, expert systems can do things that human beings cannot do — or can do only with great difficulty and expense.

For example, one company has a system that can compare X rays of a machined part with computer-aided design drawings and locate internal manufacturing flaws. When a defect is located, the system directs a precisely aimed laser blast into the part to prevent the flaw from migrating and then adds data about the problem and the remedy to the quality assurance report that moves with the part through the production process.

Ford Motor Co. has a system, built by Precept Automation, Inc. in Pittsburgh, that monitors each step in the process of attaching vinyl side moldings to its Taurus automobiles and issues a warning if temperature, pressure or location data are out of tolerance.

The Carnegie Group, Inc., also in Pittsburgh, has built a system for DEC that dispatches work for printed-wire board assembly, increasing throughput by 100%, according to Mark Fox, Carnegie Group's president and chief executive officer. Another system, currently being field tested, is capable of designing an electronic circuit from a behavioral specification, he says.

Customizable systems

Whereas these systems belong to the company that paid for their development, another category of knowledge-based systems — one which is growing rapidly — is sold on the open market and becomes tailored to the company that buys it by the addition of company-specific information.

One of these commercial systems, the Operations Advisor from Palladian Software, Inc. in Cambridge, Mass., is designed to help the development of manufacturing strategies. A process engineer could, for example, use this system to predict how changes in the process flow would affect cost, lead times and work-in-progress inventories.

Another generic expert system is DSSCA Manufacturing System by Pittsburgh-based Decision Support Systems for Commercial Applications. The product analyzes production schedules to optimize the allocation of resources and looks for opportunities to salvage materials in the rework pile for use in filling incoming customer orders.

A typical process factory has between 5% and 10% of its inventory on the rework pile at any time. It often costs less to discard spoiled materials than to spend time performing the complex calculations that would uncover other uses for them. For a company that counts on a 10% return on investment and must scrap 10% of its raw materials, turning half of the rework pile into salable finished goods can have a dramatic effect on profits.

MSA Advanced Manufacturing, a division of Management Science America, Inc. in Atlanta, sells an expert system that acts as a front-end enhancement to its MRP II software. Inserting company-specific information into MSA's MRP II software, the expert system streamlines the coding process and produces an MRP II system customized for its owner.

A growing number of companies use expert system development software, often called shells, to build their own knowledge-based systems, either using in-house programming expertise or outside knowledge engineering expertise. Dozens of shells run on everything from the largest mainframes to personal computers. IBM, DEC and Cullinet Software, Inc. offer such products; so, too, do many software publishers and consulting companies.

Lee Hales, director of Coopers and Lybrand's Systecon consulting division, says that the use of AI technology should at least be considered by anyone planning for computer-integrated manufacturing (CIM). "It's not axiomatic that every CIM plan needs an expert system," he says, "but somebody should look at it, evaluate tools and understand what other companies have achieved."

The question of whether AI technology can work in manufacturing is no longer an issue, Carnegie Group's Fox says. "We're past the point of proving the technology," he adds. "We're now at the point of finding whether people are smart enough to get involved with it."

MICKEY WILLIAMSON

A little preparation takes risk out of MRP II

BY LARRY G. CURRY

If you surveyed the top managers of U.S. manufacturing companies today, most would probably voice some, if not all, of the following complaints:

- We can sell, but we can't ship.
- We've got cash-flow problems.
- We're getting a lot of calls from irate customers.
- We've got too much inventory.
- People don't properly execute top management's plans.
- We're not as competitive as we used to be.
- We're losing market share.

These are the difficulties manufacturers gripe about, but are they really the problems, or are they only the symptoms of a company lacking the control of an overall game plan? Probably the latter.

Most companies do not have a strategy that encourages all of their employees to march to the beat of the same drummer. As a result, they are seldom able to produce the right quantity of the right product at the right time.

Manufacturing resource planning (MRP II) has long been recognized as the tool that allows a company to generate the integrated company plan required to improve top management's control of the business.

Misconceptions

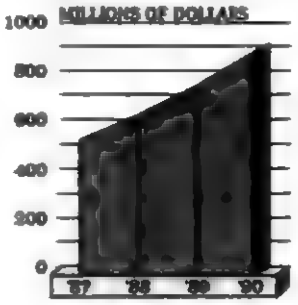
Why, then, have so few companies chosen to take advantage of it? Possibly it is because of the misconceptions that MRP II is just another computer system or that it addresses only inventory issues. Or perhaps management is looking for a quick fix for all of their problems.

MRP II is none of the above. It is a people system that integrates the plans of marketing, finance, engineering and manufacturing into a unified company strategy. It is not a quick fix; the average implementation time lasts from 18 to 24 months. During that time, the implementation project must be given highest priority, second only to the product's shipment.

Fortunately, MRP II pioneers have helped chart a path to successful MRP II implementation. Following this path can help a company avoid the pitfalls most commonly encountered during implementation.

First step: education. As with any project, the first step — education — is one of the most critical. This includes off-site classes for the chief executive officer, his executive staff and the middle-management team. The purpose of this is twofold: It allows management to make an intelligent decision regarding the need for MRP II, and, by visibly involving upper management, it stresses the importance the company places on the undertaking. This second objective cannot be emphasized enough. The attitude of the people responsible for making MRP II work is a key element in a successful implementation.

MRP II sales forecast
Worldwide sales potential for U.S. companies, 1987 to 1990



INFORMATION PROVIDED BY HARBOR RESEARCH CORP.

The project team. Once the decision has been made to proceed, a project team must be selected. This team should be composed primarily of users and include a full-time project leader. The leader should be selected from inside the company, should be knowledgeable about the company's processes and products and have credibility with both top management and users. His No. 1 priority must be to provide direction to the project team and ensure that the project is always moving forward.

The executive steering committee, which is made up of the CEO and his staff, must review the project's progress to ensure that it stays on track.

Software selection. One of the most common mistakes made by companies that are implementing MRP II for the first time lies in the area of software selection. In his book, *The Right Choice — A Complete Guide To Evaluating, Selecting and Installing MRP II Software* (Oliver Wight Limited Publications, Inc., 1987), Christopher Gray says, "Never make a software decision until initial education is complete."

Members of the management team must understand MRP II and decide how they want the company to operate. They can then select the software package that best supports their needs. To make an uninformed software decision can severely limit a company's future options.

Preparing for the pilot. Concurrent with initial education and software selection, top management must begin production planning and establish written master production scheduling policies. In addition, steps must be taken to ensure data accuracy in the bill of materials and inventory records. The software must also be tested, and a pilot product selected. Once all of these pieces are in place, the pilot project can begin.

There are three possible approaches to converting to MRP II: parallel, cold turkey and the live pilot. The parallel approach has two major drawbacks. First, it requires a substantial drain on resources to operate both systems, and, second, it implies that the new output will be compared with the old to verify its validity. Since, in most cases, MRP II is being implemented because the output of the old system was inaccurate or inadequate, comparison of the two is probably not a valuable undertaking.

Tom Wallace, author of the book *MRP II: Making It Happen — The Implementor's Guide to Success with Manufacturing Resource Planning*, (Oliver Wight Limited Publications, Inc., 1985) says that when you go cold turkey, "You bet your company." It is similar to stepping off a cliff: Once you take the first step it's almost impossible to change your mind, and if the fall doesn't kill you, the sudden stop will. One high-tech company on the West Coast combined limited education with the cold turkey approach and stopped all output from the production areas for three days.

The recommended approach is the live pilot. This method provides maximum control with minimum risk. The pilot should be allowed to run until everyone involved is assured that the output is correct and is familiar with its operation.

As soon as the pilot is complete, conversion of the remaining products should begin. Products should be converted one or two at a time to maximize control and minimize risk. When all is operating smoothly, a similar approach should be used to bring the execution and financial systems on line.

MRP II allows people do their jobs better. It can work only if everyone involved is properly educated. Fifteen years ago, only about 20% of companies implementing MRP II were successful in their endeavor. Today, any company that approaches the process carefully and with skilled guidance should reap the full benefits of MRP II within two years. ●

Curry is an American Production and Inventory Control Society-certified practitioner with 19 years of experience in manufacturing. He was involved with MRP II implementations at two Oregon companies and has been with The Oliver Wight Companies, an education and consulting firm, since 1984.

Avoiding obstacles on the road to CIM

BY DAVID SHINKFIELD

As with all business changes, computer-integrated manufacturing (CIM) begins to pay for itself only when it is successfully implemented. There is some evidence, however, that a number of major companies that were early starters have been bogged down or have run into obstacles on the road to CIM.

All this means is that CIM implementation is complex and that achieving the planned benefits is a major challenge, not that CIM is unrealistic or unachievable. There are ways to minimize the potential problems inherent in automating and integrating the manufacturing process.

First and foremost, it is crucial to keep your objective in sight: the creation or improvement of your company's competitive advantage. Specifically, this means improving customer service, quality, response time and value for money. While developing and implementing your CIM facility, all decisions should be measured against this objective.

> COMPLEXITY poses the biggest threat. The simpler the application can be kept, the greater the probability of success.

Another priority is to develop a comprehensive strategy that will provide a focus for the many different disciplines — facility planners, product designers, sales engineers, customer service engineers, manufacturing engineers, system designers and human resource managers — that will be involved in making the integrated facility work.

In order for goals to be achieved, the new technologies must be matched to changes in management and the way the manufacturing process is organized. Management structure, roles, responsibilities, perhaps even attitudes, must be changed if the new information technology is not going to merely reaffirm old and perhaps irrelevant management practices.

Complexity poses the biggest threat to a company introducing CIM. The simpler the application can be kept, the greater the probability of success. If possible, therefore, it is best to streamline the process and the flow of materials before designing the CIM system. The reward for this exercise is that your objectives may be met with less automation but more management and control.

Practice vs. perception

Hewlett-Packard Co. advises companies that wish to get into CIM to learn how their factories actually function as opposed to how they are supposed to function. One project in which our firm, PA Technology, was recently involved confirmed the wisdom of that advice. During the development of a new integrated facility at a Fortune 100 company that supplies the automotive industry, we noted a major difference between actual practice and management perceptions of practice in the area of chemical measurement methods. Convincing management that its assumptions regarding the operation of its factory were incorrect required a significant effort.

Costing out CIM can be complicated by accounting practices reflecting the traditional belief that hardware, not software, represents the major capital investment. A CIM introduction has a significant software component that can, in some instances, account for up to a third of the project costs. These costs must be an integral part of the budgeting and funding authorization process.

In simpler times, when equipment purchases were largely stand-alone machines, it was plant equipment that was purchased first, and software followed. A CIM installation consists of a variety of equipment, which can be supplied by a range of vendors. This equipment must be interconnected.

To minimize the complexity, again, it is best to start by preparing a system interface specification, defining how equipment will talk to the network and then including that standard in the equipment purchase order.

Where CIM has failed, the company has usually been in too much of a hurry to open the doors to the new technology. An incremental approach to achieving the strategy reduces the risks and any potential pitfalls.

Finally, the latest thinking on managing complex projects suggests attacking high-risk areas first. If you can crack the biggest problems up front, by comparison the rest will seem easy. ●

Shinkfield is director of advanced manufacturing at PA Technology in Hightstown, N.J.

Integration

FROM PAGE S3

"CIM is critical for our long-term success," says Richard Haslett, DEC's manufacturing CIM program manager. "It's a competitive issue for us."

Haslett says that DEC's manufacturing arm has used computers to manage the business almost since its inception, so the company followed "the classical CIM growth path by developing ever larger islands of automation," he says. Now the company has several major programs to bridge those islands and to reach out to the rest of the world.

One program focuses on shop floor integration; another links engineering to manufacturing; and a third is working on electronic data interchange with DEC's suppliers.

> "CIM is critical for our long-term success. It's a competitive issue for us."
>
> RICHARD HASLETT
> DIGITAL EQUIPMENT CORP.

"The engineering-to-manufacturing interface work is really on the cutting edge for our particular industry," Haslett says. "The quicker we can get products to market, the more competitive we're going to be."

The electronic data interchange program, which Haslett says is "still embryonic in terms of our relationships with specific vendors," has a just-in-time inventory management system as its goal. DEC has been working on just-in-time techniques long enough to be seeing measurable results. The company routinely plots published financial data for five vendors that it considers to be its major competitors. One of the factors measured is inventory turn (cost of goods sold divided by average inventory), a measure of the nonproductive portion of corporate assets.

"DEC had always defined the bottom end of the range," Haslett says. "But five years ago, we set out to improve our materials management performance." At the end of fiscal 1986, DEC led the group in inventory performance and expects to do so again this year.

"The first half of the journey, getting up to the average, just involved taking out a lot of the inefficiencies that had crept in, but surpassing the top end of the scale was the result of a very focused effort. Now we're setting the parameter for the top end, and it's still climbing," Haslett says.

To take those results to the bottom line, if nothing had changed, the company would have needed more than $2 billion in inventory to support its level of business in 1986. Instead, "we closed the books at about $1.4 billion, so we added $600 million to $700 million to the balance sheet," Haslett notes. "That number usually catches their attention."

Longtime icons

The role models for this kind of success are still few in number — so few, in fact, that most industry experts name the same companies. First on almost everyone's list is Deere & Co. (formerly John Deere), maker of farm equipment. Deere's Waterloo, Iowa, Tractor Works was the first recipient of the Industry LEAD award given annually since 1981 by the Computer and Automated Systems Association of the Society of Manufacturing Engineers for "leadership and excellence in the application and development of computer-integrated manufacturing."

"A lot of people say Deere is losing money," says David Penning, head of the CIM unit at Dataquest, Inc., a San Jose, Calif.-based market research firm. "But the point is, they're in a market where everyone else has gone broke. The fact that they're still around is due to their willingness to invest and be pioneers."

A number of factors keep companies from implementing a CIM strategy. Penning lists 10 and says, "Put them all together, and it's like hitting a brick wall." Among these impediments are the following:

- **Lack of a manufacturing strategy.** A sense of direction is crucial to a CIM plan, yet many organizations are unable to articulate where they are going or how they intend to get there.
- **Inappropriate product design.** "You can't just take a product and say, 'OK, now we'll produce this by automation,'" Penning says. "You have to design it to be produced by automatic equipment."
- **Lack of standards, especially for communication.** "IBM doesn't talk to DEC doesn't talk to HP doesn't talk to Tektronix and so forth. It's a mess," Penning says, noting, "We're beginning now to get some standards." The manufacturing automation protocol project spearheaded by General Motors Corp. is one notable effort.
- **Technically weak top management.** Management today tends to come from administrative departments such as accounting or marketing, with no experience in the technology of manufacturing or design, Penning says, and is therefore unable to cope with the complexities of CIM.
- **Inappropriate measures being used for return on investment.** "The assumption

Continued on page S6

VENDOR VIEWPOINT

Pick Systems: A step beyond the obvious

BY JOHN BLUMBERG

It has long been a given that manufacturing systems require a data base management system at their heart. This becomes increasingly true as the drive toward computer-integrated manufacturing (CIM) accelerates.

Today, the relational model is being espoused by most manufacturers and software developers. There also seems to be general agreement in the manufacturing community that, while it does not solve all of a manufacturer's integration problems, the relational model does offer the best opportunity of achieving CIM.

What is unfortunate is that one of the most effective realizations of this model is one that is little known or recognized. Ask any MIS manager or consultant where to go for a relational data base system, and his answer will be IBM, Cullinet Software, Inc., Oracle Corp., Software AG of North America, Inc., Applied Data Research, Inc. and Cincom Systems, Inc.

Or, if the manager has a particular hardware bias, the response will probably be divided among IBM, Hewlett-Packard Co., Digital Equipment Corp., Wang Laboratories, Inc. or another major player. The answer that will almost never come back is Pick Systems.

> PICK can be used in a business environment without the high-priced MIS talent normally associated with a DBMS.

The Pick system was created in the late 1960s by Don Nelson and Dick Pick and became commercially available in 1974. In the first decade of its existence, Pick was viewed strictly as an operating system, and, in fact, it does provide all the features found in operating systems released in the 1980s.

Its most important feature for the manufacturer, however, is a natural, English-like human-engineered interface to a relational data base. Pick's relational data base predates the published works of Edward Codd and Chris Date, pioneers in the field of the relational model.

Flexible from the start

Consultants and analysts point out three major advantages in the relational model: easy user interaction, programmer productivity and flexibility. These were the driving forces behind the development of precursors to the Pick system at TRW, Inc. in 1965.

While a certain number of organizational, managerial and planning problems have to be expected in any data base implementation, the Pick system reduces these to a minimum. Pick can be used in a business environment without the high-priced MIS talent that is normally associated with a DBMS. There are more than 60,000 Pick systems installed worldwide, and most of them are run without the benefit of an MIS department.

> THERE are more than 60,000 Pick systems installed worldwide, most of which run without the benefit of an MIS department.

An employee with minimal training can input and extract the information he needs from the system. Pick allows a user to direct the machine to deliver information with English-like commands. The operator asks the computer to LIST or SORT information from a relational table, states the desired selection conditions and lists the data by the desired name. These commands can be predefined, and the user can receive on-screen prompts for selection criteria.

Pick's data fields are defined in data dictionaries and given meaningful business names. The data base supports calculated fields, virtual fields, copied fields, numbers, dates, time of day, characters, text and edited fields. The user does not care about description details — all he needs to know are the data names.

Programming is accomplished through an extended version of Basic. Extensions include string manipulation, structured programming syntax, screen manipulation, subroutine support and output formatting. Programmers working with Pick Basic report it is more like Pascal than Basic.

The great strength of Pick Basic is that it is tightly coupled with the relational data base. A robust array of I/O verbs are provided to efficiently manipulate the data structures. The terminal commands can be used within the programs, providing a built-in report generator capability.

Flexibility is both the hallmark and key attraction of the relational DBMS, and Pick is extremely flexible. Pick data structures can be changed even when populated with information. When the U.S. Postal Service came up with Zip Plus Four, for example, data bases across the country shuddered, but not Pick. A data dictionary change from five to nine digits was all that was needed.

Data items such as date and time are not always handled well by a DBMS, yet these types of data are critical to a manufacturing data base. Pick, on the other hand, has always addressed these data items as special types by offering the user the functionality of a data dictionary to control data entry, display and manipulation.

Adding new data fields, new relational tables and new applications is easy with the Pick DBMS. The data dictionary is active, and there is no data base generation or binding process. Applications, fields and tables can be added to a running system without disturbing the production cycle. Of course, recompilation of programs and data entry are necessary to use the new information.

An unchanging nature

Performance becomes an especially critical issue when the data base adheres to the relational model.

The relational model does not define an implementation, and most relational DBMSs are layered on existing general-purpose file structures, which means little or no optimization can take place. This condition is caused by independent software suppliers implementing their DBMS on someone else's hardware design. With some exceptions, users of those products have no portability and, in some cases, are without upgrade paths.

Pick implementations follow generic specifications, however, so users on any machine view the system as Pick-based. Each of these Pick implementations is

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Blumberg is director of marketing at Northeast Data Systems, Inc., a Burlington, Mass.-based CIM vendor for the electronics, metal fabrication and food-processing industries.

Integration

FROM PAGE 55

that if we do nothing, it costs nothing is the worst mistake," Penning warns.

- **Rapid changes in technology and the let's-wait-for-the-next-breakthrough syndrome.**

Organizations that overcome these difficulties can choose from a number of entries with which to integrate their operations. Some start with a computer-aided design and manufacturing system, some with a manufacturing resource planning (MRP II) system and some by linking existing islands of automation on the factory floor. Few believe that they have the option of taking what industry observers call "the green-field approach" of building a fully automated company from the ground up.

Which approach makes most sense is usually a function of the kind of manufacturing enterprise in question and the systems the organization has in place.

Orr stresses the need to start with as few assumptions as possible. "Everybody is saying that the green-field theory of CIM is too expensive, and the current thought about how to deal with islands of automation is that you build bridges. But it may be better to drain the ocean and get to work with bulldozers — in a sense to start over with existing resources, reallocating and being willing not to have any sacred cows," he says.

Turf warfare is almost inevitable, and a strong management commitment is required to keep internal politics from driving the CIM plan.

SOME START WITH a computer-aided design and manufacturing system, some with a manufacturing resource planning system and some by linking existing islands of automation on the factory floor.

Systecon's Hales describes a typical situation: "Let's say a company's real problem in terms of shipment cycle is that it has a hopeless order entry system in the customer service department. They could take days out of the cycle by cleaning up the front-end paperwork processes in order entry.

"Meanwhile," he continues, "the materials manager is operating a 10-year-old homegrown MRP system that's dated and expensive to maintain. The CIM plan may acknowledge that the MRP system should be replaced, but the order entry system is far more important, so the company will work on that for 24 to 36 months and get to MRP later. That's a pretty tough pill to swallow if you're the materials manager."

In many companies, Hales says, "the person who is the most eloquent or has the ear of the funding executive is going to get the nod. In a CIM plan, each functional manager will have realized his place in the scheme of things, and you'll actually be funding, each year, that year's chunk of a long-term strategic program. That's quite different from the way we go about it today."

Contrary to the predictions of those in information resource management, CIM system design is not likely to fall under the control of the information systems department, according to Hales. "DP professionals tell us they don't want to drive it," he says, "that it should be driven by folks from manufacturing or marketing or by top management directly."

However, he adds, the MIS department's contributions are vital to the success of the effort. If ill will has developed between manufacturing and MIS, Hales warns, "that has got to be stopped up front. We've got to get back to playing together as a team."

Details and direction

Politics aside, the major pitfall in implementing a CIM plan seems to be a tendency to get involved in the details of architecture before the overall strategic direction has been set. "People cover the walls of the conference room with flow diagrams, and yet they still don't have a vision of what they want to integrate," Hales says.

After a period of lethargy, a growing interest in CIM is starting to reflect itself in the marketplace. Dataquest's Penning says the U.S. market for CIM products has been flat at $17 billion for the past couple of years. He expects it to reach $28 billion by 1991, still only about 3.6% of overall capital expenditures in manufacturing.

Penning says the new interest in CIM stems from a recognition that manufacturers "must use computers and new organizational strategies. That message has gotten through," he says. "The questions now are how and what is the best way."

Deciding to integrate may be a "bet your business" decision, Penning says, but "deciding not to is to bet on going out of business."

"There's an opportunity here as well as a threat," he continues. "How else are we going to create the wealth to give us the standard of living that we've become accustomed to? What else are we going to do: sell each other insurance and sue each other? Where's the wealth? It's got to come from agriculture and manufacturing," he says. •

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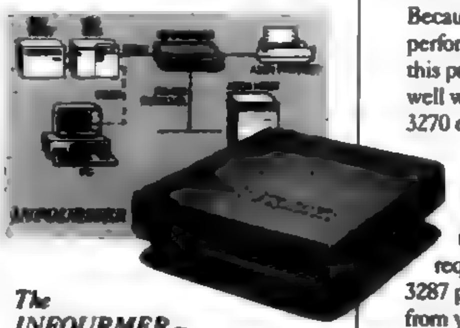

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Human systems demand equal time in CIM effort

BY STEPHEN STULCK

The transition to a computer-integrated manufacturing (CIM) environment poses challenges to virtually all elements of traditional organizational life. Implementing CIM calls for deliberate and planned change that recognizes the way the three major subsystems of a product-producing organization — the manufacturing system, the information system and the human system — overlap and interact.

It is in the intersection of these three domains that change is most pronounced. Most organizations are able to address each area independently but struggle when it comes to addressing them in an integrated manner.

Many organizations, although receptive to innovation in technology, resist innovation in the social or organizational domain. Compounding that irony is the fact that most of the recalcitrants are aware, at least on an intellectual level, that when technically innovative projects fail, it is generally not because of technical problems but because people issues go unaddressed.

A critical first step in managing the changes that accompany the introduction of advanced manufacturing technology is to identify those human issues, many of which involve more than manufacturing and require attention from the entire corporate management.

> POWER and conflict, as central features of organizational life, are affected deeply, if not always openly, by the introduction of CIM.

Structural changes

When a manufacturing organization moves ahead into an advanced automation mode, functional groups within the production facility tend to report directly to the plant manager, since the need for rapid detection and correction of errors mandates a short line of communications.

Reducing the managerial hierarchy in this way encourages managers to assume increased responsibility and adopt a more participative management style. Often, no more than three or four levels of management exist within a plant from the shop floor to the plant manager. The employees who feel the greatest impact from this hierarchical change are the lower- and middle-level managers, who are asked to assume a much broader span of control.

Reducing the managerial hierarchy can also result in a drastic reduction of job classifications. With fewer classifications, jobs become less defined, and employees must develop diverse skills that cross traditional functional or operational boundaries. A single job might, for instance, include aspects of production, materials, maintenance, quality control, personnel and housekeeping.

This blurring of functional responsibilities is not limited to the shop floor. Management and technical support staff must also cope with a greater degree of ambiguity. For example, the distinctions between quality-assurance engineering and process engineering or between product and manufacturing engineering is increasingly difficult to describe.

As a result, there is a trend in advanced manufacturing environments toward the development of work teams having the skill and authority to identify and fix problems they experience in the production process. Since it is difficult for one person to understand the entire operation, the use of a team allows information to be pooled.

Compensation systems often need to be modified to reflect and support changes in the organizational structure. Most notably, pay-for-learning systems are being developed to foster individual commitment to learning and to encourage employees to take on broad responsibilities for the operation and maintenance of the plant. These plans reward individuals with money, based on demonstrated competence in a wider range of skills and tasks. Group compensation programs reward employees at the corporate, plant or group level for improved performance.

Political changes

Power and conflict, as central features of organizational life, are affected deeply, if not always openly, by the introduction of CIM. Shifts in the distribution of power within the organization change how decisions are made and rearrange the informal pecking order within groups.

One observable change is the increased importance of employees who are knowledgeable in information systems — from corporate systems to the shop floor device controls. Such knowledge is critical and provides those who possess it with a legitimate seat at the table in the planning process.

Knowledge is often splintered among various groups, however, such as the corporate MIS function, the advanced engineering group and the plant manufacturing engineering function. Focusing this knowledge often requires great powers of conciliation on the part of the project manager.

Human resource managers also gain influence in effective CIM implementations. The need to closely align human resource policies and practices with the new operating practices in plants requires innovative and creative solutions.

The introduction of CIM makes new claims on scarce resources, and it is not unusual for coalitions to form and lobby for their own interests. Tensions also develop over who will control a specific project. Manufacturing engineering, manufacturing information systems and manufacturing operations, among others, all have claims to leadership of the project. Creating a unifying set of corporate objectives becomes critical when traditional turf struggles escalate.

In many cases, the organization is designed outward, from core production tasks to the various support activities, creating an organizational chart that resembles a jelly roll. The goal is to invest production teams with ultimate control over the resources needed for ongoing production. Support teams, on the other hand, deal with technical innovations and maintain liaisons with the wider corporate and vendor community.

This type of power division runs contrary to the traditional decision-making matrix within a plant and often disrupts already established corporate reporting relationships.

Plant managers, while given greater autonomy within the plant, are more dependent on product design groups, equipment engineering and marketing and must therefore learn to interact with them in a collaborative manner.

At the same time, the supervisor is asked to become an effective boundary manager and coach, ensuring that a work group has the information, skills and resources it needs to solve problems effectively.

Human resource changes

People need to be committed to organizational goals instead of feeling compelled merely to comply with specified behaviors. A paradox of CIM is that while a company's automation increases, its manufacturing process becomes increasingly dependent on sound judgment, effective decision making and accurate responses to unpredictable problems.

An investment in training is necessary to enhance technical and interpersonal skills. Training often begins long before plant start-up and tends to be formal, requiring designated trainers, course development and certification standards. In addition, it is not unusual to periodically require employees to be recertified in certain critical skills.

Although education on this scale can be expensive, the cost of shutting down the production operation in a highly integrated plant would far outweigh the cost of prevention.

In a CIM operation, problem solving is a responsibility that belongs to everyone in the plant, and there should be an effort to foster an environment in which information is readily available and in which problems surface early. This is happening in many places, and the term "employee information system" is starting to crop up with some frequency as a replacement for "management information system."

An even more significant redefinition resulting from CIM comes in the accounting status of human resources investments. Instead of regarding labor as a variable cost, companies often begin to treat it as a fixed cost of production, which has tremendous implications for the organization's relationship to its human resources.

Symbolic changes

The introduction of CIM is not a purely rational act. The organizational environment is ambiguous, contradictory and often confusing to those who work within it. To derive sense and order out of specific events or decisions, we use myths and rituals to help explain them.

Two major symbolic themes that arise in implementing CIM deal with the cultural values that encourage democratic participation and management by principle instead of by procedure.

As previously mentioned, expertise and knowledge become the prime determinants of authority in the organization, and control shifts according to who can contribute to the resolution of a given problem at a given time.

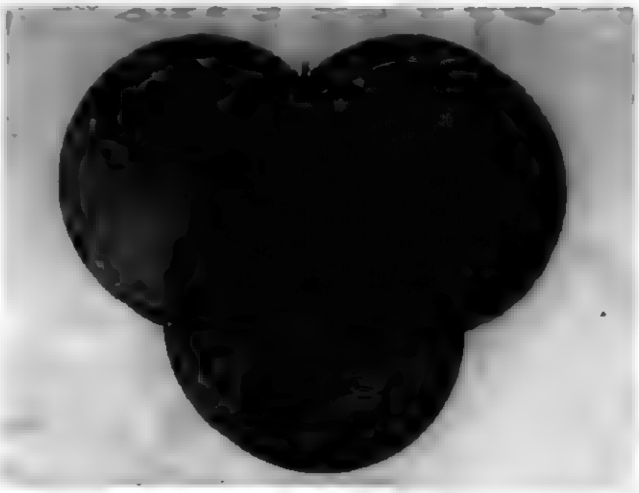
Business objectives are frequently discussed widely and in explicit terms on the assumption that when employees have a central role in creating the organization, they tend to feel more commitment to the organization. This theory appears to be valid for the first generation of employees in the plants. Whether it holds true over time is a subject for research.

The implementation of CIM requires managers to suspend their business-as-usual perspective. Technical innovation and social innovation are inextricably interconnected. Social innovation requires the same degree of attention, knowledge and experimentation as any technical system.

We need to learn how to create organizations capable of using the promise of computer-integrated manufacturing to its best advantage. To do that, we need to have organizations that mirror the characteristics of CIM technology: agility, adaptiveness, robustness and efficiency. •

Key components of CIM

Areas of interaction and maximum change



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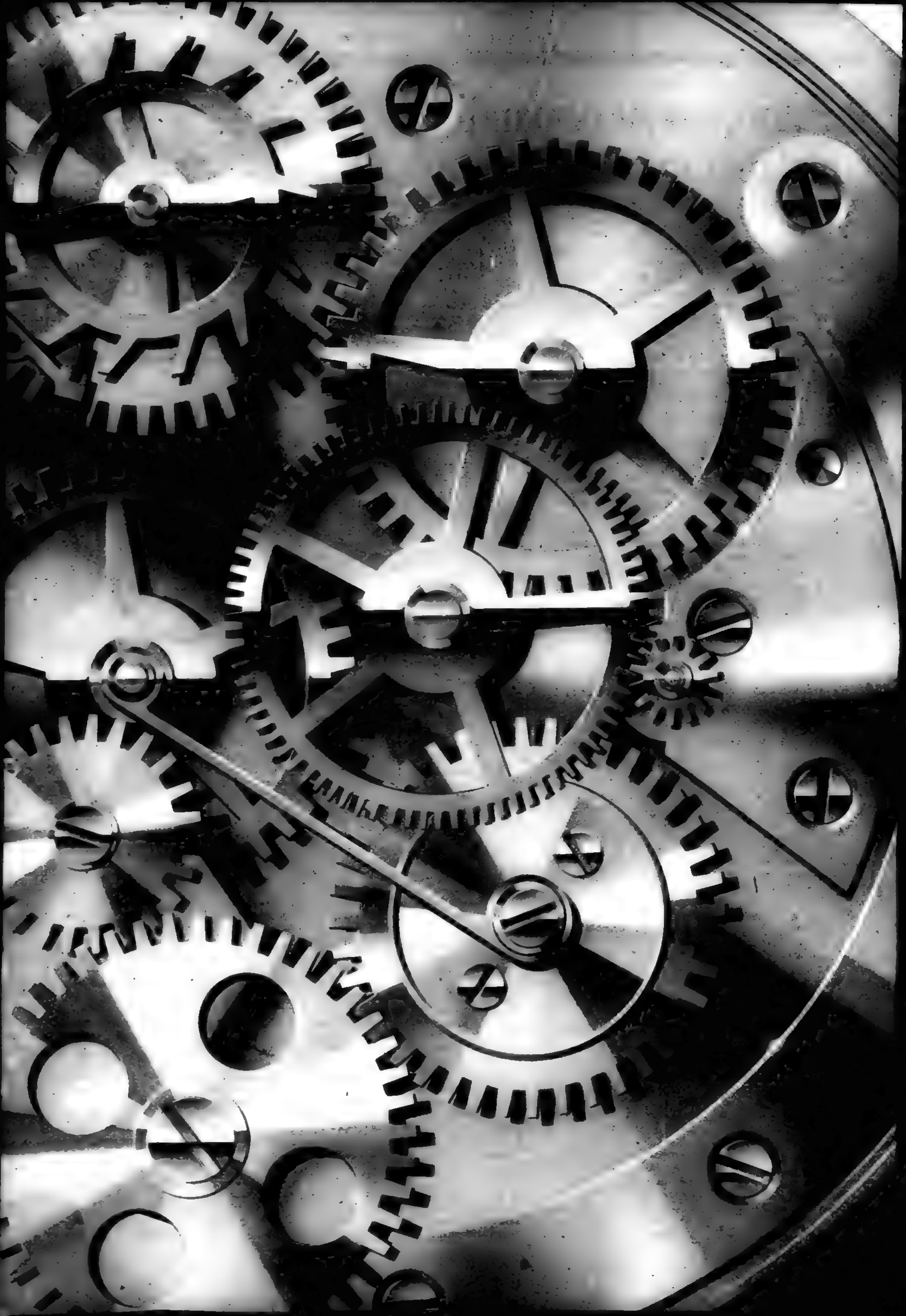
Stulck is director of human systems development at ITP Boston, Inc., a systems integrator for computer-integrated manufacturing.



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Pick Systems

CONTINUED FROM PAGE S5

> FAULT-TOLERANT nonstop processing is a requirement for many manufacturing environments, and Pick is currently one of the few relational DBMSs that are implemented on redundant hardware systems.

hardware-dependent and optimized for the specific target machine. There are three methods used to put Pick on a computer: the dedicated approach, coexistence and data base machine.

In the dedicated approach, the machine is engineered to run the Pick operating system as the native control system. Since hardware, firmware, utilities and mass storage are all set up specifically for Pick, performance is optimized.

Using the coexistence approach, Pick is implemented as a data base environment within Unix or Prime Computer, Inc.'s Primos. Performance is maintained by special CPU firmware and a formatting of mass storage devices to hold data in the Pick format. This technique is used by Prime with Prime's Information data base.

An array of machines — from vendors as diverse as NCR Corp., NEC Corp., Apollo Computer, Inc. and AT&T, to name a few — offer support for both Pick and Unix. Although the two operating environments might be expected to be fierce competitors, they actually complement each other. Unix is becoming a major factor as an operating system, and Pick adds a relational data base that supports many manufacturing and general business applications.

Fault-tolerant nonstop processing is a requirement for many manufacturing environments, and Pick is currently one of the few relational DBMSs that are implemented on redundant hardware systems. Nonstop communication front-end processors are available for some minicomputer and mainframe machines that support the well-known relational systems. Sequoia Systems, Inc. has announced fault-tolerant Pick, Parallel Computers, Inc. is expected to announce a related product shortly, and other fault-tolerant vendors are certain to follow with Pick and Unix functionality in the near future.

The data base machine approach is used by Ultimate Corp. to implement Pick on Honeywell Bull, Inc. and DEC machines. The host processor is augmented by special-purpose processors that execute the Pick data base programs. This leaves the host CPU free to run other tasks, such as native-mode programs, and to manage data traffic.

Ultimate also supplies the Pick system for the IBM 370 architecture machines — the 4300 and 9370 processor series — and larger mainframes. In this implementation, Pick runs as a machine under VM, which results in an interesting combination of all three methods.

From the beginning, Pick was to be a small-system solution. The objective was to provide the user community with low-cost, easy-to-use, people-oriented solutions. This meant 8- and 16-bit processors that could support few terminals, limited memories and limited mass storage.

That may have been, but it's not the way it is now. Pick is available on systems that are small in size, but there is no lack of power. Thanks to Motorola, Inc.'s 68000 and Intel Corp.'s 80386 chips, Pick processors are available in small packages that will realistically support more than 1,000 users.

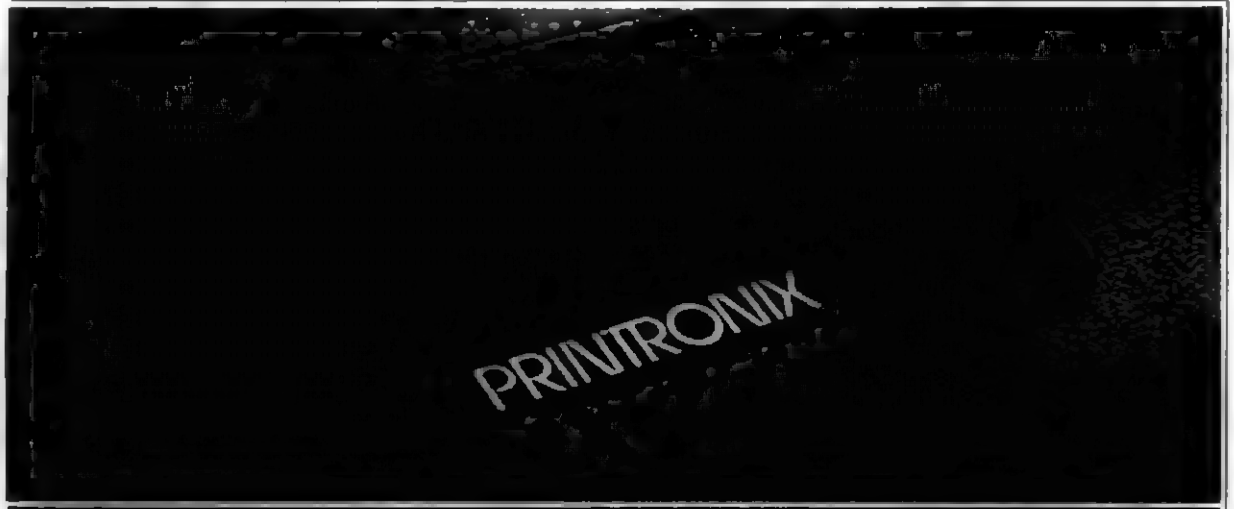
In manufacturing and in CIM, integration is everything. Distributed processing is seen by many in the manufacturing world as a necessary strategy for achieving fully integrated systems. Pick is no stranger to that sphere.

Since early 1985, the Pick system has been available on a wide variety of Intel 8086- and 80286-based desktops from more than 20 vendors. More than 10,000 users adopted Pick on their desktops in 1985 and 1986. This makes the Pick system a viable choice for individual companies that follow the clustered personal computer philosophy of distributed data processing.

For organizations that see the plant-level controller systems approach as the way to implement distributed data processing, Pick systems are also a solution. Prime, for example, supports networked links between desktops executing Pick programs and superminis that act as file servers for the Information data base. This approach distributes the computing load to desktops and preserves the integrity of the relational data base.

Desktops running Pick are effective in off-loading host machines in the development process. Programming, system modeling and system testing can take place on PCs, and the finished software can then be moved to the host for production. This conserves valuable ports and machine cycles needed to support the manufacturing business process.

Although few MIS professionals, industry consultants or data base gurus will mention Pick in a relational data base discussion, Pick is a real entity whose existence has been overlooked for much too long. ●



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Advanced Manufacturing Software, Inc. (602) 839-7822	PMC	Assembly and machines companies with 20 to 100 employees	27	Purchasing, engineering, manufacturing, material allocation/capacity planning, rough-cut capacity planning/MRP[1], accounting	IBM AT, XT and compatibles, AT&T 3B series, NCR Tower, Unisys 5000/50, Convergent Mighty Frame, DEC VAX/VMS, Compupro, Plexus, Stride 440	All	Regeneration	Yes	No	Yes	Yes	Yes	Yes	7	$1,000-$5,000
All Type Software, Inc. (216) 243-2380	Mancos	Electronics, car component manufacturers	12	Master scheduling, shop floor control, inventory control, sales order processing, purchase order processing, capacity planning	Data General MV line	All	Both	Yes	Yes	Yes	Yes	Yes	Yes	None	Contact vendor
American Business Computer, Inc. (313) 885-4530	ABC Manufacturing Management	Repetitive manufacturers	4 subsystems	MRP, inventory control, production planning, bill of materials, vendor communications, distribution	AT&T Unix System V, Microsoft Xenix SCO, MS-DOS	Most	Regeneration	Yes	No	Yes	Yes	No	No	30	$2,000-$30,000
American Software, Inc. (404) 261-4381	MRP-8	IBM mainframe users	11	MRP/MPS[2], bill of materials, route and work center, production order status, capacity planning, product costing	Any IBM mainframe	Most	Both	Yes	Yes	Yes	Yes	Yes	No	70	Contact vendor
Applied Information Development, Inc. (312) 574-3030	Aid-Manufacturing Control System	Medium- to large-size manufacturers and distributors	4	MRP, MPS, CRP[3], distribution requirements planning	Any IBM mainframe	None	Both	Yes	No	No	No	No	No	12	$30,000-$75,000
Arthur Andersen & Co. (312) 507-6695	Mac-Pac/Just-in-Time	Commercial manufacturers	12	Just-in-Time planning, Kanban, design engineering, manufacturing engineering, inventory control, master scheduling	IBM 360, 370, 3080, 3090, 4300 series	All	Both	No	Yes	No	Yes	Yes	Yes	110	Contact vendor
	Mac-Pac/D	Defense industry	14	Design engineering, inventory control, shop floor control, contract materials planning, material engineering, contract accounting	IBM 360, 370, 3080, 3090, 4300 series	All	Both	Yes	Yes	No	Yes	Yes	No	25	Contact vendor
Ask Computer Systems, Inc. (415) 969-4442	Manman Information System	Manufacturers with $5 million to $20 million in sales revenue	19	Manufacturing, order management/accounts receivable, general ledger, fixed assets, accounts payable, quality management	HP 3000 series, DEC VAX	All	Regeneration	No	Yes	Yes	Yes	No	No	1,000	$80,000-$400,000
Axis Computer Systems, Inc. (617) 481-9600	Az/IOM	Made-to-order companies with $10 million to $250 million in sales	19	MPS/MRP, product configuration/final assembly scheduler, customer order processing/customer service, shop floor control/CRP, bill of materials, purchasing/receiving	Unisys 5050, 5070, 5090	All	Both	No	Yes	Yes	Yes	Yes	Yes	30	$44,000 (for 8 users)
Boeing Computer Services (800) 551-0800	Production Management System	Aerospace, defense manufacturers	14	MRP/CRP, shop floor control, product structure, inventory control, purchasing/receiving, financing	IBM 4300 series and above, HP 3000	All	Both	No	Yes	Yes	Yes	No	Yes	50	$80,000-$400,000 (total system cost)
Bluebird Systems, Inc. (619) 438-2220	Plant Manager	Small- to medium-sizemanufacturers	13	MRP with master scheduling, sales/purchase order processing, job costing, general accounting, bill of materials, inventory control	IBM AT	Most	Regeneration	No	No	Yes	No	No	No	50	Contact vendor
CSC Compufact, Inc. (714) 891-6336	Man-Fact II	Mid-size discrete manufacturers	18	Accounts payable/receivable, cost accounting, marketing/sales, production control/shop floor control, production/inventory management, production planning	Prime 50 series	All	Net change	Yes	Yes	Yes	Yes	Yes	Yes	80	Contact vendor
Cadus Associates, Inc. (509) 456-8566	Management System	Manufacturers with $5 million + in sales	22	Production planning (MPS, MRP, CRP), sales order entry and management, purchase order management, bill of materials processor, inventory control with lot and serial number tracking, shop floor control with automated data collection	Wang VS	All	Both	Yes	Yes	Yes	Yes	Yes	Yes	90	$10,000-$175,000 (total system cost)
Cincom Systems, Inc. (513) 662-2300	Control: Manufacturing	Fortune 1,000 companies	14	Full closed-loop manufacturing, financial, lot/serial traceability, project manufacturing control, repetitive manufacturing control	IBM 3080, 3090, 4300 series, 9370, DEC VAX/VMS	All	Net change	Yes	Yes	Yes	Yes	Yes	Yes	100+	$100,000-$500,000 (total system cost)
Compusource Corp. (714) 879-6000	Dynamic	Manufacturers with $2 million to $50 million + in sales	18	MRP, accounting, distribution, work order processing, capacity planning, scheduling	Data General MV 2000 to 20,000 series, IBM PC AT	Most	Both	Yes	Yes	Yes	Yes	No	Yes	100	Contact vendor
Computer Covenant Corp. (303) 677-0800	Integrated Manufacturing System	Custom-build manufacturers	9	MRP, order entry, bill of materials, job costing, production planning, tool inventory	IBM PC and compatibles on PC-DOS, Novell Netware, Xenix, DEC PDP-11, DEC VAX	All	Net Change	No	Yes	Yes	No	No	No	100	$2,000

[1] Manufacturing resource planning [2] Master production scheduling [3] Capacity requirement planning

The companies included in this chart responded to a recent telephone survey conducted by *Computerworld*. Further product information is available from vendors. Research assistance was provided by The Oliver Wight Companies.

COMPANY	PRODUCT NAME	TARGET MARKET	TOTAL NUMBER OF MODULES	MAJOR MODULES (SIX MAXIMUM)	HARDWARE REQUIRED	AMOUNT OF TRANSACTIONS UPDATED IN REAL-TIME	NET CHANGE- OR REGENERATION LOGIC-BASED	OFFERS DISTRIBUTION RESOURCE PLANNING	TOOL PLANNING AND SCHEDULING	INTEGRATED ACCOUNTING/ FINANCIAL SYSTEM	APPLICATIONS AND DBMS INTEGRATION	RELATIONAL DATA BASE MANAGEMENT FEATURES	FOURTH-GENERATION DEVELOPMENT TOOLS	NUMBER OF CURRENT U.S. SITE LICENSES	PRICE PER MODULE
Computer Strategies, Inc. (616) 987-4444	**Repetitive Manufacturing System**	**Repetitive manufacturers**	**6**	**Financial control system, quotation management system, level load production planning, repetitive purchasing system, release control system, demand-demand modeling and forecasting system**	**DEC VAX, Honeywell DPS-6, IBM 9370**	**Most**	**Net change**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**75**	**$50,000-$250,000**
Computer Systems Development, Inc. (617) 460-0330	Impcon	All manufacturers	11	MRP, component data and inventory management, purchase management, bill of materials, work order management, manufacturing/cost control	DEC VAX, PDP-11	Most	Regeneration	Yes	Yes	Yes	Yes	Yes	No	20	$5,000 (average)
Computer Technology, Inc. (206) 455-1700	**MCS II**	**Manufacturers with $3 million + in sales**	**7**	**MRP, inventory, purchasing, bill of materials, shop floor control, labor productivity**	**Wang VS**	**All**	**Both**	**No**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**70+**	**$3,000-$7,000**
Cullinet Software, Inc. (617) 329-7700	Manufacturing System	Manufacturers, government contracting companies	12	MRP/MPS, order entry/purchasing, inventory control, shop floor control, bill of materials, costing	IBM 4300 series, 3080, 3090, 3030,370, 9370, 9390, all IBM-compatible mainframes	Most	Both	Yes	No	Yes	Yes	Yes	Yes	—	$70,000 (approximate)
DBSI Information Systems, Inc. (714) 837-3744	**SMC**	**Manufacturers with $3 million to $50 million in sales**	**11**	**Purchasing, materials planning, general ledger, order processing, accounts payable, production control**	**DEC VAX series, TI 990, AT&T Unix System V**	**All**	**Both**	**No**	**Yes**	**Yes**	**Yes**	**No**	**No**	**100**	**Contact vendor**
Data Systems for Industry Corp. (313) 493-4541	QED	All manufacturers	18	Inventory control, bill of materials, purchasing, work order, net resource planning, receiving inspection	HP 3000, Stratus 32, IBM System/38	All	Both	No	No	Yes	Yes	No	No	50	$6,000-$24,000
Data 3 Systems, Inc. (707) 528-6560	**Manufacturing Resource Planning System 36-S**	**Small manufacturers**	**12**	**MRP, MPS, business planning, order entry, inventory control, purchase order management**	**IBM System/36**	**All**	**Regeneration**	**No**	**No**	**No**	**Yes**	**No**	**NA**	**100**	**Contact vendor**
	MRPS 38-S	**All manufacturers**	**12**	**MRP, MPS, business planning, general ledger, accounts payable/receivable. payroll**	**IBM System/38**	**All**	**Regeneration**	**No**	**No**	**Yes**	**Yes**	**No**	**No**	**100**	**Contact vendor**
	MRPS 38-P	**Process manufacturers**	**12**	**MRP, MPS, business planning, general ledger, accounts payable/receivable, payroll**	**IBM System/38**	**All**	**Regeneration**	**No**	**No**	**Yes**	**Yes**	**No**	**No**	**100**	**Contact vendor**
Diversified Data Systems, Inc. (602) 792-3250	Summit-Keystone	Manufacturers with $50 million + in sales	76	MRP, inventory control, forecasting, shop floor control scheduling, vendor analysis, job tracking	Wang VS, DEC VAX, Concurrent 3200 series	All	Both	No	Yes	Optional	Yes	Yes	Optional	10	$2,000-$30,000
Driver-Harris Systems, Inc. 201-641-6600	**Easy Manufacturing Resource Planning**	**Manufacturers with less than $50 million in sales, divisions in large companies, FDA-regulated companies**	**16**	**MRP, inventory control, lot control/traceability, bill of materials, customer orders/manufacturing orders, shop floor control**	**IBM PC and compatibles**	**All**	**Both**	**Yes**	**Yes**	**Yes**	**Yes**	**No**	**Yes**	**70+**	**$5,000-$15,000**
Escom, Inc. (206) 828-6095	Manufacturing Management and Control	General, discrete manufacturers	9	MPS, standard costing, inventory planning, shop floor control, purchase order processing, sales order processing	All hardware supporting Pick operating systems, Prime 50 series superminicomputers	All	Net change	Yes	No	Yes	Yes	Yes	Yes	200	$1,000-$10,000
Formation, Inc. (609) 234-5020	**Formas**	**Discrete manufacturers**	**12**	**Integrated MRP/CRP, MPS/forecasting, inventory control, shop floor control, receiving/purchasing, simulation**	**IBM 370, 4300 series, 3080, 3090, 9370 series**	**All**	**NA**	**Yes**	**No**	**No**	**Yes**	**No**	**No**	**6**	**Contact vendor**
Fourth Shift Corp. (800) 342-5675	Manufacturing Software series	All manufacturers	20	MRP, inventory control, bill of materials, general ledger, order entry, accounts payable/receivable	IBM PC and compatibles	All	Both	No	Yes	Yes	Yes	Yes	Yes	—	$295-$4,995
Herbert Friedman & Associates, Inc. (312) 948-7180	**HFA**	**Manufacturers with $25 million to $150 million in sales**	**20**	**Customer order processing, manufacturing reporting and control, accounts payable, engineering records, purchasing, general ledger**	**IBM System/38**	**All**	**Both**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**75**	**$4,000-$40,000**
Genesis Resource Management, Inc. (617) 339-5503	Genesis	All manufacturers	9	MRP, purchasing, order processing, inventory management, bill of materials/cost/routing, general ledger	IBM System/38	Most	Both	No	Yes	Yes	Yes	Yes	No	70	$10,000-$35,000
Gnosis, Inc. (215) 664-1010	The Bottom Line	**All manufacturers**	12	**Inventory, job costing, scheduling, bill of materials, labor productivity, invoicing**	**Unisys B20**	**All**	**Net change**	**No**	**Yes**	**No**	**No**	**No**	**No**	**50**	**Contact vendor**
Heuristicus Corp. (206) 248-2661	Bytims	Made-to-order job shop manufacturers	10	MRP, production scheduling/capacity planning, cost accounting, purchasing, inventory control, bar code factory data collection	All Prime hardware	All	Regeneration	No	Yes	Yes	Yes	Yes	No	20	$10,000 (average)
Hewlett-Packard Co. Contact local HP office	**MMII**	**Medium- to-large-size, discrete and discrete process manufacturers**	**8**	**MRP/shop floor control, purchasing, sales order management, product costing, financials, Just-in-Time**	**HP 3000**	**All**	**—**	**No**	**No**	**Yes**	**Yes**	**Yes**	**Proprietary**	**600**	**$18,000-$36,000**

COMPANY	PRODUCT NAME	TARGET MARKET	TOTAL NUMBER OF MODULES	MAJOR MODULES (SIX MAXIMUM)	HARDWARE REQUIRED	AMOUNT OF TRANSACTIONS UPDATED IN REAL-TIME	NET CHANGE- OR REGENERATION LOGIC-BASED	OFFERS DISTRIBUTION RESOURCE PLANNING	TOOL PLANNING AND SCHEDULING	INTEGRATED ACCOUNTING/ FINANCIAL SYSTEM	APPLICATIONS AND DBMS INTEGRATION	RELATIONAL DATA BASE MANAGEMENT FEATURES	FOURTH-GENERATION DEVELOPMENT TOOLS	NUMBER OF CURRENT U.S. SITE LICENSES	PRICE PER MODULE
Honeywell Bull, Inc. (602) 862-3771	**Manufacturing System**	**Medium- to large-size discrete manufacturers**	**9**	**MRP, MPS, inventory management, manufacturing data control, job floor control, purchasing**	**Honeywell DPS 7000, DPS 8, DPS 8000**	**All**	**Net change**	**Yes**	**No**	**Yes**	**Yes**	**No**	**Yes**	**—**	**$8,000-$30,000**
	Distributed Manufacturing System	**Small- to medium-size manufacturers**	**5**	**MRP, inventory record management, shop floor control, order processing, financial packages**	**Honeywell DPS 6, 6+**	**All**	**Net change**	**Yes**	**No**	**Yes**	**Yes**	**No**	**No**	**—**	**$7,000-$17,000**
IBM Contact local IBM office	Manufacturing Accounting and Production Control System (MAPICS) I and II	Small- to large size manufacturers	19	MRP, inventory management, product data management, MPS, CRP	All IBM System/36, 38 models	All	Both	No	No	Yes	Yes	No	Yes	—	Approx. $5,500
	Communications Oriented Production Information Control System (COPICS)	All manufacturers	25	MRP, customer order servicing, MPS, CRP, purchasing/receiving, plant monitoring and control	IBM 370, 4300 series, 3090, 9370 series	Most	Both	No	No	No	Yes	No	No	—	Contact vendor
Inserst Computer Systems, Inc. (800) 874-1020	**Pro-MS**	**Warehousers, distributors, manufacturers**	**6**	**MRP/MPS, inventory control/bill of materials, capacity planning, shop floor control, costing, labor management**	**IBM System/36, 38**	**Most**	**Regeneration**	**Yes**	**Yes**	**No**	**Yes**	**Yes**	**Yes**	**—**	**Contact vendor**
Infisy Systems, Inc. (713) 820-5954	Shop Floor Control System	Custom job shops and manufacturers	15	Estimating/routing, production planning, cost accounting, performance measurement, inventory control, bill of materials	All Data General hardware, all AT&T hardware, IBM AT and compatibles	Some	—	Yes	Yes	Yes	Yes	No	No	250 +	Contact vendor
Infosource Management, Inc. (919) 828-0040	**Job Manufacturing and Accounting Control System**	**Sheet-metal fabricators, custom manufacturers**	**6**	**Customer order processing, purchasing, inventory/bill of materials, plant reporting, job costing, system administration**	**IBM ATs, any Microsoft MS-DOS-compatible system, Wang VS**	**All**	**Net change**	**Yes**	**Yes**	**No**	**No**	**Yes**	**No**	**4**	**$4,000-$18,500 (total system cost)**
Integral Computer Systems, Inc. (203) 928-0451	Computer-Integrated Manufacturing Resource Planning	Manufacturers with $1 million to $50 million in sales	20	Forecasting/requirements planning, job shop scheduling, bill of materials, costing, order entry, inventory management	IBM PC stand-alone and LANS, Unisys Unix, IBM System/36	All	Net change	No	Yes	Yes	No	Yes	Yes	5	$1,000-$3,000
Interactive, Inc. (619) 560-8526	**Manufacturers Infofio**	**General manufacturers**	**15**	**MRP, MPS, capacity planning, production costing, field service management, financial accounting**	**All Ultimate hardware, DEC VAX, Microvax, all Prime hardware, IBM 4300 series, 360, 370, 9370**	**Most**	**Both**	**No**	**No**	**Yes**	**Yes**	**Yes**	**Yes**	**2,000**	**$4,000 (average)**
Interactive Applications, Inc. (408) 727-8161	Manufacturing Core System	Small- to medium-size manufacturers	9	MRP, bill of materials, inventory control, purchasing, shop floor control, cost accounting	Unisys A series, XE 550 supermicro	All	Regeneration	No	No	No	Yes	No	Yes	0	$15,000 (total system cost)
Interactive Information Systems, Inc. (602) 790-4214	**IMCS**	**Manufacturers with up to $20 million in sales**	**9**	**Master schedule/MRP, order entry, configuration, inventory, bill of materials, shop floor control**	**DEC VAX 8300, 8800, IBM 9370, 4300 series, Sequent SB 8, SB 21, IBM PC and compatibles**	**Most**	**Both**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**100**	**From $5,000**
Intrologic, Inc. (800) 521-5639, (313) 557-7120 (in Mich.)	Manufacturing III	All manufacturers	7	Materials control, order management, production, accounts payable/receivable, general ledger, payroll	IBM System/34, 36, 38, IBM PC, IBM micros	All	Both	No	Yes	Yes	Yes	No	No	43	$2,520-$11,000
Jacobson and Associates, Inc. (818) 878-7804	**Jacobson**	**Small- to medium-size manufacturers**	**23**	**MRP, bill of materials, routing, shop floor control, shop loading, purchasing**	**Data General MV series**	**All**	**Regeneration**	**Yes**	**No**	**Yes**	**Yes**	**No**	**Yes**	**82**	**$2,000-$30,000**
Keystone Information Systems, Inc. (609) 722-0700	Intrepid MMS	Manufacturers with $10 million to $180 million in sales	19	MRP, MPS, customer order processing, product data management, inventory management, general ledger	All Prime hardware	Most	Both	No	Yes	Yes	Yes	Yes	Yes	150	$5,000-$9,000
Leland, Inc. (404) 998-3800	**Leland MRP**	**Manufacturers with $50 million + in sales**	**5**	**MRP, customer order servicing, purchasing, requisitions, receiving**	**IBM 4300, 3080, 3090, 9370 series**	**All**	**Both**	**No**	**No**	**No**	**Yes**	**No**	**No**	**—**	**$22,000**
MAI Basic Four, Inc. (714) 731-5100	Manbase Manufacturing System	Discrete, process and repetitive manufacturers with $25 million to $100 million in sales	15	Prospecting and sales management, order management, product/routing definition, materials and capacity planning, production/activity control, inventory and purchasing	All MAI Basic Four hardware	Most	Both	Yes	Yes	Yes	Yes	Yes	Yes	400	$4,500 (average)
	Manufacturing System	Value-added distributors, make-to-order, make-to-stock, job shop manufacturers with $2 million to $20 million in sales	12	Order administration, inventory control, purchase order processing, engineering control, manufacturing control, manufacturing planning	All MAI Basic Four hardware	Most	Both	Yes	No	Yes	Yes	Yes	Yes	1,000	$4,000 (average)
	Sewn Products System	Apparel/apparel accessory, footware, home furnishing manufacturers, textile/manufacturers with $5 million to $50 million in sales	12	Allocation/pink slip generation, piecework payroll, plant loading, sales order processing, cut and sold reporting, fabric and trim requirements	All MAI Basic Four hardware	Most	Regeneration	No	NA	Yes	Yes	Yes	No	300	$3,700 (average)
MCBA, Inc. (818) 242-9600	**MCBA Manufacturing System**	**Discrete manufacturers with $3 million to $100 million in sales**	**19**	**MRP, inventory control, shop floor control, costing, financials, distribution**	**Wang VS, DEC PDP-11, all DEC VAX, all Altos, HP 3000 system (in development)**	**Some**	**Regeneration**	**No**	**No**	**Yes**	**Yes**	**No**	**No**	**500**	**$1,000-$9,000**

COMPANY	PRODUCT NAME	TARGET MARKET	TOTAL NUMBER OF MODULES	MAJOR MODULES (SIX MAXIMUM)	HARDWARE REQUIRED	AMOUNT OF TRANSACTIONS UPDATED IN REAL-TIME	NET CHANGE- OR REGENERATION LOGIC-BASED	OFFERS DISTRIBUTION RESOURCE PLANNING	TOOL PLANNING AND SCHEDULING	INTEGRATED ACCOUNTING/ FINANCIAL SYSTEM	APPLICATIONS AND DBMS INTEGRATION	RELATIONAL DATA BASE MANAGEMENT FEATURES	FOURTH-GENERATION DEVELOPMENT TOOLS	NUMBER OF CURRENT U.S. SITE LICENSES	PRICE PER MODULE
MC Software, Inc. (800) 824-5953, (916) 786-6104 (in Calif.)	Inman II	Discrete assembly manufacturers, job shops, distributors	11	MRP, inventory, order entry, purchasing, bill of materials, job cost/work in process	Microsoft MS-DOS 2.0 or higher, CPN 86, Digital Research's Concurrent DOS, Novell Netware	All	Regeneration	No	No	Yes	Yes	No	No	—	$995-$1,295
MDS Qantel, Inc. (415) 887-7777	QMRP	Discrete manufacturers with $3 million to $75 million in sales	17	Complete material management, sales order processing and quotations, material/capacity scheduling and planning, shop floor data processing, comprehensive purchasing applications, complete financials	All Qantel micro, mini and supermini computers	Most	Both	Yes	Yes	Yes	Yes	No	Yes	500+	$1,250-$10,000
MMS International (614) 885-0736	MCS-3	Repetitive manufacturers	8	MRP, inventory control/bill of materials, shop floor control/job costing, customer order entry/sales analysis, capacity planning, purchase order control	Any hardware supporting Unix, Microsoft Xenix, MS-DOS	All	Both	No	Yes	Yes	No	No	No	350	$950-$2,500
	Symix	Job shops, discrete and made-to-order manufacturers	9	MRP, job shop, purchasing, order entry, inventory control, general ledger	Any hardware supporting Unix, Microsoft Xenix, MS-DOS	All	Both	No	Yes	Yes	Yes	Yes	Yes	110	$795-$16,995
MRM, Inc. (414) 792-0400	Pacs-38	All manufacturers	12	Master scheduling/MRP, engineering data base, capacity management, shop floor control, standard cost/job cost, order entry	Wang VS series	All	Both	Yes	Yes	Yes	Yes	Yes	Yes	250	$2,000-$23,000
	Pacs-36	All manufacturers	12	Master scheduling, engineering data base, capacity management, shop floor control, standard cost/job cost, order entry	IBM System/36	Most	Both	No	Yes	Yes	No	No	No	125+	$2,000-$10,000
	Pacs-VS	All manufacturers	12	Master scheduling/MRP, engineering data base, capacity management, shop floor control, standard cost/job cost, order entry	Wang VS series	All	Both	Yes	Yes	Yes	Yes	No	Yes	200+	$2,000-$23,000
Madic Corp. (408) 980-8311	Madic	General manufacturers with $300+ million in sales	21	Manufacturing, engineering, finance and accounting, marketing and sales, human resources	Prime 50 series superminicomputers, any hardware that supports Pick operating systems	All	Regeneration	No	No	Yes	Yes	Yes	Yes	118	$35,000-$225,000 (total system cost)
Management Science America, Inc. (404) 239-2000	Amaps/M	Discrete, repetitive, process manufacturers	14	MPS, inventory control, product costing, manufacturing accounting, multiplant, purchasing	IBM 4300 series, 3030, 3080, 3090, IBM plug-compatible	Most	Both	Yes	No	Yes	Yes	Yes	Yes	225	$290,000-$580,000 (total system cost)
	Amaps/Q	Process, repetitive, discrete manufacturers	19	MRP, material control, lot trace, scheduled managed production, multiproduct management, cost management	IBM 4300 series, 3030, 3080, 3090, IBM plug-compatible	Most	Both	Yes	Yes	No	Yes	Yes	Yes	475	$290,000-$580,000 (total system cost)
	Amaps/G	Make-to-order, contract manufacturers, aerospace and defense contractors	10	MPR, contract engineering, material control, bill of material, process and routing, purchasing control	IBM 4300 series, 3030, 3080, 3090, IBM plug-compatible	Most	Both	No	Yes	No	Yes	Yes	Yes	15	$360,000-$600,000 (total system cost)
	Amaps/3000	Repetitive and discrete manufacturers	16	MRP, material control, cost management, scheduled managed production, lot trace, order management	HP 3000 Series 50, 60, 70, HP Spectrum 930, 950	Most	Both	No	Yes	Yes	Yes.	Yes	Yes	125	$155,000-$240,000 (total system cost)
	Amaps 36/38	Process, repetitive and discrete manufacturers	9	MRP, inventory management, product data management, sales order processing, cash management, purchasing/receiving	IBM System/36, 38	All	Both	Yes	No	Yes	Yes	Yes	No	50	$50,000-$210,000 (total system cost)
Manufacturing Decision Support Systems, Inc. (216) 861-8100	MDSS	Selective repetitive manufacturers	15	Estimating and quoting, shop floor control, material control, financial management, marketing management	HP 3000 series	All	Both	No	No	Yes	Yes	No	Yes	—	$36,000-$84,000 (total system cost)
Mandata Systems, Inc. (513) 733-6030	Mandata 2000	Repetitive process market and configuration applications	17	MRP, MPS, order entry/configuration, quotation, multifacility, product costing	IBM 4300, 9370 series, DEC VAX, ADDS Mentor, all Ultimate hardware	All	Both	Yes	Yes	Yes	Yes	Yes	Yes	100+	$2,000-$6,000
Manufacturing Solutions and Systems, Inc. (414) 786-1172	Manufacturing Control System	Manufacturers with up to $100 million in sales	11	MPS/MRP, CRP, engineering data base, standard product costing, work in progress, job/inventory costing	IBM System/34, 36, 38	Most	Regeneration	No	No	Yes	No	No	No	45	$1,500-$15,000
Marcam Data Systems Corp. (617) 449-5510	Prism	Process and/or repetitive manufacturers	4	Foundation, resource management, resource processor, planning	IBM System/38	All	NA	Yes	Yes	Yes	Yes	Yes	NA	22	$20,000-$25,000
Martek, Inc. (800) 323-6686	Advanced Integrated Manufacturing System	Small- to medium-size manufacturers	20	MRP, production scheduling, shop floor control, order tracking, job costing, custom report generator	All IBM PC-DOS, Microsoft MS-DOS, Xenix systems, Altos	Some	Regeneration	No	Yes	Yes	Yes	Yes	No	86	$2,000-$3,000
Martin Marietta Data Systems (800) 654-3835	MAS Manufacturing	All manufacturers	14	Manufacturing planning control system, financial management system, sales order management system	HP 3000, DEC VAX, IBM 4300, 3080, 3090 series	All	Both	No	No	Yes	Yes	No	Yes	700	Contact vendor
McCormack & Dodge Corp. (800) 343-6401, (617) 655-8200 (in Mass.)	Production and Inventory Optimization System	Discrete and process manufacturers	9	Inventory/MRP, MPS, bill of materials, shop floor control, purchasing, cost management	IBM 4300, 3080, 3090 series and compatibles, DEC VAX 8600	All	Both	Yes	Yes	No	Yes	No	No	38	$30,000-$70,000
	C/PIOS	Aerospace and defense contractors	9	Inventory/MRP, MPS, materials management, bill of materials, shop floor control, purchasing	IBM 4300, 3080, 3090 series and compatibles	All	Both	Yes	Yes	No	Yes	No	No	30	$40,000-$130,000
Micro-MRP, Inc. (800) 338-6921, (800) 523-6577 (in Calif.)	Max, The Production Manager	Manufacturers with up to $25 million in sales	17	MRP, bill of materials, inventory control, master scheduling, purchasing, shop floor control	IBM PC and compatibles, Northstar Dimension	Most	Both	No	Yes	Yes	No	No	Yes	350	$2,000-$4,000

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Minx Software, Inc. (415) [illegible]	Minx Information System	Manufacturers with up to $200 million in sales	9	MRP, order management, accounts receivable, accounts payable, general ledger, report writer	HP 3000, DEC VAX, AT&T 3B, Unisys 5000 series, Stratus XA 2000, IBM AT, Altos 3068	All	Regeneration	Yes	No	Yes	Yes	No	Yes	30	Starts at $20,000 (total system cost)
Mitrol, Inc. (617) 933-9545	Mitrol MFG	All manufacturers	18	Materials management, shop floor control, sales order management, aerospace and defense, management summary, cost planning and control	IBM 3090, 4300 series, 9370, PC AT/370	All	Net change	No	Yes	Yes	Yes	Yes	Yes	45	Contact vendor
NCA Corp. (408) [illegible]	[illegible]	Manufacturers with $3 million + in sales, Fortune 500 companies	22	Manufacturing applications, financial applications, sales/marketing applications, information management, repetitive manufacturing configurator	All DEC VAX systems	All	Regeneration	No	No	Yes	Yes	No	Yes	500	$1,000-$40,000
Norampac Software Ltd. (416) 831-0515	MRP II	Manufacturers with $20 million + in sales	9	MRP, inventory, manufacturing costing, capacity planning, work order management	All IBM mainframes	Most	Both	Yes	No	No	Yes	Yes	No	—	$65,000-$80,000
Northeast Data Systems, Inc. (617) 273-3030	Intrepid Manufacturing Management System	Manufacturers with $10 million to $100 million in sales	19	Quotations, marketing, inventory management, production, cost, financials	All Prime hardware, Honeywell DPS 6, IBM 9370, 4300, 3080, 3090 series, DEC VAX	All	Both	Yes	Yes	Yes	Yes	Yes	Yes	65 to 70	$3,000-$15,000
On-Line Software Labs, Inc. (714) 680-6502	Distribution, Manufacturing, Accounting, Costing, Scheduling	All manufacturers	18	MRP, DRP, order entry, shop floor control, financials, purchasing	Unisys A series	All	Both	Yes	Yes	Yes	Yes	Yes	Yes	50	$63,800 (total system cost)
Oriole Software, Inc. (301) 823-6651	Respond	Discrete, repetitive/Just-in-Time manufacturers, government defense contractors	13	MRP, factory management, shop floor control, product assurance, time and attendance, simulation	All Tandem hardware	All	Net change	No	No	Yes	Yes	Yes	No	5	$25,000-$45,000
Pansophic Systems, Inc. Applications Products Company (312) 954-3600	Manufacturing/38	All manufacturers	17	MRP, DRP, MPS, CRP, product structure, product standard costing	IBM System/38	Most	Regeneration	Yes	Yes	Yes	Yes	Yes	No	500	Contact vendor
Pilot Systems, Inc. (414) 792-0050	Manufacturing Software	Manufacturers with $2 million to $50 million in sales	6	MRP, manufacturing control, manufacturing costing, engineering control, inventory control, sales/accounting control	HP 3000, NCR Tower, Unisys 5000	Most	Both	Yes	Yes	Yes	Yes	No	No	600	$5,000-$10,000
Profit Center International, Inc. (416) 475-1101	Control	Process, pharmaceutical, food, electronic and jewelry manufacturers	17	MPS, MRP, distribution, capacity planning, cost accounting, finance	IBM System/36	All	Both	No	Yes	Yes	Yes	No	Yes	1	$6,000-$12,000
Profitkey International, Inc. (603) 898-9800	Manufacturing System	Small- to medium-size manufacturers	13	MRP, shop floor control, purchasing, financials, estimating, customer management	IBM AT, NCR Tower series, AT&T PC and 3B series, Unisys PC-IT 5000 series, DEC Microvax line	All	Regeneration	No	Yes	Yes	Yes	No	No	—	$15,000-$55,000 (total system cost)
Pro:Man, Inc. (206) 451-0404	Pro:Man	Small- to medium-size manufacturers	18	MRP, sales order processing, purchase order control, shop floor control, integrated financials	IBM 286 or 386, IBM minis and mainframes, Honeywell minis, DEC VAX, NCR Tower	All	Both	Yes	Yes	Yes	Yes	Yes	Yes	220	$5,000 (total system cost)
STSC, Inc. (301) 984-5488	Logistics Plus System	Repetitive and process manufacturers	10	MRP, CRP, forecasting, distribution resource planning, master scheduling, bill of materials/routings	IBM 4300, 3080, 3090, 9370 series	All	Both	Yes	No	No	No	No	No	3	$165,000-$415,000 (total system cost)
Safe Computing Ltd. (416) 826-5352	Safe S2000	Make-to-stock manufacturers with $10 million to $40 million in sales	5	MRP, bill of materials, costing, work-in-progress, capacity planning	Any system supporting Unix, DEC VAX, ICO minicomputer	Most	Regeneration	No	Yes	Yes	Yes	No	Yes	10	$10,000 (average)
[illegible], Inc. [illegible]	Quality and Manufacturing System	Process manufacturers	8	Quality and specifications, materials management, production management, customer order processing, purchasing/receiving, summary analysis	HP 3000	Most	Net change	Yes	No	Yes	Yes	Yes	No	31	$15,000-$30,000
Steinberg Research, Inc. (516) 751-4277	Accumark PIQ	All manufacturers	4	MRP, inventory, bill of materials, purchasing	IBM PC, XT, AT and compatibles	Most	Regeneration	No	No	Yes	Yes	No	No	75	$800
Systems for Profit, Inc. (414) 327-7500	CMI Profit	All manufacturers	8	Accounting, manufacturing planning, manufacturing control, engineering control, inventory control/sales control, manufacturing costing	Unisys 5000 series, NCR Tower, all Altos hardware, IBM AT, System/36, 38, PC	All	Both	Yes	Yes	Yes	No	No	No	1,100+	Contact vendor
Systems Software Associates, Inc. (312) 641-2900	BPCS	Manufacturers with $5 million to $200 million in sales	23	MRP, MPS, capacity planning, inventory management, shop floor control, Just-in-Time	IBM System/36, 38	All	Both	Yes	No	Yes	Yes	Yes	Yes	400+	$10,000 (for System/38), $2,000-$5,000 (for System/36)
TBC Computer Systems, Inc. (617) 964-3000	Advanced Manufacturing and Financial System	Discrete and process manufacturers	12	MPS/MRP, inventory control, bill of materials, purchasing, production control, sales order management	DEC VAX	All	Both	No	Partial	Yes	Yes	No	Yes	—	$15,000-$30,000
Telet Corp. (312) 571-6111	TIMS	All manufacturers	24	MRP, MPS, shop floor control, production control, manufacturing control, general ledger	Prime 50 series superminicomputers	All	Both	Yes	Yes	Yes	Yes	Yes	Yes	5	$20,000-$60,000 (total system cost)
Thomas-Logsdon & Associates, Inc. (414) 782-6300	IM-85	All manufacturers	12	MRP, engineering records, inventory, purchasing, manufacturing order control, shop floor control	IBM 4300 series or higher	All	Both	No	Yes	Yes	Yes	Yes	No	26	Contact vendor

COMPANY	PRODUCT NAME	TARGET MARKET	TOTAL NUMBER OF MODULES	MAJOR MODULES (SIX MAXIMUM)	HARDWARE REQUIRED	AMOUNT OF TRANSACTIONS UPDATED IN REAL-TIME	NET CHANGE- OR REGENERATION LOGIC-BASED	OFFERS DISTRIBUTION RESOURCE PLANNING	TOOL PLANNING AND SCHEDULING	INTEGRATED ACCOUNTING/ FINANCIAL SYSTEM	APPLICATIONS AND DBMS INTEGRATION	RELATIONAL DATA BASE MANAGEMENT FEATURES	FOURTH-GENERATION DEVELOPMENT TOOLS	NUMBER OF CURRENT U.S. SITE LICENSES	PRICE PER MODULE
Uniq Digital Technologies, Inc. (312) 879-1008	Spider II	Manufacturers with $5 million to $40 million in sales	15	MRP, shop floor control, job costing, standard product routings, inventory management, bill of materials	DEC PDP series, VAXs, AT&T 3B series	All	Regeneration	No	No	Yes	Yes	No	No	900	$3,500-$7,000
Unitronix Corp. (609) 424-3693	Praxa	General manufacturers and distributors	18	MRP, master scheduling, capacity planning, order entry/invoicing, sales/bookings analyses, inventory control	DEC VAX	All	Regeneration	Yes	Yes	Yes	Yes	No	Yes	150	$8,000-$10,000
Userware International, Inc. (619) 745-6006	Pioneer Command	Wholesale distributors, batch assembly	14	Sales order processing, purchase order processing, general ledger, production control, sales analysis	DEC VAX	Most	Regeneration	No	Yes	Yes	Yes	Yes	Yes	12	From $6,000
Vertical Business Software, Inc. (914) 632-6306	Manufacturer with Process Control	Small- to medium-size manufacturers	3	Accounts payable/general ledger, payroll, manufacturing, process control	IBM PC and compatibles, Novell Netware hardware	All	Both	Yes	No	Yes	Yes	Yes	Yes	30 to 40	$2,000-$2,800
Xerox Corp. (800) 222-3700	Xerox Business Management System	Discrete manufacturers	17	MRP, MPS, repetitive manufacturing, production control, inventory management, cost planning and control	IBM 4300 series, 3080, 3090, 9370	All	Net change	Yes	Yes	Yes	Yes	No	Yes	800	From $225,000
Louis A. Wright & Associates, Inc. (313) 459-7760	Automated Manufacturing Planning System	Highly repetitive manufacturers	10	MRP, resource scheduling, general ledger, accounts receivable, accounts payable, payroll	IBM System/36	Most	Net change	Yes	Yes	Yes	Yes	—	Yes	50	$3,000-$21,000
	Access	Job shop contract manufacturers	10	Job costing/estimating, order entry/shipping/invoicing, inventory, purchasing, general ledger, accounts receivable/payable	IBM System/36	All	Regeneration	Yes	Yes	Yes	Yes	—	Yes	20	$3,000-$7,500

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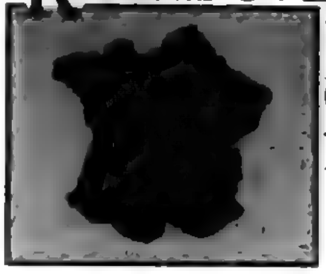

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Aug. 17	Field Service	July 31
Aug. 24	Education & Training	Aug. 7
Aug. 31	DBMS for Micros & Small Systems	Aug. 14
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SYSTEMS & PERIPHERALS

HARD TALK

James Connolly

Godzilla gets serious

The symbolism has been used before. It pops up when IBM gets serious about a field in which dozens of smaller companies are running about with their own profitable, 10% market shares.

"Bambi meets Godzilla" rings crunchingly true again, just as it did a few years ago when it was used to illustrate IBM's impact on victims such as the then-blossoming microcomputer vendors.

This time, Godzilla's shadow is falling on the ASCII terminal makers, whose competition for market share has — compared with what is to come — been about as violent as yearlings going through their first rutting. There was plenty of head-butting but minimal damage. Those vendors would undercut each other by a few bucks — OK, a few dollars — and would claim to be a bit better than the big guys. But the big guys were companies such as Wyse Technology, which is roughly 200 times smaller than IBM.

Then IBM included in its re-

Continued on page 51

DEC minisuper foray looms

Predicted late '88 entrance would speed shakeout in $300M market

BY MITCH BETTS
CW STAFF

WASHINGTON, D.C. — Vendors in the minisupercomputer market are preparing for an invasion by Digital Equipment Corp. in late 1988 that may accelerate the shakeout under way in this market, according to speakers at a recent conference on advanced computer systems.

The market now includes such firms as Alliant Computer Systems Corp., Convex Computer Corp., Scientific Computer Systems Corp. and Floating Point Systems, Inc.

The firms typically sell systems in the performance range of 6 million to 40 million floating-point operations per second — a $300 million market niche just below that of Cray Research, Inc.'s supercomputers.

The future of this young market was of keen interest at the second annual Conference on Advanced Computer Systems, held here last week by Technologic Partners and Kidder, Peabody & Co.

Predict DEC's entrance

Vendors and analysts predicted that DEC will enter the market in the next 18 to 24 months with vector extensions to the high end of its VAX architecture.

Robert J. Paluck, president and chief executive officer of Convex in Richardson, Texas, said DEC users have told his company that the DEC product, called Pegasus, will be a four-head parallel processing machine and run at 15 million instructions per second.

Jeffry Canin, senior technology analyst for Hambrecht & Quist, Inc., an investment banking firm in San Francisco, said the minisupercomputer niche is now saturated with suppliers and that the DEC entry will hasten the shakeout, leaving only two or three major survivors. He said it is not clear who the victims will be.

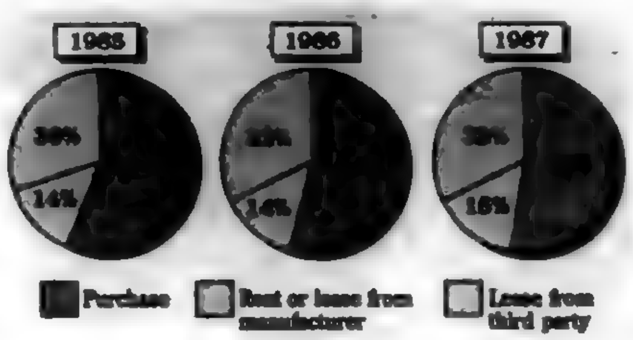
Already, Canin said, two firms have been forced out of the minisupercomputer market, and Beaverton, Ore.-based Floating Point Systems is retrenching with layoffs and a corporate reorganization [CW, June 8].

"Most institutional investors will buy into two or three of the companies — and quickly flee from whichever gives the first hint of faltering," said Richard A.

Continued on page 50

Data View

Mainframe system acquisition
Changes in method



INFORMATION PROVIDED BY DATAPRO RESEARCH CORP.
CW CHART

Edge claims 11-MIPS mini

BY STANLEY GIBSON
CW STAFF

SCOTTSDALE, Ariz. — Edge Computer Corp. recently announced a dual-processor minicomputer, the Edge 1200, which it claims can perform 11 million instructions per second (MIPS). In addition, the company announced the single-processor Edge 1100, which it rated at 6 MIPS.

Continued on page 51

Memorex deals IBM add-in card

BY STANLEY GIBSON
CW STAFF

MILPITAS, Calif. — Marking its re-entry into the memory board market, Memorex Corp. recently announced add-in memory cards for IBM System/38 processors.

A Memorex spokesman said the firm will be offering memory boards for other IBM mid-range machines in the future. Memorex sold memory for IBM 370 processors in the late 1970s. Memorex announced the System/38 memory boards for the European market in February and has been selling them there for several months.

"Our research shows a large number of System/38 users to be upgrading their processors," said Greg Grodhaus, Memorex's U.S. vice-president of the small systems group. "We're finding that users are installing IBM's Control Program Facility Re-

Continued on page 50

Inside

- DG releases Rugged, Tempest versions of MV/15000 series. Page 50.
- Computervision announces 4-MIPS graphics workstation. Page 52.
- Eastock adds departmental image scanner to document processing system. Page 52.

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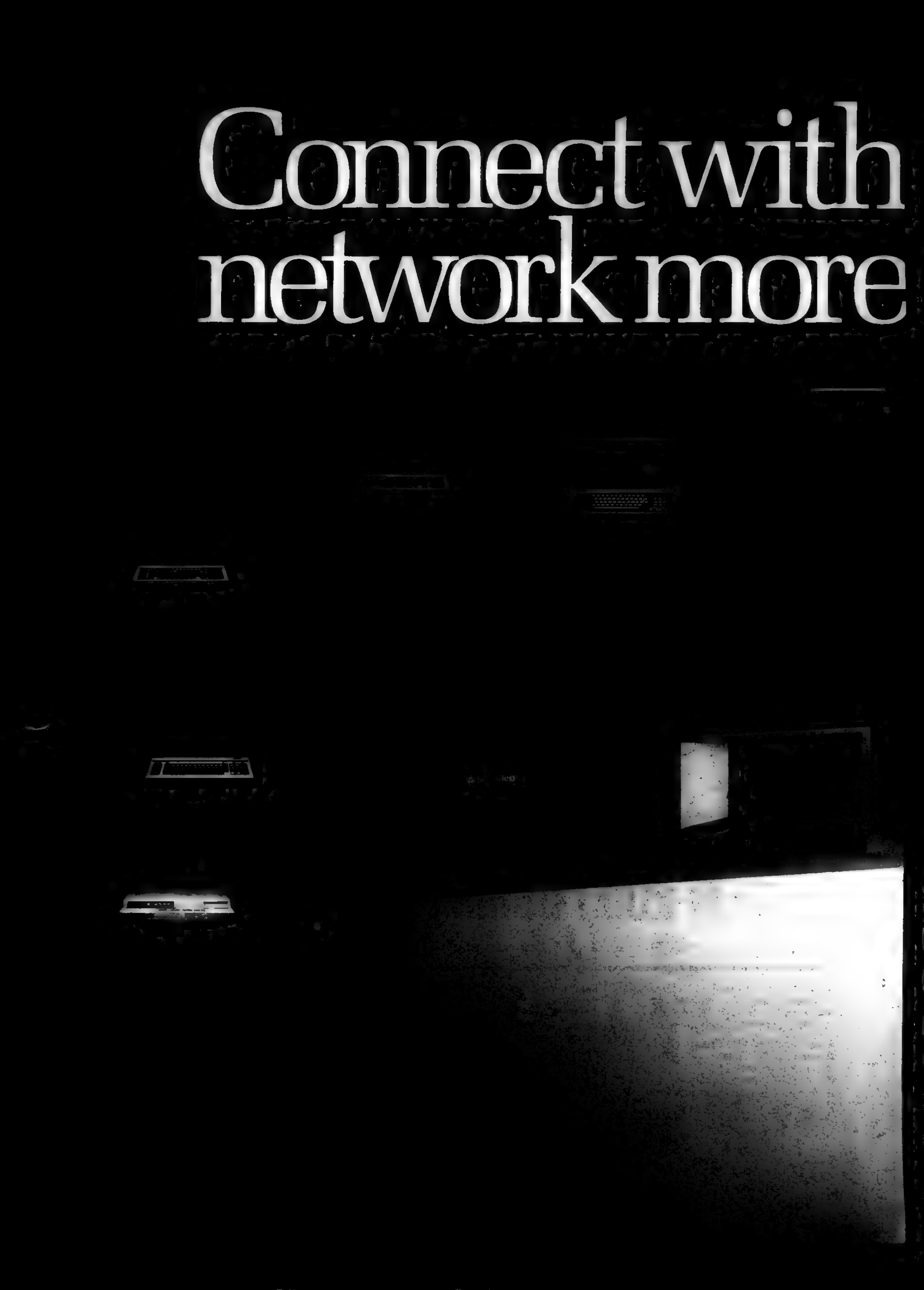
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DEC foray

FROM PAGE 47

Shaffer, editor of the "Computer Letter" newsletter and head of Technologic Partners in New York. He reported that sales are strongest at Alliant and Convex.

Jack W. Hugus, president and CEO of Scientific Computer Systems in San Diego, Calif., said DEC will be a "formidable contender." But executives from Alliant and Convex claimed that they can beat DEC in the market because of their focused sales efforts, high-performance products and loyal customers.

By the time DEC enters the market, Convex's Paluck said, Convex will have several hundred installations worldwide, a dominant position in specific market segments and many new products.

The situation is similar to the engineering workstation market led by Apollo Computer, Inc. and Sun Microsystems, Inc., Paluck said. "Companies like IBM and DEC are actually playing catch-up . . . because they can't move fast enough," he said.

The recent strategic alliance between DEC and Cray, focusing on an interface between DEC's VAX minicomputers and Cray's X-MP supercomputers [CW, June 8], was a defensive move by DEC to buy time until it can enter the minisuper market, according to a report by researchers Piper, Jaffray & Hopwood, Inc. "The early successes of minisuper vendors like Alliant, Convex and Scientific Computer Systems have largely come at the expense of DEC," the report said.

Recent DEC alliances with Cray and Floating Point Systems are "part of a DEC stopgap strategy to slow the penetration of minisupers into the VAX installed base until DEC can respond with a minisuper of its own, probably within the next 12 to 18 months," the report said.

Memorex

FROM PAGE 47

lease 8 because they want to improve response times, support additional system users and add new application programs. All these measures frequently require more main memory," he added.

The memory cards, called the 9000 series, reportedly are available in sizes of 1M, 2M and 4M bytes, priced at $3,500 per megabyte. The cards are said to be compatible with the System/38 CPU, microcode and software. They can be transferred between different models of the System/38 family, from the Model 6 through Model 700.

Made for Memorex by Locom Corp., the boards are available immediately.

DG rolls out top guns for military

WASHINGTON, D.C. — At a recent convocation of U.S. Armed Forces computer users, Data General Corp. released the Rugged and Tempest versions of its 6-month-old MV/15000 computer series.

The Eclipse MV/15000R, called Rugged, and the MV/15000T, or Tempest, series range in power from 2.9 million to 6.4 million instructions per second, the company said.

The Rugged models, which are said to meet military standards for withstanding vibration, shock, extreme temperatures, humidity and poor air quality, cost from $117,500 to $284,000. The Tempest version, which is said to satisfy the Nacsim 5100A Tempest requirements, costs from $177,000 to $299,000. There are three models of each version.

DG also released a Tempest terminal, the $2,805 Dasher D461T; a $30,000 Rugged 234M-byte removable-disk subsystem; and fiber-optic communications converters, priced at $480 per pair, for connecting terminals or printers to the host.

Available operating systems include the time-sharing AOS/VS, the real-time AOS/RT32 and DG/UX, a standard AT&T Unix System V implementation.

Godzilla

FROM PAGE 47

cent announcements an entry-level ASCII terminal priced at$399, which is 42% below its previous low-end price of $695. That undercut many competitors' prices, and IBM added that the 3151 display station can be used not only with IBM ASCII hosts such as the Series/1 and RT Personal Computer but with various other hosts through Digital Equipment Corp. and Wyse emulation cartridges.

Making it still tougher on ASCII vendors whose customers might have "buy American" policies, IBM officials just happened to say that the 3151 is made entirely in the U.S. At least IBM did not mention that many of the other ASCII vendors rely on off-shore manufacturing facilities in locations such as South Korea and Taiwan.

According to International Data Corp. (IDC), a Framingham, Mass.-based market research firm, IBM shipped 39,000 of the 1.27 million ASCII-type terminals sold in the U.S. in 1986. The market leader was Wyse, which shipped 281,000 terminals.

IDC Senior Research Analyst Diane Farrell called the ASCII market a slow growth area and said, "It's not likely that IBM can come in and grab a share of the market without hurting someone else." She described IBM's plans as a statement that IBM is getting tough.

IBM's move does not mean all ASCII terminal makers are about to be crushed. Companies such as Wyse should be able to respond. Even some of the smaller vendors may undercut or at least match IBM's price and claim functional superiority.

But pity the little vendor whose slim profit margins are about to be squeezed again, when IBM charges into a customer site with a competitive price and the backing of a $51 billion company.

What the customer should hope for is that enough alternative suppliers survive to keep the market competitive. But what they should be wary of is the first vendor to come calling with the statement, "IBM's presence legitimizes our market." That has been said before, usually by vendors who would not be around to service their product because Godzilla was behind them.

Connolly is *Computerworld's* senior editor, systems & peripherals.

Edge

FROM PAGE 47

Edge machines include a proprietary microprocessor design manufactured by National Semiconductor Corp. that emulates the Motorola, Inc. 68000 instruction set, according to Phillips W. Smith, chief executive officer and chairman of Edge.

"People using the 68000 chip can move to Edge computers with virtually no porting of the software," Smith said.

High-end machines

Value-added resellers and system integrators offering products using the 68000 microprocessor may want to resell the Edge systems as their high-end machines, Smith said. "We want resellers and integrators to see our products as ideal for applications where their customers need more than 6 MIPS at their fingertips," he said.

Smith likened the dual-processor's power to that of Digital Equipment Corp.'s VAX 8800. He said the new processors are ideal for applications involving more than 64 users, especially when the work requires graphics, imaging, communications and the use of relational data bases. The superminis are also well-suited for electrical and mechanical computer-aided design applications, Smith said.

The Edge 1200 contains 8M bytes of system memory, 337M bytes of hard-disk storage and Edge's GSX Unix operating system, which is based on AT&T's Unix System V, Release 2. The Edge 1200 is priced at about $128,000; the single-processor Edge 1100 in the same configuration costs $104,000. Edge said it will begin shipping the machines in July, with volume shipments beginning in September.

XEROX

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Xerox Ventura Publisher, the easily mastered, industrial-strength publishing genius that runs on a standard IBM XT or AT, or compatible, just got better. Version 1.1 offers 80 significant enhancements for short document handling; text, graphics and font support; and broader output capability.

Xerox Ventura Publisher already gets raves for long documents; now Version 1.1 offers 20 additional features for producing short documents. There's automatic kerning, support for multicolumn frames, improved hyphenation, cropping and sizing of art, on-screen rulers, and automatic letter spacing, to name a few.

For documents of any length, page layout and type control have been raised from excellent to sensational. Pictures are now anchored to text during batch pagination. Documents up to 128 chapters in length, each containing 150 to 300 pages of text, are easily handled. The result is a desktop publishing package that can be judged by printing industry graphic standards.

To the longest list of text and graphics input support in desktop publishing comes even greater capability. Version 1.1 adds word processing interfaces for XyWrite, Displaywrite III and IV and DCA files. There's graphic conversion for more than 500 graphics packages based on a dozen file formats, including Macintosh "PICT" and image files. Plus downloaded PostScript fonts, conversion of H-P Soft-fonts and support for Adobe screen fonts.

This new release makes Xerox Ventura Publisher the first desktop publishing program to support the industry-standard page-description languages: PostScript and Interpress. That means total compatibility with all popular laser printers, including, of course, the Xerox 4045 Laser CP and the Xerox 4020 Color Ink-Jet Printer.

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NEW PRODUCTS

Processors

CIE Systems, Inc. has expanded its family of 32-bit multiuser business computer systems with the addition of the **CIES 680/550** high-end system and the **CIES 680/50** entry-level system.

The CIES 680/550 features a 25-MHz Motorola, Inc. 68020 CPU, 45-nsec 1M-byte memory chips and a high-speed 4M-byte small computer systems interface disk cache. The system can support 250 users. A standard configuration costs $125,995.

The CIES 680/50 features a 68020 CPU running at 16.7 MHz and support for eight users. A basic configuration costs $12,750.

CIE Systems, 2515 McCabe Way, Irvine, Calif. 92714.

CAD/CAM/CAE

Computervision Corp. has announced a graphics workstation said to deliver 4 million instructions per second (MIPS) integer performance and 125K floating-point operations per second.

The system, called the **Caddstation 34**, includes a 64K-byte virtual-address memory cache and high bandwidth as well as a 64-bit processor-to-memory bus. It features Sun Microsystems, Inc.'s Sunos 3.2 release of the Unix operating system, the vendor said.

A sample configuration includes the 4-MIPS CPU, 16M bytes of main memory, a ½-in. tape, a 515M-byte hard disk, an Ethernet interface and a color monitor. It costs $90,400.

Computervision, 100 Crosby Drive, Bedford, Mass. 01730.

Data storage

Eastek Corp. has added a **departmental image scanner** to its optical disk-based document processing system.

The departmental scanner is said to scan up to 20 letter-size page/min. It processes paper sizes ranging from 3 by 5 in. to 8½ by 11 in. at a density of 200 dot/in. The document processing system is based on a distributed workstation environment and uses the Apollo Computer Corp. Domain local-area network.

The departmental image scanner option is priced at $17,500.

Eastek, 10 Bloomfield Ave., Pine Brook, N.J. 07058.

Terminals

Teleray, a division of Research, Inc., has enhanced its **Model 20-DHP** to include type-ahead and return and enter features as well as a dual-port option that allows the terminal to operate and maintain sessions with two Hewlett-Packard Co. hosts or an HP and a Digital Equipment Corp. host or two DEC hosts.

Other 20-DHP enhancements include the addition of a soft-white 14-in. CRT and a simplified lock capability that is implemented with a single keystroke in set-up mode. Standard features include 8-page display memory, bidirectional printer port, 80- or 132-col. display and separate VT220 emulation mode.

The 20-DHP is priced at $1,295.

Teleray, Box 24064, Minneapolis, Minn. 55424.

Printers/Plotters

The **Model 6704** 400 line/min dot matrix line printer designed for use with IBM System/34, 36 and 38 minicomputers has been unveiled by **Decision Data Computer Corp.**

The Model 6704 is said to emulate the IBM 5256, 5224 or 5234 dot matrix line printers. Character resolution is 60 by 120 dot/in. in the draft mode and 90 by 180 dot/in. in the near-letter-quality mode., according to the vendor. Character and line spacing are variable. Print speed is 400 line/min in the draft mode, 300 line/min in the data processing mode and 175 line/min in the near-letter-quality mode.

The Model 6704 printer is priced at $6,995.

Decision Data, 400 Horsham Road, Horsham, Pa. 19044.

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Model 5080, for System 34/36/38, uses standard twin-axial connectors, and emulates the IBM 5219.

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Which data is which?

To get a workable picture of corporate data, MIS needs a framework for data engineering

BY SERGIO FAISSOL

The discipline of data base engineering concerns itself with managing data as a corporate resource. Traditionally, development has concentrated on designing correct and efficient algorithms to collect and process data, thus making it available to the various parts of an organization.

Data base technology was born of the need to share data and make it easier to adapt to unforeseen applications. Data has been too closely tied to the applications for which it was originally defined. This flaw has created a number of problems, the least of which is wasting storage resources by filling it with redundant data.

Modern data base management systems provide increasing amounts of data independence — which is supposed to facilitate the separation of data from individual applications — in addition to backup and recovery facilities for on-line processing, teleprocessing, screen-handling capabilities and even integrated fourth-generation languages.

With all of these facilities available, why do organizations still tie data so closely to applications, and why are they using a DBMS mostly for their fringe benefits — as sophisticated access methods?

The answer is that one of the most important prerequisites for sharing data is not and cannot be supplied by a DBMS. To identify areas with a potential for sharing, companies must analyze data from different applications — data that has been defined, grouped and named in a variety of ways — identify those data elements that can be shown to be the same and then redefine them appropriately.

Better still, companies can design new data in such a way that it can be easily shared and reused. Only when such redefinitions are made can a DBMS be used not just as an access method but also as a tool to manage data as a corporate resource.

Creating a corporatewide integrated data base environment is not an undertaking to be taken lightly. It is not uncommon to find companies with tens of thousands of data elements, most of which are redundant and poorly defined. The sheer volume of data descriptions to be handled, not to mention issues related to the meaning of data and their relationships, make it virtually impossible to approach the overall problem at once in a top-down fashion.

Evidence of this can be readily seen in the failure of a number of expensive, long-term projects that perform data modeling in a careless and grandiose way.

On the other hand, a piecemeal bottom-up approach, which has been used for many years, usually leads to a nonintegrated environment.

Relating data to business

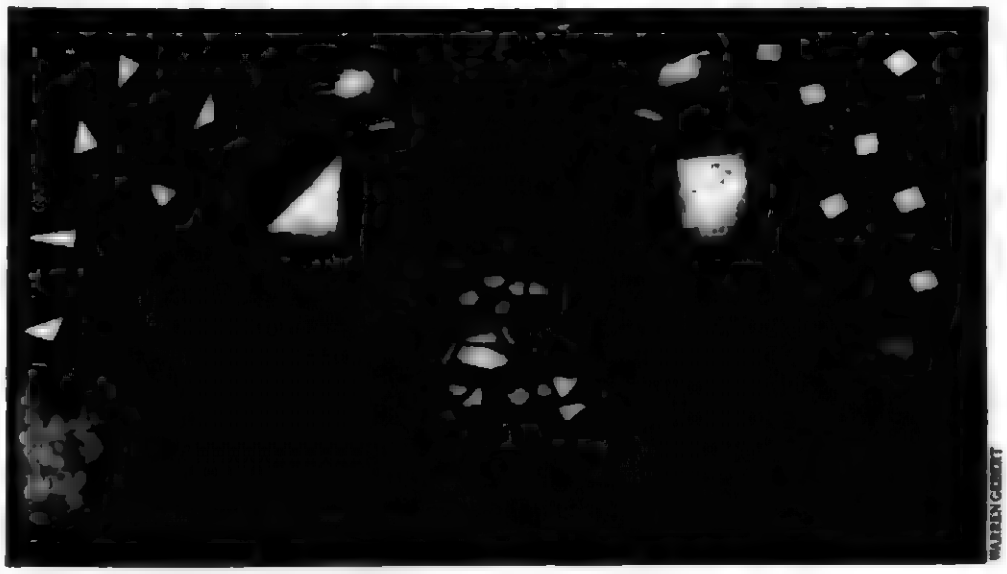
The discipline of data base engineering is concerned primarily with the knowledge and technologies required to define, group and relate data in a way that will promote sharing and reusability as much as possible.

Data analysis is a highly skilled task that requires a profound knowledge not only of a set of techniques but also of the underlying data as it relates to the operation of the business. Equally important is the way in which this knowledge is acquired, stored and communicated to people with backgrounds and experience that can vary from applications programmers to top-level managers.

In leading an organization into an integrated data base environment, data managers must create data abstractions from the requirements level to the lowest and most basic form. Such abstractions should model data that reflects the fundamental nature of the business. It should also be easily understandable throughout the organization and lead to data structures that will minimize redundancy, optimize performance and facilitate evolution.

No single model can accomplish all of this, and attempts to develop one usually end up as expensive mistakes. The level of detail required to fine-tune one individual application makes an overall picture unmanageable. In addition, the desire to prepare for unforeseen uses of data has led data analysts to define and include in their models many unnecessary data elements, which further complicate the issues and increase the amount of work involved.

What is needed is a framework that addresses the data knowledge needs of users, systems developers, data base designers and performance specialists. This framework should



WARREN GEBERT

Faissol is chief scientist at M. Bryce & Associates, Inc. in Palm Harbor, Fla., developer of the Pride data base engineering methodology.

……

- Top-down vs. bottom-up compromise
- Data from a business point of view
- No single model will do

lend itself to evolutionary development while maintaining a clear overall view. Since most organizations already maintain a multitude of data definitions and existing systems that must be preserved, this framework must be able to handle existing data architectures and still be able to integrate them with new developments.

Built by evolution

A pure top-down approach to building an enterprise model is rarely possible any place else than in very small companies. The effort and time required for such a project usually discourages the potential beneficiaries — system development, user management and user operations — before the project is complete. Also adding to the problem is that substantial time must be spent resolving conflicts about data definitions in a changing environment. Very often, after all this effort, users see no direct benefit arising from the project.

The best approach in data modeling is to "divide and conquer" but to do so with strong discipline and control to prevent the "conquered territories" from becoming isolated islands with different cultures and languages. In other words, each modeling effort, which may include one or more systems, needs to be carefully integrated with the existing model. Conflict resolution must be done at this time in a nondisruptive way.

As a result of the integration of the model with a new system, changes to existing models may be necessary. This can be achieved without disruption only if the boundaries between logical and physical are sharply maintained so that adjustments to logical models can be made without affecting the physical implementation and vice versa.

Engineering framework

The framework for data base engineering presents a multilevel view of data. This framework is composed of the following four interrelated data base models, each of which addresses a different aspect of the data base (see chart above):

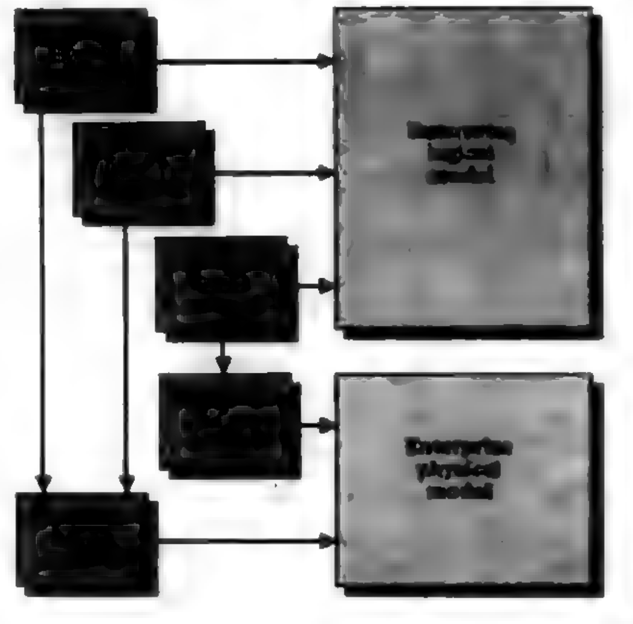
- Enterprise logical data base model.
- Application logical data base model.
- Enterprise physical data base model.
- Application physical data base model.

The logical models rely on the concept of objects and are totally independent of any implementation detail, including access paths. The physical models take into account the type of DBMS used, or the lack of one, and represent actual files and records.

This approach allows the design of proper logical models without disrupting existing data structures no matter how they are organized.

A framework for data base engineering

The physical models and logical models represent data differently; together they provide a full picture of corporate data



CW CHART

Enterprise logical data base model. The purpose of this model is to present a logical overall view of all data currently of interest to the organization, excluding implementation-dependent details. It is a meaning-oriented model, intended to provide users and system designers with a global understanding of the data used by the information system that is currently implemented or under development in the organization.

The data is structured into interrelated objects, each representing a certain type of fact or event of interest. These objects are composed of normalized records, which in turn are composed of data elements. This approach provides a stable model, which, when completed, will need to be modified only as the nature of the business changes.

This model is built and maintained by data management in an evolutionary way and is connected to the application logical data base model and the enterprise physical data base model.

Application logical data base model. The purpose of this model is to provide systems analysis with a local logical view of the data required for a specific application. There is one such model for each application; each model is related to the enterprise logical model and the application physical model.

The application logical model is composed of a set of interrelated objects, which contains only the data that is required to implement the information requirements for a specific application or system. The objects of this model will eventually be the same as those in the enterprise logical model and will be identified in the same way, but they will be represented by a different level of detail, possibly with different relationships.

Enterprise physical data base model. The purpose of this model is to provide data base designers with the freedom to choose the best technology for each new application — a DBMS, disk, tape or even manual files — and keep that technology independent from the logical models.

The enterprise physical model is a global view of all physical files, records and data bases used to implement the objects in the enterprise logical model. It reflects the technology used for implementation at any given time. Objects of the enterprise logical model may be regrouped or split in different ways to compose the enterprise physical model. Performance and security considerations could dictate such rearrangements, which need not necessarily be normalized.

Application physical data base model. The purpose of this model is to provide program designers with the physical data structures necessary for their programs. This model may be just a subset of the enterprise physical model that refers to the particular application, or it may depart substantially from it to an extent that it depends on the DBMS or file access methods used.

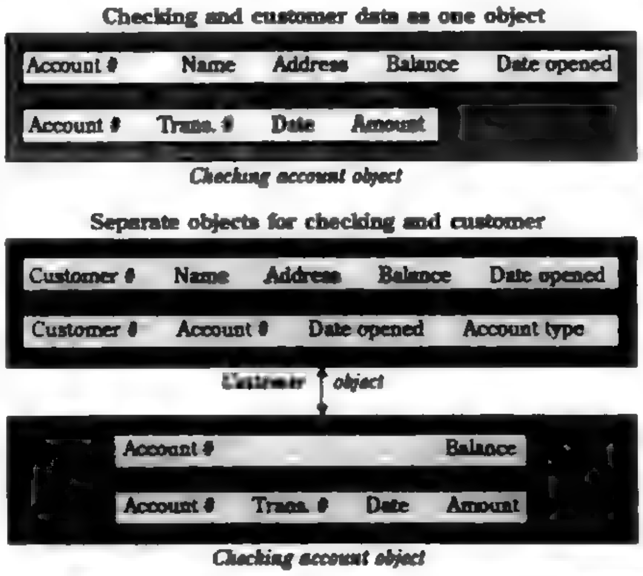
Objects

Business facts and events are the backbone of the logical models in data base engineering. They are represented by data abstractions called objects, which are conceptual representations of the facts and events required to operate and manage an enterprise. Objects may be as tangible as a customer, an employee or a vendor or as intangible as a debit, a credit or a transaction. The key point is that objects are used to operate the enterprise and are unique to a specific business or type of business. They do not exist on their own merit; they must have a legitimate bearing on the organization.

Objects are represented by groups of data elements used to define and describe those objects. It is, however, impossible and unnecessary to record every potentially collectible piece of data about an object. Furthermore, it is only necessary to be concerned with certain facts and events of interest to the business. Objects are designed around these facts or events, regardless of physical implementation issues, and at the proper level of detail. This fact/event approach, coupled with normalization techniques, is the key to achieving a stable model that promotes sharing and allows for unforeseen uses of data.

Data modeling

One bank found that identifying "checking account" as an object in a data model made for an inflexible data base; keeping the customer information separate fit the business more closely



Checking and customer data as one object

Account # Name Address Balance Date opened

Account # Trans. # Date Amount

Checking account object

Separate objects for checking and customer

Customer # Name Address Balance Date opened

Customer # Account # Date opened Account type

Account # Balance

Account # Trans. # Date Amount

Checking account object

CW CHART

An object instance is defined as a data abstraction that records an individual fact or event. For example, the fact that John Doe is an employee at the First Alien Bank is recorded by one instance of the object "Employee." The bank will probably record the same data about all its employees. An object is defined as the description of all such instances, that is, it describes the properties recorded about all employees. These properties are defined as data elements, each of which specifies a more elementary fact recorded about employees.

Objects may be as concrete or as abstract as data analysis makes them in order to represent facts or events of interest. The identification of objects is the single most important task in data base engineering, since it has an impact that reaches far beyond the scope of information systems development. The following example from the banking business illustrates this point.

Historically, the first and foremost product offered by banks was the custody of funds. The Checking Account abstraction was created as a means to keep track of relevant data. In the early days of banking, this data was maintained as a manual file that contained such elements as the current balance, the date opened, the customer's name and address, deposits, withdrawals and so on. The checking account would be a final object.

In fact, this is how most banks implemented their first computerized checking account systems — with a single sequential tape file. Even if the concepts of third normal form were applied to such a file, it could have been designed with two normalized records, one for the data elements that occurred only once and the other for the variable deposit/withdrawal transactions (see chart at left).

The problem with this approach became apparent when banks started to offer other products such as savings accounts, loans and insurance. It was further complicated by joint accounts. New objects (Savings Account, Loan Account and so on) that could not communicate with each other were created, along with large amounts of redundant data and all the associated problems.

When the banks realized they should maintain a Customer object as distinct from the Checking Account object, they found that the effort to perform this conversion was enormous. Not only did the information systems need to be redesigned, but functional units also had to be

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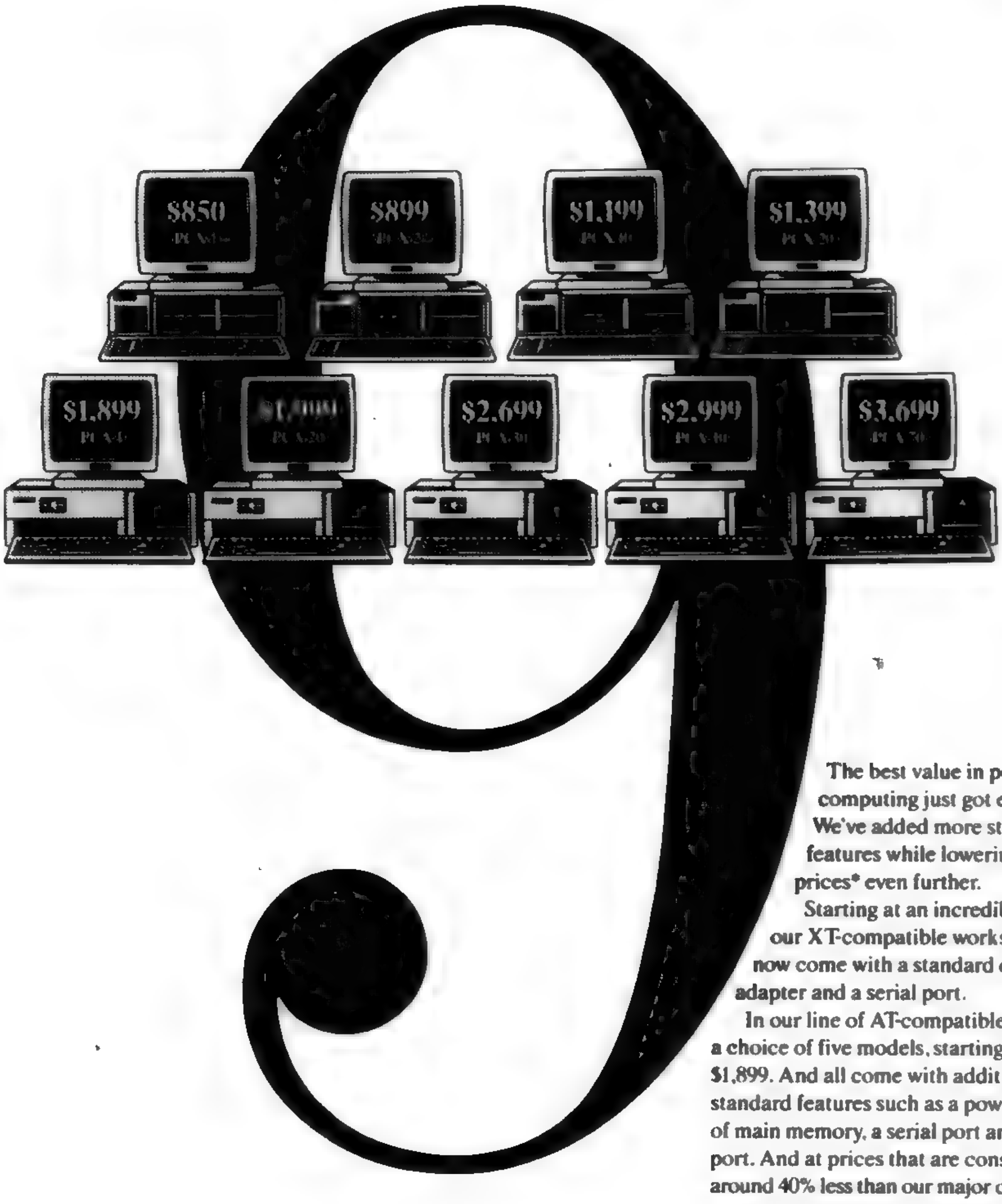

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Rules of normalization

It might be argued that the rules of normalization would separate a Customer object from a Checking Account object, but this might not always be true, depending on the existing functional dependencies among the data elements involved. If only one name and address — the account holder's — could be associated with a checking account, and no other products (such as insurance) were of interest, name and address would be functionally dependent on the Checking Account number and there would be no need for a Customer object. This was the approach taken by most banks in the past.

AS A RESULT of the integration of the model with a new system, changes to existing models may be necessary. This can be achieved without disruption only if the boundaries between logical and physical are sharply maintained so that adjustments to logical models can be made without affecting the physical implementation.

Ideally, new objects should be created only when the enterprise enters a new area of business and by those in charge of defining that business (the realm of enterprise engineering). However, in practice, systems analysis is often confronted with identifying objects when developing a new system for an existing business area or when documenting an existing system.

This fact/event-oriented approach to data abstractions is less ambiguous than the entity-oriented approach commonly used. The major difference between these two approaches is not in the form of representation of the model but rather in the semantic difference between objects and entities.

While entities represent things that exist in the real world, objects are more general, in that they can be any convenient data abstraction known to the business. In the entity-oriented approach, two kinds of data are defined: attributes of entities and relationships among entities. Records are created by first identifying groups of data that represent things that exist in the real world. These will constitute the entities. Then, relationships are identified and named. Some relationships, such as "many-to-many" or those containing additional attributes, also become records.

The point here is that there is no effective criteria to discriminate between those things in the real world that are entities and those that are not. For example, suppose we define Orders and Products as entities. A many-to-many relationship between these two containing the additional attribute Quantity would have to be represented as a nonentity record, which we might call a Shipment. Which intrinsic property of a Product makes it an entity, while a Shipment is seen as a relationship?

This type of ambiguity finds itself in most data bases and, further, clouds the process of entity identification. Furthermore, since different user groups may view the same real-world item either as an entity or as a relationship, an additional dimension is added to the data modelers' task — that of integrating different views into one global model.

A checking account is another example that would hardly qualify as an entity and would probably be labeled as a relationship between Customers and Transactions, unless we force the rules of entity definition.

In fact, in the entity-oriented approach, all major business events would fall into the category of relationships, which are harder to characterize, especially for users. The preceding discussion does not imply that all objects are regarded in the same way. There are many different kinds of objects, some of which, certainly, are more important than others and therefore will be dealt with at earlier phases of design.

First things first

The point to be stressed in this discussion is that the identification of the objects to be represented in the logical data base models is not only of crucial importance to the development of information systems but can also bear on the basic operation of the business.

The rules of normalization are important for a proper design of data structures and must be strictly adhered to, but these rules can only be applied after the fundamental data abstractions — the objects — have been identified and semantically defined.

Although data management is required to have an overall understanding of all of the data, such data abstractions are not defined as a result of a caprice on data management's part. They are created by those who are most knowledgeable in that particular area of the business — the users — and systems analysts working together.

The fact/event-oriented data modeling approach leads to an easier and less-ambiguous way to create data abstractions and, most importantly, facilitates both the processes of object identification and integration. ●

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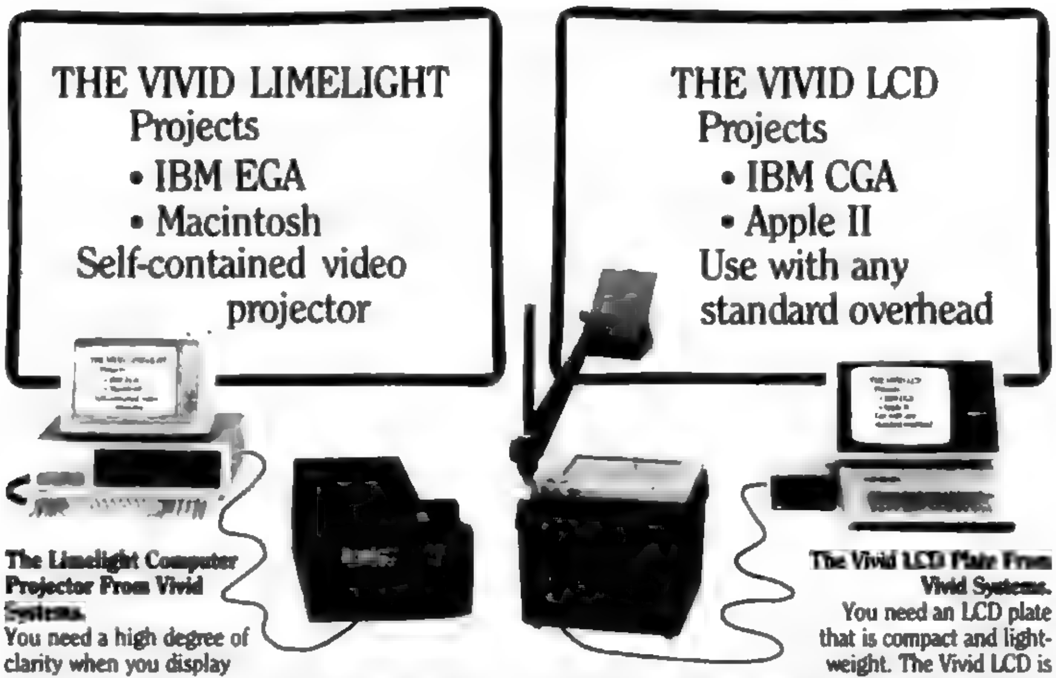

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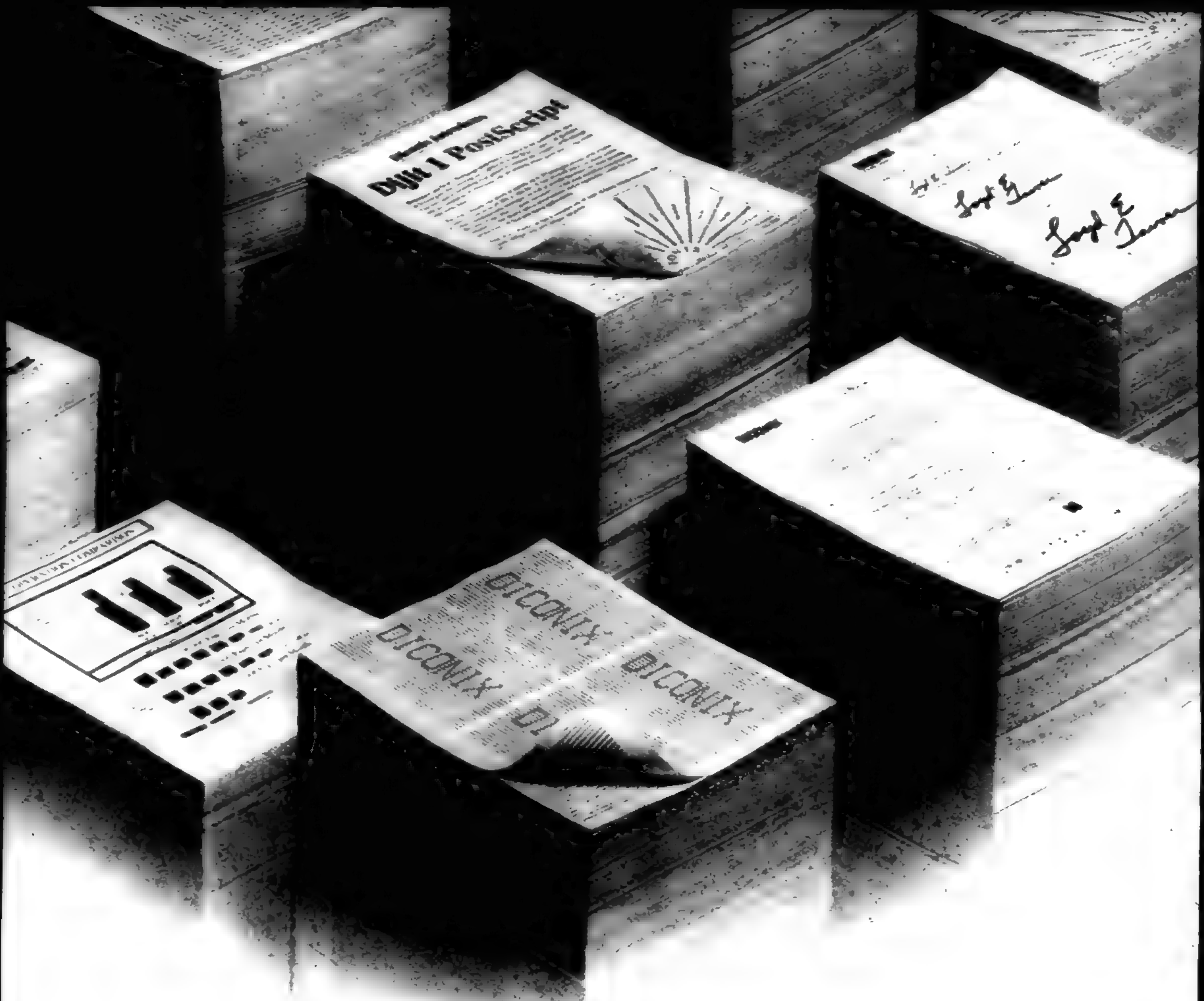

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MANAGEMENT

TAKING CHARGE

Efrem G. Mallach

Putting MIS in focus

Focus means different things to different people. To a photographer, it has to do with adjusting a lens. To an astronomer, it is the sun's position in a planetary orbit. To a physician, it is where the center of an infection is located. In business, focus means choosing the most important things to concentrate on — and then concentrating on them.

Lack of focus can be disastrous. In the late 1960s there was a company called Viatron. Viatron was the prototype for the go-go high-tech start-ups of a decade later. It set out to build a terminal to rent for the then-unheard-of price of $39 per month. It was well on its way to that goal when management decided to pursue minicomputers and digital watches as well. Chapter 11 was right behind.

I have seen the difficulty of achieving focus first-hand. As director of strategic planning for a minicomputer firm, I found it easy to get agreement on the concept of focus. It was not difficult to get agreement on areas for focus. The hard part was get-

Continued on page 64

GTE tries incremental backup

Selective copying reduces risk, labor needs, storage requirements

BY JEFFRY BEELER
CW STAFF

SACRAMENTO, Calif. — For years, the problem of how to back up mainframe disk files has created a classic bind for managers of GTE Data Services, Inc.'s computing site here.

On the one hand, the combined capacity of the data center's direct-access storage devices is growing by about 40% per year, according to GTE Senior Systems Analyst Diane Koenig. Each night, the facility has to copy the complete contents of its 99 IBM 3380s and 3380Es to its IBM 3480 cartridge-tape subsystems.

On the other hand, the window within which the site is supposed to complete the backup of its files is rapidly shrinking. "We used to start our backup at 8 or 9 p.m., when we took our on-line systems down, and were able to continue the process until about 6 a.m.," Koenig recalls.

But lately, steady growth in the company's end-user and on-line application base has forced the center to restrict its data-duplication activities to a window between midnight and 4 a.m., Koenig says.

In short, like its counterparts in many other corporations, the local GTE computing site currently finds itself burdened with more data and less time in which to back it up than ever before.

Now, however, the facility is trying to extricate itself from its growing predicament by redefining its approach to data backup. Starting last week, the data center officially became a practitioner of incremental backup.

As a result of the development, Koenig and her colleagues no longer copy the site's disk files in their entirety. Instead, they now back up only a selected subset of the contents, she says.

Included in the subset are the data sets for their IBM TSO users, production batch activities and test batch functions. In a

Continued on page 64

New Fannie Mae chief stresses ease of use

BY DAVID A. LUDLUM
CW STAFF

Samuel A. Alward will have an advantage in trying to follow the increasingly widespread corporate maxim that information systems managers should keep close to their users.

As the new executive vice-president for technology at the Federal National Mortgage Association, better known as Fannie Mae, Alward is both a user and an MIS manager, overseeing mortgage administration as well as information services.

Samuel A. Alward

"Being a provider and user is becoming less curious in my experience. Some of the Wall Street firms are going this route," says Alward, a former executive vice-president for finance and administration at the New York Stock Exchange.

Looking at Fannie Mae, Alward says he sees parallels with the stock exchange. "A lot of it is automated, but if we look at what can be done, it provides an exciting opportunity to make the whole thing automated," he says.

Alward describes his goal as "bringing together the different elements with the theme of making it efficient and easy to do business" with the mortgage agency.

Alward will continue the roll-out of Fannie Mae's once-troubled Laser system, which mortgage lenders use to file monthly updates on the status of the loans that they have sold to Fannie Mae but continue to service.

Continued on page 63

CIM may spawn new industry

BY DAVID A. LUDLUM
CW STAFF

NEW YORK — Computer-integrated manufacturing (CIM) systems may allow firms to perform manufacturing as a service for various industrial customers, an assistant secretary of the U.S. Department of Commerce told a gathering of information systems executives here recently.

Reprogrammable CIM systems might even allow such firms to offer manufacturing services to companies in different industries, said D. Bruce Merrifield, assistant secretary of commerce for productivity, technology and innovation.

Addressing a June 23 executive forum on Competitiveness Through Techology held by The Diebold Research Programs, Merrifield cited CIM as a technology that could enhance the competitiveness of U.S. industry.

Productivity measures

Merrifield focused his remarks on advocating an array of societal changes intended to accommodate improvements in productivity.

These changes included a comprehensive program of "computer-aided education" to improve elementary and secondary schools, new incentives for innovation — such as easier ap-

Continued on page 63

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LOCAL HAPPENINGS

JULY

Women's Progress as Leaders: Reality or Illusion? San Francisco. July 8, 5:30 p.m. — Contact: Association for Women in Computing, Bay Area Chapter, Suite 1044, 41 Sutter St., San Francisco, Calif. 94104.

Hewlett-Packard Toptech Users Club. Rockville, Md. July 8, 9:00 a.m. — Contact: Bruce Baxter, Internal Revenue Service, 1111 Constitution Ave. N.W., Washington, D.C. 20224.

Programming in Postscript and Rethinking Applications Design. Boston. July 13 — Contact: The Boston Computer Society, One Center Plaza, Boston, Mass. 02108.

Data Base Design Tailored to DB2. Philadelphia. July 14, 9:30 a.m. — Contact: Delaware Valley DB2 Users Group, Suite 505, 3650 Silverside Road, Wilmington, Del. 19810.

System/38 Communications Hardware, Software and Futures. Fairfield, N.J. July 16, 3:30 p.m. — Contact: Northeast System Thirty-Eight Users, Inc., New Jersey Chapter, P.O. Box 1272, West Caldwell, N.J. 07007.

Graphics Programming Under the OS/2 Windows Presentation Manager. Boston. July 20 — Contact: The Boston Computer Society, One Center Plaza, Boston, Mass. 02108.

Data Administration Management Association. Chicago. July 21, 5:30-9 p.m. — Contact: Patricia Cupoli, Northrop Corp., Building 3555, 600 Hicks Road, Rolling Meadows, Ill. 60008.

AUGUST

Computer Consulting vs. Permanent Employment. San Francisco. Aug. 5, 5:30 p.m. — Contact: Association for Women in Computing, Bay Area Chapter, Suite 1044, 41 Sutter St., San Francisco, Calif. 94104.

CALENDAR

JULY 12-18

Fourth Annual Information Center Conference and Exposition. New Orleans, July 12-16 — Contact: Weingarten Publications, Inc., 38 Chauncy St., Boston, Mass. 02111.

IBM Users/DEC Users Computer Security Conferences. Philadelphia, July 13-14 — Contact: Computer Security Institute, 360 Church St., Northboro, Mass. 01532.

Computer-Aided Engineering: The Many Faces of CAE. San Francisco, July 13-14 — Contact: Frost & Sullivan, Inc., 106 Fulton St., New York, N.Y. 10038.

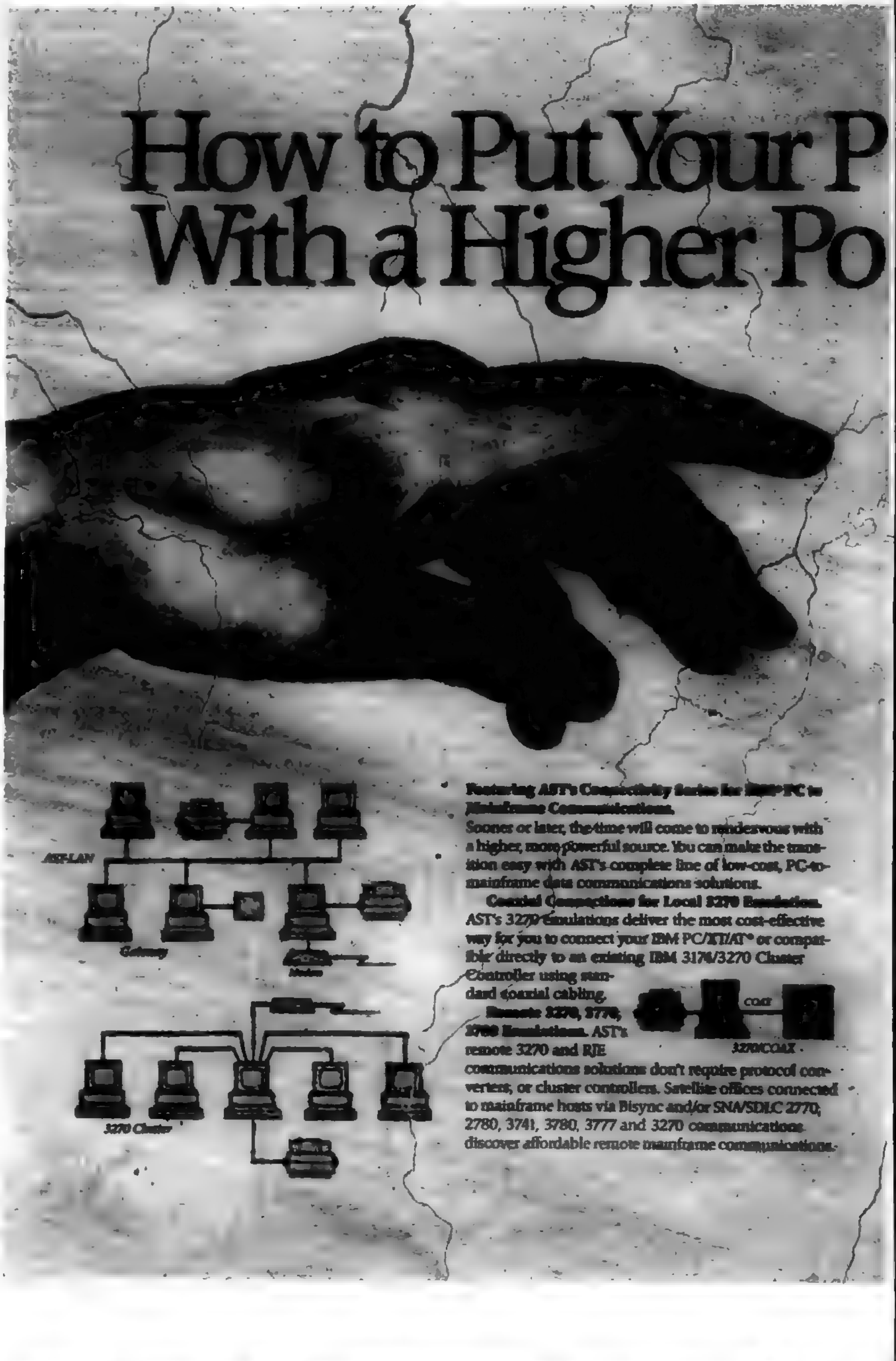
AAAI-87, The Sixth National Conference of the American Association for Artificial Intelligence. Seattle, July 13-15 — Contact: AAAI-87, 445 Burges Drive, Menlo Park, Calif. 94025.

Chief Information Officer: Teaming for Profit. New York, July 14-15 — Contact: William Smulsky, The Yankee Group, 200 Portland St., Boston, Mass. 02114.

JULY 19-25

AM/FM International Conference X. Snowmass, Colo.,

Continued on page 64



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Fannie Mae

FROM PAGE 51

The system is replacing three older systems based on different Fannie Mae programs for buying mortgages. Lenders ship most of the updates by tape to Fannie Mae.

The Aggregate Exception System, the largest of the components that Laser is replacing, was converted to Laser Oct. 1, 1986 after a widely publicized plague of 1,500 bugs in its Cobol code delayed the start-up for 19 months and doubled Laser's estimated cost to $50 million. That component serves about 1,600 lenders, most of whom are mortgage bankers who service roughly two million loans.

Fannie Mae expects to implement the second component of Laser, replacing its Summary and Participation Reporting System, with a pilot group of about 100 lenders in September, according to Alward.

Eventually, Fannie Mae will handle about 1,300 lenders, generally thrift and savings-and-loan institutions, that service about 500,000 loans. Full-scale use is expected early next year.

The third component, replacing the Mortgage Backed Securities system, is for about 800 lenders that service about 500,000 loans. Its start-up is scheduled for the fall of 1988.

Fannie Mae also operates Mornet, a communications network for the lenders that has bulletin boards and applications that have been enhanced to allow them to edit data and deliver it to Fannie Mae via microcomputer.

"That's really exciting, because it's been a boon to small bankers. All it takes is one personal computer to talk to Fannie Mae," says Marty Mitchell, a spokeswoman for the agency.

Alward is also responsible for Fannie Mae Software Systems, a division of the association that develops and sells mortgage banking software.

Alward succeeds William A. Dawson, a former executive vice-president of Girard Bank in Philadelphia who joined Fannie Mae in February 1985, a month before the initial deadline for getting the first component of Laser running.

Dawson's drive to meet the October 1986 start-up date involved 12-hour programming shifts seven days a week. He has since resigned to pursue other career opportunities, according to Mitchell.

Alward's mission

Alward joined Fannie Mae in November 1986 as president and chief executive of the National Mortgage Exchange Interim Corp., a division that studies the feasibility of starting an exchange for mortgage-backed securities.

"My mission was to see if there was support out in the market for that," Alward says. "With other initiatives going on, another entry probably didn't make good sense. I recommended we not proceed."

Previously, Alward was vice-president for Seaboard Coastline Railroad and president of its computer services subsidiary, Cybernetics & Systems, Inc. He graduated from the U.S. Military Academy in West Point, N.Y., and was a marketing manager for IBM.

CIM

FROM PAGE 51

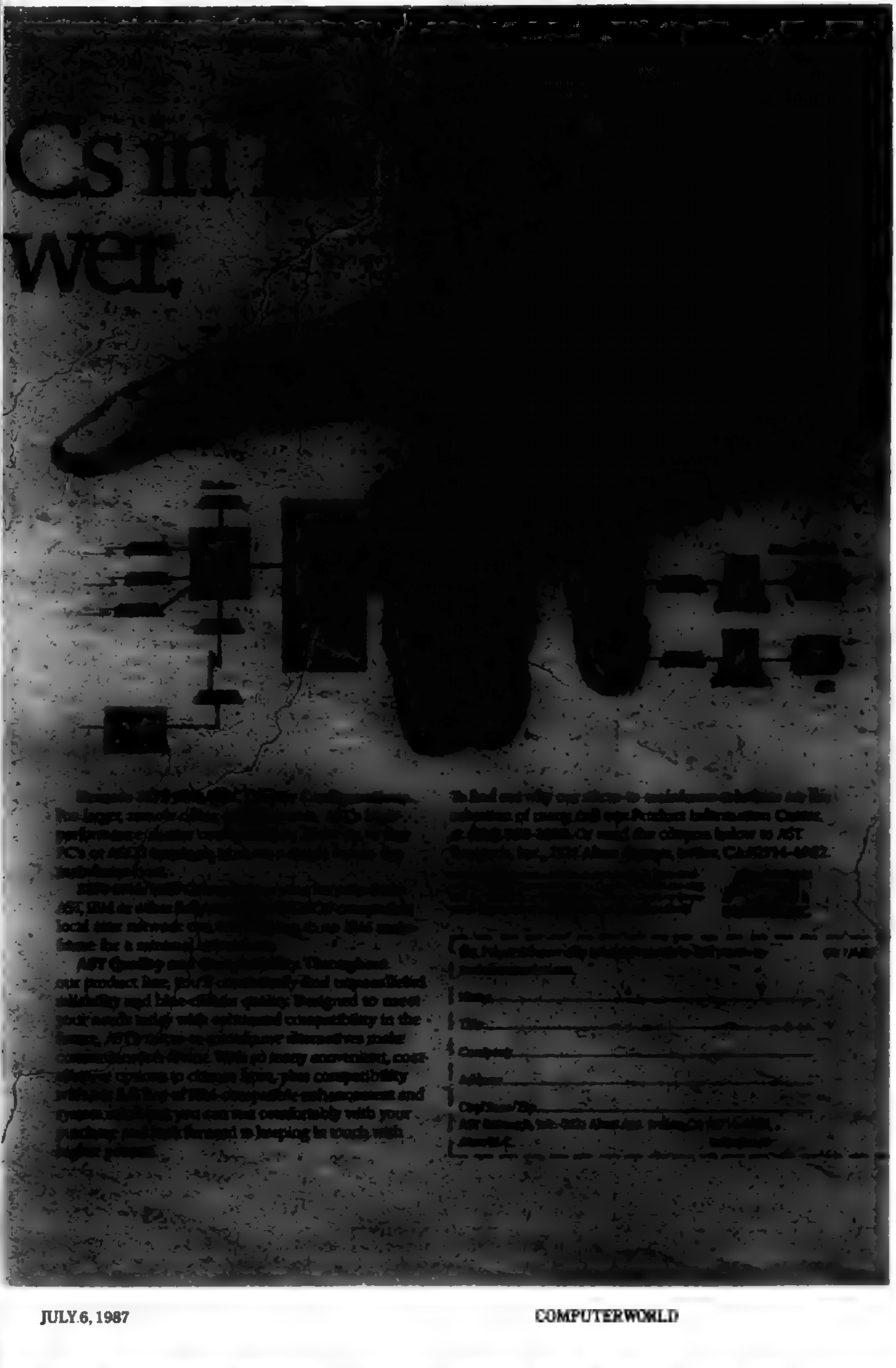
proval of patents for defense-related inventions — and greater use of cooperative research and development programs.

Merrifield also advocated several steps intended to remove barriers to American competitiveness, such as relaxing the 73-year-old Clayton Antitrust Act, loosening industrial regulations and lowering the cost of capital.

He justified such moves on the basis of the global competition facing U.S. industry.

"If it's pro-competition in the global context, it's OK," Merrifield said. "It's going to happen with us or without us. It better be with us."

Merrifield also noted that the U.S. has advantages in competing globally, including the country's advanced technology, industrial infrastructure, wealth of capital and entrepreneurial culture.



Continued from page 62

July 20-23 — Contact: Barbara Emery, Automated Mapping/Facilities Management International, Suite 820, 8775 E. Orchard Road, Englewood, Colo. 80111.

The Federal Desktop Publishing Conference and Product Showcase. Washington, D.C., July 20-23 — Contact: FDPC coordinator, 3825-I S. George Mason Drive, Falls Church, Va. 22041.

The Desktop Publishing Conference. Arlington, Va., July 21-22 — Contact: The JLS Group, Inc., 7485 Demille Court, Annandale, Va. 22003.

National Fincom: Financial and Computer Automation Conference. New York, July 22-23 — Contact: Jim Mion, H. A. Bruno, Inc., 333 Sylvan Ave., Englewood Cliffs, N.J. 07632.

Microtrends '87. New York, July 22-24 — Contact: International Communications Industries Association, 3150 Spring St., Fairfax, Va. 22031.

JULY 26-AUG. 1

Computer Associates International, Inc. Annual User Conference. Orlando, Fla., July 26-31 — Contact: Barbara Peacock, Computer Associates, 711 Stewart Ave., Garden City, N.Y. 11530.

1987 Summer Computer Simulation Conference. Montreal, July 27-30 — Contact: The Society for Computer Simulation, P.O. Box 17900, San Diego, Calif. 92117.

Siggraph '87 — The Fourteenth Annual Conference on Computer Graphics and Interactive Techniques. Anaheim, Calif., July 27-31 — Contact: Siggraph '87, Conference Management, Smith Bucklin and Associates, Inc., Suite 600, 111 E. Wacker Drive, Chicago, Ill. 60601.

AUG. 2-8

Annual Remittance and Document Processing Forum. San Francisco, Aug. 2-5 — Contact: Recognition Technologies Users Association, P.O. Box 2016, Manchester Center, Vt. 05255.

25th Annual Conference of the Urban and Regional Information Systems Association. Fort Lauderdale, Fla., Aug. 2-6 — Contact: URISA, 319 C St. S.E., Washington, D.C. 20003.

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MIS in focus

CONTINUED FROM PAGE 51

ting people who saw themselves "losing" to give up their pet projects. They would bring in a sales representative to promise a 600-system order if we did *X*. Of course, nobody ever ordered 600 systems, even when we pulled out all the stops. The order went to a firm that had been doing *X* for years, had made it the corporate focus and finally had it right.

Focus isn't just for computer manufacturers. It's just as important for MIS executives. Nobody can be all things to all people. One can choose to do a few things well or many things poorly. In 99 of 100 cases, doing a few things well is better for all concerned.

That's nice in theory, but how do you choose the few things that are worth doing well?

Using CSFs to your advantage

One way is via critical success factors, or CSFs. CSFs were first put forth publicly in a 1979 *Harvard Business Review* article by John Rockart. The basic CSF concept is simple, almost trivial: Figure out the most important measures of success, figure out what you have to do to succeed by those measures and focus on them. If CSFs have been properly defined, proper priorities will follow.

The hard part is defining CSFs properly. One may have 100 current applications, any of which would cause a crisis if it broke. Does this mean the MIS head should worry about all 100? Of course not. A shop big enough to have 100 critical applications has more than one manager. Put Harry in charge of applications. Then the MIS head has one CSF in this area — making sure Harry does his job.

As Jerry Kanter and Richard Dooley pointed out in a 1986 Babson College study, this may call for fewer direct reports to the MIS head. While this reduction must not create too many management levels, it may be the only way a chief information officer can focus fully on what is truly important.

This year's critical issues

The real CSFs for most MIS heads this year relate to the organization's business. They have to do with making a contribution to the business by increasing its competitiveness, responsiveness and product quality; by decreasing its capital investment needs in manufacturing and distribution; and by enabling its executives to make better and faster decisions.

They include keeping MIS staffers happy and productive. They reflect concern for control, audit, stability and maintenance of on-going applications, some of which are mundane.

The specifics vary with each organization: its industry, culture, strengths, weaknesses and the position of its top information systems executive. But CSFs exist in every case.

MIS chiefs should ask themselves, "What are my critical success factors? What can I do, in my job, to make a contribution to this organization?" Having done so, they must translate these needs into personal CSFs. The result will be good for both the employee and the employer.

Mallach is associate professor of computer science at the Boston College School of Management.

GTE

CONTINUED FROM PAGE 51

nutshell, "we're now backing up only those data sets that change," Koenig says.

Under the full-volume backup procedure the data center used previously, "we clearly had a problem, and incremental backup was the vehicle we chose to solve it," says GTE Associate Systems Programmer Mike Mathis.

The shift in GTE's computing site backup strategy coincides with its conversion from Cambridge Data Systems, Inc.'s ASM2 to IBM's Data Facility Hierarchical Storage Manager, which went into production at the facility on June 29. The IBM data storage manager is the software mechanism that makes the selective copying of GTE's data sets possible.

Previously, the data center used ASM2, an automated storage manager, to migrate its disk files to a Masstor Systems Corp. M860 mass-storage unit. But whether the GTE location here will continue to use the M860 for archival storage purposes remains to be seen.

Evaluating storage systems

The site is currently testing both the mass-storage subsystem and the 3480 for their suitability as data-migration media. Completion of the testing is set for mid-August, Koenig says.

Prior to switching from full-volume to incremental backup, GTE says it sometimes found itself unable to duplicate all its direct-access storage files to tape within the allotted window of time. The result was that the computing site was occasionally forced to conduct the next day's processing activities with only one copy of some of its key data sets. If a disaster had befallen its master disk packs, critical data might have been irretrievably lost.

Thanks to good fortune thus far, the lapses in the company's backup procedures never coincided with any serious accidents. "But we definitely had some exposures," Mathis recalls.

Now that it has converted to incremental backup, the firm no longer faces the danger of having to operate with only one copy of its key data. The reason is that the change in backup techniques has greatly cut the amount of data the organization has to duplicate at night and thus has virtually guaranteed its ability to finish the task on time.

Cuts costs, work load

In embracing incremental backup, GTE also expects to be able to cut the number of tapes it has to mount during the evening by 80%, Koenig says. Previously, the data center averaged 200 to 300 tape mounts per night.

The reduction in tape mounting requirements, in turn, promises to help the computing facility trim its personnel costs, which are already "very high and are rapidly rising," Koenig says.

Another benefit of selectively backing up data is that the tactic will shrink to 2,000 the number of tape cartridges the site has to maintain to copy its critical files, she adds. In the past, the processing center's tape library typically contained about 9,000 such cartridges.

COMPUTER INDUSTRY

INDUSTRY INSIGHT

Clinton Wilder

Catching up with the past

Like baseball's All-Star break, the three-day Fourth of July weekend provides an appropriate midpoint to look back on events of the first half of the computer industry's 1987 season. Hopefully, a recap and assessment of some of the major developments in the first six months will help prepare us for what may be in store in the second half. But of course, in this business, you never know.

When the shark bites. . . The biggest industry event of the year so far has been Computer Associates International, Inc.'s surprise acquisition of Uccel Corp. Standing the independent software industry on its ear during the week of Comdex/Spring '87, the brothers Wang vaulted their fast-growing firm to the top of the size list. If the $800 million deal is approved later this summer, Computer Associates could arguably become the industry's first software conglomerate.

Is this good or bad for users? Opinions vary widely, and only time will tell how well Computer Associates lives up to its promises of continued product support and upgrades. But one certainly cannot charge that the Garden City, N.Y., software mansion has no experience in digesting acquired companies.

From a business standpoint, however, the software industry suffers when one of its best success stories of the past two years disappears under the wing of a larger partner. Uccel's Chief Executive Officer Gregory Liemandt had done a superb job of refocusing the Dallas vendor with a savvy combination of selloffs and buy-outs; even Wall Street was impressed. While Liemandt and his colleagues obviously reaped handsome financial rewards from the buy-out, the industry itself, in losing a strong independent player, is poorer for it.

P.S. Do I love you? At least three entire industries — microcomputers, add-on pe-

Continued on page 67

More mergers in networking industry

DCA to purchase LAN manufacturer Fox Research

BY ELISABETH HORWITT
CW STAFF

ALPHARETTA, Ga. — As part of its strategic direction of offering a complete communications product line, Digital Communications Associates, Inc. (DCA) agreed last week to acquire local-area network (LAN) company Fox Research, Inc., a subsidiary of Fox Technology, for $10 million in cash and debt assumption.

Fox's "entry level-oriented LAN" would strengthen DCA's ability to meet the needs of "independent end users who are not necessarily attached to a corporate 'host,'" said William Hiller, DCA director of communications systems. Whereas DCA's flagship product line, the Irma micro-to-mainframe board, "provides host-data access and involves day-to-day MIS support," the company is now concentrating on end user-to-end user communications products, he explained. The acquisition of micro communications software company Microstuf, Inc. last year was another move in that direction. DCA is also internally developing products "geared to linking remote end-user locations with no mainframe host," Hiller said.

DCA has no plans to integrate its Irma line with Fox's 10-Net family of IBM Personal Computer LAN products, Hiller said. This departs from a precedent set by LAN vendors Unger-

Continued on page 67

Micom to acquire Spectrum for $25M

BY JAMES A. MARTIN
CW STAFF

SIMI VALLEY, Calif. — Micom Systems, Inc. said last week it plans to acquire Spectrum Digital Corp., a T1 multiplexer vendor, for a total of $25 million in cash and stock.

The merger will bring greater T1 capabilities to Micom and will give Spectrum Digital the resources of a larger company to strengthen its presence in the hotly competitive T1 market, officials said. Spectrum Digital, based in Herndon, Va., will be operated as an independent subsidiary of Micom.

"The merger removes a cloud that any small high-tech company has about their financial viability," said Joseph T. Pisula, Spectrum Digital's president. "Many large customers hesitate to do business with smaller companies for that reason."

That type of consolidation has been exemplified by several recent deals in which larger companies acquired T1 technology from smaller T1 vendors.

Among these were Digital Communications Associates, Inc.'s acquisition of Cohesive Network Corp. and IBM's OEM agreement with Network Equipment Technologies Corp.

Expands network products Micom, like many data communications equipment makers, is seeking to expand its networking product offerings through acquisitions. In 1985, Micom acquired Interlan, Inc., a local-area network maker based in Boxboro, Mass.

Industry observers said they believe the Spectrum Digital acquisition will have little impact on the two companies' products. Spectrum Digital and Micom previously had an OEM agreement under which Micom repackaged and resold Spectrum Digital products.

Micom's acquisition of Spectrum Digital is a good move but belated, according to Phil Litwin, an analyst with L. F. Rothschild, Unterberg Towbin.

"The T1 market is still strong, but they've missed a lot of its growth already," Litwin said. "In addition, Spectrum Digital doesn't have a large market presence, and Micom's range of T1 multiplexer products is still not as broad as that of some competitors."

Paradyne Corp., a Micom competitor in certain markets, also has an OEM agreement with Spectrum Digital, although none of the companies involved believe this will create conflict.

"We have exclusive manufacturing rights to the T1 multiplexer in the U.S. and nonexclusive distribution rights," said Ron Stein, manager of telecommunications marketing for Paradyne in Largo, Fla.

"We have always had a good relationship with Micom, so I don't see any effects from the merger," he added.

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IBM's new European unit goal: PBX market

BY AMIEL KORNEL
IDG NEWS SERVICE

PARIS — In a move designed to help hawk its telecommunications wares in Europe, IBM recently announced the creation of a unit to develop and manufacture voice- and data-switching systems adapted to the European market.

Called Integrated Services Switching Systems (ISSS), the organization will be based in the England at IBM UK Holdings Ltd.'s Havant facility, according to the company, and will be headed by Frank Onions, currently a vice-president of IBM-owned Rolm Corp.

"ISSS will concern the Europeanization of products from Rolm," explained a spokesman for IBM Europe in Paris. "Up to now, there have been no switching systems of Rolm effectively up for sale in Europe."

Equipment destined to be linked to the public networks in Europe requires official approval from the government-controlled telecommunications authorities. ISSS will implement the neces-

Continued on page 67

IPL recovers with memory products

BY ALAN J. RYAN
CW STAFF

WALTHAM, Mass. — After being squeezed out of the plug-compatible mainframe market by mammoth IBM, a new focus and new products have helped bring some life back to once-dying IPL Systems, Inc.

The company, now marketing memory products for the IBM System/36 Model D and System/38 minicomputers, has reported six consecutive profitable quarters.

However, while its figures are back in the black, many of IPL's profits still stem from the IBM 4300-compatible CPU product line; the company is trying to move beyond this niche.

IPL aims to soon be 100% dependent on sales and earnings from the memory products, but of the $1.09 million reported in sales last quarter, approximately $750,000 came from the sale of CPUs, according to President and Chief Executive Officer Robert W. Norton. "Even though we are not currently investing any money into the mainframe business, we continue to sell mainframe computers on an OEM basis," Norton says.

Norton says the company's mainframe business will likely end in mid-1988 with the expiration of a major federal government contract with one of IPL's OEM customers, which is widely believed to be AT&T. A second OEM customer for IPL is Mastor Systems, Inc.

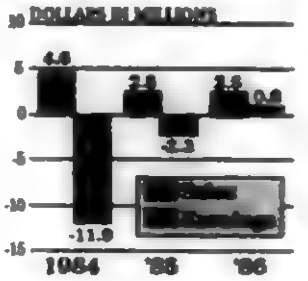
Also aiding in IPL's return to profitability has been a massive work force reduction of more than 75% of the firm's employees. In the early 1980s, some 260 names made up the employee roster. The company had two sites and sales of $16 million annually. Then things went downhill, and the layoffs started.

IPL was founded in 1973 by current Chairman Stephen Ippolito, who had previously worked at Cambridge Memories, Inc., also in Waltham. IPL achieved some of its early success selling

Continued on page 69

IPL's bumpy road

After hitting rock bottom, IPL is climbing back; the firm reported a $419,000 profit on $1.1 million in sales in this year's first quarter



[illegible] SYSTEMS, INC
CW CHART

Concurrent restructures, slims staff

BY ALAN ALPER
CW STAFF

HOLMDEL, N. J. — Concurrent Computer Corp. last week laid off approximately 2% of its domestic work force as part of a modest restructuring of its corporate resources.

The layoffs cut across the firm's 1,650 Monmouth County, N.J.-based work force, according to a company spokesman, affecting employees in marketing, service and administration. The minicomputer maker also said that it is consolidating its nine New Jersey locations into three facilities.

Concurrent's service operation, which was dispersed throughout several facilities, will now be located with manufacturing at its Ocean Port facility. The firm is also moving its corporate administration staff from Holmdel to Tinton Falls, where sales and marketing are located. The consolidation is expected to be completed during the next six months, the spokesman said.

In a related move, the firm named Joseph Rechner, its vice-president of customer service, to the newly created position of vice-president of operations. Rechner is responsible for customer service and manufacturing in his new post.

The moves come as Concurrent attempts to rebound from a soft economy that has affected demand for its and other minicomputer companies' products. Although Concurrent earned $2.4 million in the third quarter, compared with a $724,000 loss in the comparable period last year, its nine-month results reflect the sluggish times. Concurrent earned $4.6 million during the last nine months, off 5% from the same period last year.

DEC settles DSI copyright suit

BY CLINTON WILDER
CW STAFF

MAYNARD, Mass. — Digital Equipment Corp. won an out-of-court victory last week over a Lanham, Md.-based third-party maintenance firm that allegedly used unlicensed diagnostic software from DEC to service VAX minicomputers.

DEC agreed to drop its 1986 copyright infringement lawsuit against DSI Computer Services, Inc. [CW, Nov. 18, 1986] and received an undisclosed cash payment from DSI. According to DEC, DSI admitted its unlicensed use of the software. In addition, DSI assured DEC that it is not currently using the software in question and will not do so in the future.

When the suit was filed, DSI had characterized it as a "DEC sales tactic" to discredit DSI in the eyes of its third-party VAX maintenance customers, which are primarily federal government accounts. But DEC viewed the matter strictly as a case of copyright protection.

Maxtor purchase steps up move on PC market

BY JAMES A. MARTIN
CW STAFF

SAN JOSE, Calif. — Maxtor Corp. said last week it has acquired Storage Dimensions, Inc., a data storage subsystem distributor in the IBM Personal Computer market, for an undisclosed amount.

The acquisition "reflects Maxtor's commitment to compete actively in the high-capacity segment of the PC marketplace, which involves applications tools and distribution channels that differ from Maxtor's traditional OEM business," a Maxtor spokesman said.

Storage Dimensions, based in Los Gatos, Calif., is a privately held company that purchases Maxtor's 5¼-in. Winchester and optical disk drives. It incorporates the drives, along with its own operating system utility software, into its family of data storage subsystems for distribution to value-added channels.

Independent subsidiary

Storage Dimensions reportedly is to be included in Maxtor's Storage Systems Group, which includes U.S. Design Corp., a firm Maxtor acquired two months ago. Both companies will be operated as independent subsidiaries, Maxtor said.

Analysts viewed Maxtor's recent acquisitions as a positive move for the firm. "Maxtor's been getting closer to its end users and their applications, and this is just another step in that direction," said Jim Moore, a storage analyst for Dataquest, Inc. in San Jose, Calif.

The strategy behind the acquisition was to open up new avenues for distribution, not to create new products, the company said.

"A key element in our strategy is using our existing channels of distribution while further expanding our distribution through our subsidiaries," said Bob Teal, Maxtor's senior vice-president of marketing.

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IBM's unit goal

CONTINUED FROM PAGE 65

sary design changes of telecommunications equipment manufactured in the U.S. so that it meets European requirements, the spokesman said.

Effective resource allocation

"This move will enable IBM to focus its telecommunications development and manufacturing resources more effectively on the European marketplace," asserted Michael Armstrong, president and director general of IBM Europe, in a prepared statement.

IBM indicated in September 1986 that a reorganization of its European operations at that time was partly motivated by a will to improve its European telecommunications business.

IBM already sells its 1750 model analog private branch exchange in five European countries. In addition, Rolm provides British users with its Automatic Call Distributor, which is used for distributing a high volume of incoming calls to agents, such as for ticket reservations.

Looking to the future

Observers noted that the ISSS emphasis on developing products integrating voice and data that can be connected to Europe's public networks will permit IBM to target the future market for Integrated Services Digital Networks (ISDN).

ISDN is being championed by several European telecommunications authorities, with major pilot projects under way in France and West Germany.

Separately, IBM announced plans last week to create a value-added network services venture in France sometime this summer.

The firm is to be owned jointly by two French banking groups, Paribas and Credit Agricole, and a French software and services company named Sema Metra.

With the launch, IBM scores a major victory in its efforts to penetrate the European value-added network services market.

The consortium has been awaiting government approval of the project since February 1986.

Catching up

CONTINUED FROM PAGE 65

ripheral vendors and micro software — will be sorting out the potential damage/market opportunities of the IBM Personal System/2 for months to come.

In peripherals, an industry already littered with ailing players will certainly shake out further. In micro software, the inevitable evolution of the Big Three into mainframe territory will be hastened. Among the clone makers, there will be plenty of market opportunity for the swift and the smart — but beware the mighty Blue legal force. Compaq Computer Corp.'s Rod Canion will find out if there is a *Business Week* cover jinx.

Workstation warfare. With the heavy artillery of price cuts and MIPS ratings, the battle rages. What else would one expect in an area that covers Unix, computer-aided software engineering, computer-integrated manufacturing, expert systems development and networking? The guys to watch carefully are in Maynard, Mass. — this could be the market that keeps Digital Equipment Corp. riding high.

Raging bulls. With the Dow Jones industrial average roaring again and the shine returning to high tech in the investment world, initial public offerings are back in vogue. From minisupercomputers to desktop publishing software, dozens of vendors took the public plunge in the first half of the year. Even microcomputer retail chains are getting into the act. So where is that recession those economists have been predicting?

Wilder is *Computerworld's* senior editor, computer industry.

DCA

CONTINUED FROM PAGE 65

mann-Bass, Inc. and Novell, Inc., which acquired micro-to-mainframe companies during the past couple of years.

Earlier this year, Ungermann-Bass announced a network gateway that supports micro-to-mainframe software from its wholly owned subsidiary, Linkware Corp. And Novell announced at Comdex/Spring '87 that its subsidiary CXI, Inc.'s terminal emulation software now supports Novell's Netware.

Fox Research, a Dayton, Ohio, company with 1986 revenue of approximately $6.8 million, is the latest in a series of acquisitions by DCA. DCA made three acquisitions in 1986: Forte Communications, Inc., one of its competitors in the IBM PC terminal emulation board market, T1 switch vendor Cohesive Network Corp. and Microstuf.

While Fox has concentrated on the international market, "avoiding the national market which has been dominated by the 3Com Corp.-Novell battle," DCA hopes to boost 10-Net sales in the U.S. through its own distribution channels, Miller said.

The agreement between DCA and Fox calls for the payment of cash and the assumption of liabilities of approximately $10 million by DCA with a contingent "earn-out" of up to an additional $6.5 million. The latter provision is based on the future financial performance of the Fox Research Division of DCA during the one-year period following the closing.

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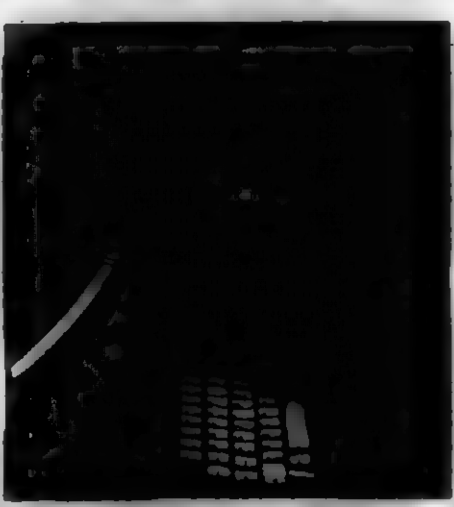

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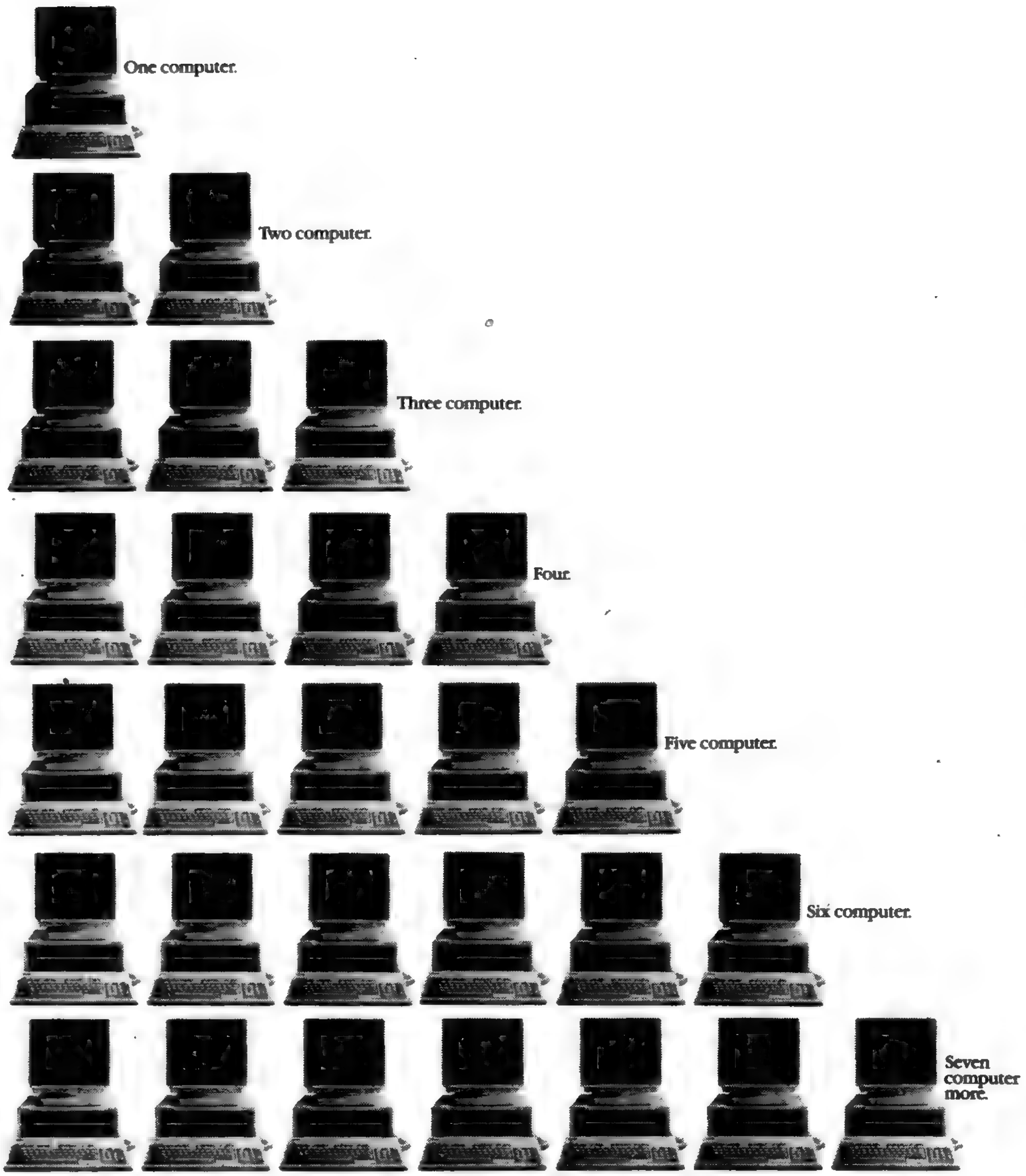

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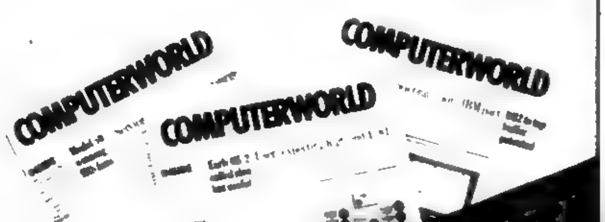

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IPL

CONTINUED FROM PAGE 65

to Control Data Corp., which funded IPL's start-up to provide IBM plug-compatible CPUs after Cambridge Memories closed its doors.

But the hard times hit in recent years. In 1983, IPL reported a loss of $4.25 million on sales of $9.9 million. The following year, the company lost $11.9 million on sales of just $4.6 million. In 1985, the firm reported earnings of $385,000 in its fourth quarter but lost $2.3 million for the year on sales of $2.5 million.

Today, the company's remaining 24 employees have much excess space in IPL's 55,000-square-foot facility, which is located in an industrial park in Waltham, a city west of Boston.

On the upswing

The current workers are leading IPL in its new direction, and for now, the strategy seems to be working. IPL returned to the black in 1986, earning $800,000 on sales of $2.5 million. In its first quarter of fiscal 1987, IPL reported modest net profits of $419,000, or 8 cents per share — a 38% increase over the previous year's first-quarter results. Some $255,000 of first-quarter sales were from the memory products, a 180% increase over the preceding quarter.

"Our plan is: As the mainframe revenues phase out as expected, the revenue from the new products will phase in and take over," Norton says. "That presents a very severe short-term management problem to make sure that the transition is done effectively."

To sell its product line, IPL goes through the dealer, broker and value-added reseller channels and also conducts telemarketing. The company maintains no outside sales force. IPL does have in-house manufacturing for the CPUs but subcontracts the memory products to an outside manufacturing house. "You don't have to go through the pain of dismissing people if business has a negative trend, nor do you have the possibility of being stuck with a large amount of real estate that you can't use because of a downward trend in the business," Norton says of the outside manufacturing.

On the positive side, he adds, the outside manufacturers can more easily accommodate a spike in production needs.

IPL plans to use its memory products to gain name recognition in the new marketplace before branching out to other IBM-compatible peripheral products, the CEO says.

Norton says he remains optimistic about the company's future success and that the price/performance of the memory products will keep IPL in business. He says IPL can provide the memory for the System/38 at a 50% savings over IBM's pricing. "We have a unique design that allows us to keep the cost very low, but the storage of data is identical to the way IBM and other developers do it," he says.

Armed with a heavy reminder of the company's past, the IPL president is humble. "We haven't lost sight of the big job in front of us," Norton says. "If you go into a new marketplace, you have to convince the customer that the organization he's dealing with is going to be around for a long time to provide service and support to the product. If you try to do that with red ink on your financials, the customer would just stay away from you."

EXECUTIVE CORNER

The board of directors of **Hogan Systems, Inc.** recently announced a series of organizational changes.

George L. McTavish, president and chief executive officer, assumed the role of CEO and chairman of the board. McTavish succeeds **Gregor G. Peterson**.

Peterson remains a director of the company.

Richard B. Aldridge, executive vice-president, was named president and chief operating officer. **Patric J. Jerge** was promoted to senior vice-president of field operations and will report directly to Aldridge. Hogan also announced that **James J. Murphy** has joined the company as senior vice-president in the community banking group. Prior to joining Hogan Systems, Murphy spent 24 years with IBM.

Mitel Corp. announced that President and CEO **Anthony F. Griffiths** will become chairman of the company. **David Golden**, the current chairman, will remain as a director of Mitel and chairman of two of its subsidiaries, Mitel Datacom and Trillium Telephones Systems, Inc.

Bert Novak has been appointed to the post of president of the **McDonnell Douglas Field Service Co.** Novak had been director of quality assurance and technical support for Cupertino, Calif.-based McDonnell Douglas Network Systems Co., which operates the Tymnet worldwide public and private telecommunications networks.

Mentor Graphics Corp. Chairman and CEO **Thomas Bruggere** announced the appointments of **Gerard Langeler** as president and chief operating officer and **David Moffenbeier** as executive vice-president. Langeler was previously executive vice-president and chief operating officer.

NICKELS & DIMES

Floating Point Systems, Inc. announced revenue for the second quarter ended April 30 of $23.5 million, compared with $21.3 million the previous year. The company also reported a net loss of $2.1 million, or 24 cents per share, compared with a net loss of $1.5 million, or 18 cents per share, in the like period a year earlier.

American Software, Inc. announced revenue for the year ended April 30 of $46.7 million, up 22% from the $38.3 million reported last year. Profits were $8.8 million, or 85 cents per share, compared with $5.9 million, or 59 cents per share, in the comparable period a year ago.

Revenue for the fourth quarter was $12.8 million, compared with $10.3 million the previous year. Profits were $2.1 million, or 20 cents per share, compared with $1.9 million, or 18 cents per share, in the comparable period a year ago.

Gandalf Technologies, Inc. reported revenue for the third quarter ended May 2 of $33 million, compared with $28.2 million one year ago. Profits were $1.7 million, or 16 cents per share, a 74% increase from the $962,000, or 10 cents per share, in the like period last year.

PC's Limited/Dell Computer Corp. announced record results for the first quarter of its 1988 fiscal year. The company earned $1.9 million on net sales of $33.4 million in the quarter ended April 30. This compares with net earnings of $2.2 million and net sales of $69.4 million for the full fiscal year ended Jan. 31.

As a percentage of sales, net earnings were 5.8% for the first quarter of 1988, compared with 3.1% for fiscal 1987.

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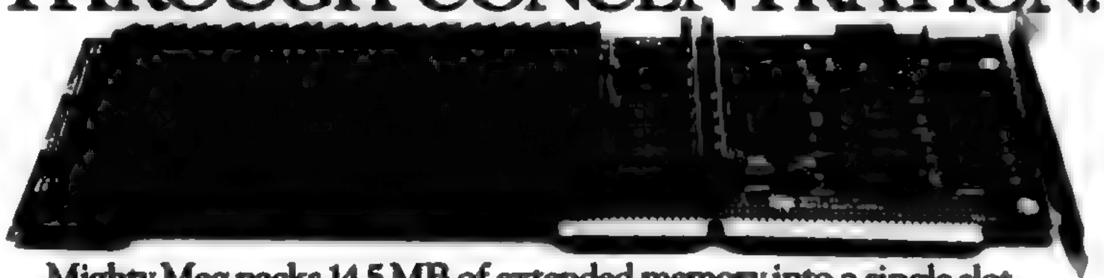

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EMPLOYMENT TODAY

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BY DALE F. FARMER
SPECIAL TO CW

With the advent of computer-aided design and manufacturing (CAD/CAM), manufacturing resource planning and robotics, manufacturers are rivaling service industry companies in their implementation of automation. Data processing professionals, especially those with manufacturing experience, are finding more opportunities in this environment.

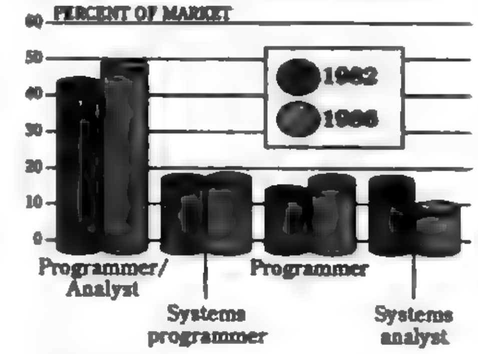
In 1982, service industry companies accounted for 71% of total U.S. DP hiring, according to Dunhill Personnel Systems, Inc. That figure dropped to 64% in 1986. Manufacturers accounted for 29% of the DP hiring in 1982 and 35% in 1986, the firm says.

The DP environment in manufacturing companies offers unique opportunities and challenges. Professionals hired by companies just starting to automate face the challenge of developing a system that is acceptable to the line personnel. They must overcome objections from current employees who want to maintain the status quo. They must handle criticism of the new system diplomatically and present the advantages provided by automation.

Besides the drive to automate, the growth of many manufacturing organizations is creating openings in senior and management-level DP positions. Candidates for these levels must possess a good performance record and be willing to adapt to a new environment. Two manufacturing companies may make similar products, but their manufacturing processes will differ. In some cases, the processes may differ within a single company that makes the same product in various locations.

DP goals in manufacturing differ from those of DP in service companies. In banking, insurance or retail, for example, DP professionals must be concerned with providing information or answers to customers. In manufacturing, they must use technology to create an actual product that can be sold. This distinction is small, since both groups are concerned with satisfying a customer's needs. However, manufacturing managers focus more on cost control, efficiency and accuracy in getting the product out the door and into the customer's hands.

Hiring growth in manufacturing



INFORMATION PROVIDED BY DUNHILL PERSONNEL SYSTEMS, INC.
CW CHART: MITCHELL J. HAYES

"You're constantly being pushed, because making the product makes the dollars," says Henry Buckland, DP manager for Rowe Furniture Corp. in Salem, Va. "There is a lot of pressure, because nothing must impact the manufacturing process. You have to be responsive to any type of crisis which may require an immediate response."

Such crises can be as simple as the breakdown of a conveyor belt or as complex as the breakdown of labor negotiations.

Because few DP professionals understand manufacturing processes, many companies find locating the right candidate for senior-level positions difficult. Experienced candidates are hardest to find for the positions of senior programmer/analyst, data base manager and MIS director, manufacturers say.

"Most of our applicants have a financial background," Buckland says. "Our experience, so far, is that we get our best results by hiring DP people directly out of college and training them in manufacturing concepts."

The key to success in manufacturing for the DP professional is to be able to understand the terminology and procedures and translate them into viable DP alternatives. Aided by grants from computer manufacturers, a number of educational organizations, including national colleges and universities, are now offering programs in this area.

Manufacturers say they are particularly interested in hiring programmer/analysts with a high degree of communication skills. Most of the new programming for manufacturing requires a working knowledge of the manufacturing pattern, so the programmer/analyst must work closely with people on the shop floor.

While companies are also looking for systems and applications programmers, they are less eager to hire systems analysts because they are relying on the programmer/analyst to perform much of that function.

Making the switch

DP professionals searching for positions in manufacturing may find better opportunities if they aim their search at familiar industries. Candidates with a background in higher mathematics and engineering possess a definite advantage, especially in robotics and CAD/CAM environments.

Professionals who choose to make the switch from service industries to manufacturing will probably be rewarded with higher salaries. In all job categories, the average salaries in 1986 for manufacturing positions were higher than those in the service industries, according to Dunhill.

A typical programmer/analyst made $30,000 last year in manufacturing companies, compared with $29,000 in service companies, Dunhill says. Manufacturing programmers earned $32,000, while those in service industries earned just less than $27,000. Systems analysts collected $35,500 from manufacturing employers, while service analysts received just less than $34,000. Systems programmers were paid $39,000, bettering service systems programmers' salaries of just less than $37,000.

Farmer is a security administrator for Financial Technologies, Inc. in Chantilly, Va.

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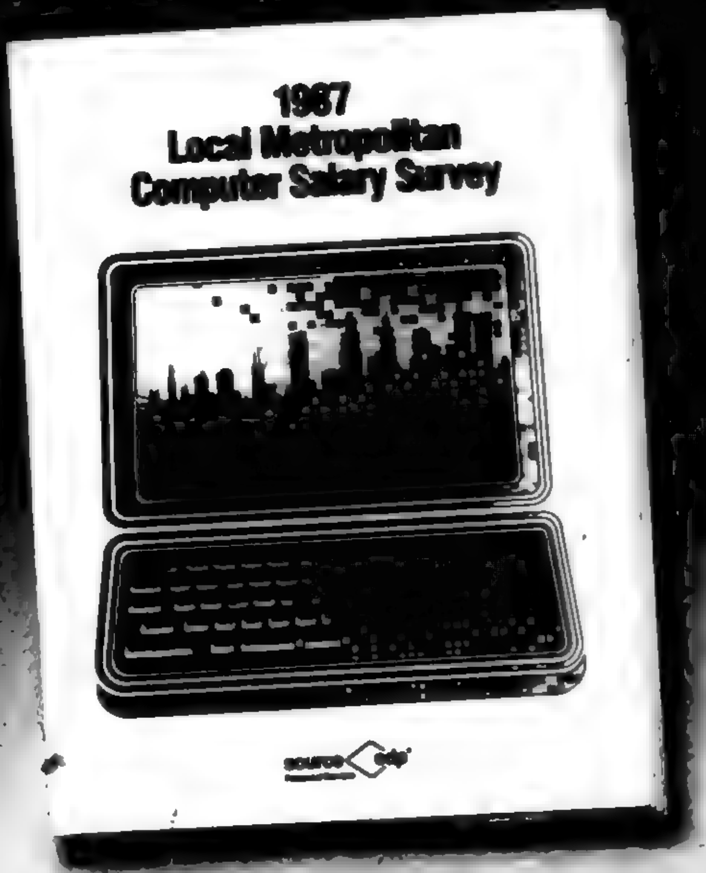

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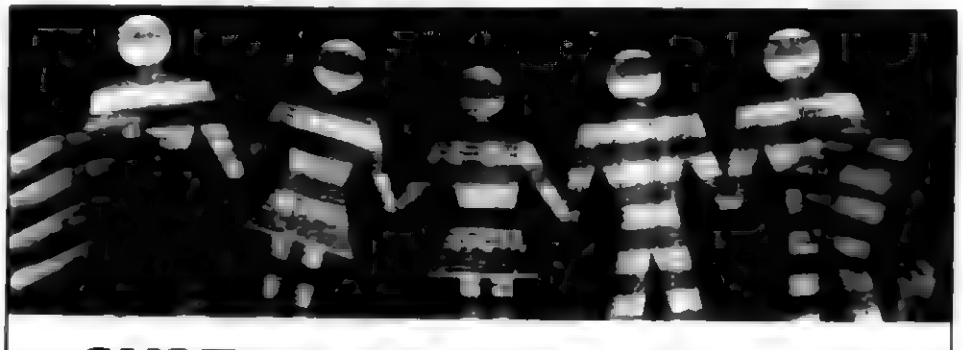

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This position requires direct experience as a platform instructor, experience in the preparation of course materials employing the Instructional System Development (ISD) methodology or its equivalent, and technical training experience preferably of foreign nationals. Familiarity with real-time command and control systems is desired, especially air defense and tactical air operations systems

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DATA PROCESSING OPERATIONS MANAGER

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The qualified candidate will have a degree in Computer Science, Business Administration or related field and at least 5 years of computer operations experience with increasing levels of supervisory responsibility Experience in the following areas is desirable retail business, merchandise control & distribution, IBM System /3X, telecommunications, point-of-sale, capacity & contingency planning

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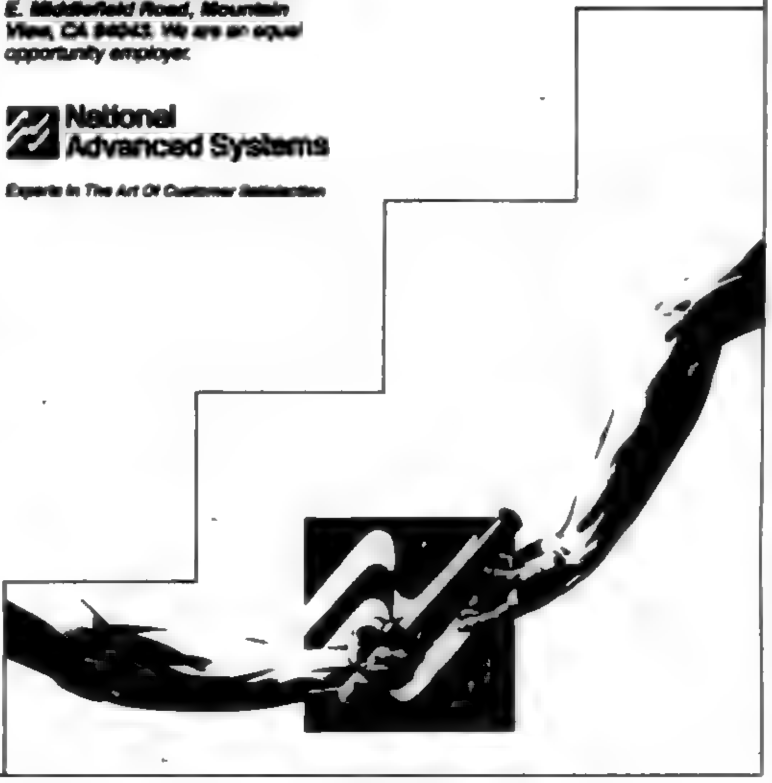

DATA PROCESSING CENTER EXPANSION

The NYC Department of Correction is currently expanding its administrative data processing staff to assist in the development of its on-line manpower scheduling system and to upgrade and maintain its electronic mail system. We are recruiting for the following:

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CONSULTANT (2 positions, part-time, some evening work) — to provide consulting to Faculty and students using standard end-user software and on-line consulting tools. Will provide feedback to Athena staff about operations in the field. May evaluate pre-release software and provide technical training to users or consultants. Experience consulting end users and strong interpersonal skills required. Experience with Emacs, text formatters, data analysis, graphing packages, and programming desirable. **(A87-836)**

Please send two copies of resume, referencing appropriate job number to: Sally H. Hansen, MIT Personnel Office, E19-238, 77 Massachusetts Ave., Cambridge, MA 02139.

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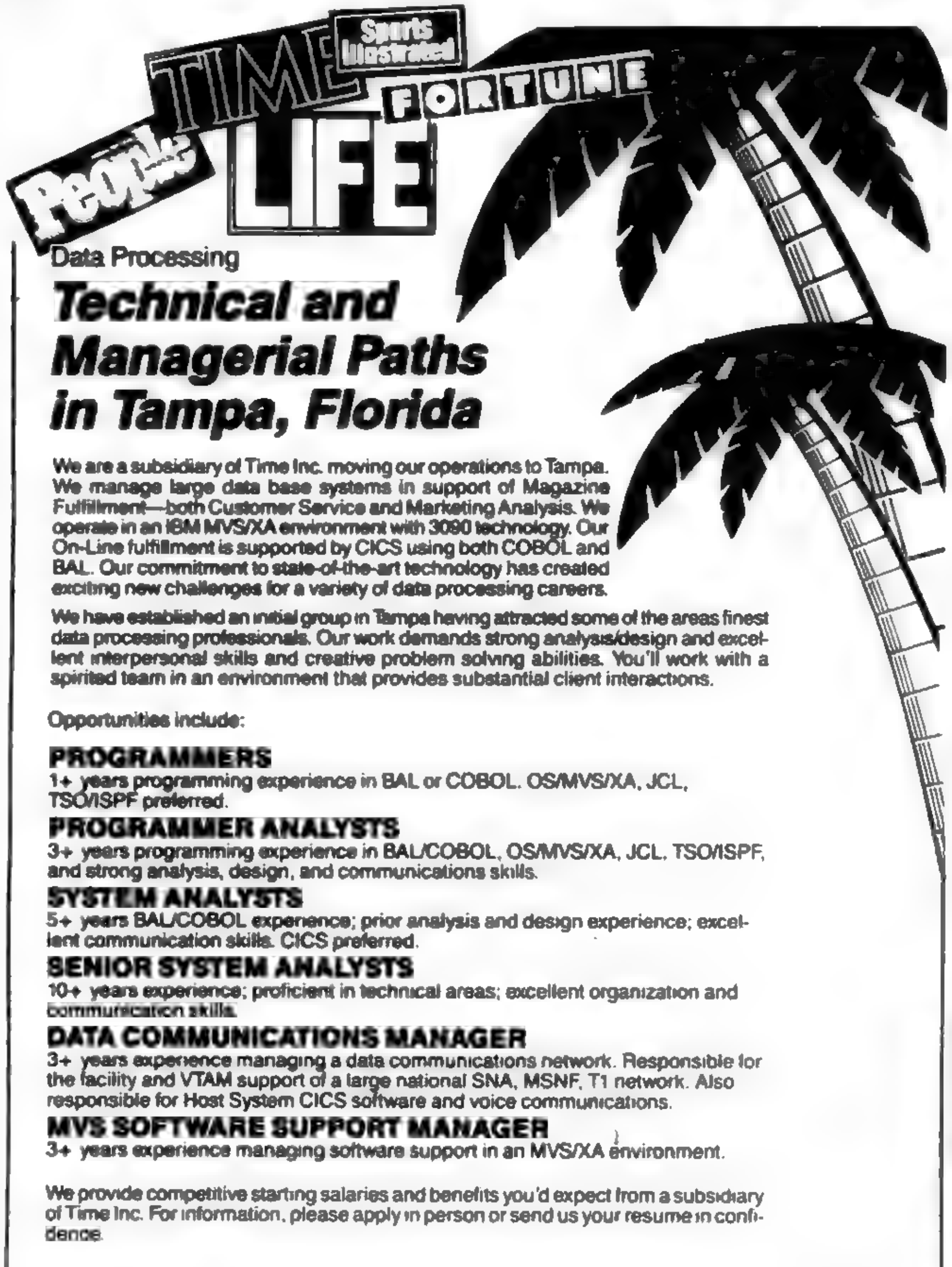

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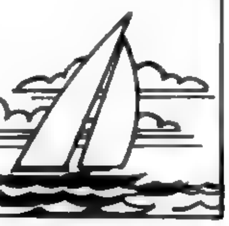

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Minimum requirements include an MS degree in electrical engineering or computer science, at least 6 years experience with computer programming in at least three languages, and at least two years experience with the C programming language. The candidate must have experience with Berkeley Unix 4.2BSD systems internals, demonstrated ability to configure hardware systems and upgrades and ability to interact effectively with a broad spectrum of faculty and staff.

Minimum salary is $32,000; salary depends on qualifications. In order to ensure full consideration, applications must be received by July 15, 1987.

Send resumes including names of at least three individuals who can be contacted for references to Lorraine Salender, Assistant Director, Coordinated Science Laboratory, 1101 West Springfield, Urbana, Illinois 61801 (217) 333-2515.

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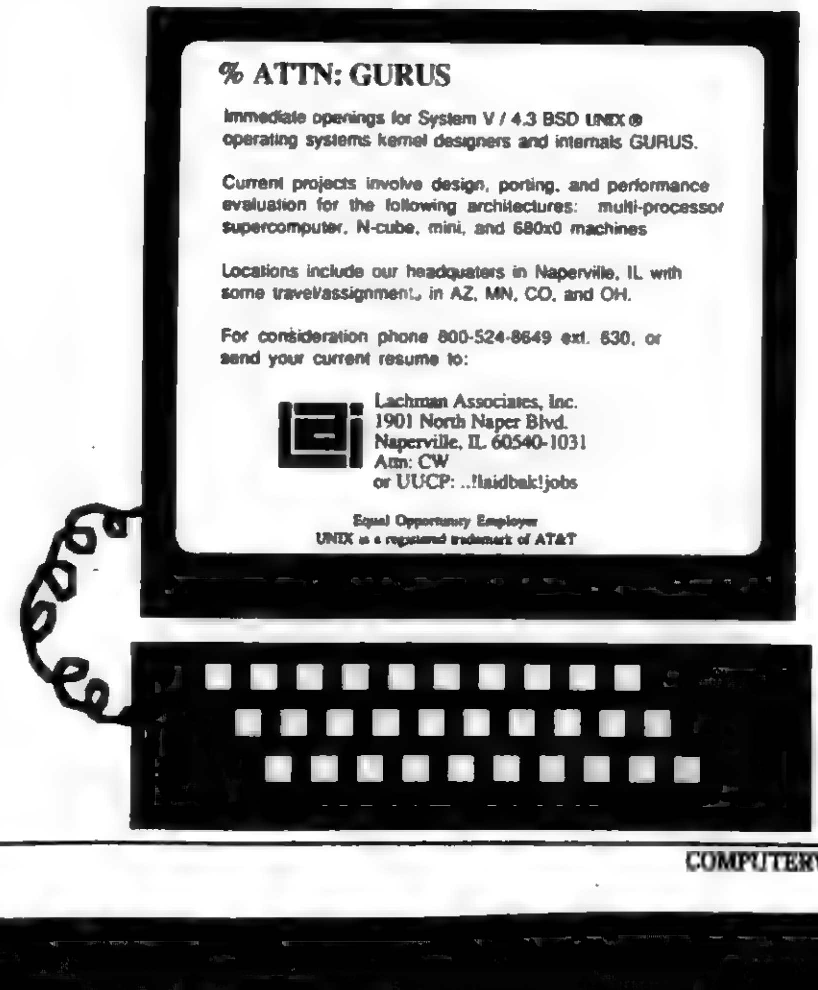

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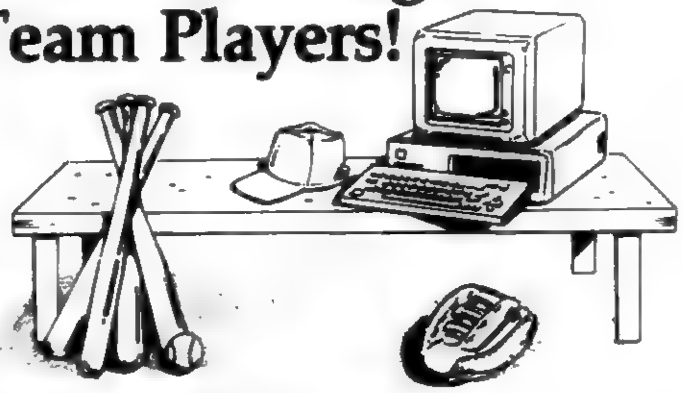

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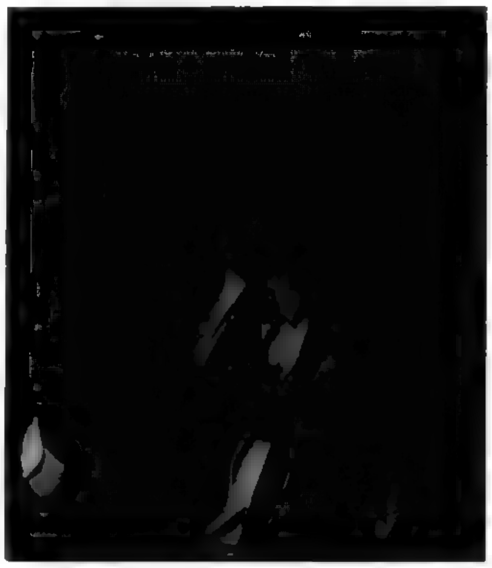

Marc Blessing
Director
CompuSearch
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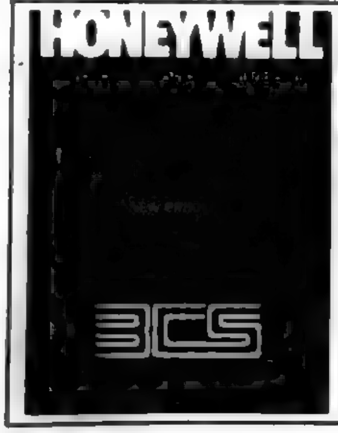

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The Department of Finance requests proposals to provide for the Acquisition of an Automated Scheduling Software Package.

Copies of the RFP will be made available Thursday, June 25, 1987 upon application to the Department of Finance, Contracts Administration, One Centre Street, Municipal Bldg., Room 1040, New York, NY 10007

A pre-RFP conference is scheduled for Tuesday, July 30, 1987 at 2:00 pm in the 10th floor Conference Room, 345 Adams Street, Brooklyn.

All enquiries must be submitted in writing before 5:00pm, July 23rd and will be addressed at the scheduled pre-conference.

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Request for proposal No. 1342, due Tuesday, July 21, 1987 at 3:30 p.m. for an on-site maintenance contract for IBM and Telex equipment for the MISSISSIPPI DEPARTMENT OF PUBLIC SAFETY, Highway Safety Patrol Division. No charge.

Request for Proposal No. 1343, due Thursday, July 23, 1987 at 3:30 p.m. for an on-site maintenance contract for IBM S/36 and peripherals and a Decision Data printer. This equipment is located at the Senatobia, Southaven, Oxford, and Ashland campuses of NORTHWEST MISSISSIPPI JUNIOR COLLEGE. No charge.

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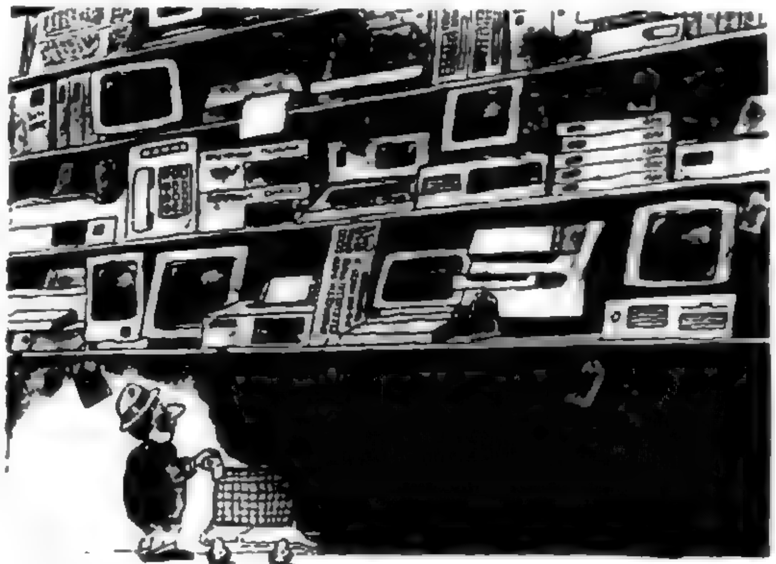

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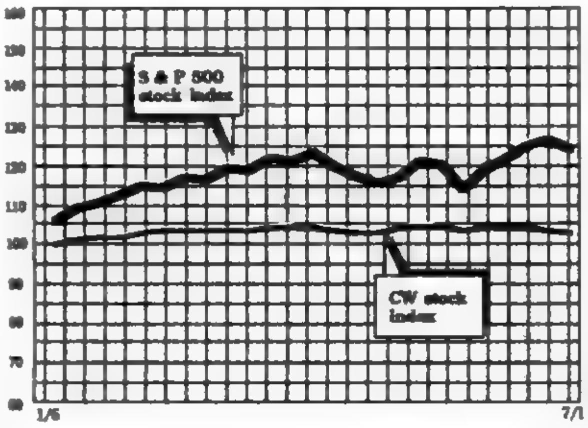

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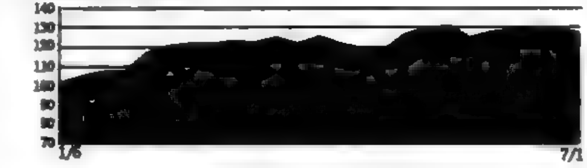

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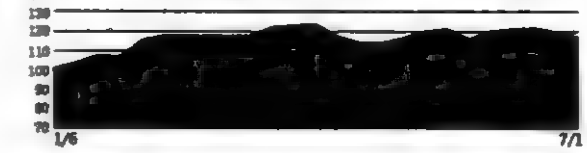

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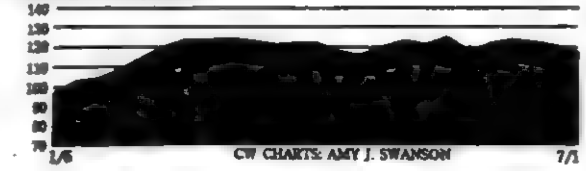

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Communications and Network Services

EXCH		52-WEEK RANGE (1)		PRICE CLOSE JULY 1 1987	WEEK NET CHNGE	WEEK PCT CHNGE
N	AMERICAN INFO TECHS CORP	101	77	87.13	-1.3	-1.4
Q	ANDREW CORP	19	14	15.50	+0.3	+1.6
Q	ARTEL COMM CORP	6	2	3.00	-0.1	-4.0
N	AT&T	29	22	28.38	-0.3	-0.9
Q	AVANT GARDE COMP INC	7	3	3.63	+0.0	+0.0
Q	AVANTEK INC	19	13	15.75	+0.8	+5.0
N	AYDIN CORP	38	18	34.25	-1.0	-2.8
N	BELL ATLANTIC CORP	77	62	68.25	-1.9	-2.7
N	BELLSOUTH CORP	46	35	40.75	-1.4	-3.3
Q	BRIDGE COMMUNICATION	27	11	22.25	+0.1	+0.6
Q	COMPRESSION LABS INC	13	4	4.50	-0.3	-5.3
Q	COMPUTER NETWORK TECH	8	4	4.00	-0.3	-6.9
O	CONTEL CORP	35	27	32.38	-0.4	-1.1
Q	DATA SWITCH CORP	9	5	6.75	-0.3	-3.6
Q	DIGITAL COMM ASSOC	49	16	33.75	+4.9	+16.9
Q	DYNATECH CORP	44	27	31.00	+0.8	+2.5
Q	EQUATORIAL COMM CO	8	2	3.13	+0.1	+4.2
Q	GANDALF TECHNOLOGIES	11	5	8.13	+0.0	+0.0
Q	GENERAL DATACOMM INDS	14	8	9.63	+0.1	+1.3
N	GTE CORP	43	34	38.50	-1.0	-2.5
Q	INFOTRON SYS CORP	15	7	10.00	+0.3	+2.6
N	ITT CORP	66	47	58.00	-1.4	-2.3
N	M A COM INC	17	12	13.75	-0.3	-1.8
Q	MCI COMMUNICATIONS CORP	11	5	7.38	-0.3	-3.3
Q	MICOM SYS INC	18	10	12.75	-1.8	-12.1
Q	NETWORK SYS CORP	19	9	9.75	+0.0	+0.0
N	NORTHERN TELECOM LTD	23	13	21.00	-0.8	-2.3
Q	NOVELL INC	27	9	19.50	-0.3	-1.3
N	NYNEX CORP	73	50	69.38	-1.6	-2.3
N	PACIFIC TELESIS GROUP	31	23	26.50	-1.1	-4.1
N	PARADYNE CORP	9	4	6.88	-0.3	-3.5
A	PENRIL CORP	6	4	4.63	-0.3	-6.1
N	PLESSEY PLC	41	24	37.00	+0.0	+0.0
N	SCIENTIFIC ATLANTA INC	20	9	19.50	-0.4	-1.9
N	SOUTHWESTERN BELL CORP	41	33	38.88	-1.0	-2.5
Q	3 COM CORP	24	9	18.50	-0.6	-3.3
N	TIMEPLEX INC	41	14	30.50	-4.3	-12.2
Q	UNGERMANN BASS INC	16	7	12.38	-0.9	-6.6
N	U S WEST INC	62	45	53.13	-1.0	-1.8

Computer Systems

EXCH		52-WEEK RANGE (1)		PRICE CLOSE JULY 1 1987	WEEK NET CHNGE	WEEK PCT CHNGE
Q	ALLIANT COMPUTER SYS	37	16	28.00	-2.3	-7.4
Q	ALPHA MICROSYSTEMS	7	3	4.50	+0.9	+24.1
Q	ALTOS COMPUTER SYS	17	10	12.63	-0.5	-3.8
A	AMDAHL CORP	42	16	35.25	-1.9	-5.1
Q	APOLLO COMPUTER INC	25	9	19.25	-2.0	-9.4
Q	APPLE COMPUTER INC	43	15	40.00	-0.5	-1.2
N	BOLT BERANEK & NEWMAN	60	37	43.63	-2.1	-4.6
Q	BRITTON LEE INC	5	3	3.25	-0.8	-18.8
N	COMPAQ COMPUTER CORP	51	12	46.63	+2.8	+6.3
Q	COMPUTER AUTOMATION INC	17	2	14.00	-1.0	-6.7
A	COMPUTER CONSOLES INC	12	7	9.50	+0.0	+0.0
Q	CONCURRENT COMP CORP	19	11	17.00	+0.3	+1.5
N	CONTROL DATA CORP DEL	35	20	28.38	-1.3	-4.2
Q	CONVERGENT TECH	12	4	7.00	+0.3	+3.7
Q	CONVEX COMPUTER CORP	22	8	15.63	-1.4	-8.1
N	CRAY RESH INC	138	89	101.63	+1.0	+1.0
Q	DAISY SYS CORP	13	8	7.88	-0.3	-3.1
N	DATA GEN CORP	39	25	31.88	+0.6	+2.0
N	DATAPOINT CORP	9	4	6.50	+0.0	+0.0
N	DIGITAL EQUIP CORP	175	82	164.63	-3.9	-2.3
N	FLOATING POINT SYS INC	38	8	9.63	+0.8	+8.5
N	GOULD INC	22	15	19.75	-0.6	-3.1
N	HARRIS CORP DEL	43	27	36.75	-0.6	-1.7
N	HEWLETT PACKARD CO	67	36	60.13	-3.0	-4.8
N	HONEYWELL INC	85	58	81.00	-1.9	-2.3
N	IBM	180	116	164.00	-3.9	-2.3
Q	INFORMATION INTL INC	18	13	14.00	+0.3	+1.8
Q	IPL SYS INC	4	2	2.88	+0.0	+0.0
Q	MASS COMPUTER CORP	10	5	8.13	-0.1	-1.5
N	MATSUSHITA ELEC INDL LTD	157	77	152.00	-4.3	-2.7
Q	MEGADATA CORP	7	2	5.75	+0.0	+0.0
Q	MENTOR GRAPHICS CORP	34	11	29.50	-1.0	-3.3
N	MAI INC	13	8	12.13	-0.5	-4.0
N	NCR CORP	80	42	74.13	-2.8	-3.6
N	PRIME COMPUTER INC	30	16	26.00	-0.1	-0.5
Q	PYRAMID TECHNOLOGY	12	4	9.25	-1.4	-12.9
Q	STRATUS COMPUTER	41	18	34.25	-1.5	-4.2
Q	SUN MICROSYSTEM INC	46	11	42.13	+0.8	+1.8
Q	SYMBOLICS INC	12	4	4.13	+0.0	+0.0
N	TANDEM COMPUTERS INC	38	14	32.00	+0.0	+0.0
N	TANDY CORP	56	31	42.75	-2.3	-5.0
N	ULTIMATE CORP	28	13	26.63	-1.1	-4.1
N	UNISYS CORP	128	62	123.38	-4.1	-3.2
A	WANG LABS INC	19	11	15.88	-0.5	-3.1

Software & DP Services

EXCH		52-WEEK RANGE (1)		PRICE CLOSE JULY 1 1987	WEEK NET CHNGE	WEEK PCT CHNGE
Q	ADVANCED COMP TECH	6	3	4.00	+0.0	+0.0
N	ADVANCED SYS INC	25	12	24.63	+0.6	+2.6
N	AGS COMPUTERS INC	22	8	17.25	-0.6	-3.5
Q	AMERICAN MGMT SYS INC	19	7	17.38	-0.9	-4.8
Q	AMERICAN SOFTWARE INC	22	7	14.50	-0.5	-3.3
N	ANACOMP INC	9	3	8.50	-0.4	-4.2
Q	ANALYSTS INTL CORP	11	4	9.13	+0.1	+1.4
Q	ASHTON TATE	30	10	24.75	-1.8	-6.6
Q	ASK COMPUTER SYS INC	17	9	12.38	-0.1	-1.0
Q	AUTODESK INC	28	8	25.00	-0.5	-2.0
N	AUTO DATA PROCESSING	51	29	47.50	-2.3	-4.5
Q	BOOLE & BABBAGE INC	11	4	10.50	-0.1	-1.2
N	COMPUTER ASSOC INTL INC	29	10	24.75	-1.0	-3.9
Q	COMPUTER HORIZONS CORP	15	10	12.75	+0.0	+0.0
N	COMPUTER SCIENCES CORP	61	30	56.38	-1.3	-2.2
N	COMPUTER TASK GROUP INC	18	11	13.13	-0.4	-2.8
Q	COMSHARE INC	28	11	25.75	+0.5	+2.0
N	CULLINET SOFTWARE INC	13	8	11.63	-0.3	-2.1
Q	CYCARE SYS INC	14	7	9.00	+0.4	+4.3
Q	DUQUESNE SYS INC	33	12	21.75	+1.0	+4.8
Q	ENDATA INC	12	5	10.38	-1.5	-12.6
N	GENERAL MTRS (CLS E)	48	24	38.88	-1.5	-3.7
Q	HOGAN SYS INC	17	9	13.13	-1.1	-7.9
Q	INFORMIX CORP	23	7	18.88	+0.0	+0.0
Q	INTELLICORP INC	11	4	7.38	-1.9	-20.5
Q	KEANE INC	15	5	9.00	+0.0	+0.0
Q	LOTUS DEV CORP	37	9	28.75	-1.3	-4.2
Q	MANAGEMENT SCI AMER	21	11	11.88	+0.3	+2.2
Q	MICRO PRO INTL CORP	8	2	6.88	-0.1	-2.1
Q	MICROSOFT CORP	128	26	102.50	-2.0	-1.9
Q	NATIONAL DATA CORP	27	16	21.25	-0.5	-2.3
Q	ON LINE SOFTWARE INTL INC	20	6	16.88	+0.1	+0.7
Q	ORACLE SYS CORP	30	7	22.13	-1.4	-5.9
N	PANSOPHIC SYS INC	23	12	19.75	-1.3	-6.0
Q	POLICY MGMT SYS CORP	30	18	24.50	-1.5	-5.8
Q	PROGRAMMING & SYS INC	13	8	10.25	+0.0	+0.0
Q	REYNOLDS & REYNOLDS CO	42	27	32.50	-1.5	-4.4
Q	SEI CORP	17	8	17.00	+0.3	+1.5
Q	SHARED MED SYS CORP	53	23	27.13	-0.8	-2.7
Q	SOFTWARE AG SYSTEMS INC	20	10	13.50	+0.1	+0.9
Q	SOFTWARE PUBG CORP	17	5	8.75	-1.3	-12.5
A	STERLING SOFTWARE INC	21	9	10.88	-0.4	-3.3
Q	SUNGARD DATA SYS INC	21	10	18.25	-0.3	-1.4
Q	SYSTEMATICS INC	30	14	25.75	-0.3	-1.0
N	UCCEL CORP	46	18	40.75	-1.5	-3.6
N	URS CORP	21	13	17.38	-0.1	-0.7
Q	VM SOFTWARE INC	46	16	23.00	+0.0	+0.0

Semiconductors

EXCH		52-WEEK RANGE (1)		PRICE CLOSE JULY 1 1987	WEEK NET CHNGE	WEEK PCT CHNGE
N	ADV MICRO DEVICES INC	25	13	18.75	+0.1	+0.7
N	ANALOG DEVICES INC	24	14	19.25	-0.3	-1.3
Q	ANALOGIC CORP	13	10	10.75	-0.6	-5.5
Q	INTEL CORP	48	16	45.50	+3.8	+9.0
Q	LSI LOGIC CORP	17	8	10.38	+0.0	+0.0
Q	MONOLITHIC MEMORIES INC	19	10	16.00	+0.1	+0.8
N	MOTOROLA INC	64	34	53.50	-2.6	-4.7
N	NATL SEMICONDUCTOR	17	8	12.75	-0.3	-1.9
N	TEXAS INSTRS INC	68	34	60.13	-1.4	-2.2
A	WESTERN DIGITAL CORP	33	11	25.00	-0.9	-3.4

Peripherals

EXCH		52-WEEK RANGE (1)		PRICE CLOSE JULY 1 1987	WEEK NET CHNGE	WEEK PCT CHNGE
N	AM INTL INC	9	5	7.38	-0.4	-4.8
Q	AST RESH INC	23	11	14.00	-1.4	-8.9
Q	AUTO TROL TECH CORP	9	3	6.00	-0.8	-11.1
Q	BANCTEC INC	16	6	12.13	-1.3	-9.3
Q	CIPHER DATA PRODS INC	18	10	11.00	-0.4	-3.3
A	COGNITRONICS CORP	5	2	4.25	-0.3	-5.6
N	COMPUGRAPHIC CORP	24	16	23.50	+0.8	+3.3
N	COMPUTERVISION CORP	23	10	15.00	-0.5	-3.2
N	CONRAC CORP	30	12	27.25	+0.0	+0.0
A	DATAPRODUCTS CORP	16	10	11.13	-0.3	-2.2
A	DATARAM CORP	10	7	7.25	-0.1	-1.7
N	DECISION INDS CORP	14	7	9.75	-0.3	-2.5
N	EASTMAN KODAK CO	89	52	85.63	-3.6	-4.1
Q	E M C CORP MASS	34	11	28.50	-0.3	-0.9
Q	EMULEX CORP	10	5	7.38	-0.6	-7.8
Q	EVANS & SUTHERLAND	40	20	32.50	-0.8	-2.3
Q	ICOT CORP	13	5	6.75	+0.3	+3.8
Q	INTERLEAF INC	20	8	15.75	-1.3	-7.4
Q	IOMEGA CORP	13	2	3.88	+0.3	+6.9
Q	LEE DATA CORP	10	5	5.50	-1.0	-15.4
Q	MASSTOR SYS CORP	5	2	4.25	+0.1	+3.0
Q	MAXTOR CORP	34	10	19.25	+0.0	+0.0
Q	MICROPOLIS CORP	44	14	35.88	+4.0	+12.5
Q	MINISCRIBE CORP	18	5	16.38	+0.8	+4.8
N	MINNESOTA MNG & MFG CO	73	50	69.88	-3.0	-4.1
A	MSI DATA CORP	18	10	17.50	-0.8	-4.1
Q	PRIAM CORP	6	2	4.63	-0.1	-2.6
Q	PRINTRONIX INC	14	10	12.00	+0.1	+1.1
N	QMS INC	18	11	16.38	-0.3	-1.5
Q	QUANTUM CORP	35	15	16.25	-0.5	-3.0
Q	RAMTEK CORP	6	4	5.06	-0.2	-3.6
N	RECOGNITION EQUIP INC	27	10	19.75	-0.9	-4.2
Q	REXON INC	14	5	9.50	-0.4	-3.8
Q	SCAN TRON CORP	19	11	11.75	+0.0	+0.0
Q	SEAGATE TECHNOLOGY	46	10	33.38	-1.1	-3.3
N	STORAGE TECH CORP	5	2	3.63	+0.0	+0.0
Q	TANDON CORP	7	2	5.13	-0.3	-4.7
A	TEC INC	7	3	5.13	-0.9	-14.6
N	TEKTRONIX INC	43	27	38.63	+0.4	+1.0
Q	TELEVIDEO SYS INC	3	2	2.50	+0.0	+0.0
N	TELEX CORP	102	52	71.50	-1.3	-1.7
Q	WYSE TECH	35	13	28.13	+1.3	+4.7
N	XEROX CORP	81	49	76.63	-2.6	-3.3
Q	XIDEX CORP	20	11	11.50	+0.0	+0.0

Leasing Companies

EXCH		52-WEEK RANGE (1)		PRICE CLOSE JULY 1 1987	WEEK NET CHNGE	WEEK PCT CHNGE
N	COMDISCO INC	33	15	30.13	-0.9	-2.8
N	CONTINENTAL INFO SYS	14	7	11.88	-0.6	-5.0
Q	PHOENIX AMERN INC	8	3	4.25	-0.3	-5.8
Q	SELECTERM INC	8	5	5.25	+0.0	+0.0
N	U S LEASING INTL	53	38	52.00	+0.3	+0.5

EXCH: N—NEW YORK; A—AMERICAN; Q—NATIONAL;
O—OVER-THE-COUNTER; S—SPLIT

O-T-C PRICES ARE BID PRICES AS OF 3 P.M. OR LAST BID
(1) TO NEAREST DOLLAR

Rodime plunges

Drive maker's stock drops 48% amid massive investor sell-off

Investors have battered the U.S.-listed stock of Scottish disk drive vendor Rodime PLC after the firm announced 10 days ago that it expects to report its fourth straight losing quarter.

In the four days of trading ended Wednesday, Rodime's over-the-counter stock plummeted 48%, from an opening price of 9⅜ bid on Friday, June 26 to a close of 4⅞. That plunge included single-day percentage drops of 23% on June 26 and 29% — the largest over-the-counter market loss of the day — on June 29.

Rodime's stock debacle is the latest example of massive investor sell-off when a company reverses itself on earlier predictions of improved business.

In April, Rodime announced that its quarter ended June 30 would show a significant revenue increase from the previous quarter. However, the company's revised recent assessment noted that reported sales would actually fall 18%.

Other recent industry examples of similar financial faux pas — with comparable stock market reactions — include Floating Point Systems, Inc. and Daisy Systems Corp.

CLINTON WILDER

DEC adds bus licenses

Two vendors receive VAXBI bus authorization

BY ELISABETH HORWITT
CW STAFF

Two Transmission Control Protocol/Internet Protocol (TCP/IP) networking companies have joined the elite ranks of third-party vendors with licenses to develop products for the VAXBI bus, Digital Equipment Corp.'s newest bus architecture.

Excelan, Inc. in San Jose, Calif., announced last week that it had obtained the license to the VAXBI bus. Excelan's competitor, Micom-Interlan, Inc. in Boxboro, Mass., made a comparable announcement two weeks ago.

Both companies already offer intelligent CCITT 802.3 Ethernet controllers that allow DEC VAX Unibus and Q-bus systems to communicate with other vendors' systems using TCP/IP.

DEC reportedly has been frustrating third-party vendors by making it difficult for the vendors to obtain a VAXBI bus license. Approximately 30 companies are currently said to have licenses.

The license allows the networking vendors to develop controllers that link directly to the VAX 8000 bus without the need for a Unibus adapter, according to Micom-Interlan, a subsidiary of Micom Systems, Inc.

This should significantly reduce the cost of such products, the vendor added.

"The VAXBI bus license is a natural transition of our relationship with DEC," said Micom-Interlan President Michael Barker. "We offer one of two DEC-supported Decnet-Ethernet controllers for the IBM Personal Computers."

TCP/IP provides a link between DEC products and non-DEC computers that do not support the firm's Decnet networking system, according to Barker. DEC depends on third-party vendors to provide TCP/IP connectivity for its hosts because "it is committed to Decnet and to migration to Open Systems Interconnect," Barker said.

> **DEC reportedly has been frustrating third-party vendors by making it difficult for the vendors to obtain a VAXBI bus license.**

DEC spokesmen have cited OSI as the company's strategy for offering multivendor connectivity; however, while TCP/IP is mature and supported by a wide range of vendors, the OSI standard is currently still under development.

Micom-Interlan reportedly plans to ship its intelligent VAXBI bus Ethernet controller, to be named NP800, in the first quarter of 1988. Excelan cited a mid-1988 shipping date for its VAXBI bus Ethernet boards and software.

Pricing information was not available from either of the companies.

SQL data base link crosses system gaps

BY CHARLES BABCOCK
CW STAFF

MENLO PARK, Calif. — Gupta Technologies, Inc. is expected to release this month a distributed networking product that can tie together different vendors' SQL-based data base management systems on different-size machines.

SQL Net employs IBM's LU6.2 application-to-application communications standard, giving it two standards with which to work, company President Umang Gupta said last week. The IBM SQL standard allows a user at a personal computer to formulate a query using another Gupta product, SQL Base.

The LU6.2 standard allows the query to be transmitted to the proper data base management system, where it will extract data in the same manner it would if it were running against its local data base.

"This is the first program that uses Advanced Program-to-Program Communications [APPC] to directly communicate with a remote data base. The host becomes like an extension of the PC data base," said Richard Finkelstein, manager of the Codd and Date Consulting Group in Chicago.

The initial release of SQL Net supports data distribution between SQL Base and IBM's DB2 under the mainframe MVS environment of CICS/VS, Gupta said.

The $50,000 network product is made up of two components. SQL Host runs on an IBM mainframe as a CICS transaction program. SQL Gateway uses an IBM Personal Computer on any IBM Netbios-compatible local-area network as a gateway to mainframe- and minicomputer-based SQL data bases.

Each gateway PC must have an IBM Synchronous Data Link Control board connection to the mainframe via a leased or dial-up line or an IBM Token-Ring connection via an IBM 3720 or 3725 communications processor or a 3174/1L terminal controller. IBM's APPC/PC package is required on the PC gateway machine.

Unisys offers 5G-byte disk drives

BY JAMES CONNOLLY
CW STAFF

BLUE BELL, Pa. — Unisys Corp. last week announced a quadrupling in on-line storage capabilities for mainframes made by the former Burroughs Corp. as the company introduced a 5G-byte disk drive comparable to the IBM 3380E models.

The Unisys 9494-24 is intended to provide users with greater storage capacity at a lower cost per megabyte than is available with the 2-year-old Unisys 9494-12. That machine, which has a formatted capacity of 868M bytes and an unformatted capacity of 1.2G bytes, remains available, according to Harry Goldberg, Unisys program manager for disk products. Both drives are manufactured at Unisys' Santa Clara, Calif., peripherals facility, he said.

The 9494-24 was designed for use with Unisys A series, V series and B7900 mainframes.

Thin-film heads

Like the earlier model, the 9494-24 uses thin-film heads. The new model features two head-disk assemblies (HDA) per drive instead of one HDA and provides double the capacity with each HDA, Goldberg said. The new drive features a 17-msec average access time, compared with a 16-msec access time in the single-capacity drive. Goldberg said the time difference is negligible and is consistent with the differences among IBM 3380 models.

He said the older 9494-12 with a 9389 storage controller, a 9399 string controller and eight drives costs $355,300. A new 10G-byte 9494-24 configuration, consisting of a 9389, a 9399-E with an integrated drive and one additional drive, costs $288,090. The 9399-E and integrated drive costs $129,150 and can support up to three more drives, which each cost $98,140. The 9494-24 is available immediately, Goldberg said.

Juggler

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applications that provide communications capability may have problems running under Juggler.

Although Juggler should arrive well before OS/2, Apple has yet to announce the product. "We don't preannounce versions of our operating system," an Apple official said.

But a demonstration of Juggler given to *Computerworld* points out the ease with which users can open multiple applications and share data through cut-and-paste functions while applications share the same screen.

And, like the latest version of Microsoft Windows, Juggler uses overlapping, rather than tiled, windows. These features are a major enhancement to the Macintosh's ability to exchange data and switch among applications. In addition, Macintoshes equipped with Microsoft's MS-DOS coprocessor boards will be able to run MS-DOS applications in a window. Most MS-DOS programs will not need to be modified to run in Juggler's windows.

While most existing applications are expected to run unaltered under Juggler, some minor modifications may be required to ensure compatibility, especially with communications software.

Limitations

"The one thing that Juggler does not do very well is in ownership of certain system resources, like the serial ports," said one of the developers briefed by Apple. "If you have some serial activity going on, you don't really have any control.

"That is why it is not true multitasking: because the operating system does not do the resource arbitration," the developer said.

The lack of resource arbitration may pose a threat to the compatibility of communications software, a key application for a multitasking environment, the developer added. "Right now, there is a lot of concern that, given the current release, if I am the author of any software that does communications, I have got problems."

In contrast to OS/2, which will offer full multitasking capabilities, Juggler will provide nonpreemptive multitasking, which is not considered to be multitasking in the strictest sense.

Under preemptive multitasking, which is the pure form, the operating system assigns priorities to tasks and ensures that each task has adequate resources to run effectively. "It is not true multitasking unless the events that occur in one application have no side effects on any other applications running in the system. You can't guarantee that with Juggler," the developer said.

Multitask apparition

Despite the limitation, software that is written closely to Apple's standard software-development guidelines appears to the user to be a true multitasking program. A user, for example, could work with a word processing package while a data base was sorting or a spreadsheet was recalculating.

Although it will not be supported in the initial release, a later release of Juggler will provide virtual memory capability, under which hard-disk memory can serve as RAM, an Apple official said. This will be a key feature of the initial release of OS/2.

True multitasking may be available in a later release of Juggler, but such a version would only run on the Macintosh II, which uses the Motorola, Inc. 68020 processor. It is not expected to be available any time in the near future.

"The only way you are going to get true multitasking is in a product that supports the PMMU [paged memory management unit]," said a source close to Apple. The PMMU is the 68851 support chip that is part of the 68020 family upon which the Macintosh II is based. The chip allows applications to have separate and protected memory partitions.

Because applications are not fully protected from one another, problems can occur. "If you crash in Juggler on an SE or a Plus, you have a chance of corrupting the machine or crashing the set of tasks that is running," a developer said. With the PMMU version, however, "even if one application crashes, all the other applications continue to run."

With bated breath

Users are looking forward to the release of Juggler. "Everybody is anticipating Juggler. A lot of users are going to like it," said Rick Richardson, national director of technology development for Arthur Young in New York. "If it says anything, it says buy more memory," Richardson said. Other users interviewed last week agreed.

Richardson, who describes the Juggler concept as a "nice add-in," is skeptical about the need for multitasking, viewing it as helpful only for background communications or for recalculating large spreadsheets.

The appeal of Juggler for Richardson is a hoped-for improvement in the ability to cut and paste data.

Symphony option targets tech users

Lotus's Measure works within older tool; firm also inks pact with HP

BY ALAN J. RYAN
CW STAFF

CAMBRIDGE, Mass. — Lotus Development Corp. last week announced a software package aimed at engineers and scientists who work with the company's Symphony software.

Measure for Symphony was designed to work within Symphony to collect data from measurement instruments and transfer it directly into the spreadsheet for analysis, storage and graphic display. The program's features and functions are basically the same as those of Measure for 1-2-3, according to a company spokeswoman.

The instruments are connected to a personal computer via one of three interfaces included in the software, which are the IEEE 488, RS-232C and analog-to-digital plug-in-board interfaces. Measure takes the data from the instruments and plugs it directly into Symphony or 1-2-3, where it can be graphed or incorporated into a document or plugged into the spreadsheet, Lotus said.

Users control data

The user is responsible for sending the information to the correct area in the spreadsheet and uses instructions via macros to do so. The user can also manipulate the data as it is coming into those areas.

The Measure 488 Interface allows users to streamline the process of collecting data by connecting Symphony to IEEE 488-compatible instruments, including multimeters and digital oscilloscopes.

The RS-232 Interface reportedly provides simplex, half-duplex and full-duplex communications with any RS-232C-compatible hardware such as lab balances and bar-code scanners.

The Measure Analog-to-Digital Interface works with a plug-in data acquisition board that can be directly connected to sensors such as thermocouplers, strain gauges and more, the vendor said.

Measure for Symphony runs on the IBM Personal Computer, PC XT and AT, the Hewlett-Packard Co. Vectra C and the Compaq Computer Corp. Portable. It is scheduled to be available in the middle of this month for $495.

In other announcements, HP and Lotus said last week they have signed an agreement under which HP will distribute and support Measure for 1-2-3 and Measure for Symphony on a worldwide basis as part of its product line.

Judge Greene

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services, Greene called the Justice Department's support for state-by-state review of the competitive situation a "far-fetched" antitrust theory.

Greene also said he was "astonished" that the Justice Department wants to relinquish its job of determining whether the Bell holding companies have subsidized their unregulated business ventures with telephone ratepayer funds.

During the third day of hearings, which concerned information services such as videotex and on-line data bases, Greene was skeptical about assertions that the FCC's rules for Open Network Architecture (ONA) will prevent the Bell holding companies from giving other information service providers low-quality or overpriced access to the local network.

"Are you talking about the FCC regulations that aren't in effect yet?" Greene asked the department's lawyer, Nancy Garrison. ONA plans must be filed with the FCC in 1988 and are not likely to be approved until 1989 or thereafter.

To base a decision about lifting the information services restriction on the assurance that there will be ONA plans in 1988 or 1989, Greene said, "seems to be a pretty thin reed. Do you have something more than that?"

> "ARE YOU talking about the FCC regulations that aren't in effect yet?"
>
> JUDGE HAROLD H. GREENE
> U.S. DISTRICT COURT

But Greene — who showed keen interest in the French telephone authority's role in the Minitel videotex system — seemed open to some limited role for the Bell holding companies in the information services industry [CW, June 29].

For example, Greene asked information service vendors whether the court should allow the Bell companies to offer transmission services integrated with information services but not the editorial content.

Donald E. Ward, attorney for the on-line data base companies and others, said it would be too difficult to distinguish between transmission and content.

While many information service companies opposed entry of the Bell holding companies into their turf, the Videotex Industry Association supported removal of the restriction on information services.

Howard Liberman, an attorney for the videotex association, said the industry is not afraid of competition with the Bell holding companies if the FCC implements the appropriate safeguards.

Industry analysts have suggested that struggling videotex companies will be rescued by alliances with the Bell holding companies, which can profit from the increased traffic on their networks.

"The key issue," Liberman said, "is how will the revenues be shared."

INSIDE LINES

Toot sweet. Dun & Bradstreet is expected to announce this week the sale of the assets of its D&B Computing Services subsidiary to Thomson S.A. of France [CW, June 15]. Sources say Thomson will meld D&B with its Princeton, N.J., subsidiary, United Systems Software & Services, and rename the operation Must Software International. Thomson has agreed to keep the merged company in D&B's Wilton, Conn., offices until the lease on its headquarters building is up. Thomson has also agreed to remain in Fairfield County, Conn., for the foreseeable future. Apparently, negotiations became bogged down on a variety of issues, not the least of which was a Thomson requirement that 75% of D&B's employees sign employment contracts.

On the right TAC. Lotus this week is scheduled to announce a new version of The Application Connection (TAC), a range of software products that allow IBM PCs to extract data from IBM 370 host applications and have that data translated into popular PC formats. The new version is expected to allow more applications to exchange data, including a connection to IBM's DB2.

A word to the wise. In a help-wanted ad last week in the *Wall Street Journal*, IBM said it is seeking experienced attorneys to work on patent and intellectual property matters. Specific technical areas in which IBM is seeking patent-law experience are signal processing, computer systems, computer programming, digital electronic circuits, semiconductor devices and communications.

Will it play in Peoria? At the upcoming American Association for Artificial Intelligence show in Seattle, Symbolics, Inc. is slated to introduce an add-in board containing the Intel 80386 microprocessor for use in Symbolics' AI workstations. Symbolics says the board will enable the workstations to run Unix and Microsoft's MS-DOS, along with the library of applications written for these operating systems. Symbolics is scheduled to roll out a software package that will enable applications developed on its machines to be ported to 80386-based PCs.

We expect to announce our intent to introduce. Unisys has plans to dive into the 80386 waters sometime in late October or early November. Last week, the company announced its "intent to introduce" an 80386-based PC that will reportedly support Unix and Microsoft's Xenix for multiuser environments as well as Microsoft's MS-DOS and MS OS/2 for single-user applications. Pricing was not available. Unisys also said it will provide OS/2 to users of its PC/ITs, PC/Micro ITs and future Unisys systems when the operating system becomes available early next year.

Just don't mention the computer. Trintex, the IBM and Sears joint venture into the ill-fated videotex market [CW, May 25], has come up with a name for its forthcoming service that makes no mention of home computers or videotex. From now on, it will be called "Prodigy, an interactive personal service." As a Trintex spokesman put it, "It's a low-tech name that the average person can relate to."

Looking to be protected. A high-ranking Ashton-Tater told *Computerworld* recently that his firm was looking into using tools from non-Microsoft third-party vendors that would allow Dbase III to exploit the large memory of 80386-based machines. Even if Ashton-Tate takes this approach, users should still expect an OS/2 version of Dbase.

Someday it will all be clear. A noted computer analyst recently met with IBM officials, who suggested that users interested in running IBM's OS/2 Extended Edition buy only IBM machines. The IBMer likened that version of OS/2 to some IBM software and IBM add-on boards that just don't run on clones. In addition, OS/2 Extended Edition does not run under the Presentation Manager, OS/2's graphics user interface. There are two theories behind this, the analyst said. One is that IBM does not want to have to wait for the Presentation Manager to ship before hawking OS/2 Extended Edition. Another is that IBM began developing OS/2 Extended Edition before agreeing to use Microsoft Windows as the foundation for the Presentation Manager.

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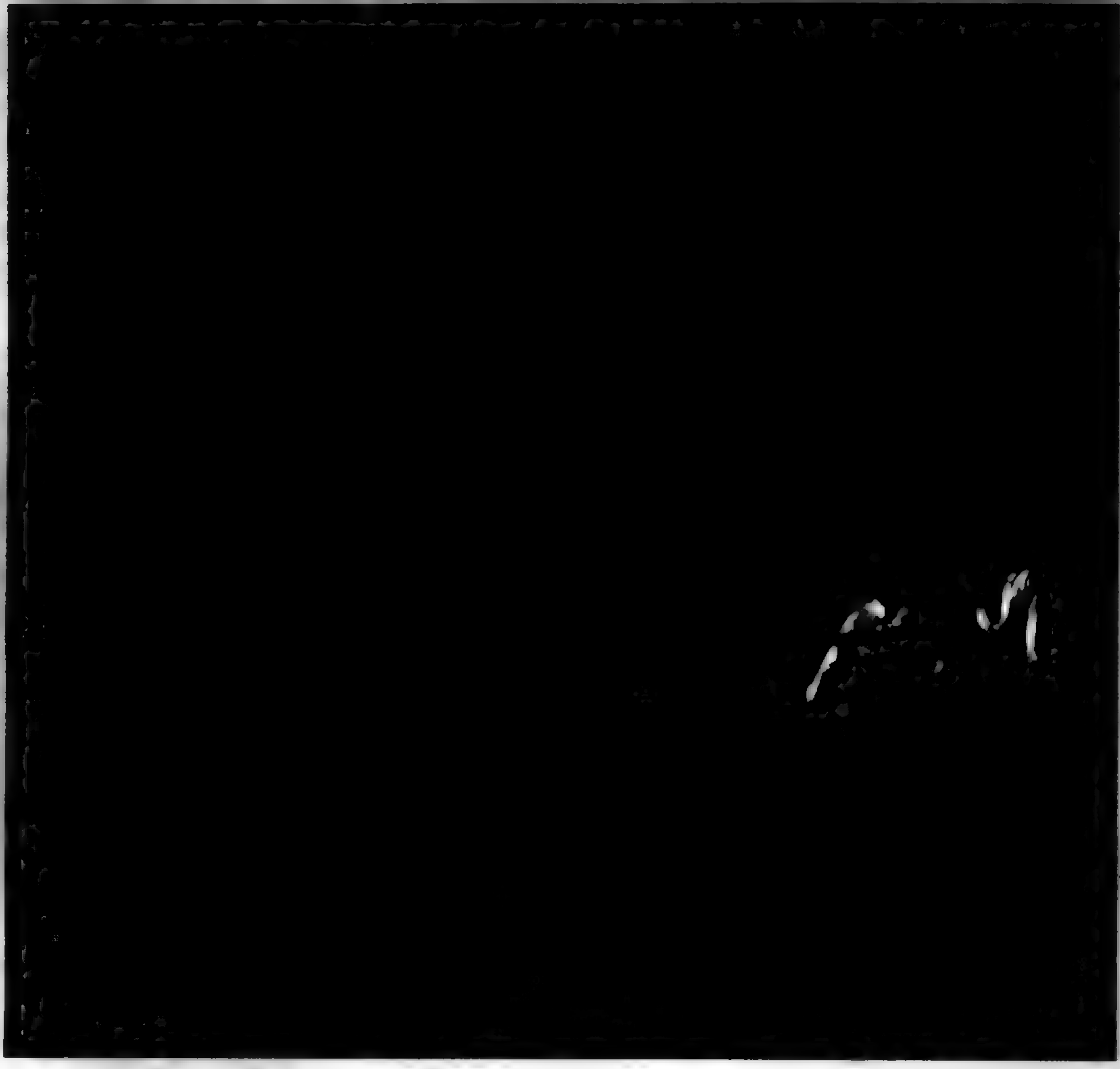

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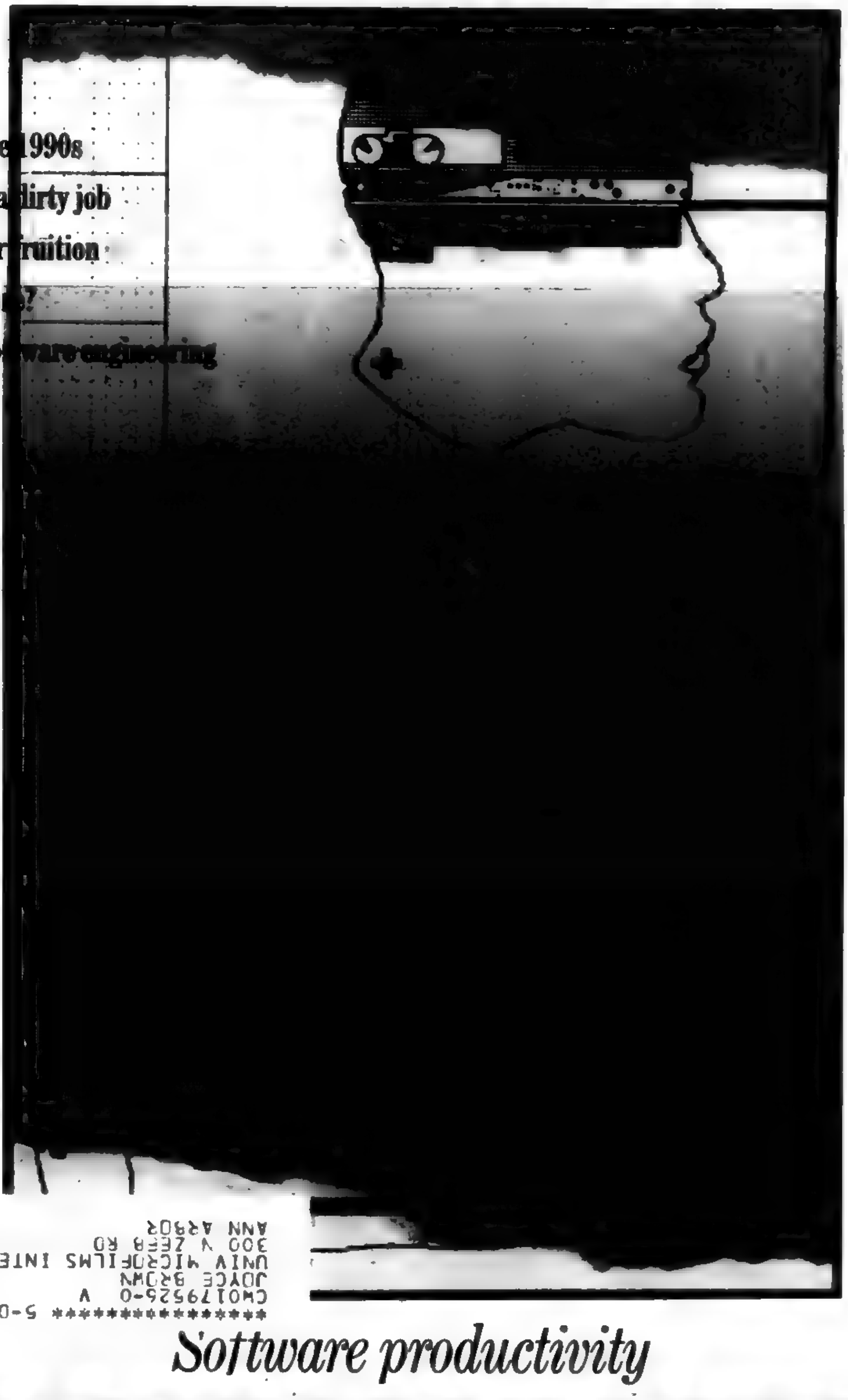

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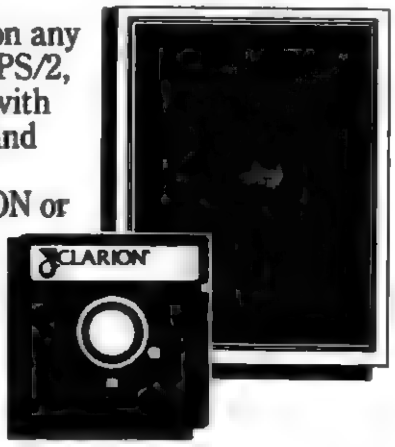

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in focus

DIRECTING TALENT At the heart of many system implementation failures lies a gap between people and technology. Nurturing a skilled, talented staff is an art that can be learned. Failing to deal with human resource issues can damage organizations immeasurably and lead to less than successful systems performance. By Roger Sobkowiak. Page 16.

IS OS/2 THE FUTURE? OS/2 and PS/2 may force MIS to rethink the direction that computing will take in their companies during the next 20 years. Many consider these offerings to be IBM's most attractive products in a long time; others consider them to be a Pandora's box that, once open, will overrun a firm with a software overhead of cataclysmic proportions. By Brian Jeffery. Page 25.

MANAGEMENT IN THE 1990S MIT has undertaken an ambitious five-year program to study the effect that the rapid acceptance of computers has had on companies and workers. Leaders of the individual projects that make up the program discuss what the future holds for information systems and MIS professionals. By Stan Kolodziej. Page 45.

CASE systems near fruition
By Rebecca Hurst. CASE is said to offer salvation from hand coding and applications backlogs. Read about the CASE products available to fit your needs. Page 27.

UIMS
By Stan Kolodziej. User interface management systems pack a productivity punch but have remained an industry secret. Find out about these mysterious tools. Page 31.

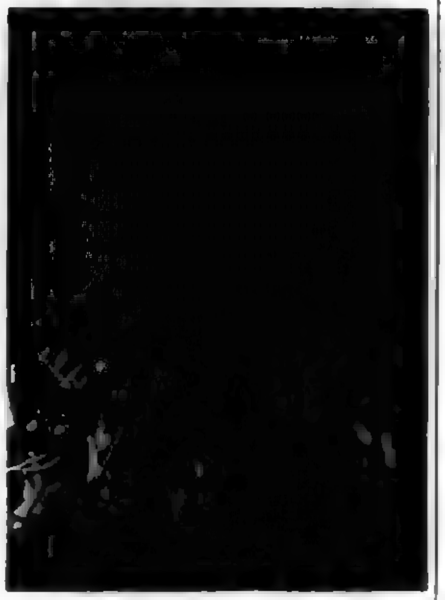
Computers R Us
By Sandy Austin. A number of Fortune 500-class firms are getting into the software business. See how they're faring. Page 39.

Maintenance is a dirty job
By Girish Parikh. Software maintenance won't go away. Learn how to turn this unpopular job into a cost-cutting, productive one. Page 47.

Users debate 4GL virtues
By Rebecca Hurst. Users state the pros and cons of using a 4GL over a third-generation tool. Page 49.

Compiling facts on toolboxes
By Walter Kozachek. Toolboxes help free you from the tedious chore of coding. Here's some advice to help you shop for one. Page 51.

Humanizing the machine
By Larry R. Harris. See what is taking AI out of the labs and into the commercial mainstream. Page 55.



Software engineering

MIS managers have long felt that there was little software engineering could offer commercial, real-world programming. But as pressure increases on them to speed up software development and maintenance, MIS will need the productivity benefits that software engineering techniques and tools, such as CASE, provide. Begins on page 35.

From the Editor
Including your letters to us. Page 5.

Q and A
Amoco data base administrator's thoughts on IBM's maturing DB2. Page 6.

Manager's Corner
Jim Young on methods analysis. Page 8.

News & Analysis
PS/2 news; X Windows; R&D consortia; high-tech help for the blind; Cadre's EDIF support. Page 9.

Products
Tech Talk on CM2; C tool that cracks 640K limit; Hot Seat column; product checklist. Page 57.

Blue Beat
Deidre Depke on the realities of OS/2. Page 57.

Calendar
Industry events. Page 60.

The Insider
Thomas Roberts on the fluff in integrated office systems. Page 64.

Log Off
The lowdown on Unix use in the technical and commercial arenas. Page 64.

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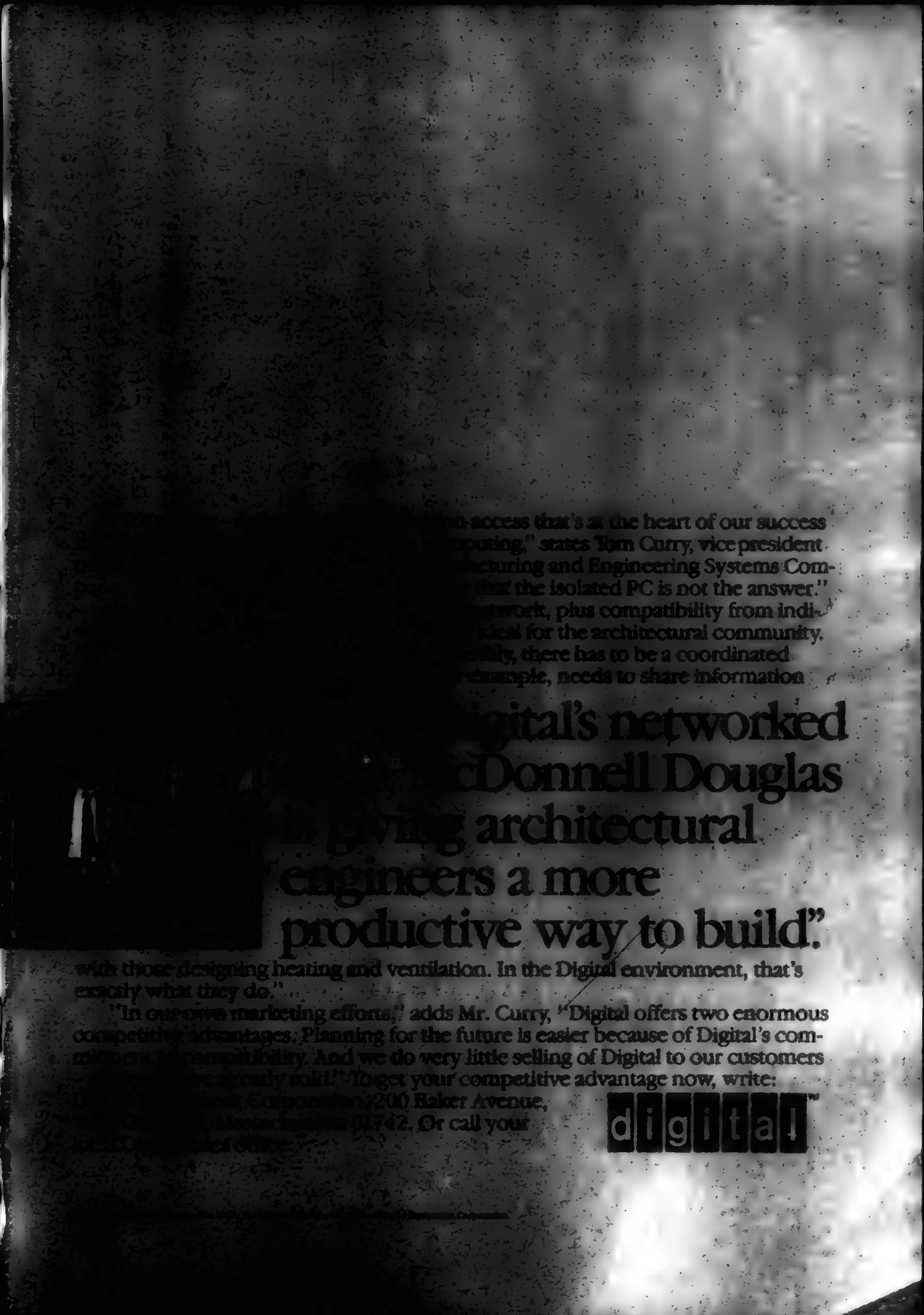

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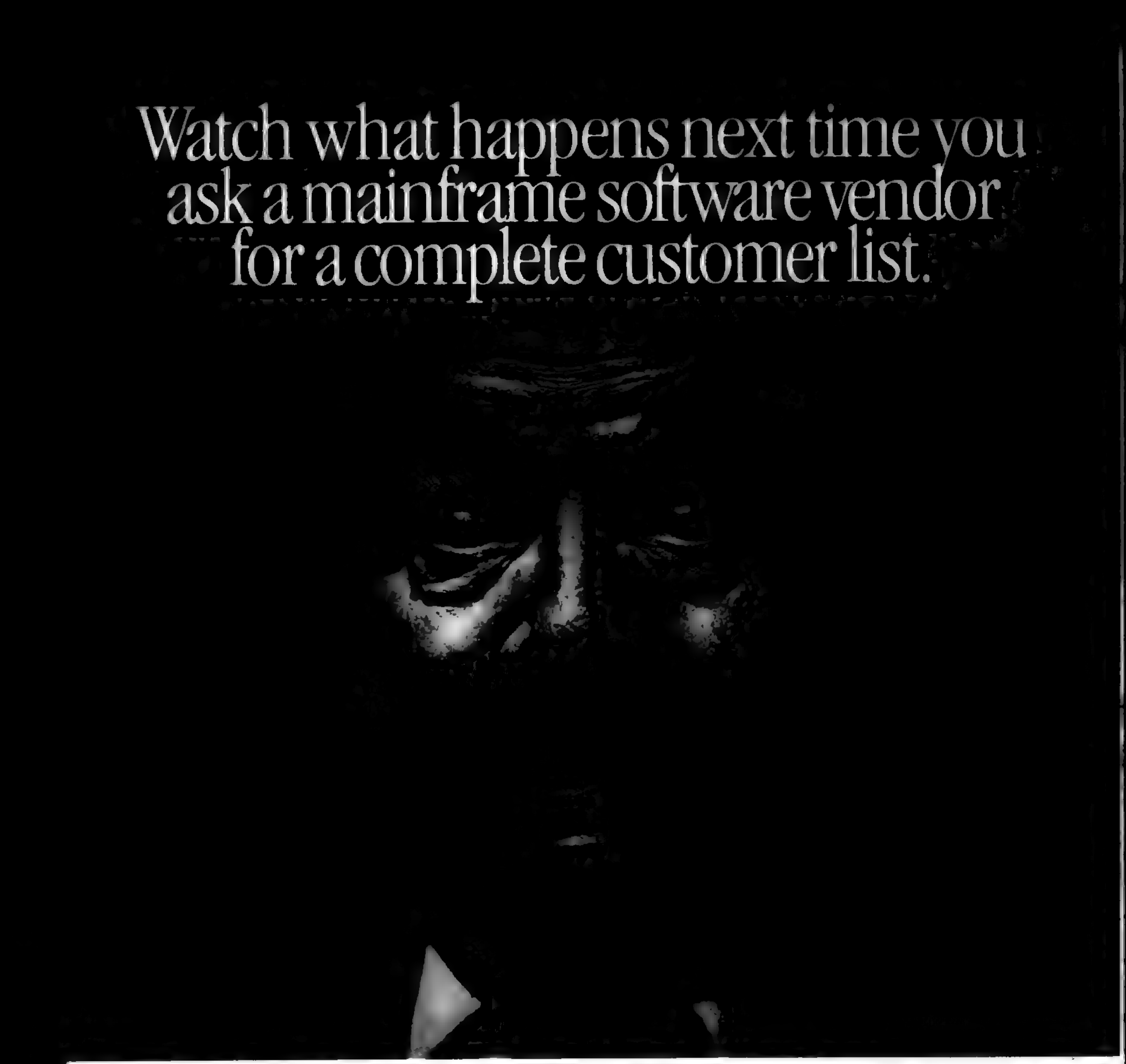

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FROM THE EDITOR

100% over budget

MIS is facing a continuing software crisis that threatens to delay any potential productivity gains expected from computer use. An applications backlog has been with us for years, and as computing spreads, user demand for better and more varied applications escalates. The average wait for unwritten or unimplemented software is estimated to be between five and seven years. Meanwhile, the average software project is often one year behind plan and 100% over budget. What's more, firms can spend 50% of their computer budgets on software and still not achieve high-quality results or reduce their backlogs.

All hope is not lost, however. Tools are being developed to aid in the fight for greater productivity. MIS should not ignore nontraditional techniques and technologies for fear of lessening its power. MIS needs to shed its traditional, static role of implementor and don the guises of problem solver and business planner. The process will not be an easy one. Not only will MIS have to experiment with different technologies, but it will also have to try different organizational procedures. Utilizing people as a resource is essential to any project and is an aspect that is often overlooked. It is important to develop a clear picture of what can be accomplished with software advances and what cannot. Scrutinize the trade-offs but don't delay — the search for a productivity tool solution may only add to your problems.

MERGER MANIA STRIKES CLOSE TO HOME. Another important event in the industry that impacts MIS and users is the increase in acquisitions and mergers among software vendors. A case in point is Computer Associates International, Inc.'s recent surprise acquisition of Uccel Corp. On one hand, the consolidated company may have increased funds for R&D, product promotion and service. Furthermore, larger firms can usually be counted on to be around for the long term. On the other hand, customers are often not given the personal attention they may have received when their vendor was small and struggling. Additionally, a more competitive market offers customers more choices at better prices. If the trend toward acquisitions continues, the very nature of the competitive independent software industry may change substantially.

Ann Dooley

Access Technology program runs on IBM machines

I read with interest the Special Section on IBM's 9370 written by Michael Tucker [*Computerworld Focus*, May 6] and found it to be thorough and insightful.

I would, however, like to make one correction in reference to Access Technology, Inc. The author reported in the Special Section article that Access Technology does not currently run on IBM machines.

In fact, we have had an IBM VM/CMS version and an IBM Personal Computer version of our 20/20 spreadsheet available to our customers since October 1984.

In a study recently undertaken by Sentry Publishing Co., Access Technology was found to be a leading vendor of mainframe spreadsheets, with close to 10% of the installed user base in 1986.

Access Technology looks forward to continued success in the IBM marketplace, and we feel that the IBM 9370 machine will play an important role in that success.

Carl Nelson
Vice-President, Marketing
Access Technology, Inc.
South Natick, Mass.

Compliments on *Focus*'s redesigned look

I just wanted to tell you how nice *Computerworld Focus*'s new format looks. The color looks great. Congratulations!

Tracy Haller
Kalman Communications
Santa Monica, Calif.

The importance of a resume that reads 'experienced'

I am responding to a letter written by Ken Yeager of Futures Personnel Services, Inc. entitled "Don't Leave Your Future To Others" [*Computerworld Focus*, March 4].

Yeager mentions that not enough large institutions and colleges offer co-op programs that give the students of today the hands-on experience they need.

I am currently enrolled in a computer technician course at the Baton Rouge School of Computers in Louisiana, and I find it very interesting and challenging.

I have kept in touch with a few graduates who are now out in the real world trying to find a lucrative job.

Although I find the Baton Rouge School of Computers to be a fine institution, many graduates are still looking for employment because their resumes do not read "experienced."

I feel optimistic about securing employment after I receive my graduation certificate from school, but I am sure that it would be more helpful in hunting for a job if my resume included practical experience.

I agree with Yeager that there should be more co-op programs available to students to give them the hands-on experience companies are looking for!

M. Oberding
Baton Rouge, La.

Q AND A

Howard Fosdick

DBMS double take: Amoco data base chief says maturing DB2 deserves a second look

Howard Fosdick is the president of the Midwest DB2 User's Group, headquartered in Chicago. The Midwest users group was formed more than two years ago when it became obvious that DB2 had become IBM's primary relational data base management system offering.

As data base administrator for Chicago-based Amoco Corp., Fosdick is also one of the first users of IBM's DB2. Fosdick recently spoke with *Computerworld Focus* Senior Writer Rebecca Hurst about the reasons behind using DB2 and the young DBMS's technical problems and solutions.

Why did you first decide to use DB2?
Amoco has a group that does nothing but evaluate products. Three years ago, the group began to work with DB2 to see if it met our requirements. The group reported that DB2 wasn't mature enough to do much of what we wanted. There was no question, though, of whether we were going to buy DB2; we just had to decide when. As it was, we went fairly early.

I can't speak for all companies, but at Amoco, we saw some advantages in going into DB2 early. Even if the product was not strategic then, we knew it would be later. Also, it takes awhile to develop experience with a DBMS, and IBM gave us a lot of special help.

From your perspective, how seriously is IBM marketing DB2 and IMS together?
The official story for some time has been that IBM is taking a dual-DBMS strategy. In reality, I think IBM has sold all the copies of IMS it's going to sell. IBM is pushing DB2 very heavily.

If that is the case, will DB2 completely replace IBM's IMS?
A small company with one mainframe may well replace IMS with DB2. A company like Amoco has hundreds of systems running IMS, therefore, moving them all to DB2 would be cost-prohibitive. We have five mainframes at this site alone. We'll use DB2 as we develop products. With so much invested software, though, we'll probably have IMS for many years to come.

What technical concerns have you had about DB2?
Performance has been one concern. There has been a bit of a trade-off in using DB2 instead of IMS. DB2 automates a lot more tasks for programmers. Using IMS, we might need three or four programmers, while we only need two using DB2. Users pay a price in performance, though. You have to weigh the cost of the systems analysts' time vs. the cost of slower performance.

Release 1 of DB2 was not a good performer at all. IBM has been responsive, though, and Release 2 is much better. Release 3 will come out in another month or so, and it [is expected to] perform better, so performance [may] no longer be the issue it once was.

Basically, DB2 running on IBM's MVS operating system suits our needs very well. In the future, though, we may have a problem if we need to run DB2 on more than one computer. DB2 is a single-computer system, so we would have to put a copy of DB2 on every machine. I hear that IBM is working toward distributed data processing so that [scenario] should not be a problem.

How well does DB2 compare with other data base management systems? Would you consider purchasing one of these non-IBM products?
If you compare the fourth-generation language capabilities of DB2 to other DBMS, it's pretty weak. DB2 has a good kernel, but there are a lot of little missing parts because the DBMS is new. However, we're so heavily invested in IBM that we try to go with its products as much as possible. Where we need added capabilities, we buy add-on products from third-party vendors.

Other factors [in going with IBM] are IBM's strength in the market and the number of DB2 users. DB2 is so big that there are a lot of third-party vendors that supply product enhancements. Every DBMS has strengths and weaknesses, but if you go with a smaller vendor's product, you're stuck with it. There's [usually] no one else supplying add-on products.

What types of add-on products are users buying for DB2?
Members of the Midwest User's Group are looking at applications generators such as the one from [Palo Alto, Calif.-based] Sage Software. There are a number of products that handle full screen insertion of data, an area in which DB2 is weak. Users are also buying tools that help move applications from a test environment to a production system.

How viable is DB2 as a DBMS?
A lot of things in DB2 don't work, but it is evolving in a hurry. I've seen major improvements in the past two years, and I'd advise anyone who wasn't happy with DB2 a year ago to look again.

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MANAGER'S CORNER

Methods analysis revisited

Jim Young

By and large, I am not a believer in the good old days. I prefer data processing as it exists today. However, occasionally I come across a practice that fits today's needs and, therefore, deserves a revival. The technique of methods analysis is such an area.

Methods analysis was a holistic approach used by computer professionals that included designing the entire work process along with the computer system. Methods analysis took many of its tools from old time-and-motion study methods as it attempted to engineer the workplace. As a result, not only did a company create a system, but it also formed all adjacent elements, including work structures, job content, forms design, paper flow and so on.

I have a number of theories about why this approach went out of fashion. First, methods analysis is a precise, overbearing process and quite threatening. It conjures up the image of a silent observer with a clipboard unilaterally changing jobs. Moreover, this technique is consciously complex, requiring extensive data collection and bureaucratic overhead. In many instances, MIS chose to abandon this technique in the spirit of improving project productivity and user relations.

There are other reasonable causes for the demise of methods analysis. Many applications, though, needing an initial work structure, have since seen a basic process and work pattern become established. There is no reason to cause the upheaval brought on by a major reassessment.

These processes also have a diminishing amount of manual and administrative content, which lessens the benefits of methods analysis. In the meantime, to reduce costs, management has tended to take proposed comprehensive studies and whittle them back to less ambitious and less thorough efforts. As a result, any changes to these systems tend to be evolutionary rather than revolutionary and inappropriate for a fundamental design methodology.

Another deciding factor for avoiding methods analysis is the changing balance of authority over applications. No longer are users the passive recipients of MIS's services. Today, they are active participants in design activities and often make their business analysts responsible for how users interface with DP technology. With the increase in personal computer use directly within applications, users are increasingly exercising responsibility for some of the technical portions of their applications. They don't feel they need MIS techniques to tell them how they should conduct their work.

As a result of the trend toward greater user leadership, evolving system changes and shrinking manual content, data processing has been misdirected to a limited and less effective posture. Because of a diminished opportunity to use the global approach of methods analysis, not many in MIS are learning its skills, and all but the most resistant of practitioners are becoming atrophied in this area. Unfortunately, this situation means that the scope of projects has not been as broad as it should be. MIS has responded to and perhaps fostered the attitude that technology is the answer. The systems MIS does design frequently stop at the hardware. Not only do we fail to always look at the situation in broad terms, but we also fail to consider simple, nontechnical alternatives in our designs.

Why does it make sense to revert to an old technique like methods analysis? With some changes, methods analysis can optimize the effectiveness of data processing and help improve the state of today's applications.

The systems that have been evolving have not had the benefit of a redesign and consequently carry old inefficiencies around. For example, most systems rely heavily on standardized reports and do not take advantage of the flexibility of decision support systems. Today, productivity tools make methods analysis much more attractive. If MIS redesigned systems, it could implement these systems using new productivity tools, thus enabling them to be modified. Use of such tools would free up a greater amount of project time compared with traditional development technologies. The extra time could reduce project costs and minimize overall time to completion.

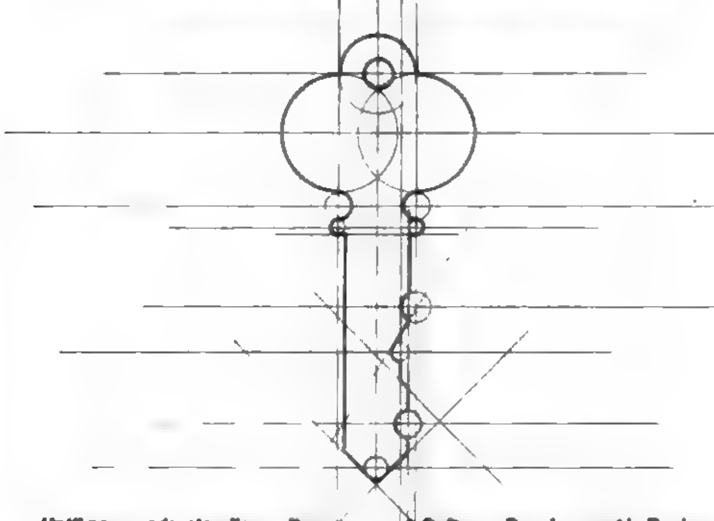
Efficient interfaces

The growth of integrated systems is another justification for methods analysis. Even in environments in which users successfully design their own systems, tools are needed for MIS to ensure that efficient interfaces exist across functional boundaries.

The major reason for a methods analysis approach is the increasingly urgent need to examine the big picture. Different industries are desperate for a last measure of productivity improvement. Ultimately, productivity improvements will only come through fundamental reassessment of what jobs should be done and how they should be performed. As companies identify strategic systems opportunities, making sure they perform as intended may require MIS to examine the building blocks of the workplace. As we competitively strive for increases in productivity, methods analysis is a tool to use to increase thoroughness.

Regardless of how it is approached, the return to a more comprehensive design technique is imperative. Rather than reinventing the wheel, we can revive a successful approach from our past. With a little modernization, it may come to the rescue of our beleaguered applications development efforts — and not a moment too soon.

Young is managing director of MIS for the Wheeler Group, a division of Pitney Bowes in Hartford, Conn.



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news & analysis

UPDATE

Lotus pens pact with IBM

Lotus Development Corp. has stormed back into the headlines again. The Cambridge, Mass.-based software company celebrated its fifth year of existence by penning a 10-year joint marketing and development agreement with IBM. First on the list of IBM/Lotus ventures will be an IBM mainframe version of Lotus's 1-2-3, which is scheduled to appear early in 1988. Lotus also announced that the pact will result in a low-end data base management system for personal computers.

Both products will use IBM's Systems Application Architecture, giving Lotus the ability to plug both products into OS/2, IBM's Personal System/2 operating system, and IBM's 370-based mainframe architecture. Analysts are saying the deal will help Lotus make out like a bandit, giving the company a huge edge in selling into the IBM mainframe marketplace as well as a big push in developing a relational DBMS for the high-end IBM PC market.

In response, Digital Equipment Corp. has kicked up some of its own spreadsheet dust. The company has announced Version 3.0 for both its VAX Decalc and VAX Decalc-Plus spreadsheet programs. The versions, DEC claims, will provide much larger spreadsheets than previous editions.

Microsoft strikes DBMS agreement with Sybase

Microsoft Corp. and Sybase, Inc. have entered into a licensing agreement allowing Microsoft to use Sybase's relational data base management system as a back or front end to Microsoft MS-DOS. It seems as though Microsoft, pressed to produce a relational DBMS, has had to purchase the data base technology from another firm to do it.

SAPC hits Lotus with Visicalc 'look and feel' suit

Not all is gravy in Lotusland. Lotus Development Corp.'s push to secure copyright protection for the "look and feel" of its packages recently suffered a setback.

The company was slapped with copyright infringement and misappropriating trade secrets by SAPC, Inc., a firm made up of former Software Arts, Inc. executives and producers of Visicalc, which is claimed to be the original personal computer spreadsheet package. Ironically, SAPC principals claim Lotus's 1-2-3 comes too close to copying the structure and sequences as well as the total "look and feel" of the Visicalc program.

ADR claims IBM hurting third-party developers

IBM is not without its problems. Right after the company announced that its DB2 relational data base management system would be the first application under its Systems Application Architecture, top officials at Applied Data Research, Inc. (ADR), a Princeton, N.J., software developer, claimed that the move could hurt third-party software developers.

ADR said it feels that because IBM's proposed Extended Edition OS/2 operating system will have a relational DBMS and communications manager built into the operating system, third-party software developers such as ADR are being preempted from a potentially lucrative market.

ADR means business. It has taken the issue to ADAPSO with the intent of passing it on to the U.S. Department of Justice and the Federal Trade Commission.

IBM has remained silent.

D&B unveils PC version of Nomad2 language

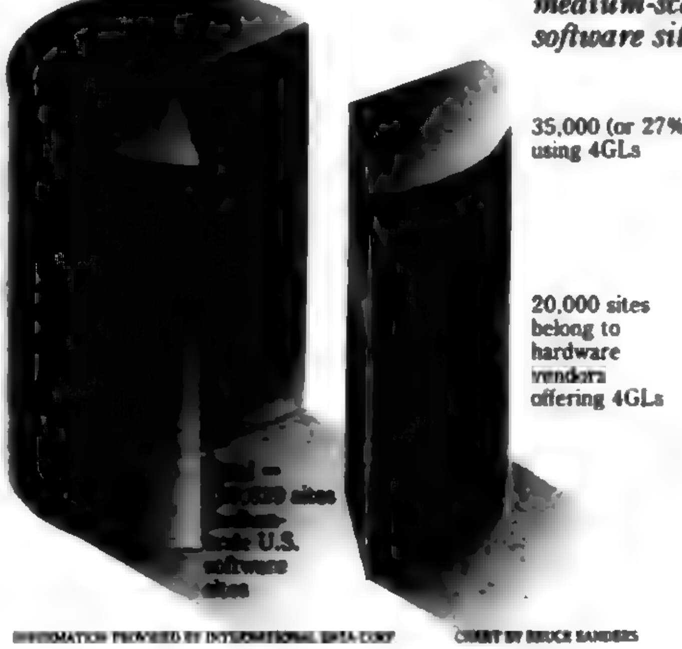
Fourth-generation languages enter the personal computer world. Wilton, Conn.-based D&B Computing Services, Inc. has come out with a PC version of Nomad2, its mainframe fourth-generation language. D&B claims the PC version carries most of the attributes of mainframe Nomad2, including windowing techniques that help users access mainframe data or develop their own applications.

D&B also claims that PC Nomad is a relational product that can create IBM SQL queries from its syntax and store data in its own relational data base

Continued on page 12

4GL flurry

1987 survey of U.S. medium-scale software sites



INFORMATION PROVIDED BY INTERNATIONAL DATA CORP   CHART BY BRUCE SANDERS

PS/2 debut fanfare fails to appease concerns

It was quite a party. Everyone attending April's IBM Personal System/2 announcement says nothing like it had been seen since IBM introduced the 360 back in the 1960s.

"I was at IBM's Personal Computer AT and Topview announcements, and they weren't even close," claims John Parsons, president of Micro-Integration Corp., a Friendsville, Md., developer of bisynchronous communications packages for IBM PCs. "This announcement was well orchestrated."

It must have been. Some attendees from research group International Data Corp. (IDC) in Framingham, Mass., say they saw 20,000-odd participants brought together by IBM through a live broadcast over IBM's internal television network. With all the spotlights, music videos and general ostentation, the IDC staff members say the entire production gave off a whiff of TV evangelism.

Not all guests were in a spirited mood, however. Parsons claims that the demeanor of attending IBM PC board and clone manufacturers quickly changed from excited to ugly when a technical seminar switched from a two-hour briefing into a brief shouting match after it became apparent that IBM would release no technical details of the PS/2's Micro Channel bus until this fall.

Parsons, speaking as an independent software vendor, says the IBM announcement revealed to him just how much work IBM had to do to improve its relations with the independents.

"One of the most surprising things was the fact that IBM wasn't prepared to make sure independent software vendors were able to purchase machines after the announcement," Parsons claims. "IBM's a little slack on the hardware side, but it does offer the independents good discounts on new PC software."

There were other mysteries. The PS/2 Micro Channel bus will offer concurrent communications and come in both 16-bit and 32-bit flavors. What Big Blue has not made clear, however, is whether the machine's bus can be cloned legally.

That mystery could spell trouble.

"IBM's OS/2 operating system is offering open-ended software not very different from

Continued on page 11

Tools for the visually impaired user in a sight-dependent industry, page 13.

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Fanfare

Continued from page 9

existing operating systems from Microsoft Corp.," Parsons says. "I can't see software developers having any problems working with the new machines," Parsons claims.

"Hardware vendors, however, are going to have some problems. The entire inside of the new IBM machines consists of little tin cans that snap together like Lego blocks. About 80% of the PS/2 Models are made up of proprietary IBM components," he explains.

PC rules have changed

As a result, according to Parsons, the IBM PS/2 announcements have succeeded in changing the rules of the personal computer game.

"It's going to be much more expensive for clone makers to duplicate the machines," he claims.

"The disk drive for the PS/2 uses different engineering than other drives, and the motherboard is 30% smaller. The days of cloning in a garage are gone," Parsons claims.

Taking their sweet time

Thomas Roberts, manager of personal computer research at IDC, says that users will take their sweet time migrating to the OS/2 operating system.

"Users are tentative and suspicious of OS/2 right now," Roberts says. "There are huge investments in Microsoft's existing MS-DOS, and there are no real performance advantages running existing applications under OS/2.

"There is also a popular misconception that OS/2 is a true [Intel Corp.] 80386 operating system and that it can make existing applications run in multitasking mode. That's not the case," he says.

Inconvenience vs. new software

Roberts adds that the inconvenience of migration to OS/2 must be balanced by compelling new software applications. Such applications probably will not arrive, however, until at least the last half of 1988, right in the middle of what Roberts calls "the period of missionary selling for OS/2."

Could the PS/2 announcement have been premature? The lack of details on the bus and skimpy technical documentation point to IBM scrambling at the last minute to get the announcement off the ground.

"Another clue was the amazingly similar answers that all of the IBM employees gave to questions," one announcement attendee explains. "It was as though the IBM people were put together at the last minute and were versed in every possible question. It seemed like they had little cue cards glued to the insides of their glasses." — SK

dB

By Rich Tennant

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X Windows gets IBM, Sun support; seen as victor in standards race

The Unix world, generally quick to embrace industry standards, has shown signs of internal conflict over graphics windowing definitions. The battle has subsided, though, and the X Windows system appears to be the victor.

X Windows, graphics and windowing software developed at MIT as part of the university's Athena project, provides a common interface for applications developers, says Bruce Huie, a senior analyst at Framingham, Mass.-based International Data Corp.

"Applications developed for X Windows can be easily ported from one machine to another," Huie says. Like the Apple Computer, Inc. Macintosh interface, X Windows will also provide users with a common platform for using different Unix applications.

Sun favors NEWS

By the beginning of this year, X Windows had already garnered the support of several vendors, including standard-setter IBM. Yet Sun Microsystems, Inc., a pacesetter in adopting standards in the Unix market, held back support. Instead, Sun promoted its own windowing standard, the Network Extensible Window System (NEWS). The Sun camp was joined by Intel Corp., which supported NEWS on its 80386 processor.

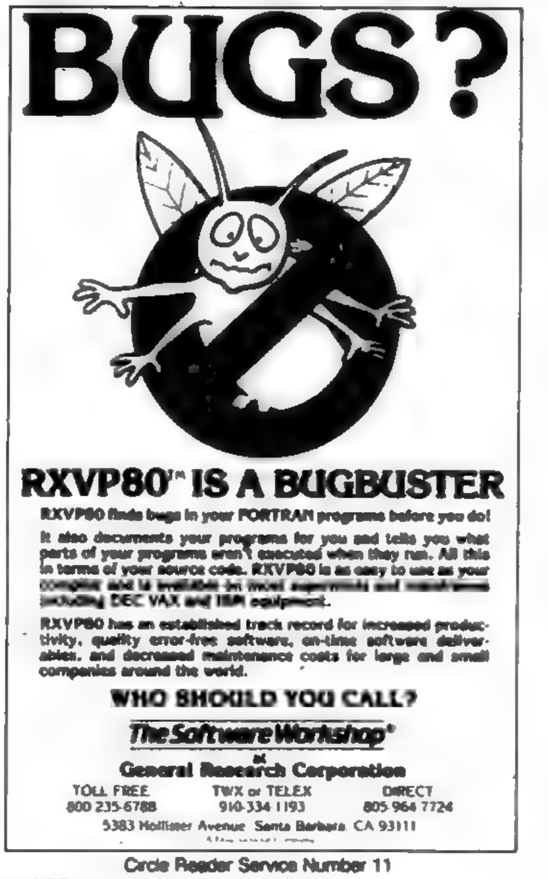
The potential storm that was brewing quickly dissipated in April when Sun announced that it would integrate Version 11 of the X Windows, known as X.11, with NEWS.

Sun promoted NEWS because it is a richer program than X Windows, according to Huie. However, Sun and other vendors will incorporate their more sophisticated functions on top of NEWS, he says. "X Windows serves as a baseline standard for vendors. It's the enhancements that differentiate their products," Huie explains.

Similarly, any Unix-based graphics windowing package announced for the Apple Macintosh II will contain the X.11 standard.

Connectivity with Digital Equipment Corp. has become an important business strategy for Apple, Huie explains. Therefore, because DEC has announced support for X Windows, "Apple will have to follow suit if it wants to continue its close link with Digital," he says.

Since Sun joined, more than 20 hardware and software companies occupy the the ranks of X Windows supporters, including Intel. — RH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Circle Reader Service Number 12

Update

Continued from page 9

management system. And that's not all. PC Nomad also comes with its own data dictionary.

Index announces DEC Vaxstation version of its Excelerator system

Index Technology Corp. in Cambridge, Mass., has just written a version of its Excelerator computer-aided software engineering system for Digital Equipment Corp. Vaxstations running under VMS.

Chris Grejtak, vice-president of sales and marketing at Index, says that teams of Excelerator users developing information systems on multiple Vaxstations can share project and design data concurrently across a Decnet network using the VAX for project storage and analysis. Grejtak says this marks the first move by Index into the 32-bit workstation environment, citing big improvements in the price/performance ratio of 32-bit workstations such as the Vaxstation 2000.

Unisys, Sterling plan to port mainframe data to expert systems

Unisys Corp. and Sterling Software, Inc. will join forces to design a software product that will take mainstream MIS data base information from IBM mainframes and port it down to expert systems and Unisys 1100 systems.

Porting data from an IBM mainframe to a specialized LISP workstation usually spells trouble, requiring major conversions and reprogramming or even rekeying data into an artificial intelligence-based machine. The Unisys/Sterling program will stem from the Unisys Knowledge Systems division, which will use Sterling's Answer/DB, a data link and extractor that runs on IBM mainframes, to develop the connection between IBM systems and Unisys machines running AI applications.

The initial program will connect Explorer, a LISP processor from Texas Instruments, Inc., to the IBM Systems Network Architecture (SNA) environment, using a 3270 SNA link.

Multiflow machines use very long-instruction word scheme

High-speed computing has another player in Multiflow Computer, Inc., which recently introduced its Trace family of Unix-based minisupercomputers. Of software interest is Multiflow's statement that its machines make use of a very long-instruction word architecture and a compacting compiler that the company claims packs an instruction word up to 1,024 bits wide, enabling the machines to handle up to 28 operations simultaneously.

Multiflow says that to get around conditional jumps, a problem apparently tied to overlapped executions, Multiflow's Trace Scheduling compiler picks the most probable path that the code will take and adds compensation code for the lines that do not follow. Multiflow says the code is then compressed into a very long-instruction word architecture.

Apple independent software firm to spark third-party applications

In a move aimed at sparking the creation of additional third-party application software for its Macintosh and Apple II microcomputers, Apple Computer, Inc. is planning on creating an independent software company that will market both Apple and third-party-developed applications software under Apple's own label.

According to Apple, a number of small companies are currently laboring to produce creative new programs for Apple machines without the resources to finish them. That is where the new company will step in to help.

IIA, ADAPSO merger probable; Computer Associates to buy Uccel

If you do not think the software industry is getting any bigger, think again. The Information Industry Association (IIA) and ADAPSO have expressed the urge to merge, probably in 1988. The resultant organization of 1,400 vendors would be "the largest information-related association of its kind in the nation," according to an official letter issued by the organizations.

Speaking of mergers, Computer Associates International, Inc., a Garden City, N.Y., vendor of mainframe systems software, is swapping stock to buy Dallas-based competitor Uccel Corp. The acquisition is the high watermark in a series of software company purchases by Computer Associates in the past few years that has also taken them into the microcomputer software market.

To give an idea of the size of the new software venture, analysts estimate the combined revenue of the two companies will reach $700 million this year, almost double that of the independent software industry's next biggest revenue maker, Microsoft Corp.

"The merger means the only credible competition in many systems software areas will be IBM, which has announced it will increase software tool prices," says David Thomas, an associate securities analyst at Hambrecht & Quist, Inc. in New York.

"The result could be duopolistic software systems market," he says. — SK

Two ways to expand your VM System.

Ours.	Theirs.
Single System Image (SSI) from VM/CMS	VM Inter-System Facilities (ISF) from IBM
You can use any processors in Group 10, 20, 30, or 40 in an SSI complex.	IBM's ISF does not support Group 10 and 20 processors. In Group 30, ISF only supports 4381's with 16 megabytes or more, and 3083's. In Group 40, ISF does not support the 3081 D16 processor.
You can use IUCV and VMCF to communicate between programs across processor boundaries in an SSI complex.	With IBM's ISF, you can't use IUCV and VMCF across processor boundaries.
An SSI complex supports up to 33 processors.	IBM's ISF is limited to two CPUs.
SSI dynamically switches virtual machines from one processor to another to satisfy user requirements. This means a user's terminal and virtual machine can be on different CPUs. As a result, duplicate software licensing and maintenance charges can be reduced or eliminated.	IBM's ISF offers no switching capability.
You can use any version of VM/SP or VM/HPO in an SSI complex.	IBM's ISF requires that you use HPO 4.2.
SSI balances the user load automatically.	IBM's ISF doesn't do load balancing.
SSI supports FBA and Count/Key/Data devices.	IBM's ISF inter-system link and spool facilities do not support FBA devices.
SSI doesn't require extended storage support.	IBM's ISF does.
SSI has been in production since 1980. It's available *today!*	IBM's ISF *planned availability* isn't until August 1987.

SSI allows multiple VM-based CPUs to communicate with each other in order to present a single system image to the users. SSI is the only current alternative to CPU upgrades that can keep user communities whole when the exhaustion of resources fragments those users onto multiple CPUs.

An SSI complex offers the reliability and availability of multiple-processor configurations together with the convenience of a single processor.

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CASES

COMPUTER-AIDED SOFTWARE ENGINEERING SYMPOSIUM

Boston, September 21–23, 1987
San Francisco, October 27–29, 1987

Guest Speakers

Daniel S. Appleton
Richard Carpenter
Ken Orr
Ronald G. Ross
Dr. George Schussel
Edward Yourdon

PRESENTATIONS BY:

ABVENT
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AGS MANAGEMENT SYSTEMS
AION CORP.
AMERICAN MANAGEMENT SYSTEMS
APPLIED BUSINESS TECHNOLOGY
ARTHUR ANDERSEN & CO.
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CAP GEMINI SOFTWARE PRODUCTS, INC.
CGI SYSTEMS, INC.
CHEN & ASSOCIATES
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DISUS
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INDEX TECHNOLOGY, CORP.
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The First Conference on Computer-Assisted Application Development

If you are responsible for developing application software, we want to alert you to revolutionary new technology called Computer-Aided Software Engineering (CASE). CASE extends both 3rd and 4th generation languages by providing automated support to all phases of the development life cycle process.

A key problem with current development tools is the lack of front-end facilities that support the design and specification phases of the life cycle. This lack often results in the introduction of errors in specification and design.

Manual structured specification techniques are often used as an aid in the application design process. However, manually created structured diagrams cannot be converted automatically into code. CASE, on the other hand, provides a technique to **automatically** convert design specifications into code.

No standards have yet emerged for CASE technology. Different software vendors are offering many approaches. The CASE Symposium (CASES) will present the different approaches being used for design automation. In three intensive days, you will be able to evaluate, compare and contrast these approaches and to incorporate this new technology effectively within your development methodology.

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WHAT YOU SHOULD KNOW ABOUT CASE TECHNOLOGY

CASE Technology brings the same benefits to software development as CAD/CAM has brought to manufacturing. Both CAD/CAM and CASE enforce a disciplined, engineering approach to the development of systems. Both use interactive graphical design techniques, design checking rules, encyclopedias of design elements, and simulation. These techniques are applied and enforced throughout all phases of the design, development, manufacturing, testing, deployment, and maintenance process.

CASE provides a process and tools for every part of the software development life cycle. Figure 1 shows some key functions provided by CASE products. Products which implement ALL of these functions will be discussed and analyzed at CASES.

Front-end CAD/CAP diagramming techniques: Most CASE tools utilize computer-aided design and programming techniques to create diagrams of the system design. Analysts are able to create, verify, and revise drawings on an interactive screen. Specifications for the system are stored in graphical form in a central dictionary or encyclopedia.

Design analyzers: The function of the design analyzer is to detect internal inconsistencies, ambiguities, and omissions in the design specifications. Design analyzers in current CASE tools are being improved rapidly to incorporate smart editors, intelligent assistants, and expert systems.

Code generators: Many CASE tools are moving toward the incorporation of a code generation module which generates application code automatically from consistent design specifications.

SPECIFICATIONS

Encyclopedia or repository: A number of CASE tools incorporate an automated encyclopedia which is used as a central repository of knowledge about the enterprise and its structure, functions, procedures, data models, data entities, entity relationships, process models, etc. Sufficient detail is maintained about the design of a procedure so that program code for that procedure can be generated automatically.

Expert Systems: A few CASE tools are beginning to incorporate expert systems that apply inference processing to a knowledge base which contains data and rules. Initially, expert systems are being used to detect inconsistent or incorrect data base actions. However, they are likely to be extended to support the front-end graphical design process, and to generate efficient code.

Methodologies: CASE tools are moving toward the incorporation of a disciplined methodology that guides the analyst step-by-step in the application of the tool. The application of a comprehensive methodology brings a more standardized approach to systems development, and enables management to gain better control over the development process.

The functions of CASE tools are described in Figure 1 below. All of these concepts and the tools which implement them will be discussed and analyzed in CASES.

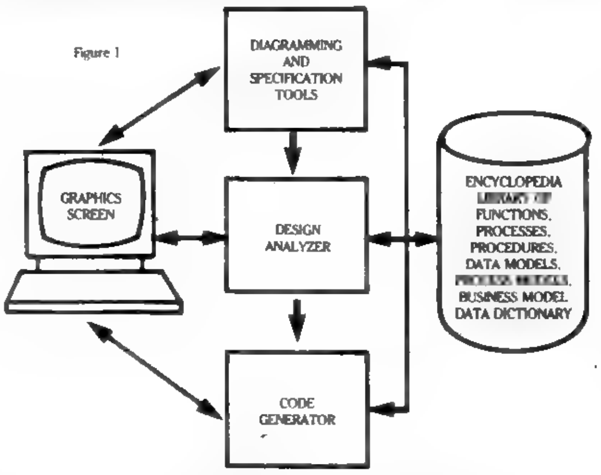

Figure 1

Day One of the CASE Symposium provides a comprehensive review of the CASE technology, the characteristics of CASE systems, and the CASE development environment. The presentation will show you how these major components are integrated in specific products.

MAJOR TRENDS IN CASE TECHNOLOGY

The design of CASE products is being driven by important technology trends in the following areas:

Human factoring: Major improvements have been made in human interfaces, including simplified, intuitive command interfaces, elimination of alien syntax, use of graphics, etc.

PC orientation: Many CASE products are available as intelligent workstations within the PC environment. The PC environment provides dedicated processing capability, decisecond response time, superior graphics, and access to thousands of PC software support packages.

Design automation: Front-end graphical design techniques are being improved rapidly. These support the specification of systems in graphical form using consistent diagrams that are sufficiently complete to be converted automatically into code.

Artificial Intelligence: CASE tools are making increasing use of AI techniques, including the incorporation of expert system shells and a knowledge base of rules of interface.

These technology trends are converging to produce a new generation of tools that are fundamentally different from previous technology. Digital Consulting's lecturers and consultants will alert you to the significance of these new trends in technology, and will show how individual CASE products incorporate these new ideas.

DAY ONE

Day One

The first day of CASE Symposium provides a complete review of the technology; the major trends, characteristics, components, environment, changes to the software life cycle, productivity benefits, and future issues.

Days Two and Three

Days two and three of CASES consist of one-hour product presentations from all of the leading developers of CASE products. Consultants from DCI will be available to direct you to the right presentations and answer your questions on CASE technology. Distinguished guest speakers, including Daniel Appleton, Richard Carpenter, Dr. George Schussel, Ken Orr, Ronald G. Ross, and Edward Yourdon, will appear during the luncheon and afternoon to share their insights into where this technology is heading. Evening hospitalities will allow you to actually see and test the leading CASE products hands-on.

DAY ONE-SEMINAR

Dr. Carma McClure
Guest Speaker

Dr. Carma McClure, internationally known author and lecturer will lead the CASE Symposium overview. Dr. McClure specializes in software methodologies, software law and project management. Since 1974, she has served as a software consultant to the industry, and has worked with major corporations including Time, Inc., Blue Cross Blue Shield, Western Electric, GTE, Bell Labs, Bellcore, Diebold, Nixdorf, Texas Instruments, Digital Equipment Corp., and Dupont.

Dr. McClure is a software engineer and has taught software engineering courses at Illinois Institute of Technology (IIT) and Northwestern University. She has co-developed several video-based training courses on structured techniques, structured design methodologies, and software maintenance. She has also served as a National ACM Lecturer and has conducted numerous professional seminars on software maintenance. Her publishing credits include numerous articles on software and six books, including four co-authored with James Martin.

CASE SEMINAR OUTLINE

1. **Overview of Computer-Aided Software Engineering (CASE)**
2. **CASE Technology**
   - a. What is CASE Technology
   - b. Automation of Automation
   - c. Automation of Software Life Cycle
   - d. Linking Design Automation and Program Automation
   - e. Total Solution to Software Crisis
   - f. Evolution of CASE Technology
   - g. Current CASE Issues

3. **Characteristics of CASE Systems**
   - a. New Software Development Environment
   - b. Graphic Design Capabilities
   - c. Central Information Repository
   - d. Tightly Integrated Tool Sets
   - e. Full Life Cycle Coverage
   - f. Prototyping Support
   - g. Automatic Code Generation
   - h. Automatic Correctness and Consistency Checking
   - i. Key CASE System Concepts
   - j. CASE System Comparison Criteria

4. **Review of Vendor Products**
   A discussion of how to categorize CASE products:
   - a. CASE Toolkits
     - – Analyst Toolkits
     - – Programmer Toolkits
   - b. CASE Workbenches
     - – Software Engineering Workbenches
     - – Information Engineering Workbenches
   - c. CASE Methodology Companions
     - – Documentation Systems
     - – Guidance Systems

5. **CASE Environment**
   - a. PC Workstations
   - b. PC Tool Sets
   - c. Mainframe Tool Sets
   - d. PC-Mainframe Link
   - e. One, Two, and Three Tiered Architectures

6. **Changes to the Software Life Cycle**
   - a. Front End Loading – Increased Emphasis on Analysis Phase
   - b. Object-Oriented Program Design
   - c. Minimizing Manual Implementation Tasks
   - d. Rapid Iterative Prototyping
   - e. Minimizing the Need for Testing
   - f. Merging Development and Maintenance Strategies

7. **CASE Productivity Benefits**
   - a. Increasing Productivity by a factor of 20
   - b. Getting More from Each Developer
   - c. Reducing the Change and Maintenance Effort
   - d. CASE Studies on CASE
   - e. Short and Long Term Benefits

8. **Related Technologies**
   - a. CASE's Dominant Role
   - b. Software Reusability as a Development Methodology
   - c. Role of COBOL
   - d. Absorption on Fourth Generation Technologies
   - e. Incorporation of Fifth Generation Technologies
   - f. Emerging Issues

9. **Future Trends**
   - a. Habitable Environment – Beyond User Friendly
   - b. Intelligent Training Systems
   - c. Intelligent Methodology Drivers
   - d. Software Reusability – Key to High Productivity

ABVENT

Anatool automates SSA (Yourdon) methodology with hierarchical Data Flow Diagrams, an integrated Data Dictionary, and Standard Specifications (optional structured English). Consistency checks maintain accuracy between parent and child diagrams or between data stores and connecting flows by cross-checking the dictionary definitions.

ADPAC COMPUTING LANGUAGES, CORP.

Adpac Computing Languages Corporation develops, markets and services technology support tools for the IBM mainframe operating under MVS. Adpac's CASE tools (DFDP and DESIGN) provide a front-end CAD/CAM diagramming technique that assists analysts in drawing any type of diagram and design analysts with the capability to verify the contents of diagrams.

AION CORP.

Aion Corporation of Palo Alto provides a complete line of inference-based programming tools for the design, development, delivery, and maintenance of MVS/TSO, MVS/CICS, IMS DB/DC, VM/CMS, and PC/DOS applications. Aion's ADS environment will be presented with special attention to issues of cross-system transportability, life-cycle management, economic benefits of inference-processing in conventional application development, and opportunities for advanced expert-systems applications.

AMERICAN MANAGEMENT SYSTEMS

AMS is a major computer services firm specializing in applications development. AMS's Life cycle Productivity System (LPS) integrates productivity tools from AMS and other vendors for strategic system planning, design, development, maintenance, and project management. LPS produces all deliverable work products required by most methodologies. Major portions of LPS operate on PC's implementation, configuration control, and foundation software modules operate on IBM mainframes.

AGS MANAGEMENT SYSTEMS, INC.
(AGS/MS)

AGS/MS is recognized as the world's leader in systems development methodologies and project management systems. The MULTI/CAM Systems Development Workstation created by AGS/MS integrates software development tools, software design and production models, and project management capabilities into a unified automated work environment.

APPLIED BUSINESS TECHNOLOGY CORP.

Applied Business Technology Corp. specializes in providing decision support management tools, consulting and training. Since 1983 they have marketed Project Workbench, a project management system which integrates Gantt charts, dependency (CPM) networks, and resource spreadsheets. Workbench produces presentation quality graphics, and operates on IBM PCs/compatibles and all major LANs.

ARTHUR ANDERSEN & CO.

The Arthur Anderson Worldwide Organization provides professional services in accounting and audit, tax and management information consulting. Arthur Andersen will demonstrate Design/1, a PC based software tool which assists in the planning, analysis and design phases of the on-line system life cycle, and will present Install/1, which addresses the implementation and support phases.

ARTHUR D. LITTLE, INC.

The PC-Based tool IRMA (Information Resource Management Aid) supports Arthur D. Little's methodologies for strategic systems planning and data modeling, as well as structured analysis and prototyping. The planning methodology relates business objectives to systems opportunities. The tool has advanced data modeling features and interfaces with DB2, IMS, IDMS, and Datacom.

ARTHUR YOUNG & COMPANY

Arthur Young is an international accounting, tax and management consulting firm and is working with KnowledgeWare to develop the Information Engineering Workbench (IEW). In addition to using the IEW for systems building and marketing the products internationally, the AY/IEW was developed to provide methodological and management underpinnings for information engineering.

ASYST TECHNOLOGIES, INC.

THE DEVELOPER, an IBM PC-based workbench software provides a generic multi-user automated support for the entire systems development process. As opposed to a methodology driven tool, THE DEVELOPER allows the use of any methodology at all desired levels of compliance and rigor. Its CUSTOMIZER module, coupled with its Import/Export functions, allows an easy link to other products such as code generators and central data dictionaries.

THE CADWARE GROUP, LTD.

The CADWARE Group designs, produces, and markets rule-based modelling tools for complex systems. Managers, planners, systems analysts, and designers use these tools to help manage the complexity of defining and evaluating mission-critical business, industrial, and technical systems. CADWARE's PC based tools adapt to the system definition methods and practices that you use. Models and designs may be used to automatically generate: data bases, operational software, and system documentation.

CAP GEMINI SOFTWARE PRODUCTS, INC.

CAP Gemini exists exclusively to market the MultiPro System. MultiPro is an application development environment integrating PC-based workstations into the IBM mainframe environment. MultiPro is an open system, tailorable to any development life cycle and it uniquely addresses the business aspects of system development. MultiPro automates aspects of the analysts workstructure, consolidating project documentation within its mainframe resident Project Library System.

CGI SYSTEMS, INC.

PACBASE, is a full life-cycle CASE product. It integrates: Mainframe and PC based analysis and design workstations for the development and maintenance of application specifications through active prototypes, a centralized enterprise-wide dictionary that controls and manages all business specifications, and generators which transform the dictionary-based specifications directly into complete COBOL applications, including all code and documentation.

Presenter

Abvent
Adpac Computing Languages Corp.
AGS Management Systems

Aion
American Management Systems
Applied Business Technology
Arthur Andersen
Arthur D. Little
Arthur Young & Co.

Asyst Technologies, Inc.
The Cadware Group, Ltd.
Cap Gemini Software Products, Inc.
CGI Systems, Inc.
Chen & Associates

Cortex Corp.
Cullinet Software
D. Appleton Company, Inc.

Data Architects, Inc.
Digital Equipment Corp.

Disus
Dupont IEA

Errico Technologies, Inc.
Interactive Development
Environment, Inc. (IDE)
Index Technology Corp.

Info Model
Integrated Systems, Inc.
Ken Orr & Associates
Knowledgeware

CHEN & ASSOCIATES, INC.

Chen & Associates, Baton Rouge, Louisiana, is a leading company providing products, training, and consulting in data-oriented system development. Products (PC-based) to be presented are: ER-Designer, which defines your information requirements in Entity-Relationship diagrams; SCHEMAGEN, which generates schemas for your database systems (from micro-based to mainframe based); Normalizer, which normalizes data or words.

AND THREE

CORTEX CORP.

CorVision is an application development system that automates the entire software development life cycle for the DEC VAX/VMS environment using a technique called Picture Programming. Picture Programming allows DP professionals to visualize an application by diagramming the design and then automatically generating a production-ready application directly from the pictures. CorVision is built on application generator technology for the DEC VAX Application Factory.

Product
ANATOOL
DFDP, DESIGN
MULTI-CAM SYSTEMS
DEVELOPMENT WORKSTATIONS
ADS ENVIRONMENT
LIFECYCLE PRODUCTIVITY SYSTEM
PROJECT WORKBENCH
DESIGN/1, INSTALL/1
IRMA
INFORMATION ENGINEERING
WORKBENCH
THE DEVELOPER
RULE-BASED MODELLING TOOLS
MULTIPRO
PACBASE
ER-DESIGNER, SCHEMAGEN,
NORMALIZER
CORVISION
IDMS/ARCHITECT
DATA RESOURCES, LEVERAGE,
RAP, DDM
EXSYS
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DEVELOPMENT TOOLS
DEFT
CUSTOMIZED SOFTWARE
APPLICATIONS PROGRAMS
AMS-TEAM
SOFTWARE THROUGH PICTURES

EXCELERATOR, EXCELERATOR RTS,
CUSTOMIZER, NEW INTERFACE
PRODUCTS
CASE PRODUCT
AUTOCODE
DESIGN MACHINE
INFORMATION ENGINEERING
WORKBENCH/WORKSTATION

Presenters are continued on pages 6 & 7.

CULLINET SOFTWARE

Cullinet is a developer and integrator of software and AI technology for database, applications, and information center products. IDMS/ARCHITECT is Cullinet's family of Computer-Aided Software Engineering (CASE) Products. IDMS/ARCHITECT addresses the development process where it begins - with systems analysis and design. The first member is a PC-based, graphics oriented tool which aids in the logical design and physical implementation of databases and applications. It supports Entity modeling, Relational Data Analysis, the automatic generation of schematic syntax for IDMS databases, the definition of applications including logical and physical transactions, flow of control, program dialogs, and maps.

D. APPLETON COMPANY, INC.

D. Appleton Company (DACOM) solves business responsiveness problems by applying asset-management principles, practices, and tools to information. DACOM methodologies for information system planning, RAP, and development, PDM when coupled with Data Resource LEVERAGE (data and activity modeling with the JANUS software), enables teams of professionals to use and reuse data assets for improved productivity.

DATA ARCHITECTS, INC.

Data Architects, Inc. (DAI) is a systems consulting firm that offers both customized and packaged solutions to its international client base. DAI and EXSYS Inc. will demonstrate EXSYS – the Expert System for business software development. EXSYS makes possible the development of systems directly from statements of facts in English. EXSYS eliminates programming and combines analysis, design, and testing into a comprehensive one-step development approach. EXSYS is the one product which supports the entire life cycle.

DIGITAL EQUIPMENT CORPORATION

As a leading computer manufacturer, Digital provides a range of integrated Application Development tools for solutions to business and engineering problems. The unique offerings are workstation based and address all aspects of the Applications Development Life Cycle. They are integrated into the VAX hardware, software and network architecture to provide enterprise wide solutions.

DISUS

Deft is a suite of Computer Assisted Software Engineering (CASE) tools, widely used for systems analysis/design in North America and Europe. Deft supports dataflow, program-structure and entity-relationship diagrams, a data dictionary and forms design. Development projects using Deft have reported significant productivity gains in all phases of system building: analysis, design, development, documentation and maintenance.

DUPONT INFORMATION ENGINEERING ASSOCIATES

DuPont Information Engineering Associates (IEA) offers high-quality customized software applications programs for DEC/VAX systems, delivered in under 120 days with an up-front fixed price, and a complete money-back guarantee from DuPont. DuPont/IEA has developed and installed successful applications programs for major Fortune 500 companies, as well as for dozens of DuPont internal operations. And every project has been delivered on time and on budget. Our track record to date? Success 40, Failures 0.

ERRICO TECHNOLOGIES, INC.

AMS-TEAM is a truly integrated and fully comprehensive CASE product completely supporting the IBM mainframe environment. CONSTRUCTION COMPONENT: Helps design as a team . . Complete repository . . Reusable parts . . Interfaces to PC diagramming tools . . Generates and documents entire Batch/Online Program efficiently . . MANAGEMENT COMPONENT: Automatically monitors and collects management information . . Enforces your standards . . Tracks your development phases . . Easily migrates with import features . . AMS-TEAM learns how you develop software.

INTERACTIVE DEVELOPMENT ENVIRONMENT (IDE)

IDE's product, Software through Pictures, is a set of integrated graphical editors and error-checking tools supporting structured analysis and design methods. The editors are linked to a Data Dictionary supporting definition of names, types, constants and associated text. Users can generate Ada declarations and define process and module templates to generate specifications.

INDEX TECHNOLOGY CORPORATION

Index Technology Corporation, leaders in the CASE market, develop and market a range of products that automate the systems development life cycle. The product line includes products that support strategic systems planning, analysis and design of systems, project planning and a series of NEW interface products that provide linkages to leading code and application generators. These products provide an extensible, flexible and integrated systems development environment for large and small projects in both the DOS and VMS environments.

INFO MODEL

Info Model is an information engineering company that has developed a comprehensive methodology for information resource management, systems development, and information systems planning. To support this methodology Info Model IBM PC software has been developed. Info Model will present an overview of its methodology and the capabilities of its product.

INTEGRATED SYSTEMS, INC.

AutoCode focuses on the needs of Real-Time Software Engineers and addresses all steps from analysis to design, simulation and code generation. The graphical specification environment features engineering block-diagrams, data flow/control flow, state transition, and process descriptions. Ward-Mellor real-time software methodology with Boeing-Hatley extensions are included in an environment where simulation and analysis can be performed for design verification; and real-time code in C, Ada or Fortran can be generated automatically.

KEN ORR & ASSOCIATES, INC.

Ken Orr & Associates, Inc. specializes in building integrated software engineering environments that incorporate technology, tools, and training for maximum productivity. The Design-Machine is an IBM PC-based CASE tool that automates the requirements and analysis phase of systems development. It automatically generates design deliverables from system requirements recorded in an integrated design database. It has embedded software engineering rules and built-in quality control.

KNOWLEDGEWARE, INC.

KnowledgeWare, Inc. provides software tools to automate MIS/DP. The Information Engineering Workbench/Workstation uses CASE techniques automating creation, validation, and maintenance of decomposition, entity-relationship, data-flow, and action diagrams. The expert system module validates process and data models against hundreds of structured logic rules, deciphers diagram meaning, and stores this in the knowledge-base immediately reflecting changes in any diagram.

DAYS TWO

Presenter	Product	Presenter	Product
Leading Software Technologies	THE INTELLIGENT ASSISTANT (TIA)	Netron Inc	NETRON/CAP
Learmonth & Burchett Management Systems (LBMS)	AUTO-MATE PLUS	Oracle	SQL DESIGN DICTIONARY
Managers Software Products (MSP)	MANAGER, MANAGER VIEW	Pansophic Systems, Inc.	TELON
McDonnell Douglas ISG	PROKIT WORKBENCH	Phoenix Technologies, Ltd.	PRE-C, PFIX86, PFORCE, PLINK86PLUS, PSOURCE
Meta Systems, Ltd.	PSL, PSA, STRUCTURED ARCHITECT, STRUCTURED ARCHITECT – INTEGRATOR	Polytron Corp.	POLYMAKE, POLYLIBRARIAN
Nastec Corp.	DESIGNAID	Rand Information Systems, Inc.	RAND DEVELOPMENT CENTER (RDC)
		Sage Software, Inc	APS DEVELOPMENT CENTER
		Softlab, Inc	MAESTRO

LEADING SOFTWARE TECHNOLOGIES, INC.

The Intelligent Assistant (TIA) is a rule based expert system which generates entire applications from a description of inputs, outputs and processes. As a backend CASE product, these descriptions may be gathered using any front-end CASE product. TIA then produces the entire system, 100% of code (ANS 74/COBOL II), JCL and documentation in one CPU pass. Batch, DBMS, and online systems are supported.

LEARMONTH & BURCHETT MANAGEMENT SYSTEMS (LBMS), Inc.

AUTO-MATE PLUS, the leading edge in CASE technology, provides in-depth solutions for automating software development. Created by LBMS, AUTO-MATE PLUS, a PC based tool, provides full support for systems analysis, logical design (including inter-active data normalization) and automatic physical design and DDL syntax generation for ADABAS, DB2 and IDMS for easy export to the data dictionary. All mouse-driven graphics are enhanced with catalogues.

MANAGER SOFTWARE PRODUCTS (MSP)

MSP is the world's leading vendor of a CASE environment driven off mainframe Data and Information Resource Management technology. The MANAGER Family of Products (PC and Mainframe) is dedicated to automating all phases of the Systems Life Cycle, from Strategic Information Planning to the generation of enabled code. MSP will be presenting the MANAGER Family of products including managerVIEW, the Intelligent Workstation based graphical Information Engineering tool driven by the Central Knowledge Base resident on the Corporate Dictionary. managerVIEW is integrated with the Mainframe Corporate Dictionary and will also run on the IBM PC Family and the PS/2.

McDONNELL DOUGLAS INFORMATION SYSTEMS GROUP

McDonnell Douglas Information Systems Group is focused on providing single-source solutions representing a tailored framework for software engineering. ProKit WORKBENCH is a new IBM PC-based information system that automates the application of proven structured techniques to the strategic planning, analysis, and design phases of the system life cycle.

META SYSTEMS, LTD.

Meta Systems, Ltd. offers integrated micro/mainframe-based productivity (CASE) software, which completely automates the entire process of developing information systems. Our customers include some of the world's most prestigious companies and government/military organizations. They use PSL/PSA (host based), Structured Architect (PC graphics tools), Structured Architect-Integrator (on the host), and other Meta tools to develop large and complex systems, to reverse engineer old code, and to do enterprise wide data modeling.

NASTEC CORPORATION

Nastec Corporation, originators of the CASE tools concept, develop tools for both commercial and aerospace/defense/engineering software developers. The DesignAid analyst/programmer workbench is a multi-user development system operating in the IBM PC and DEC/VAX environments. DesignAid automates software development from requirements definition through code generation, including documentation development and project management.

NETRON, INC.

The NETRON/CAP Development Center is a CASE system for building custom, portable COBOL software using a frame-based software engineering process called Bassett Frame Technology. NETRON/CAP unifies the prototyping/development/maintenance life cycle into an automated specification procedure. The open design architecture allows unlimited automation of additional application functionality for IBM mainframes and PCs, VAX systems and Wang VS minis.

ORACLE CORPORATION

SQL*Design Dictionary is an application written in the RDBMS named ORACLE whose purpose is to assist analysts and designers record the details of an enterprise model (both the data model and functional hierarchy). It generates SQL table definitions automatically and allows for documentation during each stage of the system development life cycle.

PANSOPHIC SYSTEMS, INC.

Pansophic Systems, Inc., a leading vendor of software products to improve application productivity and control, will present TELON. The TELON application development system captures design specifications to generate COBOL or PL/I applications. TELON assists the transition from analysis to design by providing interfaces to leading front end analysis tools. TELON components include: Directory, Data Administration, Screen/Report Painters, Prototyping, Specification Facilities, Automated Documentation, Generator, and Test Facility.

PHOENIX TECHNOLOGIES, LTD.

Phoenix, known worldwide for professional programmers tools such as Pre-C, Pfix86plus and PforCe, offers a full line of high-performance, easy-to-use micro-development tools that help programmers more efficiently deliver the best applications possible. Plink86plus, the only linkage editor with advanced capabilities, is considered the industry standard. Psource, Phoenix's recently announced software development management system, provides control and reporting capabilities previously available only on mainframe and minicomputer systems.

POLYTRON CORP.

POLYTRON offers the leading configuration management system for MS DOS PC and VAX VMS software development. PVCS maintains versions and revisions of software systems. PolyMake automatically rebuilds any desired version of the system. PolyLibrarian maintains libraries of reusable object modules. The tools work together or independently with ANY language and your existing tools.

RAND INFORMATION SYSTEMS, INC.

Rand Information Systems, Inc., a computer software and services company, specializes in productivity software and system development. The Rand Development Center (RDC) is a programmer workbench and tool management framework which supports application development under the most popular TP monitors and data base management systems in the IBM mainframe environment.

SAGE SOFTWARE, INC.

Sage Software, Inc. develops, markets, and supports a family of CASE tools for users of IBM and compatible computers. The company's product family (known as the APS Development Center) encompasses the software development cycle and supports the design, prototype construction, coding, testing, and maintenance of COBOL-based applications software.

SOFTLAB, INC.

Softlab, Inc., will present MAESTRO, the integrated Software Engineering Environment. MAESTRO organizes and manages the software cycle through real-time project management, time accounting, and your unique standards. MAESTRO integrates customizable tools for design, coding, testing, documentation, and maintenance, is language independent, and fits in numerous hardware and software environments.

A N D T H R E E

Presenter	Product	Presenter	Product
Software Products & Services (SPS)	EPOS	Texas Instruments	INFORMATION ENGINEERING FACILITY
Syscorp International	MICROSTEP	Transform Logic Corp	TRANSFORM
Technology Information Products	TIP CREATE, TIP DEFINE, TIP PLAN, TIP RELATE	Visual Software	VS DESIGNER
Tektronix, Inc	INTEGRAL CASE SYSTEMS SOLUTIONS	Yourdon	ANALYST DESIGNER TOOLKIT

SPS SOFTWARE PRODUCTS AND SERVICES, INC.

EPOS is a fully integrated life-cycle development support environment for requirements engineering, software/hardware design, implementation, long-term maintenance, and project management. Providing traceability from requirements through design, EPOS automatically generates code for Ada, Pascal and FORTRAN, plus complete graphic and textual technical and management documentation. Available for mainframes, minis and PC's. EPOS provides a proven disciplined framework for large-scale development.

SYSCORP INTERNATIONAL

MicroSTEP lets you build a graphical specification, from which it generates executable PC-based business applications. No human programming is needed to generate, compile, and link a complete system, including screen management, relational database interface, error recovery/restart, report writing. Specification requires AT, Hercules, mouse. Application execution requires XT.

TECHNOLOGY INFORMATION PRODUCTS

TIP provides completely integrated methodologies and software for system planning, analysis, design, implementation, and maintenance. TIP PLAN helps identify, define, and schedule the systems and data bases needed to meet a business' goals and objectives. TIP DEFINE graphically describes a system's functional and information requirements. TIP RELATE automates building the normalized relational data model. TIP CREATE then generates COBOL/PLI programs.

TEKTRONIX, INC.

Tektronix, Inc., has participated in the evolution of the computer-aided software industry for over a decade. Tek already has an established CASE base in the engineering and scientific market sectors; and is currently exploring other opportunities and applications. Tek's family of software development tools is named "Integral CASE Systems Solutions"

TEXAS INSTRUMENTS

Texas Instruments' integrated CASE product, The Information Engineering Facility, is designed to automate the complete systems development life cycle. It consists of a powerful mainframe encyclopedia and PC-based, graphical toolsets to support analysis and design. TI can demonstrate today the major components of this product including: strategic planning, analysis, design, COBOL code generation, and database generation.

TRANSFORM LOGIC CORPORATION

Transform Logic Corporation's TRANSFORM product family automates COBOL application software design, development and maintenance in IBM mainframe environments. Transform Logic will present the concepts behind development automation and application base management using TRANSFORM. Data driven design architecture, environment independence, and design prototyping are features of this approach.

VISUAL SOFTWARE, INC.

Visual Software, Inc develops and markets an integrated family of personal CASE tools for the multi-user IBM PC environment. The VS-Designer is the first CASE workbench to support different methodologies simultaneously from a LAN based information repository. Visual's unique intelligent architecture for personal adaptability enables the product to adapt to standard user-defined methodologies. It further reduces the learning curve by modifying the user interface to operate like well known word processors

YOURDON DIVISION OF DEVRY

The YOURDON Analyst Designer Toolkit, supports both the traditional and real-time YOURDON Techniques and allows for the creation of all the diagrams associated with the techniques. The diagramming facilities of the Toolkit are fully integrated with a powerful project dictionary which features dBase III compatibility. The Toolkit also provides error checking to insure the accuracy of diagrams and dictionary entries

SPECIAL CASE VIDEOTAPE OFFER

The CASE Symposium was featured in a recent edition of the *Windows on Wall Street* television series, which highlights emerging business opportunities and technologies. All of the Symposium speakers, several DCI consultants, and a representative selection of the vendors and attendees were interviewed by series host Robert Chesney on CASE technologies, major business issues and opportunities created by the emergence of CASE, and future trends in the area. The show provides a revealing look at this leading-edge technology, as well as a preview of what to expect at the CASE Symposium. Individuals interviewed include Dr. George Schussel, Dr. Carma McClure, Dr. Peter Chen, Ron Ross, and James Davey.

We are pleased to offer an **expanded** version of this first-ever television look at CASE on videotape, featuring an hour of additional footage not shown during the original broadcast.

This 90-minute tape is available from DCI for just $39.00 prepaid. If you order now, you will be able to get a flavor of what to expect at this fast-paced conference before you register to attend. You will also gain valuable insights into this exciting new technology from many of the leaders in the field. This videotape can be used within your organization as an aid to educate your management and staff on the realities and enormous potential of CASE. To order your copy, send $39.00 to: Digital Consulting, Inc. 6 Windsor Street, Andover, MA 01810. **All orders must be prepaid.**

Guest Speakers

DANIEL S. APPLETON
President
D. Appleton Company, Inc.

Daniel S. Appleton is President of D. Appleton Company, Inc. (DACOM). He specializes in industrial modernization and data resource management.

Prior to establishing DACOM in 1979, Mr. Appleton served as Director for Strategic Business Planning at the Borg-Warner Energy Equipment Group and as Director of Management Information Systems for the eight worldwide manufacturing facilities of Byron Jackson Pump. He was also Manager of Systems Development at Litton Ship Systems, and he spent time in Washington working for the CIA and later in the office of the Assistant Secretary of Defense, Comptroller, developing systems for planning, programming, and budgeting major agency and DoD programs.

Mr. Appleton is a Fellow of the Institute for the Advancement of Engineerng, the Chairman of the Technical Council and a member of the Board of Directors for the Computer and Automated Systems Association (CASA) of the Society of Manufacturing Engineers (SME), and an active member of both the IEEE and the American Association for Artificial Intelligence.

Mr. Appleton has published numerous technical papers and articles on manufacturing automation and database management, and he is the most published author in *Datamation* Magazine, having had 19 articles published.

RICHARD A. CARPENTER
President/CEO
Index Technology Corp.

Richard A. Carpenter is President and Chief Executive Officer of Index Technology Corporation, a three-year-old company that develops and markets a range of computer-aided software engineering (CASE) products. Mr. Carpenter co-founded the firm in 1983 with the goal of utilizing evolving technology to develop and market innovative products that would help people build better systems more efficiently. He was one of the principal designers of Excelerator, the company's first product.

Before founding Index Technology, Mr. Carpenter co-founded Index Group, a consulting firm specializing in the use of information technology to support strategic business objectives. In his fifteen years there, he worked with Fortune 500 companies to design and mplement custom information systems, utilizing a wide range of computer technologies to meet their key business requirements. Mr. Carpenter received master's and bachelor's degrees in Electrical Engineering from MIT, where he also served as an instructor and researcher in the computer sciences area.

KEN ORR
President
Ken Orr & Associates, Inc.

Ken Orr is President of Ken Orr & Associates, Inc., which specializes in software engineering environments that integrate technology, tools, and training for maximum productivity. As one of the principal developers of the Data Structured Systems Development (DSSD) methodology, he directs all research and development activities for advanced DSSD technology and computer-aided software engineering (CASE) tools. Mr. Orr is a leader in the systems technology "structured revolution", the forefront of the information science field. With a mathematics background, he's held key positions in management consulting, state government, and software development. He currently consults with major clients - including Pacific Telesis Group, Bell Communications Group, and Sante Fe Railway -on strategic systems planning, data architecture, and CASE.

A frequent speaker at international conferences and seminars specializing in systems planning and development, Ken is the author of *Structured Systems Development, Structured Requirements Definition,* and *The One Minute Methodology.* He has also been a contributing editor to INFOSYSTEMS magazine and has written for COMPUTERWORLD, SOFTWARE NEWS, and other industry trade publications.

Guest Speakers

RONALD G. ROSS
EDITOR
DATA BASE NEWSLETTER

Ronald G. Ross, the founder of Ronald G. Ross Associates of Houston, TX, is one of the world's leading researchers and commentators on data management topics. His books *(Data Base Systems: Design, Implementation, and Management* and *Data Dictionaries and Data Administration)* and his monograph on IBM's IMS have been read by thousands of data management professionals worldwide. His newest book, on entity modeling and logical database design appears this year.

Mr. Ross is also editor of the **Data Base Newsletter**, published by Database Research Group, Inc. of Boston, MA. The Newsletter has been providing practical insights and accurate predictions in the data management field for over thirteen years. Mr. Ross has been Editor since 1977.

Mr. Ross provides state-of-the-art services in entity modeling and logical database design, strategic data planning and data administration. Mr. Ross is also the creator of coordinated methodologies for database development in these areas

DR. GEORGE SCHUSSEL
President
Digital Consulting, Inc.

"Schussel has seen many changes in the DBMS field in the last two decades and, in his work, has been instrumental in helping bring about some of them . . . The next few decades will likely be witness to more and more rapid changes in the way information is processed, and when those changes occur, it's a safe bet George Schussel will be there to help the business community adapt."

ICP Interface

DR. GEORGE SCHUSSEL is one of the world's foremost experts in data base management technologies. He is president and founder of Digital Consulting Associates, Inc. a prominent high technology education and management consulting firm that specializes in software productivity tools and is recognized as the world leader in DBMS and 4GLs. Dr. Schussel is also Chairman of the National Database and 4th/5th Generation Language (DB & 4/5GL) Symposia. His influential role in the industry prompted *ICP Interface* to name him the "Guru of Data Base Management".

As a leading consultant and educator, Dr. Schussel has taught over 25,000 seminar attendees about state-of-the-art data management concepts and technologies. In his consulting practice, he has conducted top-level management studies for AT&T, NCR, New York Blue Cross/Blue Shield, Logica, General Electric, Software AG, Applied Data Research, and many other firms. Dr. Schussel is also a noted futurist with a long track record of making accurate predictions about emerging technology trends years before they occur.

EDWARD YOURDON
Vice-President of Planning
DeVry, Inc.

Edward Yourdon is Vice-President of Planning for DeVry, Inc., the educational subsidiary of Bell & Howell. Mr. Yourdon has worked in the computer industry for nearly 25 years, including positions with Digital Equipment Corp., and General Electric. He has worked on some 25 different mainframe computers and been involved in a number of pioneering projects.

In 1974, Mr. Yourdon founded his consulting firm, YOURDON, Inc., to provide a forum for educational, publishing and consulting state-of-the-art technology in the computer field. As chairman of the company, he oversaw an operation that trained over 100,000 people in major companies and government agencies around the world. He is the author of 14 computer textbooks, his most recent entitled: *Nations at Risk: The Impact of the Computer Revolution,* which has been excerpted in computer journals in the United States and throughout Europe. Several of his books have been translated into Russian, Japanese and a number of other languages. His articles have appeared in virtually all of the major computer journals, and he is a regular speaker at major computer conferences.

Special Features

5 Key Reasons to Attend the CASE Symposium

1. Learn this rapidly developing technology in the Day One Seminar with Dr. Carma McClure, one of the world's leading authorities on CASE
2. Receive the 500+ page proceedings containing seminar notes, product descriptions and other useful information. It will serve as a reference guide long after the symposium is over
3. Attend hands-on product presentations by the leading CASE vendors. Ask questions and determine which products are suited to your needs
4. Attend guest speaker presentations. Hear industry leaders speak on all aspects of this exciting new technology
5. Receive free implementation tips from DCI consultants and industry leaders

WHO SHOULD ATTEND

- MIS Directors & DP Managers
- Data Base Administrators
- Application Developers
- Application Systems Managers & Analysts
- Systems Planners
- Executives & Senior Management
- Departmental Managers
- Software Engineers
- Systems Designers

HOSPITALITY SUITES

The suites provide a relaxed environment in which you can ask questions and socialize with industry leaders. Enjoy the hands-on product demos and the chance to relax and share the company of fellow attendees'

PROCEEDINGS

Every symposium attendee will also receive a copy of our 1987 Computer-Aided Software Engineering Symposium Proceedings, a useful resource guide long after the Symposium is over

By Attending CASE You Will Learn How:

- CASE technology applies to software development the same rigorous engineering procedures that have been successfully used in CAD CAM technology
- CASE technology is fundamentally different from third or fourth generation technology
- The components of CASE technology make it superior to existing technology
- To evaluate and compare CASE products
- To incorporate CASE technology within your current development methodology
- AND WHO THE KEY PLAYERS ARE IN COMPUTER-AIDED SOFTWARE ENGINEERING

CASE Technology Revolutionizes and Improves Software Development By:

1. Giving MIS management more control over projects
2. Providing an environment that supports the entire development life-cycle process
3. Freeing the systems analyst by providing automated tools to support the creation of design diagrams, data models, and system definitions
4. Providing powerful graphical design aids to define and document software systems
5. Utilizing interactive prototyping techniques to clarify user requirements and to ensure that developed systems meet user needs
6. Capturing design information in sufficient detail required for automatic code generation
7. Verifying and validating functional specifications to detect errors and inconsistencies
8. Promoting reuseability of software components and other software deliverables
9. Providing automatic documentation facilities that are continually up-to-date and that are guaranteed to be consistent with systems specifications

Special Features

HOTEL INFORMATION

Boston, September 21-23
Boston Marriott Burlington

Located only twenty minutes from downtown Boston and its treasures, including the Freedom Trail, world famous Filene's Basement, the USS Constitution, and Quincy Market/Fanueil Hall, this beautiful hotel features 420 guest rooms, an indoor/outdoor pool, a health club/whirlpool, a game room and a jogging trail with exercise par course. It features two restaurants and a lounge: Foxglove, an upscale family restaurant; Champlain's, a gourmet restaurant featuring an intimate atmosphere; and Diamond's Lounge, an upbeat lounge with live entertainment and dancing. Convenient to the hotel via shuttle bus is the beautiful Burlington Mall with over [illegible] shops and restaurants, and a short ride away are the famous historic towns of Lexington and Concord. The hotel is located at Routes 128 and 3A, Burlington, MA 01803. Phone number (617) 229-6565

San Francisco, October 27-29
Hyatt Regency Oakland

Located only 12 minutes from beautiful San Francisco via the Bay Area Regional Transit (BART) System, Fisherman's Wharf, home of some of the world's best seafood restuarants, Union Square, Golden Gate Park and a world famous cable car system, await you. Downtown Oakland is only minutes away from this beautiful new luxury hotel. Attached to the all new Oakland Convention Center, this hotel features 488 elegantly appointed rooms featuring beautiful views of the Bay Area. Also featured in the hotel are: AJ Toppers, a rooftop restaurant featuring a breathtaking skyline view of Oakland and San Francisco; The Regency Cafe, a casual dining area in an open atrium; and Breezes, a lobby level lounge with entertainment. Other amenities for the business traveler who appreciates luxury include an outdoor pool, a jacuzzi, exercise area, numerous small shops, and other luxuries typical of a world class hotel. The hotel is located at 1001 Broadway, Oakland, CA 94607. Phone number (415) 893-1234

OTHER MAJOR DCI CONFERENCES

Computer-Aided Software Engineering Symposium

- Sydney, November 30-December 2, 1987

International Database and 4th/5th Generation Language Symposium

- Frankfurt, November 3-5, 1987
- Dallas, November 16-18, 1987
- Boston, December 1-3, 1987

National Artificial Intelligence Symposium

- Atlanta, December 14-16, 1987

International Connectivity Symposium on Local Area Networks and Micro-Mainframe Links

- London, September 21-23, 1987
- Chicago, October 5-7, 1987
- Auckland, October 19-21, 1987
- Sydney, October 21-23, 1987
- Washington, DC, December 7-9, 1987

National Desktop Publishing Symposium

- Chicago, November 16-18, 1987

Software Futures, Executive Conference

- Boston, August 17-18, 1987

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DIGITAL CONSULTING, INC.

These seminars will be conducted by Digital Consulting, Inc (DCI), a leader in the field of EDP management training DCI is headquartered at 5 Kimberly Terrace, Lynnfield MA 01940 telephone (617) 470-3870

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We can bring many of our seminars in-house to your company Our in-house seminars are one of the most cost-effective ways to update your managers and professionals about the leading software technologies In addition, Dr Carma McClure is available through DCI for consulting projects For information, call (617) 470-3870

RESERVATIONS

A block of rooms is being held at the hotel until three weeks prior to the symposium For preferred treatment and lower room rates please indicate that you are attending a symposium sponsored by Digital Consulting, Inc Room registrations and hotel charges are the responsibility of the individual participant

CANCELLATION POLICY

Cancellations received two weeks or more prior to the Symposium will be accepted subject to a cancellation service charge of $100 Transfers to a different Symposium date or substitutions will be accepted with no cancellation service charge as long as the fee is paid and the request is received before the date of the original Symposium Registrants whose cancellation requests are not received two weeks prior to the Symposium (or no shows) are liable for the entire fee

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REGISTRATION FORM

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High-tech help for blind

It is a typical day at the office. You sit down at your computer and log on. A message flashes on the screen signaling that you have received some electronic mail. You look at these electronic messages, and one needs an immediate response. Following the prompts on the screen, you compose a reply and send it.

It is a typical day if you have normal eyesight

But if you have lost your vision or it is severly impaired, how do you make use of a technology that relies almost entirely on visual signals?

Visually impaired alienated

For many years, computers alienated visually impaired people. More recently, software and hardware products have begun to alleviate that problem. However, these technological advances are only a partial solution, asserts Ronald Hutchinson, vice-president of marketing and research for Alexandria, Ohio-based Computer Conversations, Inc.

As late as the mid-1980s, blind computer users primarily relied on a device called an opticon to translate images from the screen. A small box with a scanner, the opticon has 144 pins that arrange themselves into characters displayed on the screen. Users use their fingers to read these images much as they would braille.

Hutchinson, a systems programmer, tried using an opticon after he lost his sight 11 years ago, but he found the device frustratingly slow. "It can only read about 40 words per minute," he explains.

Hutchinson also came across talking personal computers, but these machines cost $6,000 or more. "It's a ridiculous price to pay for the product," he says.

Hutchinson's solution was to develop a program for his Tandy Corp. TRS-80 PC. Working with a voice synthesizer option such as Troy, Mich.-based Votrax International, Inc.'s Type 'N Talk and Digital Equipment Corp.'s Dectalk, Hutchinson's software allowed the system to vocalize any text on the screen indicated by the computer's cursor.

Later Hutchinson developed a version for the IBM Personal Computer, PC XT and AT, PCjr or compatible running IBM PC-DOS or Microsoft Corp. MS-DOS and began marketing it. Known first as the PC Talking Program and the Enhanced PC Talking Program, the most recent version was renamed the Verbal Operating System in January 1986.

The product is compatible with 95% of the MS-DOS and PC-DOS applications on the market, he reports. Pricing for the Verbal Operating System begins at $500.

Since Hutchinson developed his software, several other companies have introduced products that provide voice read-back. These offerings generally use some combination of software and speech board. A few provide large print displays for partially sighted users. Also, users can add modems or communications boards to connect to minicomputers or mainframes.

In addition to technical products, visually impaired people have turned to the 40-plus computer training programs for the physically disabled that have cropped up across the U.S. during the last 12 years. Many of the training centers that host special programs report job placement rates of 90% or higher, according to Jim Vagnoni, chairman of the Association of Rehabilitation Programs in Data Processing (ARPDP), a national organization.

While they share similar success rates, the training centers' programs vary. The Berkeley, Calif.-based CIL Computer Training Program, which established the nation's first program in 1975, provides a nine-month course in programming. The curriculum includes Cobol, Basic, IBM 370 Assembler and RPG-II languages as well as courses in data base management and systems analysis and design.

At the end of formal class instruction, all graduates complete a nonpaid six-week internship at a company in which they are required to perform regular programming tasks such as designing, writing and testing programs.

The Center for Information Resources, another member of ARPDP directed by Vagnoni, also began DP training for disabled people in 1975. It provides two course tracks for students. One track offers traditional DP courses. Another focuses on end-user applications such as automated word processing, bookkeeping and accounting.

Along with the variation in computer training programs comes both criticism and praise. According to Hutchinson, special computer programs isolate blind computer users and make them dependent on the agencies that provide the programs. Despite his blindness, Hutchinson chose to take classes in several languages including Cobol, Fortran, PL/I and Basic at a local technical college. "The most successful people I know have gone through regular, integrated classes," he says.

At the same time, employers of visually impaired employees laud the training programs. "A computer training program graduate is real world business oriented and compares favorably with university-trained students," says Marshall Brown, senior project manager for Fireman's Fund Insurance Co. "They perform programming tasks above what is considered the norm for entry-level programmers," he says.

Mental prowess

Technology and training have helped blind computer users overcome many barriers, but they still face a major challenge — the perceptions of corporations. Many potential employers do not realize that physically disabled people can still think, Hutchinson says. "I, myself, have been turned down for a job because I couldn't see the screen," he says.

Nor is the problem limited to employers. Most vendors do not care about the visually impaired but they ought to, Hutchinson asserts. For example, Hutchinson claims, Microsoft has not been responsive to the needs of blind computer users with its introduction of graphics-based products such as Windows and OS/2, which is scheduled for delivery in 1988. "These products may completely close out blind people by preventing them from using voice synthesizers," he says.

"The barriers haven't gone away yet," Vagnoni agrees. "Most people have yet to learn to judge people on their abilities in the workplace rather than their physical disabilities." — RH

Cadre to declare support of EDIF

Move may signal connectivity rush among CASE products

Computer-aided design and manufacturing (CAD/CAM) may be about to merge with computer-aided software engineering (CASE). Noted CASE ware maker Cadre Technologies, Inc in Providence, R.I., is expected to announce this month that it will support the Electronic Document Interchange Format (EDIF) protocol, already widely used to link disparate CAD/CAM products.

At the very least, this merger will mean that the rush to connectivity among CASE products will vastly accelerate At the very most, it could mean that system developers will design their hardware and software at the same time, leading to a currently unheard-of efficiency of operation.

EDIF was developed for the convenience of CAD/CAM users. These users found they were using products from multiple vendors and, therefore, needed high levels of connectivity to exchange data between the various products. EDIF has emerged as the standard method of linking CAD/CAM systems to one another

However, this is the first time EDIF has appeared in CASE even though the need for some kind of connectivity has been recognized for awhile. Indeed, if there is a common theme in the CASE world today, it is the development of products that cover the the entire software development life cycle — ranging from analysis/specification to code maintenance (see story page 35). CASE vendors are either attempting to market products in each segment of the cycle or, like Index Technology Corp. in Cambridge, Mass., they are forging strategic alliances with vendors whose products are positioned elsewhere in the life cycle

So far, however, Cadre has held itself aloof from the link wars. The company markets a CASE systems analyst tool called Teamwork. Based on various 32-bit workstations, this offering has become increasingly popular in scientific and technical installations

As yet, and partly because it is based on technical workstations Teamwork remains little used in the MIS community which prefers to work with personal computer-based CASE systems. (However this situation could change The company has recently acquired the rights to a PC based product)

Now, however, Cadre has taken a radically new direction in connectivity. Rather than attempting to cover the cycle with its own products or set up strategic alliances with other vendors based on proprietary gateways, the company will support EDIF Teamwork will be able to communicate freely with any standard CAD CAM product

If EDIF becomes a standard in the CASE world as well, MIS officers could find one of their greatest problems with CASE products solved CASE's biggest drawback for MIS has been that various CASE products do not necessarily communicate with one another If an MIS department buys as an expensive system analysis device and a code generator, but one cannot mesh with the other then the investment may not be worth the cost But if each supports EDIF, and the system analysis diagrams can simply drop in the generator, then CASE could more than pay for itself

More remote from MIS but still possible is that CAD/CAM and CASE could become one field. If developers are designing for software and hardware at the same time and using one and the same tools, then each could be uniquely customized for the other. Operating systems and certain applications could be made much faster and far less taxing on system resources.

Beyond that, the distinction between software and hardware could become fuzzy. It may be that developers in the future will regard the two as essentially the same. — MT

Circle Reader Service Number 14

Programming languages that meet MIS objectives

MIS managers in search of increased programmer productivity are turning to objective programming languages. These differ from standard-type languages in that they allow the developer to work in software objects — small, almost autonomous modules of code that can be used and reused in many different applications.

Objective programming thus eliminates the need to rewrite significant chunks of code for each new application. Object-oriented code is also easier to modify and maintain. Because the individual objects can almost be considered independent programs, it is possible to crash them individually but difficult to damage so many of them at once that an entire system will cease to function.

Several objective languages are on the market, such as Ada. Possibly the most popular of these languages are two versions of the C language — Objective-C, from Sandy Hook, Conn.-based Productivity Products, Inc., and C++, which AT&T is promoting. Each has unique advantages.

C++ is second into the market but may be first in the hearts of programmers. Just ask Bruce Lynch, president of the Programmer's Shop in Hingham, Mass., a firm that specializes in tools for software development. He notes: "Objective-C is good, but C++ lets the programmer take a look inside [the individual modules of code] and see exactly what's going on at all times. Wrapping them up in a black box, the way that Objective-C does it, makes programmers very nervous."

MIS's requirements

However, MIS officers have somewhat different requirements. They may want to restrict the amount of time, money and effort that a programmer expends on the development of an application. For MIS managers, it may be that the more they can reduce programming to the reshuffling of black boxes, the better.

Objective-C has its fans, too. Users include Alen Schiller, chief scientist at Wild Lietz Canada Ltd., headquartered in Toronto. Schiller is currently at work on the company's System 9 project, a geographical information product.

System 9 will run on Sun Microsystems, Inc. workstations and provide users with an intelligent, interactive map. "If a local government wanted to know which of its taxpayers were in arrears," Schiller explains, "it could just do a query, and the addresses [of those taxpayers] would light up in red."

The product will be written mostly in Objective-C. "I got into objective coding because of my utter frustration trying to build systems in the traditional ways," Schiller says. "I kept working the old way, and I kept thinking how much easier it would be if we didn't have to rewrite so much bloody code."

He says that Objective-C's two greatest advantages are the reusability of code plus its ability to withstand dramatic changes in internal structure. So, should Wild Lietz need to modify its code later — even if there are a large number of modifications — the company will be able to do so easily

Another Objective-C user is Thomas Kraemer, research and development department manager for measurement systems software at Hewlett-Packard Co. in Palo Alto, Calif. "What we did with Objective-C was construct a signal analysis system that interfaced with a faceless instrument," Kraemer explains.

He says he chose Objective-C because "at the time — 1984 — we had done large projects in Pascal, but we realized we wanted to use some sophisticated programming concepts. We wanted to use a software 'cage,' for example, to enclose some data."

Both Schiller and Kraemer, however, say they have had problems with object-oriented programming in general. Schiller, for instance, notes that developers must retrain programmers before they can use any objective programming language. "There is a learning curve; don't let anyone kid you about that," he says. "You have to be prepared to accept the decline in productivity [as] you're learning. But in the long run, it's worth it."

Kraemer, meanwhile, notes that no programming language, objective or otherwise, can really solve the problems of developers. "I've become painfully aware that the language wasn't our problem," he says. "If I were to do the project today, I would pay much more attention to management issues. I need some [product] to coordinate the efforts of more than two programmers at a time." — MT

Correction

The information for the chart on page [illegible] was provided by Nancy [illegible] of [illegible] Inc. (*CW Focus*, June 3).

Which way wo
learn about text ma

On your own?

For years text management has hovered on the outer fringes of MIS consciousness.

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Like company attorneys faced with an unexpected lawsuit.

It's at times like these that text management software has proven its value in organizations all over the world—delivering benefits people didn't even know existed a short while ago, and creating a crescendo of demand at the very highest organizational levels.

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First, it means you'd better understand what text management is all about—before your users do. (Hint: if you're thinking "word processing," read on.)

Second, it means you'd better select a text management system with the features *users* need to obtain information—plus the features *you'll* need to maintain system integrity. Users need specialized text search and index facilities conventional DBMS's don't offer; you need database and system control facilities dedicated retrieval systems don't offer.

And third, it means you'd better start evaluating text management systems and vendors without delay. And there's no better way to begin that evaluation than by taking a close look at INQUIRE/Text—the most comprehensive, proven text management software system on the market.

Text management; It's not word processing. And it's not data management.

Traditional corporate information systems do a great job managing structured data. Unfortunately, the information most needed by decision-makers is often unstructured—embedded in the text of documents such as letters, memos, reports, contracts, and transcripts. Because this material has traditionally been beyond the reach of online systems, access to it has been slow, tedious, and error-prone. Word processors and other office automation systems have greatly accelerated document creation and distribution, but they are all but useless in making the actual information content of documents available as an online resource.

A text management system fills this need by providing highly sophisticated facilities for online index, search, and retrieval of information in stored documents. With a text management system, users at all organizational levels can pinpoint specific pieces of information within vast volumes of text—instantly. And once they've found the information, they can edit it, combine it, and report it out with complete flexibility.

Not surprisingly, the biggest text management system users have tended to be companies engaged in complex litigation or regulatory proceedings. But as text databases have proved their value in these initial applications, they have increasingly been used in others as well—from competitive intelligence gathering to online maintenance of technical documentation to a full array of corporate records management tasks. And as senior executives have become comfortable with text management facilities, they have increasingly mandated their use throughout the organizations that report to them.

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INQUIRE [illegible] IBM and compatible mainframes under MVS, TSO, MVS [illegible]

U.S. R&D consortia growing to counter foreign threat

The number of high-technology research and development consortia in the U.S. is climbing.

According to Ron Havelock, research professor at George Mason University in Fairfax, Va., roughly 55 U.S. R&D consortia have been formed since the passing of federal legislation on the subject last year. The law gave the green light for private companies to collaborate on mutually beneficial R&D.

Havelock points to a number of reasons behind the recent loosening of antitrust laws. One factor is a 1986 reenactment and revision of the 1980 Stevenson/Wylder Act, which required every federal agency engaged in internal research and development to make its findings available to private enterprise.

"The act really let it be known that it was all right for research entities to get together and share some knowledge," Havelock says. "The 1986 reenactment strengthened that original thrust."

Another plus was the formation, several years ago, of Austin, Texas-based Microelectronics & Computer Technology Corp. (MCC), a consortium of high-tech companies formed as a direct response to the threat posed by the Japanese and their government-supported Fifth-Generation Computer Systems project.

Havelock says that the perceived Japanese threat and, to a lesser extent, the threat of the Europeans, gave the Reagan administration the ammunition and incentive to change the antitrust laws.

Bruce Barnes, a director at the Software Productivity Consortium (SPC), a group of 14 U.S. aerospace companies based in Reston, Va., acknowledges the Japanese threat as a motivating factor behind the formation of SPC and other consortia. Many of the consortia, in fact, do business with the U.S military and have military backing.

"I think the U.S. military has been worried for a long time about falling behind other countries in technology," Barnes says. "The military's assistance with high-tech consortia comes from the same [military] pressure that created the Ada programming language and the Strategic Defense Initiative program."

Havelock says that U.S. consortia generally take on one of two forms. There are groups such as SPC and MCC that are composed of separate, private firms with a mandate of pooling R&D and producing technology primarily for their own use.

Havelock claims, however, that a more typical pattern involves the clustering of several private firms around a major U.S. university that coordinates much of the research activities and overall direction

While a miniature floodgate has been opened for cooperative high-tech R&D in the U.S., Havelock is quick to caution against automatically assuming the success of such efforts.

"The Japanese and some European countries have a definite advantage in experience and long-term support of consortia," Havelock explains. "There is a tendency with U.S. consortia to have sponsors come in for short periods, a year or two, and to expect quick, hard results They'll just have to be more patient."

Another disadvantage, Havelock says, is the inability for U.S high-tech consortia to channel research and development products to the commercial area.

"The Japanese are great at carrying a concept right through to the commercial field," Havelock says. "But perhaps only the British are worse than Americans at marketing and targeting the end results of consortium research and development," he says.

'Still an alien idea'

"The concept of a consortium is still an alien idea here. U.S. companies have to overcome mutual suspicion and the tendency of U.S. managers to think that anything not produced in their companies is just not good. My concern is that these consortia will produce so-called gold-plated products that will be unnecessarily expensive for what they do and that will not be commercially competitive. That is the case with many U.S. defense contractors Fortunately for them, they already have a built-in military and government market," Havelock explains.

The bright hope, he concludes, is that the members of fledgling U.S. consortia will get over their initial awkwardness and start flying.

"It will be an experimental period for these groups," according to Havelock. "I don't think the U.S. managerial style will be a stumbling block. Money is another thing. If the consortia can maintain long-term sponsorship, they could prove the concept really works in the U.S." — SK

News section compiled by Computerworld Focus staff members Stan Kolodziej, Michael Tucker and Rebecca Hurst.

uld you rather

nagement software?

Or from your legal department?

Today's rising tide of litigation is placing extraordinary demands on corporate legal departments—forcing attorneys to prepare and manage cases of unprecedented volume, complexity, and public visibility.

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But attorneys aren't the only ones who benefit from INQUIRE/Text. The very features that make INQUIRE/Text so ideally suited for legal applications also serve the needs of other departments such as planning, marketing, regulatory affairs, the library—and not least of all, MIS itself. In fact, INQUIRE/Text is a perfect system for the online maintenance of a wide variety of technical documentation. With its large capacity and flexible database facilities (including automatic backup and recovery, usage monitoring and accounting, and multilevel security), INQUIRE/Text protects the organization's interests while serving the individual.

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Circle Reader Service Number 15

LAURA TARRISH

The art of directing talent

BY ROGER SOBKOWIAK

Every workday we are mindful of systems that fall short or fail completely because MIS managers and development teams spend too little time managing the human dimension of a system introduction. Although many in the computer world can articulate the principles of good people management, why is it that organizations don't seem to implement these ideas?

For some MIS managers, spending time on people issues seems like a waste of precious management time. Often there is a gap between what managers know and what they feel.

For every systems success story in the computer news media, there are dozens, perhaps hundreds, of untold tales of systems that don't meet expectations. In companies in which managers regard people and technology as equals in creating systems that work, the following operating rules prevail:

- **They conduct work by groups.** A lone eagle is the exception, not the rule. Even lone eagles can burn out. Working as a group does not come easily to a lot of people, particularly if a development team is being asked to factor in people issues for the first time. Initial efforts may be clumsy and unproductive because no one is sure what people issues really are. Nonetheless, shared expertise, shared perspectives and shared support enhance the odds of asking the right questions and implementing a successful system.
- **They have a master plan.** Successful companies form a master plan, show it once or twice, then put it away. Most people are not interested in abstractions like a changing company culture. Most people focus best on the work closest at hand. Managers and development teams work best when they can see tangible improvements quickly. Aiming for small personal victories and being willing to make compromises are key.
- **They sell and market the need for a balanced equation of people and technology.** These companies let the people who have experienced a properly introduced system sell the merits of such a process. During and after a system introduction conducted with the proper attention to people issues, these companies ask for feedback and use that feedback to teach the next implementation team.
- **They create and use human resource tools and techniques.** Managers love tools. That's what made Kenneth Blanchard and Spencer Johnson's book, *The One Minute Manager*, a success. The authors repackaged existing management theories to make them more usable. Companies should utilize the fact that information systems professionals like rules and detailed lists and should give them the capability to deal more effectively with the human dimension of their work in the form of rules and guidelines.
- **They talk about all of these steps with the staff again and again.** Remember that getting the heart and the head working in synch takes time and practice. Companies that constantly reinforce the qualities that allow systems and people to work

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Sobkowiak is a managing partner of New Haven, Conn.-based Software People Concepts, Inc., a consulting firm specializing in the management and human resource issues of MIS organizations.

together productively will shorten that time and practice period.

Now, think of four adjectives that you would use to describe an MIS manager you know. "Analytical," "thorough," "efficiency minded," "cautious" — did any of these qualities come to mind?

Now think about how the words you chose are reflected in the following list of reasons why managers and development teams fail to factor the people component into systems introductions:

- It's not part of the company culture.
- We are not trained to deal with nontechnical issues.
- We see people issues as an extra duty.
- We delegate people issues to someone else.
- The personnel department is not strong enough.
- We do not analyze past systems failures to understand how ignoring human resource issues contributed to the downfall.
- We feel powerless in the area of people issues. (The system is against us, anyway, even if we wanted to do more.)
- The number of people involved is too great to have time to be concerned.
- People issues will resolve themselves.
- Well-designed technology takes care of people issues.
- It's a government contract, and the government doesn't pay for time required to work on human resource issues.

Any combination of four or more of the aforementioned statements assures the failure of a system introduction. Each represents a method of thinking and operating that ensures that management will not identify and deal with human resource issues.

Now think about how this situation plays out in practice and its consequences to an organization. How many of the following situations have occurred in your company?

- The existence of dual systems. Computerized and the manual systems reside side by side. It has been two or more years since the introduction of the system,whose goal it was to provide paperless transactions, but professionals are still maintaining hard copies because they do not trust the system.
- Expensive equipment just sitting around. In your company, office automation means that support personnel are using $10,000 machines at 20% of their capability and their bosses don't use the machines in their offices at all. Your project is at least three years old, and top management is still puzzled by the absence of tangible productivity gains.

Achieving a balance between people and technology solutions demands more than Band-Aid approaches such as lip service, a quick look or a simplistic training program.

- The staff not using your artificial intelligence-based system because people feel a loss of power. The organization initially brought the system in as the MIS department's newest technology, and it was used to replicate the expertise of five senior transaction specialists. But now the system is in the hands of field agents who are reluctant to use it because they see it as a usurper of their skills.

Management must consider personnel parameters before, during and after the implementation of a technology. This consideration starts with the selection of an implementation team to ensure that members of the team are capable and willing to look at human resource questions. And, most importantly, the implementation team must have the power to do something about any problems. Achieving a balance between people and technology solutions demands more than Band-Aid approaches such as lip service, a quick look or a

The data transfer software that lets nothing stand between New York and San Francisco.

A company needed to transfer data between its New York and San Francisco data centers. They were looking for a tool to move all types of data, do it automatically and provide complete security and management control. Their goal was to operate the two data centers like a single facility.

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Circle Reader Service Number 17

simplistic training program.

Management needs to make a commitment to the people resource in an organization. Mind-sets need to change. Ways of doing things differently include having human resource checkpoints built into a project development plan; inviting nontechnologists to participate in the development team; and reviewing the development plan for process as well as content and asking how the development team is working.

In addition, other methods to keep a system implementation team on track include fixing the process of work before automating; using technology to reexamine tasks, roles and relationships; looking for necessary changes to practices, rules and policies that aid technology usage; slowing down or stopping a system introduction if employee resistance has not been resolved; letting the end users own the system; spending a great deal of time on designing screens and sharpening documentation and instructions and spending less time on programming; and measuring how well the project is doing by how eager the most resistant system user becomes.

This set of commitments is difficult to make. The shame is that too few systems development teams will go through such an undertaking because of other, pressing demands. To counteract this tendency and get a jump in helping a development team consider people issues, MIS managers should try to do just three things.

First, because the recipients of a system are the best source for identifying human resource issues, ask these employees for their thoughts often and take their comments and suggestions to heart.

Second, managers should be willing to borrow from successes in other fields, showing the relevance and connection to your particular systems introduction. For example, the Quaker Oats, Inc. Gaines dog food plant in Topeka, Kan., is a heralded model of self-managed work groups that resolve a full range of sociotechnical issues. It is an exemplary model for self-managed project implementation teams that control new system introductions.

Finally, managers should keep in focus the technological mind, a mind that appreciates structure, order, checklists, forms and models. They should use tools just like technologists do to enable activities to be carried out or reinforced.

Numerous tools that can accelerate and complement the introduction of productivity improvements by emphasizing people skills or identifying people issues are already available.

Computer-assisted performance and goal setting is an important key to blending technology and human resources. Setting and tracking performance goals is always a difficult process for most technical people. Providing an electronic platform for the process enables managers and employees to work at focusing on tasks and the skills necessary for carrying out the

Make the human resource grade

The checklist below is a nonscientific, informative way to determine the amount of attention your organization gives to balancing systems development and implementation with human resource issues.

Give a value from 1 to 10 to the following questions. Responses should range from 1, representing "never occurs," to 5, representing "we talk about it, but the talk generally does not lead to action," to 10, representing "it happens all the time and we act upon it."

- People issues are built into our formal project review process.
- There are nontechnical personnel working on our projects.
- In a review after the project is completed, we consider the following: organization conflicts, the skill level of assigned personnel, management style, user attitudes, user skills and resistance to change.
- The development team is required to construct a plan to eliminate or minimize all identified or anticipated people issues.
- During the specification phase of a project, we look at the people considerations that will assure successful implementation.
- Our MIS people receive training in nontechnical skills such as team building, negotiation, collaboration, listening and consulting.
- End users are asked to identify all people issues and people-system conflicts that they foresee.
- New MIS hires more often come from the user community and are taught computer skills.
- In judging the overall success of a project, we take an accurate picture of how people feel about the system.
- In piloting a system, we pay special attention to the rules, policies programs and procedures that support or hinder the introduction of a system.

Now total up your score.

80-100 — Your organization is providing the right emphasis on human resource issues.

50-80 — Your company is on the right track.

30-50 — Better start reading some books.

30 or less — A good number of systems in your organization probably are or will be failures. — Roger Sobkowiak

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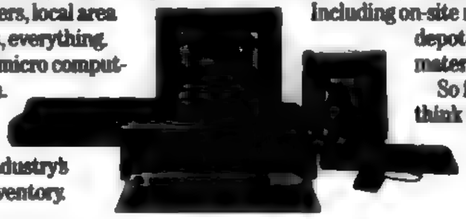

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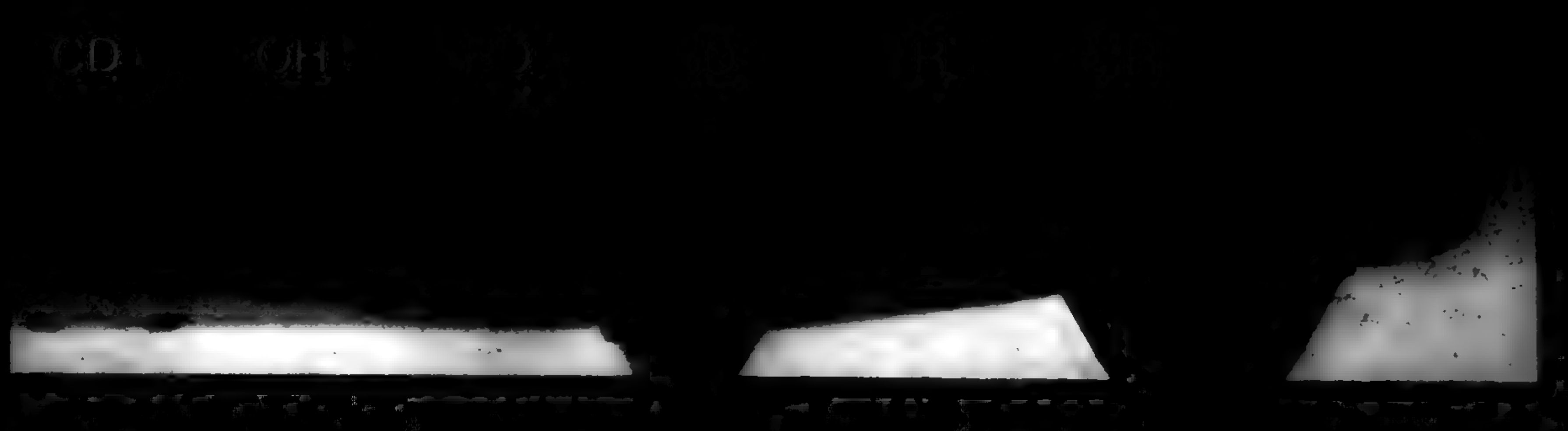

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tasks. No one gets bogged down in paperwork. And most importantly, profiles built into the package can emphasize the people skills dimensions of a job.

Joint application development is a process for improving the initial and ongoing communication between a development team and end users. It accelerates the flow of critical data at various stages in a project life cycle and makes sure that those involved address key issues. People considerations can be embedded into the process.

On a project there is frequently a need for a humanistic scan team, a group of nontechnicians who audit and assist the work of the development team by assisting with screen designs, documentation and team interfaces with clients. They also catalog the nontechnical reasons for systems working or not working.

Organizational mapping consists of using a computer to provide insights on how best to organize the MIS organization, eliminate redundancy and provide a proper focus. It helps to clarify roles and tasks and to deal with organizational boundaries. This type of mapping can be a process for charting how people issues surface and are resolved between the MIS organization and other organizations.

Competency tracking, or identifying the knowledge, skills and behaviors required for superior performance, is another way management can bridge the gap between man and machine resources. It is a powerful method for highlighting and profiling the nontechnical skills and behaviors required to do a job. With individual profiles and self-assessment capabilities, development team members come to a clearer realization of what is required of them when they are creating and introducing a system.

Computerized skills inventory systems capture data by job history, project involvement or tasks.

These systems emphasize the skills that are important to an MIS organization and provide highly visible benchmarks for all MIS professionals. By tracking the skills developed by team members during the handling of a specific project, the skills inventory system reinforces the management requirement to address people issues.

Computer-generated career mapping is a way for individuals to ask the company what they can expect in terms of career growth and what the company expects of them in terms of skills and knowledge to make successful career moves. The more that career options emphasize people skills, the better.

Profound impact

When these tools and techniques are used singly or in various combinations, the impact on the MIS organization and the subsequent impact on MIS projects is profound. Cultivating these methods takes time, however, and merely using a tool once will never produce rapid turnarounds.

Environmental factors, company culture and entrenched management attitudes are powerful forces with which to do battle, and one tool alone will not save the day.

It is important that a manager recognize that sound tools and techniques enable an MIS organization to focus on what it takes to get a system up and running successfully. However, a single, enlightened manager is not enough to shift an organization's ingrained emphasis on technology solutions over to balanced solutions that take into account both people and technology. For an MIS organization to function in a more balanced way requires different thinking, significantly different skills and the discipline to stay on track and committed.

Little successes can lead to large successes if people understand, publicize and learn from these accomplishments. Technologists diagnose systems all the time for things technical, trying to understand why they failed. Organizations must train these same talented and inquisitive minds to utilize their diagnostics skills to recognize how failing to deal with people issues inevitably leads to diminished systems performance. ◆

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OS/2: Have we seen the future?

BY BRIAN JEFFERY

Choosing to buy into IBM's Personal System/2 line is not merely a decision of hardware and software. It is a choice to follow IBM's connectivity philosophy for the future. IBM's announcements may force MIS managers to rethink the direction computing will take in their organizations during the next 20 years.

IBM's OS/2 environment introduced for its PS/2 line is part of a broader IBM software scenario that includes applications on hosts and mid-range systems and IBM System Application Architecture.

OS/2 was designed as the workstation-level component of this scheme, with IBM's data base management, communications and end-user interface features reflected in offerings throughout the firm's product line.

IBM's OS/2 Standard Edition costs $325; the Extended Edition, when it is available, will reportedly cost $795. The difference in price between the Standard Edition, which does not have many of the data base management, communications and end-user interface features, and the Extended Edition, which contains all of them, is only $470. However, the two editions present different conceptions of personal computing as well as varying levels of commitment to the full IBM scenario.

IBM's PS/2 line is not just a personal computer, and OS/2 is not just a personal computer operating system. Granted, these products provide multitasking, Intel Corp. 80286 protected mode, windows, high-resolution graphics and numerous other PC features, but IBM designed this principle PC product line to form an integral part of the firm's broader product scenario.

The extent to which the OS/2 operating environment is integrated into the full IBM scenario is striking. In particular, OS/2 Extended Edition, as a set of bundled capabilities, does not suppose a user may want to pick and choose his features; for the extra $470, you get connectivity to virtually the entire IBM product line, a commitment to an SQL-based relational data base management system (DBMS) and the core of an end-user interface that will ultimately provide transparent access to every facility of every system in an IBM network. It is rather like a workstation integration Solutionpac, a comprehensive set of "load-and-go" features.

IBM obviously put a lot of planning into its latest move, whose origins can be traced to 1983, when IBM started putting together a global software infrastructure designed to form the core of its large end-user solutions well into the 21st century. Some of these capabilities have been implemented, some are due soon and some are still in IBM programming laboratories.

RALPH MANELLO

These capabilites include a complex of relational DBMS reflected in OS/2 Extended Edition's Database Manager; a multiformat communications environment reflected in OS/2 Extended Edition's Communications Manager; and a common end-user interface implemented in OS/2 under its Presentation Manager component. The whole of these capabilities will ultimately serve as the vehicle through which a user may access the full range of facilities available on all IBM systems in an IBM complex network.

The Database Manager is a crucial component in OS/2 because mechanisms have to be established to manage, manipulate and store the large data volumes that will be generated in an IBM complex network. The data base components of this scenario have been progressively fleshed out since 1983, when DB2 debuted. DB2 was introduced as a high-end relational solution aimed at the central host MVS/XA environment and was progressively enhanced to provide features and functions with

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Jeffery is managing director of International Technology Group in Los Altos, Calif., an industry research firm.

each release.

Then, IBM's SQL/DS, which was originally introduced in 1979, began to move into the forefront last year, when it was presented as the principal relational DBMS solution for the 9370, tightly coupled with the VM/Transparent Services Access Facility environment on the system. Remote Relational Access Support provided transparency for users to IBM relational systems regardless of the hardware on which they resided.

During 1986 and 1987, DB2 and SQL/DS acquired a series of front ends, facilitating user access to the IBM relational environment.

IBM next introduced Enhanced Connectivity Facilities (ECF), a set of transformation standards initially implemented to provide connectivity between IBM and third-party PC environments, such as Lotus Development Corp. 1-2-3 and Symphony, Ashton-Tate Dbase and Microsoft Corp. Multiplan, to allow data transfers between PCs and IBM relational DBMS. Lotus, Ashton-Tate, Microsoft and other PC software companies that had been let in the plan hurried to support ECF, add SQL support and otherwise ensure that their products would fit the scenario.

In April, the finishing touches were put to the workstation level of IBM's grand plan with the announcement of OS/2 Extended Edition, which includes a built-in SQL data management function and ECF support. The result is the creation of a multilevel relational DBMS structure with system-transparent user access, support for most key PC software environments and the ability to file and access SQL-format data anywhere within an IBM complex network.

Communications abilities

IBM's communications environments have become complex in recent years as the company inserted new systems and applications into an increasingly heterogenous Systems Network Architecture (SNA) line-up.

Peer-to-peer networking was introduced through LU6.2. ECF and its Server-Requester Program Interface provided an infrastructure for PC-to-mainframe communications oriented toward relational DBMS applications but at first were not implemented supporting LU6.2.

Netbios and the IBM Token-Ring local-area network (LAN) provided new LAN interfaces. Multiple data streams, ASCII and X.25 support and several species of 3270 emulation added to the increasingly complicated picture. IBM built a spider's web of connectivity across diverse and often incompatible systems.

The problem of implementing these various communications features has been quite impressively resolved by rolling almost everything into the Communications Manager component of the OS/2 Extended Edition.

Included in the Extended Edition are support for LU6.2, ECF, conventional SNA 3270 communications, Netbios and 802.2 LAN interfaces, ASCII communications, several species of file transfer protocols, ASCII and 3270 terminal emulation and some substantial built-in communications management functions. IBM has indicated plans to further support full High-Level Data Link Control and X.25 connectivity, 5250 support for attachment to System/36 and 38 systems and other features.

Depending on how one feels about IBM's overall scenario, the OS/2 and PS/2 are either the company's most attractive products in a long time or a Pandora's box.

Combined, these features should turn OS/2 Extended Edition into an all-purpose communications package providing modular connectivity to IBM hosts, mid-range systems, LANs and various network offerings.

The end-user interface in OS/2 is based on Microsoft Windows. The interface is implemented in OS/2 Standard Edition as the Presentation Manager, with baseline windowing, pointing device and all-points-addressable graphics.

In OS/2 Extended Edition, support is provided for full Video Graphics Array (VGA) with high-resolution color graphics and scanner image support, interfaces to the IBM host Graphical Data Display Manager (GDDM) color graphics environment and Distributed Function Terminal (DFT) mode.

DFT mode is one of the more interesting pieces of the jigsaw. It is an implementation of SNA microcode that permits a single physical device to appear to another IBM system as multiple logical devices. In its workstation application, IBM has translated the DFT mode into the ability to support up to four simultaneous, user-adjustable screen windows reflecting sessions with up to four different IBM systems.

In OS/2, IBM has implemented the DFT mode capability as an overlay to the basic Microsoft Windows concept. A window, whether to a local PC session or to a system elsewhere in an SNA network, looks much the same to the end user, and PC windowing merges gently into SNA sessions.

Through this merged interface, the VGA graphics environment, which is compatible with the first-generation IBM monochrome, color and Enhanced Graphics Adapter standards, similarly merges into the GDDM color graphics world and interesting things happen with scanner images. These images can be entered through IBM scanners via PCs or high-end 3270 terminals, can be stored in IBM host data bases, can be merged with GDDM graphics and Professional Office System (Profs) text material and can be variously manipulated at an OS/2 workstation.

By now, we are getting close to the Big Blue concept of the Compound Electronic Doument (CED). This futuristic concept enables end users to create, edit, store, communicate, receive and play back fully integrated documents incorporating data, text, graphics, image, voice and noncoded or scratch-mark information. As presented by IBM, CED manipulation would include routine data, text and graphics components with some new twists.

The first component of CED is image processing in the form of scanner-inputted material. This material could be expected to consist principally of paper documents that have been entered into an IBM data base and then called up by the workstation user to incorporate a copy of one or more images into a compound document.

The second component is scratch-mark data manipulation. This element allows the possibility of being able to electronically sign a document with a light pen or comparable pointing device, thereby removing the necessity for a separate hard copy of a document in applications in which a personal signature is required.

Thirdly, CED would include voice in the form of a voice-over to a document that could be played back by a recipient as he reviewed the document.

Voice, in this case, is supplied by the overlooked Rolm Corp. Rolmphone 244PC or similar product. The Rolmphone 244PC, announced by IBM at the same time as the PS/2, is a combined voice/data interface to PCs. Currently offered only for Rolm CBX attachment, the product could signal the beginning of a more sophisticated level of PS/2-compatible voice support.

The CED concept will get closer to becoming a reality with IBM announcements later this year, although it will probably be a few years before CED is feasible. Certainly, the concept will blossom during the life cycle of the PS/2 — that is what the PS/2's 3363 internal optical drive is for. The 3363 built into the PS/2 will provide a means for storing and accessing compact electronic documents.

All the talk about integration brings us inevitably to System Application Architecture (SAA), IBM's global scheme for system integration. IBM describes the PS/2 and its software components as the first full SAA system. (This description is not strictly accurate — the 9370 was actually the first SAA implementation.)

Big Blue has also indicated that all its systems introductions from now on will have a comparable level of SAA conformance. This step suggests that some major introductions written to SAA standards will be forthcoming for MVS software applications and the 9370 VM environment. It also suggests that IBM's new combined System/36 and 38 machine — referred to as "Silverlake" — will have a comparable level of SAA implementation, which in turn suggests that IBM might be a little further along with the SAA process than has appeared to be the case to date.

IBM describes SAA as consisting of four main elements:

- **Common User Access** to the full range of IBM systems via a common menu-based end-user interface.
- **Common Programming Interface** to support Cobol, Fortran, C, a Cross System Product-based application generator, a Rexx-based procedure language, an SQL-based data base interface, a Query Management Facility-based query interface, a GDDM-based presentation interface and an ISPF-based dialogue interface.
- **Common Communications Support** to include 3270 Data Stream, Intelligent Printer Data Stream, Document Interchange Architecture/Document Content Architecture, Systems Network Architecture Distributed Services, Netview, LU6.2, Low-Entry Networking, X.25, Synchronous Data Link Control and the Token-Ring.
- **A set of common applications** based on the above and initially focusing on VM-based office software.

The principle is simple: IBM wants to create a common user environment in which access to systems for business applications and programming can be performed regardless of the actual IBM hardware and software that the user is utilizing.

Behind the interface, a mass of interlinked software applications written to SAA standards handles all of the jobs generated at the interface and looks after connectivity between the various IBM environments. Probably the best analogy for IBM's setup is of an intricate Swiss clock. The clock's machinery consists of a mass of whirring cogs, interlocking wheels, clanking gears and swinging pendulums. However, all the observer sees is the clock face, which gives him what he needs — the time.

Integrating all these components is going to require a software infrastructure of awesome size and complexity. IBM has already said it will look after its end of this job by implementing SAA conformance on its key software offerings and publishing the specifications that third parties and end users will need to structure their own programming activities. Although it is less emphasized, IBM also will assume responsibility for implanting the SAA end-user interface in the PC base.

IBM is, however, clearly taking no chances and is progressively bringing all of the major PC applications vendors onto the bandwagon. Microsoft and Lotus have already signed joint development agreements with IBM to develop applications that will conform with SAA.

More than meets the eye

There is, then, a great deal more to OS/2 than meets the eye. It is the lowest tier of an IBM effort to create a series of more or less packaged, internally compatible software environments at multiple levels. The functions available in a PC-based workstation are mirrored in those available in a mid-range system, a host system and other network components.

The connectivity, once the pieces come together, is automatic, and a mass of different systems become part of one gargantuan set of facilities available to the PC user. A few keystrokes may invoke an application on a 3090 located in Singapore with the same ease as a 1-2-3 file on a local floppy disk.

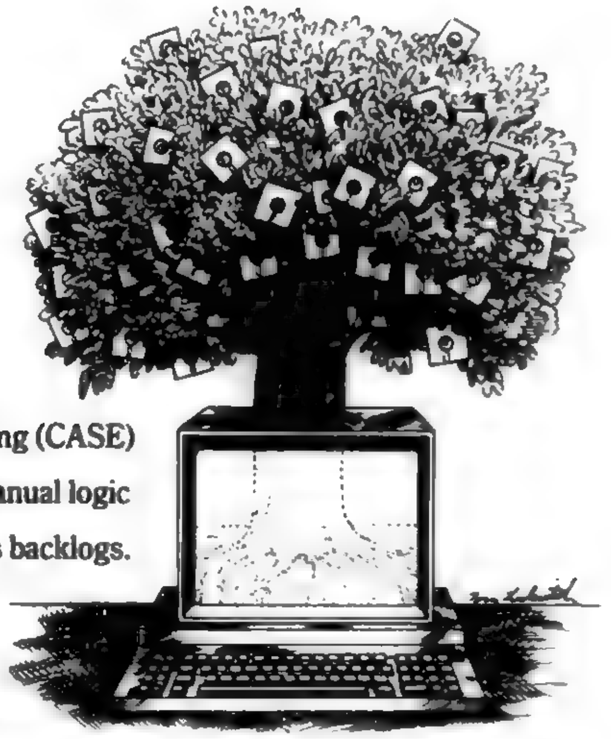
This connectivity and integration makes the PS/2 one of the most important product lines in IBM's history. Depending on how one feels about IBM's overall scenario, the OS/2 and PS/2 are either the company's most attractive products in a long time or a Pandora's box that will in a few years have the entire organization overrun with CEDs, 9370s and a software overhead of cataclysmic proportions.

Either way, the process may be a little hard to control in that IBM has thoughtfully built all of the required hardware features into the PS/2 motherboard and has packaged all of the required software functionality into OS/2 Extended Edition. Once a company loads OS/2 at the workstation level, integration into this IBM plan could be difficult to resist as PC users realise what they can do with the product.

It might be worth thinking about that $470 price difference between OS/2 Standard Edition and OS/2 Extended Edition. Paying it or not paying it may turn out to be an important decision indeed. ◆

CASE EVALUATION

CASE systems near fruition



TIM LEVITIN

BY REBECCA HURST

Hallelujah! Computer-aided software engineering (CASE) has arrived offering salvation from tedious manual logic design, hand coding and software applications backlogs. Or has it? Skeptics point out that full CASE products do not yet exist. True, CASE supporters say. However, successful users of current CASE products recite miraculous productivity leaps. Fully developed systems, they claim, will only improve those gains. The problem is that these productivity claims mean different things to different users because the CASE products available today address various aspects of software engineering automation. The challenge for MIS-managers is to identify the type of products that will best meet their needs.

CASE systems can be broken down into three basic groups: those that focus on schematic design at the front end, code generators that help programmers at the back end and overall systems that take the programmer from start to finish. Schematic design and code-generation products are available today. Complete systems are expected to begin appearing by the end of this year.

Schematic design products, which generally run on personal computers or workstations, consist of two-dimensional languages, according to George Schussel, president of Andover, Mass.-based Digital Consulting, Inc. These languages help the programmer describe a problem and provide a model based on data flow or processes, he says. Such products include Information Engineering Workbench (IEW) from Atlanta-based Knowledgeware, Inc., Case 2000 Designaid from Nastec Corp. in Southfield, Mich., and Excelerator from Index Technology Corp., located in Cambridge, Mass.

Until 1½ years ago, schematic design products, often known as analyst workbenches or tool kits, only assisted the programmer in producing specifications and documentation, says Carma McClure, vice-president of research for Extended Intelligence, Inc., a Chicago-based consulting firm. However, she notes, vendors have added more capabilities to these products as they realized the importance of solving critical problems at the beginning of the application life cycle.

To provide effective modeling, front-end schematic design systems need several components, McClure asserts. These elements include diagramming and graphics capabilities, tools to support prototyping, a design dictionary and analysis capabilities for error checking. The analysis functions, which are just appearing in schematic design products, are very powerful, McClure notes. "They're very important for productivity."

A primary advantage of a schematic design system is that "it gives programmers a metaphor for thinking about the systems they design," Schussel claims. The design system also provides consistent applications development. "A graphical design system takes the programmer through the development cycle step by step," he explains. The result is a set of standardized applications that can be more easily maintained and updated.

Two other advantages schematic design systems bring to applications are faster development and better quality, according to Dwight Muller, director of computing services for Storage Technology Corp., a Louisville, Colo.-based mainframe storage manufacturer. Storage Technology brought in Auto-Mate Plus, a PC-based graphics design tool from Westwood, Mass.-based Cullinet Software, Inc., to reduce its applications development cycle.

While Storage Technology has not made an attempt to measure quantifiable differences in the cycle time using Auto-Mate Plus, Muller has seen instances of dramatic time savings. One example is the Cullinet IDMS data base application, which Storage Technology uses for tracking spare parts at all its field sites, nationally and internationally. "My staff was able to normalize the data base in 2½ to three hours," Muller reports. "Usually, it takes two to three weeks."

More importantly, Muller says, Auto-Mate has helped improve the design and analysis stage of applications development by bringing programmers and users closer. The schematic design tool allows programmers to put up a diagram so users can visualize the logic and data flows, Muller explains. "If users don't want what they see, it's easier to change." Additionally, the product's methodology helps programmers come to decisions faster. "It takes less time for our staff to provide users with a workable design," he comments.

At the back end are software products that automatically convert software logic designs into actual program code. While these back-end

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Hurst is a *Computerworld Focus* senior writer.

systems are known as code generators, to be viable they should do more than create lines of code, according to Extended Intelligence's McClure. They also need to provide automatic documentation, analysis capabilities for error checking and a data dictionary or central repository.

Some code generators include Gamma from Knowledgeware, Transform from Scottsdale, Ariz.-based Transform Logic Corp. and VAX Cobol Generator from Maynard, Mass.-based Digital Equipment Corp.

Code generators offer advantages for developing commercial applications that handle screens and data base access, according to Digital Consulting's Schussel. "It's enormously more efficient to have computers write the code rather than relying on programmers," he asserts. Speeding up the coding process is the most important function of the generators, agrees Yancey Myres, manager of data processing systems and procedures for Riley-Beaird, Inc., a Shreveport, La.-based subsidiary of the Ashland Oil Co.

> **Only 2% of potential users have bought into CASE.**
>
> CARMA MCCLURE
> EXTENDED INTELLIGENCE, INC.

Riley-Beaird has been using DEC's VAX Cobol Generator to help update and convert its older software programs. The company also wanted to make its code more consistent. "We wanted a code generator that would standardize our code so anyone who used the product would produce the same code," he says. "This consistency will make it easier for us to provide further software maintenance."

Despite the advantages code generators offer, Schussel maintains that the greatest benefit comes from having a generator integrated with a central repository. "A generator can quickly produce some 100,000 lines of code," he says. However, a central repository allows the generator to reuse portions of code that have been created, reducing the number of lines that have to be coded from scratch.

The distinctions between schematic design systems and code generators and the advantages they offer appear to be distinct. In reality, though, the approach of complete CASE systems has muddled the market as CASE vendors attempt to extend their products into this arena. Some products are closer to providing full systems than others, Schussel says. He predicts that a few may even have full CASE systems by year's end.

However, until then, users can expect to face the same confusion that has marked CASE products for more than a year. "It's difficult to see what products have and what the vendors have in development," McClure says. A result of this confusion is that only 2% of potential users have bought into CASE, according to McClure. Moreover, she predicts, until products actually have both front and back ends, many users will not consider CASE a bona fide strategy.

To understand where CASE vendors stand in providing a complete solution, users need to know the basic components of a full CASE system. One set of criteria developed by Schussel lists five essential pieces, as follows:

- At the front end should be software that can pictorially represent various aspects of the applications cycle.
- Prototyping software should make use of graphics capabilities. "Prototyping allows the CASE system to automatically generate screens, a simple data base or a model of the system," Schussel says.
- A dictionary, encyclopedia or repository should be the center of a CASE system. These terms and their variations are synonymous, according to Schussel.
- A code generator should reside at the back end. At the mainframe level, this code is often Cobol. However, vendors provide other types of code such as DEC VAX assembly language.
- A methodology or engineering approach should tie the CASE system together. This methodology can reflect any number of logical design approaches to software design including such widely used methodologies as Gain-Yourdan, Warnier-Orr and Chen Entity Relationship, Schussel says.

Vendors planning to provide all these components include Knowledgeware and Nastec, working from the schematic design end, and Cortex Corp. and CGI Systems, Inc., working from the code generator end.

Two components currently missing in Knowledgeware's IEW product are a fully developed central repository and a code generator. Knowledgeware is reportedly enhancing its current repository. Rather than create a generator, though, the company is expected to build an interface between IEW and the Gamma code generator originally from Tarkenton Software, a firm Knowledgeware recently acquired.

Nastec's current implementation of Case 2000 Designaid supports strategic analysis and design. A beta-test version also provides real-time modeling, according to Albert Conner, vice-president of strategic business development for Nastec. Like Knowledgeware's IEW, Designaid requires a code generator. However, Nastec plans to use interfaces even more extensively to provide its CASE system solution.

First, Nastec plans to interface Designaid to several mainframe Cobol generators. The first of these will be Telon from Oakbrook, Ill.-based Pansophic

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Software, Inc. In addition to this basic CASE system requirement, Nastec plans to enhance its product through added features. To provide electronic publishing features, the firm is interfacing Case 2000 to Xerox Corp.'s Xerox Ventura Publisher. This product is in beta test. Nastec also plans to offer an interface to a simulation application. While the company is talking with vendors and universities, it has not announced any pacts.

Waltham, Mass.-based Cortex and CGI Systems in Pearl River, N.Y., take the opposite approach. The two companies each started with code generators, and they now have all but one of the CASE system pieces in place. They both need to introduce graphics-based front ends, and they both plan to address this need by developing their own offerings.

Cortex currently offers the Application Factory, which generates VAX language code and documentation. The product also includes tools for analysis and design and a central repository. In late 1986, Cortex announced Corvision, a graphics front end that would make the Application Factory a complete CASE system. The firm hopes to make Corvision available by late 1987/early 1988.

CGI's Pacbase is a Cobol generator that also provides schematic design and analysis and a central data dictionary. CGI has added project management tools to help guide the management as well as development of the application cycle. The company has announced that it is developing a graphics front end. "CGI's Pacbase is probably the closest to a true CASE system," Schussel says.

Code generator-based products such as the Application Factory and Pacbase may be powerful, but they are not for everybody. In fact, both Cortex and CGI state that they have turned down potential customers. "Some organizations are not ready for CASE technology," asserts Michael Blechar, CGI's director of corporate technical services. Managers who simply want to generate third-generation language code faster should use a straight code generator, he suggests.

'Not a short-term fix'

The key difference between simple generators and products such as those from CGI and Cortex is commitment, vendors and users agree. "This is a long-term investment," says Jaime Zapata, applications development officer for AIG-Data Center, Inc.'s Domestic Brokerage Division in Manchester, N.H. "This is not a short-term fix." DP departments using Pacbase can expect productivity drops on their first project, according to Zapata, who heads a Pacbase users group. "The payoff comes with the second, third, fourth projects and so on."

Products such as the Application Factory and Pacbase are synergistic, Schussel explains. The greatest benefit from these tools comes when a repository contains data systems of related information in the company that the CASE product can build on, he states. In addition, programmers have to learn to use the schematic design tools and methodologies of these generator-based systems, adding to the up-front investment companies have to make before they see any results.

For that matter, without a commitment to a methodology and training, no CASE tools will work to their full potential, according to Extended Intelligence's McClure. Methodology is particularly important. "From case studies, we've seen that the people with the biggest CASE productivity gains are those who already have a methodology in place and a commitment from management to support it," McClure says. Successful companies also select tools that complement their methodology and put those tools in the hands of their most skilled programmers.

Because methodology is so important, managers should choose a CASE product that supports the design approach favored by the company, Schussel recommends. MIS departments without a methodology may prefer to choose a product with an embedded methodology, he adds.

The textile fibers department of Du Pont Co., based in Wilmington, Del., uses Cortex's Application Factory because the product follows a prototyping-oriented methodology similar to that already adopted by the department, reports Daniel Baetzel, quality manager for the textile division's Information Engineering Associates business center. During the past two years, productivity gains have ranged from 4:1 to 10:1, he reports.

Racing the brain

However, Baetzel notes, at anything more than a 4:1 development rate, applications are developed faster than a user can learn to use them. The problem, he says, is that users are not accustomed to having full-function applications developed so quickly. He expects that this problem will disappear as users become involved in the development process so that they need less formal training.

Working with users relates to another methodology that managers must incorporate, Baetzel claims. Beyond a system for design, he explains, a company must also have a system of management.

"Most CASE tools don't support the need for human interaction," he says. "The danger is mistaking the design methodology for one of management." To get true benefits from CASE technology, managers must develop a system for getting users involved in the design of the applications they use. "Then you'll not only provide solutions faster, you'll be solving the right problem." ◆

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User interface management systems

Industry's best kept productivity secret

BY STAN KOLODZIEJ

If you think software has settled into a sort of sameness, user interface management systems (UIMS) just might be the tonic that refreshes.

To those working in the field, UIMS represent a revolution in software equal to the recent impact of data base management systems and structured programming.

Don't go looking for UIMS stories splashed across the trade press, however. To date, UIMS have been a candidate for one of the best kept trade secrets. But in another year or so, adherents expect UIMS to come roaring into the business world.

"UIMS will make fundamental changes in the next decade in the way many systems get built," concludes Ben Shneiderman, an associate professor of computer science at the University of Maryland at College Park and author of a book on UIMS. "I believe UIMS provide a large increase in the magnitude of productivity in people who build user interfaces. I'm a great devotee of the concept," he says.

The UIMS concept has been studied and fine-tuned in U.S. university research labs for nearly a decade. From there, UIMS concepts filtered into private industry with companies such as Boeing Co., TRW, Inc. and Computervision Corp. developing in-house UIMS software for their own use.

Only in the past year, however, have UIMS found their way into the commercial market and into public view.

In 1986, Chelmsford, Mass.-based Apollo Computer, Inc. came out with Domain/Dialogue, thought to be the first commercial UIMS product. In the period since, Domain/Dialogue has become one of the company's best selling software products. Following Apollo, a small spate of companies, most notably Precision Visuals, Inc. in Boulder, Colo., and the Template division of San Diego-based Megatek Corp., have tendered their own UIMS systems.

This showing is more a trickle than a flooding of the market, however.

"These systems are very much at the start of the product life cycle curve, in the sense that a lot of people don't even know they exist," explains Jim Foley, a professor in the department of electrical engineering and computer science at George Washington University in Washington, D.C.

Why should MIS get excited? Because UIMS promises to increase user and programmer productivity dramatically.

"The principle of UIMS is to customize and standardize the way users interface with a computer system," explains Kathleen Potosnak, a senior consultant with the Koffler Group, headquartered in Santa Monica, Calif.

"UIMS provide the tools for the user to develop these interfaces. Once the interface is done, it's also standardized in the sense that the user can utilize that particular interface for each application without having to keep learning new interface procedures. This [capability] makes the learning process and the transfer of learning much easier. If someone gets transferred to another part of the company, for example, and has to use a new system, the interface will look and behave the same," Potosnak explains.

UIMS workers agree that there are certain key distinguishing elements found in most UIMS. Foley says one prerequisite is that a UIMS should be able to control program sequencing so that if a user enters a command, the UIMS invokes an action or subroutine that does some work. "From there, the control comes back to the UIMS, and the user can specify another command," Foley says.

Foley adds that another key UIMS element is a capability for the UIMS to organize visual representation for screen layouts.

"The UIMS will often have the capability to interactively lay out the screens or interactively design icons or menus," Foley explains. "If not interactively, then the UIMS will at least enable the user to build text files that have menu, screen layout and Help definitions. The UIMS often has some embedded Help capability because the system knows where a user is in a sequence of possible activities. If the user asks for

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Kolodziej is *Computerworld Focus*'s senior editor.

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help, the UIMS can arrange to give some context-sensitive help based on where the user is in the syntax parsing stage," Foley says.

The close connection between visual input and UIMS is no accident. Most of the companies that have entered the UIMS market with products have graphics and computer-aided design (CAD) backgrounds.

"The graphics components of UIMS vary, with pop-up and pull-down menus, electronic menus and full screen-oriented manipulations that you typically do with mice, light pens and data tablets," Foley says. "What's happening now is that as high-quality Macintosh-style, CAD-style interfaces get to be more common, the graphics approach [in user interface systems] becomes more important."

Jay Wiley, advanced technology manager at Bechtel Western Power Corp. in Norwalk, Calif., and a user of Precision Visuals' Enter/Act UIMS, says the company chose Enter/Act primarily for its graphics capabilities following an expensive and, ultimately, aborted attempt to build its own user interface system.

"Over time, we had built a number of computer systems, and the user interface was always a critical and very expensive component," Wiley says. "We finally got a major manpower scheduling system together that everyone said was nice and easy to use. Unfortunately, it took six people six months to build the interface, and by the time it was finished, the need for the software had disappeared."

Wiley says that before landing on Enter/Act, he had looked at other interface building options such as fourth-generation languages.

"There are a lot of fourth-generation tools, which do menus and forms, that we use in our data base applications, but our engineering systems require good, quality graphics that are critical to engineering analysis and interpretation," Wiley adds. "Enter/Act gives us forms management, and its menuing system also allows us to put graphics into a windowing format using our existing software. We immediately saw a way to leverage and get more out of our existing system."

The windows connection

The growing numbers of graphics-based software windowing systems now on the market are important precursors and adjuncts to UIMS, according to Gilbert Cardwell, a director of engineering at Precision Visuals.

Cardwell says that any application constructed to run in a windowing system includes two elements that are fundamental to the UIMS concept: reusable code that is shared or reused by a number of applications; and independent code modules that are separated from and independent of the code that performs the actual work of the application.

"This separation of code from the application is what gives application developers more flexibility in data entry," explains Lois Framm, a technical specialist at Bell Communications Research Corp. in Morristown, N.J. "It's fantastic in terms of saving time and customizing software. UIMS are also getting a lot of attention because many companies are trying to integrate software over a number of diverse machines and trying to give a consistent view to user interfaces."

> **"If you can handle a mouse and read what's requested, you'll be able to design an interface."**
>
> TOM GREENE
> APOLLO COMPUTER, INC

A logical extension of the UIMS/windowing connection is to merge UIMS eventually into a more advanced windowing system like X Windows from MIT, a process that Apollo is scheduled to undergo soon with Dialogue.

According to Framm, "All the windowing developers are looking for something to sit on top of their windowing systems. UIMS is a natural fit."

Larry Timmons, a research analyst at the Gartner Group, Inc., in Stamford, Conn., says that UIMS can be broken into a few evolutionary generations, with most graphics and windowing systems such as Apple Computer, Inc.'s Quickdraw for its Macintosh and Microsoft Corp.'s Windows taking up the bottom tier.

"These are first-generation UIMS because they are single, unbroken systems that span from the data access level all the way up to the desktop," Timmons says. "They are also proprietary in that they're embedded in the kernels working with the operating systems or, in Apple's case, read-only memory."

Timmons adds that next-generation UIMS will be represented by products, such as X Windows and Sun Microsystems, Inc.'s Network Extensible Window System, which have user interfaces and enable users to move and share information across windows. Beyond these are UIMS such as Template's Blox and Enter/Act.

To date, however, such systems fit programmers much more than end users, Foley says.

"When you look at the integrated development environment with things like Microsoft's Windows, Digital Research, Inc.'s [Graphical Environment Manager] and X Windows, for example, what they give you is a tool kit that you access as a programmer, not as an end user," he explains.

And that situation is running counter to the designated aim of UIMS to involve the average end user heavily in interface design.

Precision Visuals' Cardwell, for instance, points out that a major UIMS benefit of floating the user interface code separately from the application code is the possibility of rapid prototyping, a process that can pull end users directly into the planning and design process. "Responsibility for the success of a project will now be shared by end users and the development team," Cardwell concludes.

Though most of the UIMS on the market still require users to have some programming expertise and a familiarity with computers, those prerequisites are slowly changing.

Tom Greene, manager of the user environment and graphics kernel departments at Apollo, claims that the UIMS user does not have to be as knowledgeable today as in the past.

"There still has to be some level of understanding, though that's going to go away entirely in the near future," Greene says. "If you can handle a mouse and read what's requested, you'll be able to design an interface."

Direct manipulation

To make that easier for the end user requires a push toward graphics and direct object or pointing-type manipulation input and away from natural languages and command-driven interfaces.

"A command language format requires the user to go through a command step by step," Shneiderman says. "With direct object manipulation, you can just use a mouse or pen to point to where you want [to go]. The challenge in direct manipulation is building UIMS that deal with alternate input devices such as pointing, touching, mice and so on and also deal with graphical objects."

Foley agrees. "Natural language interfaces are important but overplayed," he says.

"Typed input is very slow, and it seems to work well with data query applications, but can you imagine doing computer-aided design using natural language keyboard typing and having to type, 'Please pick up the round object in the center of the table,' instead of just pointing to it? Even in verbal interactive systems you can limit the way people can communicate. Showing a person what to do can be better than telling them," Foley says.

Most UIMS are headed toward such object-oriented, or direct manipulation, UIMS.

Greene says these systems are the next generation of UIMS and claims they will have an even more radical impact on productivity. Greene even predicts that UIMS products offering users pure object-oriented interfacing will appear commercially within a year.

The ultimate aim of UIMS, however, is providing more independence from specific input devices.

"If you're developing software to run on IBM Personal Computers or Macintoshes, then you might not care," Foley says, "but if you're a CAD vendor and you want your applications to run on Sun Microsystem machines, Apollo machines and so on, then you care about independence from input devices."

Part of this independence can be accomplished by supporting such emerging device-independent standards as the Graphical Kernel System and the American National Standards Institute's proposed standard, the Programmer's Hierarchical Interactive Graphics System, or PHIGS.

"Basing the interface on certain standards helps consistency," Greene says. "It allows a company that likes to pull down menus and wants them to look a certain way across the company to still be able to add their own object from another vendor and maintain consistency.

"Because they only add the object once into the UIMS, they don't have to go to all the applications that want to use it. They add the code once into the UIMS, and then everybody can use it," he adds.

> **"Some researchers who looked at code developed during the past 15 years found that the percentage of code devoted to user interfaces had increased from about 10% to 70%."**
>
> BEN SHNEIDERMAN
> UNIVERSITY OF MARYLAND

Timmons says that another key element now missing in UIMS is a definition of a universal presentation interface.

"There is no common user interface tool kit, no general user interface management system structure commercially available that allows a user to choose between a windows architecture, a speech-only architecture or, perhaps, something more exotic like a visual recognition system coupled with natural languages where it's appropriate," according to Timmons. "The main goal of UIMS is to provide a set of tools so that users can determine how information is going to be presented," he says.

The bottom line in all of this is productivity. "If it takes a morning to lay out a screen in Cobol and it takes only 10 minutes to do it with one of these [UIMS] tools, you're going to see a lot more benefits," Shneiderman says.

"We now have an environment in which the UIMS is in charge of the interaction with users," Foley says. "That provides a framework in which we can build good Help facilities into the UIMS, maybe even some expert system capabilities to help tutor the user."

The Koffler Group's Potosnak says UIMS help define the user system interface at an abstract level, using higher level languages instead of Fortran, Assembler or Cobol. This fact, combined with rapid prototyping capabilities, makes for quick on-screen mock-ups and testing.

User testimonials

Users are providing their own testimonials on UIMS productivity. Bechtel's Wiley says Enter/Act has supplied his firm with a rich set of tools for dealing with users so they don't have to sit down and code.

"Instead, you can define how you want to relate to the user, and you can plug that into a set of files, pass it through the equivalent of a compiler and get a binary out that Enter/Act will understand and do for you," Wiley says. "So you can put an interface up quickly, bring a user in, sit him in front of the machine, watch him run through it and find out if he's comfortable."

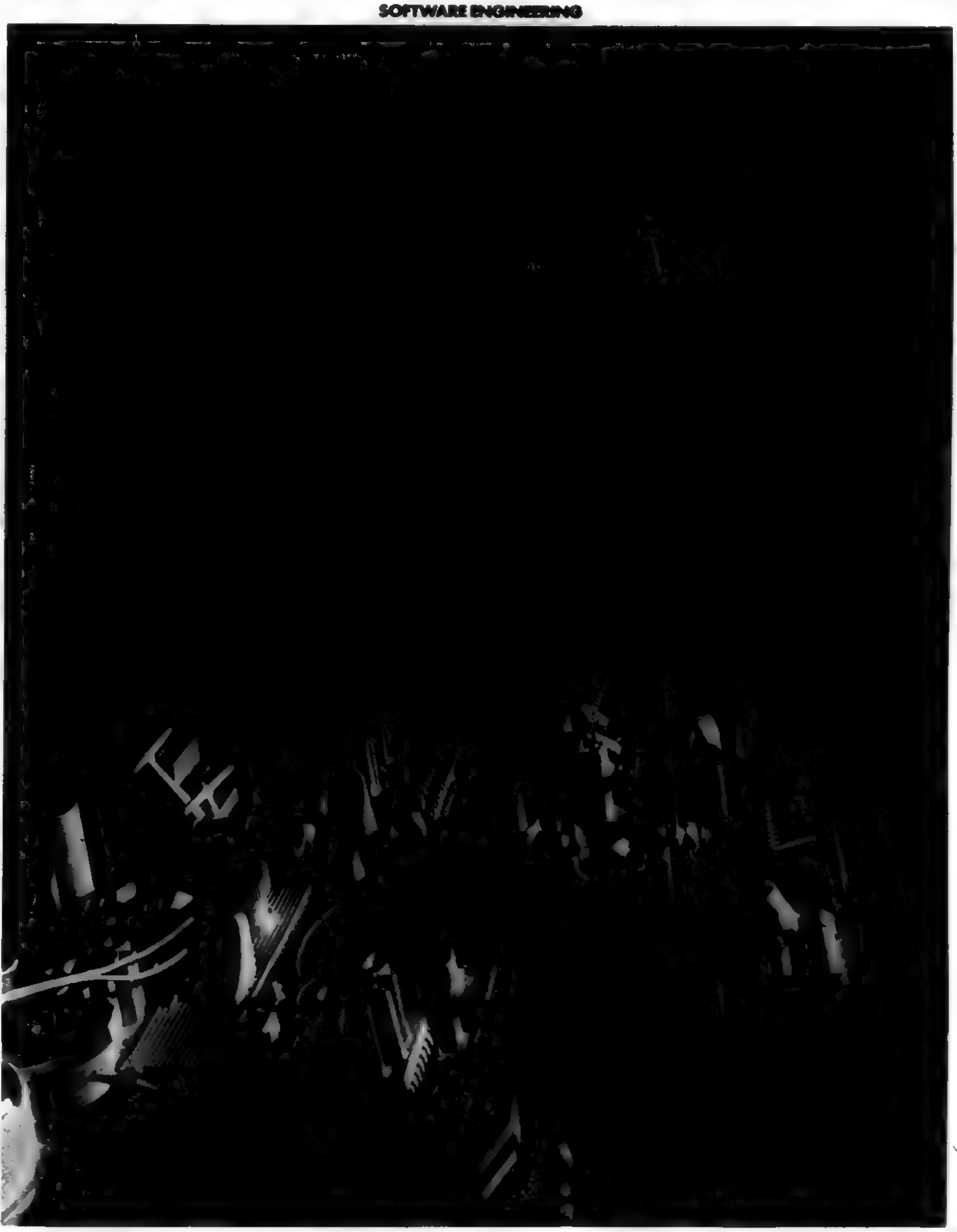
Jim Sills, a staff computer analyst at Amoco in Tulsa, Okla., says the user interface that the company developed using Apollo's Dialogue UIMS will now be ported to six other in-house engineering applications, saving the company a great deal of time and effort.

"How important are UIMS? Some researchers who looked at code developed during the past 15 years found that the percentage of code devoted to user interfaces had increased from about 10% to 70%," Shneiderman says. "User interfaces are hot topics."

Template is quick to point out that a stock brokerage firm and other nonscientific firms are users of Template's Blox UIMS, not just scientific firms.

"UIMS will affect programming across all industries," claims Gary Romans, manager of Template products.

"In many ways, UIMS represents the last frontier in the development toward computers being available for arbitrary people doing arbitrary work," Foley says. "UIMS and other programmer productivity tools that deal with high-quality user interfaces are where the real action will be for the next few years." ◆



Software engineering's frontiers

BY MICHAEL TUCKER
FEATURES EDITOR

Software engineering is a curious term. Until recently, one computer scientist notes, "it was a dirty word. I mean *two* dirty words." Programmers felt, and to some degree still feel, that to engineer software was to strip programming of its creativity.

Those MIS managers who had experimented with the concept, meanwhile, found that while it might be useful in the scientific and engineering communities, there was little software engineering could give to commercial, real-world programming.

However, two things have begun to change that thinking. First, software engineering tools and techniques are being modified to fit the requirements of commercial programming. Second, as MIS officers' roles shift from being purely operational to executive, MIS is now managing huge software development and maintenance efforts that, in some cases, dwarf the scientific/engineering efforts that gave rise to software engineering in the first place.

MIS is turning to software engineering techniques for reasons having as much to do with management as technology. It simply must have some method of keeping control of its code.

In general, software engineering means that rather than simply hacking away to produce code, a structured methodology is employed. There are various ways of structuring, but ultimately, most of them boil down to the idea that code development follows a planned life cycle.

A CASE study in vendor strategy: See the life cycle chart, page 36.

Software partisans divide that life cycle into five major segments: specification/analysis, design, implementation, testing and maintenance.

A number of companies now market products that fit into one or more of the cycle's phases,

Vendors strive for full-fledged 'CADME'

SPANNING THE DEVELOPMENT life cycle is the dominant theme of the current software engineering industry — vendors are either bringing out families of products, with one member for each segment, or they are hurrying to secure links with other vendors' products that fall further down the cycle than their own.

Computer Associates, Inc., located in Garden City, N.Y., best represents the first strategy. Early this year, the company announced the CA-Programmers' Workbench, composed of 10 individual tools.

Meanwhile, Index Technology Corp. in Cambridge, Mass., represents the second game plan. Index, with its Excelerator analysis and design tool, was one of the first companies into the commercial computer-aided software engineering (CASE) world. Now, it is forging strategic alliances with other CASE vendors.

Ed Acly, senior consultant with International Data Corp., a Framingham, Mass.-based market research firm, says he feels this trend is actually creating a technology.

"We see an evolution away from isolated tools to a complete development environment," he says. "To describe that environment we coined our own acronym — CADME, for computer-aided development and maintenance environment."

Acly notes, however, that even the broadly based Computer Associates' product is a long way from the complete CADME operation that he envisions. "It is going to be a long journey," he notes.

How far is that journey? T. Capers Jones, formerly a consultant in the software engineering business and now chairman of Cambridge, Mass.-based Software Productivity Research, Inc., did a major study from 1983 to 1984 looking into the discrepancy between current product offerings and what software developers really need.

Among the conclusions, he says, "We estimated that the full-fledged set of tools required [for complete CADME applications] would number about 110; most tool kits today provide maybe 30 tools. Moreover, we estimated that it would cost roughly $85 million to do the necessary development."

He explains, however, that gradually that price will be paid — not all at once or by one company. Instead, the investment will be made by a number of organizations, bringing out increasingly interconnectable products between now and the end of the century. — MICHAEL TUCKER

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and these firms are hurrying to secure links with other vendors' products up or down the cycle. Others, mostly recent entries to the software engineering market, are attempting to span the entire spectrum.

At the very beginning of the life cycle is specification/analysis — the process of deciding exactly what it is that one wants the application to do.

The software engineering aspect comes into play in that, traditionally, this process has been left to end users. And, as MIS has discovered, end users may not know exactly what it is they want their systems to do.

Acting as an interpreter

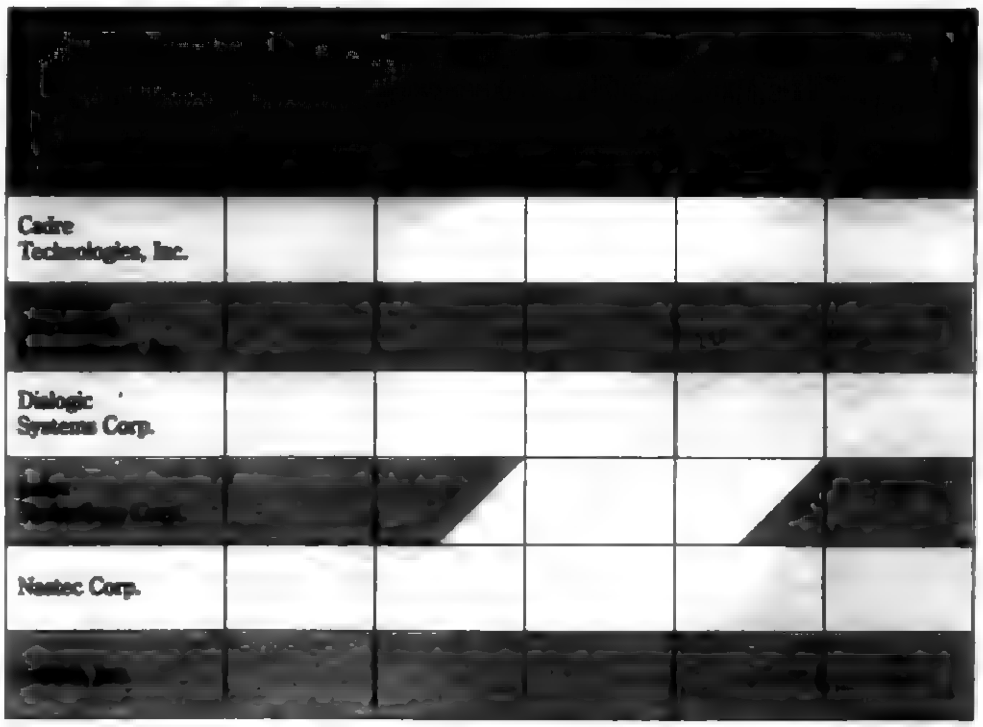
Many software developers feel that what is needed in this area is some kind of intermediary — specifically, a systems analyst — who can stand between MIS and users. This person would function almost like a knowledge engineer, helping users clearly define their needs, converting those requirements into technical terms and passing those specifications on to programmers.

Systems analysis is, of course, its own profession and one that is beginning to be quite separate from computer programming. Whether or not the MIS department has professional systems analysts on staff to assist in the process, it can exploit a number of products to make systems analysis easier.

These products range from various flowchart systems that require nothing more technical than a pencil to very sophisticated workstations. Indeed, the first computer aided software engineering (CASE) tools sold were system analysis machines, and they still form the vast bulk of the market.

The software development life cycle

Where the vendors fit in



CW CHART

One of the more well-known system analysis machine vendors is Cadre Technologies, Inc., headquartered in Providence, R.I. Cadre markets Teamwork, a group of workstation-based products that effectively automate a method of representing tasks orginally developed by Edward Yourdon and Tom DeMarco. (Yourdon's book, *Managing The System Life Cycle*, Yourdon Press, 1982, remains one of the most influential texts in the profession.)

However, Cadre has specialized in the scientific/engineering areas. In the commercial DP world, the leaders are Nastec Corp., located in Southfield, Mich., and Index Technology Corp. in Cambridge, Mass. In fact, Nastec claims that its Designaid analysis product was one of the first CASE tools in the world. Designaid runs on the IBM Personal Computer and on Digital Equipment Corp. Vaxstations. It costs $6,900 for the PC version and $12,400 for the VAX version.

Meanwhile, Index says that its system analysis product, Excelerator, has the largest installed base of any CASE product worldwde. Excelerator is a PC-based system costing $8,400.

Critics question whether these systems are really superior to working out problems with a pencil and paper. However, users of these products seem to feel the systems are more than worth their cost.

One Excelerator user is Barbara Bouldin, staff manager at an AT&T commercial DP operation in New Jersey.

"I'm in charge of data management for my particular part of AT&T. I've got hundreds of analysts and thousands of end users," she explains. "We're using [Excelerator] for data analysis and data administration, and we're moving on to using it for applications as well."

The next step in the cycle is the design of code. Cycle advocates describe the design stage as the business of blueprinting the application. It would differ from the actual writing of code in the same way that an architect's design of a house differs from a contractor's construction of it.

CASE tools to support this stage of the cycle are beginning to emerge. In fact, users report that system analysis tools can easily extend into design. AT&T's Bouldin says, "We've got all kinds of users — everybody from analysts to planners to testers. That's something I've learned from all of this. When you're buying software, you never know who your end users are going to be."

She notes, for example, that Excelerator's code specification could be rapidly transformed into code design. "We were doing some interfaces between departments," she says.

"We'd have a meeting with the planners, and they'd say, 'Give us a picture of what's going to happen at such and such an interface.' We'd run a report, and they'd take it off to their task forces," Bouldin explains.

Electronic Etch-A-Sketch

However, some of the best code design is being done without CASE at all. "Sure, you can speed things up a bit with an electronic Etch-A-Sketch," says James Janossy, manager of the City of Chicago Datacenter and author of *Commercial Software Engineering*, John Wiley & Sons, 1985. "But there's an awful lot you can do with a pencil," he says.

Janossy is one of the few advocates of software engineering to work almost exclusively with Cobol. He is also unusual in that in his system of notation, he avoids standard flowcharts. In fact, Janossy holds flowcharts responsible for software engineering's failure to catch on in the commercial DP world.

"People were burned by flowcharts," he says. "Flowcharts were supposed to make programming easier, but actually they were too complex and inflexible. Twenty years ago, there were already stories of programmers rebelling against them."

Instead, Janossy uses a system of notation that is adapted partly from the charts developed by Jean-Dominique Warnier and partly from classical logic. Janossy has also worked out a series of generic component designs that can be used as building blocks in larger programs.

Janossy has experimented with structured design in two places — at De Paul University in Chicago, where he is an associate professor, and at the Chicago Datacenter.

"It's done wonders," he says. "I've taught several hundred students at De Paul in Cobol. [With structured design,] these kids will do in two days what I've seen journeymen do in a month or more. And, they get it right in three compiles. To me, that's productivity."

Getting down to coding

The next step in the life cycle is implementation, or the actual coding.

Bruce Lynch is president of the Programmer's Shop in Hingham, Mass., a firm that specializes in tools for programmers. Early this year, the Programmer's Shop surveyed its customers to find out what they were using to increase productivity.

According to Lynch, "There are six different categories of tools currently being used to increase productivity. In decreasing order of acceptance by programmers, they are: traditional editors and utilities, reusable code, interactive languages, alternative and fourth-generation languages, application domains and esoteric technologies." As a potential seventh category, Lynch adds code generators.

"The trade-offs in each," he says, "are in productivity vs. control." In other words, the further a person gets away from the hardware, the more productive he is but the less control he has over the machine.

Thus, a programmer working in machine code would have exquisite control over the computer but abysmal productivity. By the same token, someone working in a fourth-generation language would be much more productive but have less control of the machine.

At the moment, Lynch says, traditional tools, such as third-generation languages and editors, are by far the favorite of programmers. "They give you so much control and flexibility that it's just hard to beat them," he says.

Reusable code is the programmers' second-place choice for programming productivity. "In our survey," Lynch reports, "70% of the respondents said they reused at least parts of their own code. Some 52% are using code from commercial software libraries."

The programmers ranked interactive languages third for productivity. Essentially, these are languages that are interpreted rather than compiled.

"Their big drawback is speed," Lynch says. With interpreters, programmers' productivity is higher because they can spot bugs on a screen as they occur rather than following a failed compile. But, because the interactive languages are not compiled, they are also slow. However, he says, "Several firms are attempting to overcome this obstacle."

For example, Natick, Mass.-based Rational Systems, Inc. is currently marketing an incremental compiler for the C language. Known as Instant-C, the product combines an editor, compiler, interpreter, debugger, source code formatter, object code linker, source code checker and runtime checker into one package for the IBM PC. It costs $495.

Alternative languages, fourth-generation languages and artificial intelligence languages such as Prolog came in fourth in the programmers' ranking because, according to Lynch, these products "suffer from all the problems of interactive languages, plus they're slower."

Application domains

Application domains placed fifth. This classification includes applications that allow some degree of programming within them, such as Lotus Development Corp. 1-2-3, Ashton-Tate Dbase II, various data base products and so on. Application domains provide still less control of the hardware, but, Lynch claims, "Programmers can and should consider them if their applications lend themselves to those products."

Esoteric, or nontraditional, technologies, which received a sixth-place showing, include such things as CASE and objective programming, Lynch says.

He also considers code generators as an esoteric technology but one which is growing in importance — so much so that it may soon have to be considered a seventh general class.

This code generation category may be the programmers' least favorite, however. This class of tools may eventually replace the programmer job function because they hold the promise of automating coding efforts.

According to Ed Acly, a senior consultant at Framingham, Mass.-based market research firm International Data Corp., "The bottom line is that [software developers] start working toward the automation of code production."

Once the code is written, the developer faces the business of making certain it works and, after that, of keeping it in operation for years at a time.

Wanted: A hero in the programmer's shop

IT ISN'T EASY committing to software engineering.

Everybody knows software engineering techniques can improve programmer productivity. But, it is also difficult to prove that contention — particularly to cost-cutting chief executive officers whose tolerance for technology of any form may be rather low.

This reluctance by top management is one of the reasons why MIS departments have been relatively slow to adopt software engineering.

"The delay is there because MIS managers are risk-adverse people," explains Michael Braude, vice-president of the software research center of the Gartner Group, Inc., a consulting firm located in Stamford, Conn. "And these are risky technologies."

According to Braude, MIS departments gradually will indeed adopt software engineering tools, particularly as those tools are made part of IBM products. "It will happen, but slowly," he says. "By the year 2010, perhaps, they will be standard," Braude predicts.

In the meantime, the MIS departments that adopt software engineering will be those with an advocate within their ranks.

"What you need," Braude claims, "is a hero in the shop. Some forceful, aggressive guy who is willing to take risks. . . . There just aren't that many heroes out there."

The organization that does not have some MIS officer brave or crazy enough to risk a career on software engineering can still experiment with software engineering products by setting up an advanced technology group in house.

This group would be a research and development division in which new technologies could be examined in isolation from the rest of the organization.

"Large accounts should set aside a research and development budget to experiment with these technologies," Braude claims. "I wouldn't recommend that people commit themselves wholesale, but they should definitely experiment." — MICHAEL TUCKER

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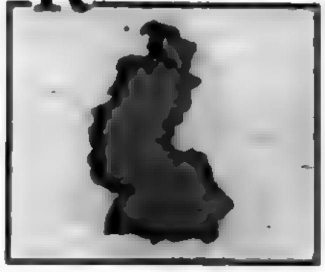

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>
> JAMES JANOSSY
> CITY OF CHICAGO DATACENTER

Fortunately for programmers who do not relish the task, there is a whole industry of testing tools available.

In general, there are two types of testing tools: those that are stand-alone but are forging links with products up and down the life cycle and those that are part of larger families of products.

For example, Computer Associates International, Inc. in Garden City, N.Y., recently began to market a group of software engineering products known as the CA-Programmers' Workbench. Four of the workbench's seven components can find use in code testing and debugging as well as in the maintenance phase of code later on.

CA-Programmers' Workbench is also interesting in that it is one of the first CASE systems meant for commercial software development, particularly in the areas of IBM's CICS and Cobol.

Another vendor of a cyclewide CASE system is Softlab, Inc., headquartered in San Francisco.

Softlab's Maestro product runs on a minicomputer and supports programmers on various 32-bit workstations. Among its approximately 30 tools, Maestro contains seven testing facilities.

Beyond testing, but not always clearly distinct from it, is the life cycle phase of maintenance.

Software maintenance has a history of being the least glamorous and interesting of all aspects of software development. Yet maintenance is slowly becoming the single most important issue in software. Increasingly, programmers deal with established code rather than new projects. The current code must be repeatedly modified to allow for new applications without introducing fatal bugs in the pro[illegible].

The industry is now in a desperate race to make code maintainable. A number of different products address the problem, ranging from automatic code restructuring programs to object-oriented programming languages.

Perhaps the most unexpected maintenance product is an emerging class of maintenance engines — computers that are at least partly dedicated to the business of managing source code.

For example, San Jose, Calif.-based Dialogic Systems Corp. sells a CASE system known as the Development Center Workbench. This 32-bit microcomputer was designed to fit between a mainframe and a mainframe controller.

Originally, the Development Center Workbench seems to have been meant for remote development. For years, programmers in the engineering and technical fields have done source code development away from the mainframe. They have worked on individual workstations and only after a complete debugging did they then download the applications to a target system.

Dialogic Systems' workbench applied the same principle to commercial computing.

With Development Center Workbench, Cobol programmers can perform their work remotely and, thus, save mainframe time for other DP tasks. Some of Dialogic Systems' customers use the product in exactly that way.

But perhaps, to the company's surprise, the area in which the product really seems to be taking off is in maintenance. MIS people seem to be using Development Center Workbench not so much for development — if they can, they leave that to code generators — but to troubleshoot existing applications.

Project management issues

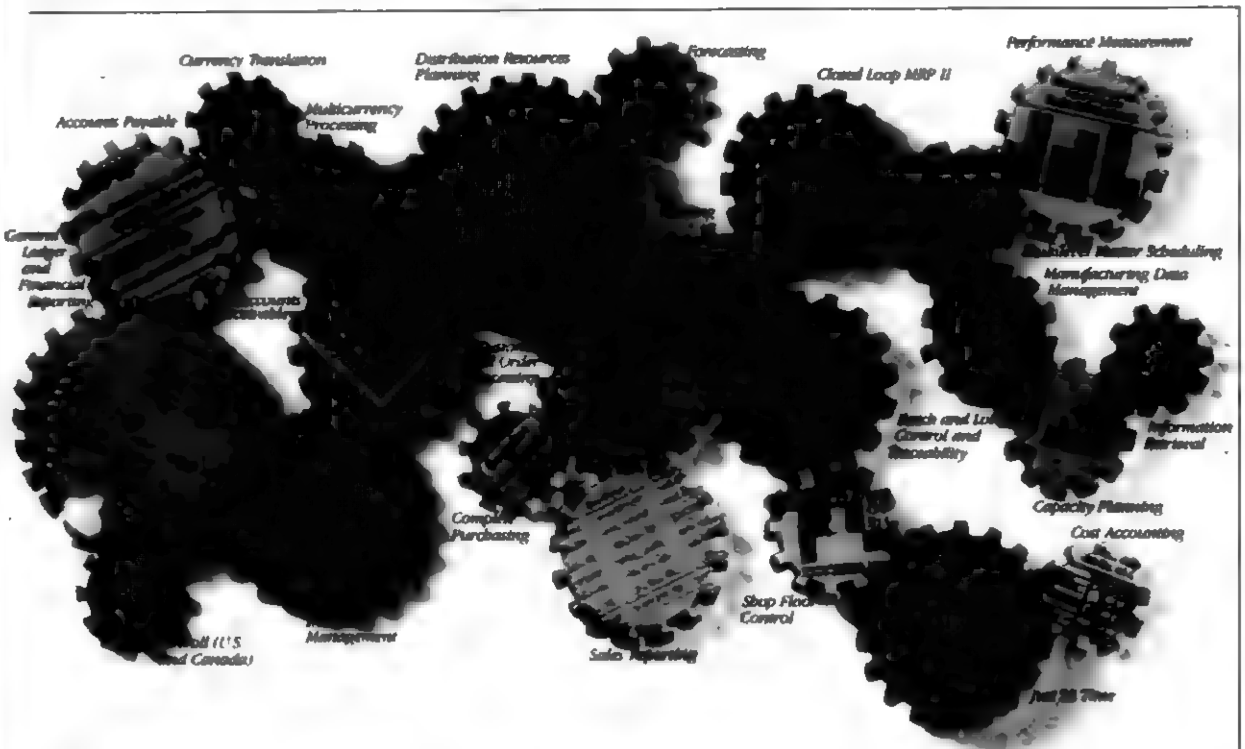
Beyond the development cycle, there are a number of larger issues. Some of these, in fact, are so large that they begin to do curious things to the term "software engineering."

For example, in even small development efforts, the management of the cycle can be astonishingly complex. Systems analysts, teams of programmers, end users, systems integrators, vendors, different products — all these and more must somehow mesh into a functioning whole. Project management, thus, becomes vitally important.

And, indeed, project management software is showing up with increasing frequency in CASE product offerings.

Furthermore, as the size of the development effort grows, MIS people become more managers of projects and less managers of technology. "Well, I suppose I always like to think there's still a little programmer in me," AT&T's Bouldin says. "But I guess I'm a manager these days."

As a result, the distinction between software engineering and corporate management may begin to get a little blurred. With a little effort, the difference might vanish entirely. ◆



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VENDOR STRATEGIES

Computers R Us

Look who's in the software business

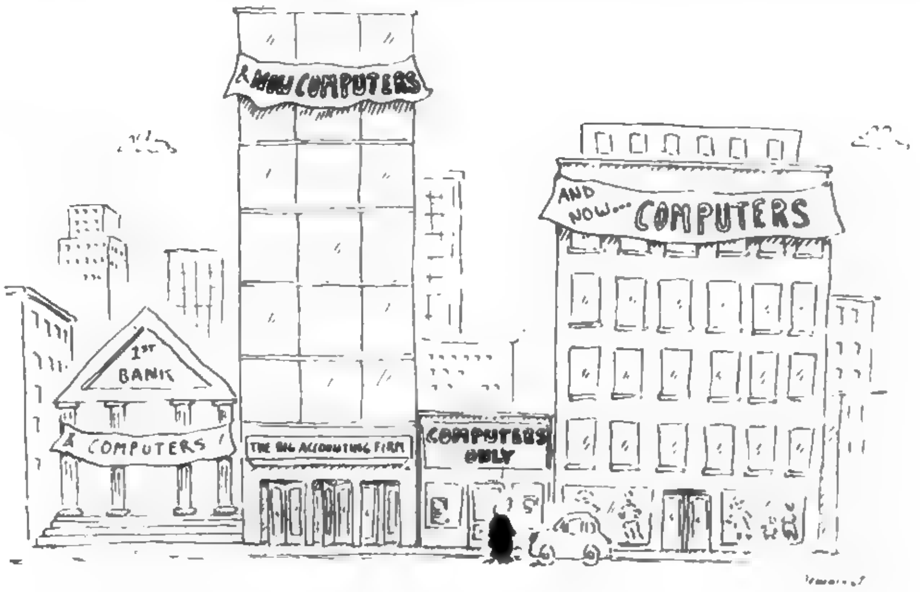
BY SANDY AUSTIN

There are a growing number of Fortune 500-class corporations recognizing the vast profit potential that lays within their own DP departments. These companies have committed millions of dollars to developing sophisticated software products to serve their business needs in competitive marketplaces. And many have come to realize that their products can be modified, packaged and sold as general applications to a broad market, or the unique features of their products can be preserved and used to serve specialized, niche markets.

Hartford, Conn.-based Travtech, a wholly owned subsidiary of The Travelers Cos., was formed two years ago. Its primary role is to market, package and sell software products and services developed in-house by Travelers' 3,000-member data processing staff.

According to Arthur Quirk, Travelers' chief operating officer and vice-president, "Data processing is typically looked at as a cost center for all businesses." But because Travelers has an enormous software development organization that produces leading-edge data base management systems (DBMS) and network management products, Travtech was originally created "as a way to recycle development costs and establish a revenue stream for data processing," Quirk explains.

Today, Travtech's mission is



Austin is a Boston-based free-lance business and technology writer.

to turn Travelers' DP operation into a profit center and, ultimately, to change the common perception of data processing.

The issues surrounding this trend, which has attracted such major players as Citicorp, Manufacturers Hanover Trust Co. and Celanese Corp., all headquartered in New York, Weyerhaeuser Co. in Tacoma, Wash., Travelers and several Big Eight accounting firms, are plentiful.

The issues include such concerns as: How does a company select products to market? How do the in-house software professionals close to the products convince upper management to commit the money, time and human resources required to start up a new business as volatile and risky as selling software? How great are the risks of losing a competitive edge in your own marketplace when you sell proprietary knowledge embedded in a product? And, why should users buy from companies that are not first and foremost software vendors; that are, in fact, often competitors?

A vital key to success in starting up a software enterprise is corporate management's understanding of the business side of the venture. "The most common internal risk an organization faces is management's underestimation of the amount of time, money and effort it takes to make selling software a business as opposed to a business hobby," says Peter Brown, senior partner at Brown, Raysman and Millstein, a New York law firm that specializes in computer law.

'Competitive climate'

"A lot of companies look at the information industry as a potential second business because they focus on the big growth and profits of a giant like IBM," asserts Mel Bergstein, a managing director in the consulting division of Arthur Andersen & Co. "But," he continues, "what many fail to see is the very competitive climate and the immense investment demanded to get involved."

Literally millions of dollars go into an initial start-up venture, and, according to experts, the least amount of the cost goes to software development expenses. "The cost of developing applications pales when compared with the cost of documentation, training and maintenance for the product. And those costs pale when compared with the packaging and marketing investment," Bergstein asserts. "Arthur Andersen has been in the information business since 1952, but it took us 25 years to consider it profitable," he claims.

On the other hand, although Travelers formed Travtech only two years ago, Quirk reports that it actually made money last year. In fact, the company's five-year business plan estimates the firm will double its size each year. "Our edge is that we have no heavy development costs," Quirk says. "The products we market are already paid for by in-house use at Travelers."

Synthetics to software

Celanese, a $3 billion manufacturer of chemicals and synthetic fibers, got into the software business by forming New York-based Corporate Class Software, Inc. early this year. The initial start-up costs of the subsidiary were "well in excess of $5 million," says Chief Executive Officer Richard Lyons. While the original investment took into account the funding for three products, only Fastar, a high-level financial reporting and analysis tool, has come to market.

"Celanese is very big on innovation," Lyons says. "It looks at the software business as a very high-risk, high-reward venture." Accordingly, Corporate Class Software is not a seat-of-the-pants operation. "Upper management looked at the big picture, considered all factors and assumed the position of, 'What will it cost to succeed?' " he says.

In the case of Corporate Class Software, once upper management was sold on the idea, it could go ahead and use the wealth of corporate resources — attorneys, tax specialists and management talent of executives experienced in managing multibillion-dollar firms — to add polish to the original start-up effort. The firm also hired outside sales and marketing professionals with software industry experience, relocated a number of development specialists from in-house DP and launched a major advertising campaign in *The Wall Street Journal, Businessweek* and two computer journals.

In short, Celanese is a good example of a corporation that fully understands the immense financial and human resources that go into launching a successful software business.

In contrast, "Most independent software companies are small, undercapitalized and never reach their full market potential," Brown asserts. "Many times corporate DP budgets are bigger than an independent software firm's entire revenue." Arthur Andersen's Bergstein concurs. While their sense of financial stability is always in question, Fortune 500-class firms have more than ample financial resources to successfully launch a start-up venture. In addition, Brown explains, "a new subsidiary or division directly reflects the parent company's reputation. So, there is an inherent sense of security present that is often missing from small, independent firms."

Convincing management to take the risk involves a lot of homework from internal sources close to the product. "If you are proposing a software start-up, you must have internal credibility — someone in senior management not associated with the operation — that is willing to go to bat for you," Corporate Class Software's Lyons comments. The bottom line is to identify strong products that will appeal to a varied customer base or breakthrough products that address heretofore untapped areas.

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>
> PETER BROWN
> BROWN, RAYSMAN AND MILLSTEIN

Travtech's first product, Net-Pic, a visually oriented, quick-alert network management program, was initially developed because of an outage in Travelers' Salt Lake City network hub. "IBM wasn't offering any products of this type at the time, and even though they do have IBM Netview now, it still lacks the capability to instantly view the entire network topology," Quirk explains. Thus, he saw Net-Pic as the perfect breakthrough opportunity — a chance to address an area of vital concern to a broad, cross-industry audience.

Chevron Corp.'s San Ramone, Calif., division purchased Net-Pic in January 1985. "We didn't have any tools to provide quick alerts to problems in the network," says Blake Wood, supervisor of network monitoring and performance at Chevron.

"We did have IBM's network management software tools — the Network Communications Control Facility and Network Problem Determination Application. But what attracted us to Net-Pic was its graphics/visual orientation. You can look over your shoulder, monitor the 40-in. screens and immediately detect if there is a problem," Wood says. "Plus," he explains, "Travtech was the only company that had a product like this at the time." Today, Net-Pic runs as a task under Netview.

Travtech attributes the same broad-based appeal to its new lead product, Traps, a personal computer-based host application tester and debugger. "This is a very hot area right now, and we are concentrating our 1987 marketing efforts on this product," Quirk says. Travtech's advantage here is that its competitors are mainframe software vendors. Because Traps is PC-based, it sells at a much lower price point — $18,000 as opposed to the $20,000 to $30,000 asking price for competing products.

Travtech's marketing strategy takes into account the degree of functionality and success products have enjoyed in-house at Travelers and the belief that systems software products are easier to promote than applications. "Systems software is more prudent for a start-up to market because it appeals to a broader audience and has a shorter sales cycle," Quirk says.

For example, an application specific to the insurance industry would entail many more decision-making levels from the prospective client because, to a certain degree, it would change the way a company does business. For that reason, it would also require a large support staff.

Corporate Class Software takes a similar approach to product selection. Its flagship product, Fastar, was designed for departmental use by financial professionals. The mainframe version was ported to microcomputers for departmental use and then redesigned for commercial marketing.

Celanese has embedded extensive financial analysis and reporting expertise into Fastar that is universal enough to be useful to a broad array of customers. But unlike Travtech, Corporate Class views Fastar, which is a specific application program, as having a "significantly shorter selling cycle than development systems from vendors such as Management Science America, Inc. or Execucom Systems Corp.," Lyons says. "Fastar is a what-you-see-is-what-you-get product." Its main design objective is to allow users to make changes quickly, he says.

Fastar's market appeal is further enhanced by interfacing directly with Ashton-Tate's Dbase DBMS products and Lotus Development Corp.'s 1-2-3, thereby tapping into the PC market as a companion product.

Federal Way, Wash.-based Weyerhaeuser Information Systems, which has been serving its $5 billion wood products parent corporation for 25 years, began competitively marketing its products and services as an independent business late in 1985. According to Gary Crowell, sales and marketing director, "During the last 18 months, we have narrowed the product selection from 300 possibles to 10 to 12 definites." Thus far, the firm is concentrating its attention on niche markets, particularly process manufacturing, in which its expertise is strongest.

The firm's three major products are Worksmart, a maintenance management system that helps control costs by tracking equipment maintenance histories and parts inventories; Comptrack, a workers' compensation claims system for self-insured companies; and Excellerate, a transportation program that helps shippers compare and monitor truck and rail rates. As for services, Weyerhaeuser focuses on recovery services because of the broad, varied appeal.

While parent Weyerhaeuser is still the information systems subsidiary's largest client, 10% to 15% of Weyerhaeuser Information Systems' revenue will come from outside sales this year. And with its more than 350-person staff, the majority of which come from in-house DP with outside hires making up the direct sales team, the Weyerhaeuser subsidiary says it hopes to have a 50-50 split between internal and outside sales within three to five years.

By focusing on niche markets in which Weyerhaeuser Information Systems has built up most of its valuable in-house expertise and in which the parent company actively competes, is there a risk of giving away the competitive edge? Crowell says no. "We simpy don't offer all [our] products for sale on the market. We will not market custom products developed for a client in a competitive position — be it Weyerhaeuser or anyone else," he asserts. "You won't find in general software houses the depth of experience we bring from the manufacturing arena."

Adding value

The financial services industry is feeling the competitive crunch to offer value-added products and services more than many other industries. Thus, it is not surprising that a lot of entrepreneurial marketing is coming from this arena.

Take, for example, MH Financial Management Systems, Inc. in New York, a wholly owned subsidiary of Manufacturers Hanover Corp. that was developed internally and has existed since the fall of 1983. It has four major PC-based product lines that focus on cash management and treasury-related functions. Called the Interplex series, the products, ranging in price from $22,000 to $50,000, are distributed through the electronic banking group and are sold in conjunction with other services offered by Manufacturers Hanover.

The catalyst behind these products was "the realization that the financial services business is becoming very specialized. Today, every service firm is

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getting into value-added processing," says Steve Groppi, vice-president of electronic banking product management.

Because of the fierce competition in financial services, world-class banks such as Citicorp, Chase Manhattan Bank N.A. and Bankers Trust Co. in New York will not buy MH's products. "One of our largest markets is with regional correspondent banks," Groppi explains.

Citicorp acquires Fame

Citicorp bought Fame Software, located in Dexter, Mich., five years ago after it was approached by the small, independent firm to buy its decision support system. "At that time, [the company] was called Gemnet, a venture capital start-up that was going through financial problems," says George Vessels, Fame's chief operating officer. Citicorp revamped Gemnet's system from a broad DP product into a specific financial services product, using its in-house expertise in the banking and brokerage and forecasting fields. The new company took on the name of its Forecasting, Analysis Modular Environment product — FAME — and the tool is used throughout Citicorp as well as marketed via Fame Software's direct sales force to user communities in MIS and information centers.

What is unique about Citicorp's handling of FAME, according to Vessels, is that "where most corporations develop a product in-house and generalize it for the commercial market, FAME was tailored to be much more specific to meet Citicorp's internal requirements and to focus on large banks and brokerage firms that are Citicorp's competitors."

Fame Software still has only its original product, but it offers numerous supporting modules.

The Big Eight accounting firms are, in many ways, the pioneers of entrepreneurship. With their vast stores of in-house experts who cover every conceivable application and system planning, design and development area, product marketing naturally grew out of their consulting operations and custom development work.

"We bring a lot more knowledge to the development of an application than most software developers," says George Rittersbach, director of Peat, Marwick, Main & Co.'s Information Technology Group. "Our consulting staff covers all industry segments from accounting, manufacturing, distribution, marketing and custom support functions. They are always involved in the first third of the product development phase."

The evolution of a packaged product often grows out of an original solution to a client's problem. The solution goes through the various design, production, implementation and testing phases, and after a long process, it may be formalized into a marketable product that requires documentation, a sales force, training and support.

Up until 1982, with the onslaught of the PC in corporate America, "We didn't see ourselves as selling a product but a service," says Steve Desmond, partner-in-charge of corporate computer-assisted tax services at Price Waterhouse. Today, the division offers between 20 and 25 different PC-based products under the umbrella of the Tax Management System. "We saw the opportunity to encode expertise to the masses via the emergence of the PC as a business tool," Desmond says.

Can't keep a secret

The general consensus among Big Eight firms is that they do not lose a competitive edge by loading their products with proprietary expertise. "If you keep all your secrets to yourself, they aren't worth much," Arthur Andersen's Bergstein asserts. "The products are only valuable if clients use them. Plus, there are contractual agreements that prohibit loss."

According to Desmond, "Sixty-five percent of the companies that buy our software are not audited by Price Waterhouse, therefore, many of the software sales bring in new, large consulting engagements." The average software sale is around $75,000, while a consulting fee could easily run to $100,000, he says.

But there is no doubt that the Big Eight take selling software seriously. "This operation is a first-class software company. We are not taking a backseat to anyone," asserts Bob Forney, partner-in-charge of the Catalyst Group, part of Peat Marwick's DP operation.

One of the most hotly contested issues in entering the software sales fray is whether contenders lose their competitive edge by giving away trade secrets, often to their very competitors in an industry segment. "Most companies do view software as a competitive weapon," says Brown of Brown, Rayman and Millstein. "But, because technology moves so fast, that edge is short lived. Companies need to balance that advantage against significant software sales and the growth of a new business," he says.

So, why should users buy products from companies that sell software as a sideline business? The value-added expertise many of these organizations offer in specific vertical markets as well as in broad, cross-industry areas such as finance, accounting and data base management can be a tremendous asset to any potential customer.

Additionally, major corporations with deep pockets have recycled development costs through internal use of the products and, thus, can bring the products to market at a lower price point than independents.

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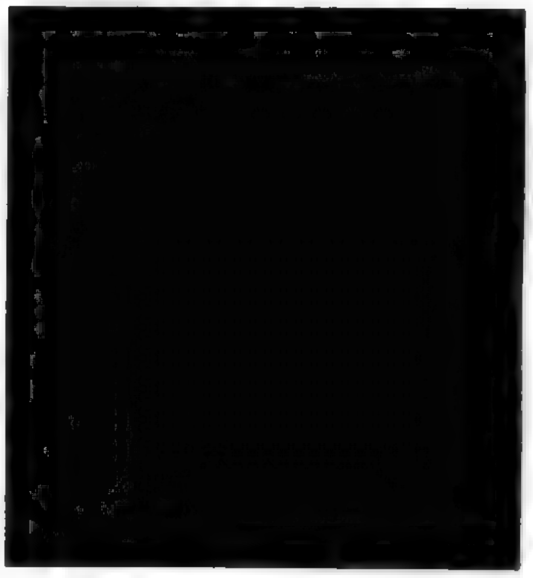

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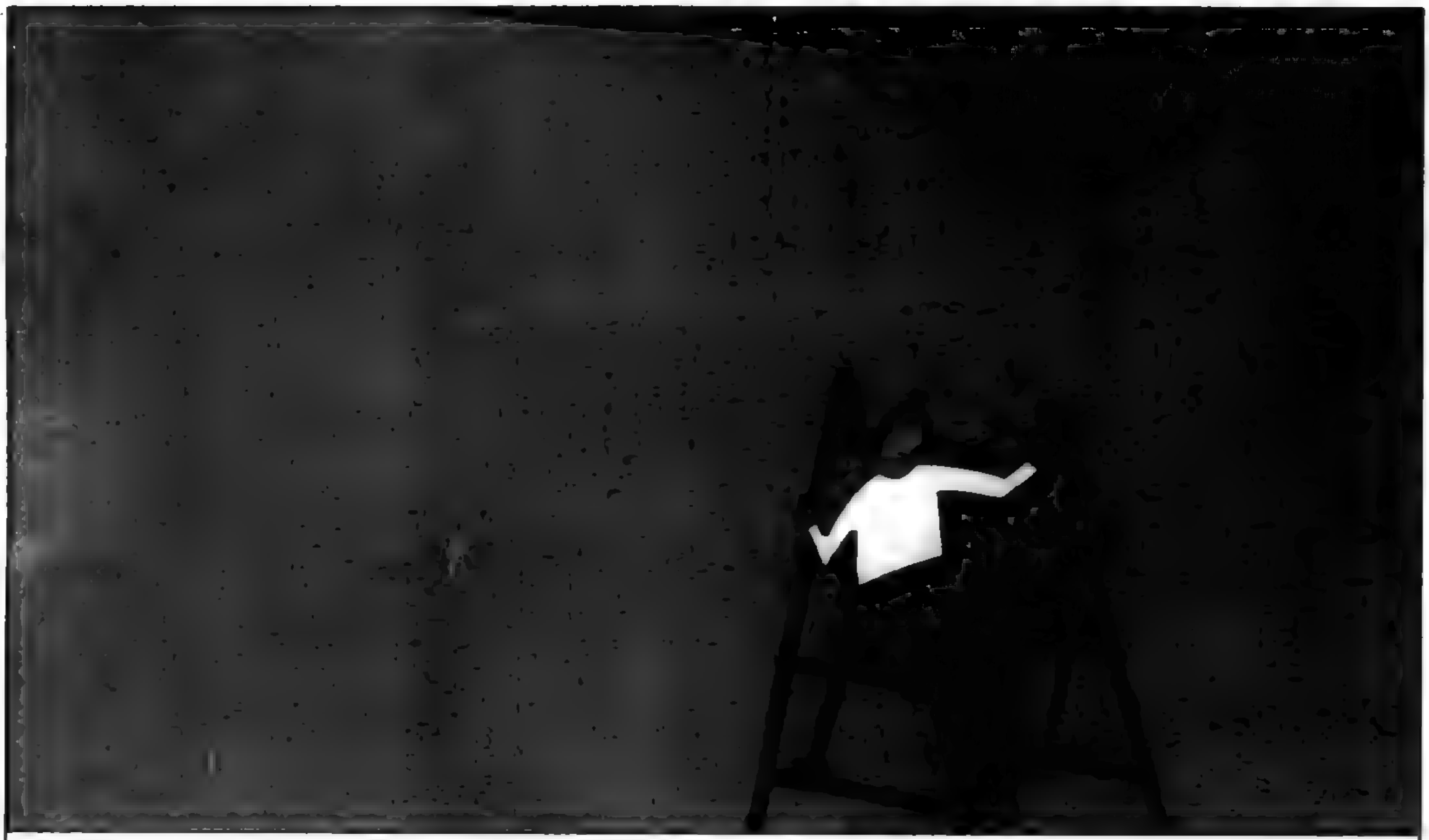

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Circle Reader Service Number 31

Management in the 1990s

BY STAN KOLODZIEJ

The work being done in artificial intelligence software today is eventually going to find its way into the office. When that happens, it's going to create ripples of change in the relationship between management and computers.

A program under way at MIT in Cambridge, Mass., focuses on those changes. Entitled "Management in the 1990s," the ambitious five-year program consists of 17 related projects working under the official mandate "to discover how the rapid acceptance of computers in corporations is affecting companies and workers."

The project, directed by MIT's Sloan School of Management, is roughly at the halfway point in its research span, which is scheduled to end in 1989. Underwriting the program are such blue-chip corporate sponsors as Digital Equipment Corp., American Express Travel Related Services Co., British Petroleum Co., General Motors Corp., Arthur Young, MCI Communications Corp., Eastman Kodak Co. and the U.S. Internal Revenue Service.

Many of the software projects promise to play a major role in shaping the very U.S. systems and management areas that these programs study.

"The 1990s study is a beginning, a chance to analyze and learn something about major management and computer issues," explains Roger Samuel, program manager of the 1990s project. "In the U.S. today, many things are happening because of the push of technology rather than the pull of the market. Yet it's amazing how poorly or incompletely explored this whole area of information technology is."

Many of the goals within the 1990s program and related MIT projects are directly aimed at increasing software productivity.

For example, one major project, called the ""Information Lens," has been looking at ways of using AI techniques to increase the effectiveness of programmers sharing and coordinating information, especially with systems like electronic mail.

RAY VELLA

MIT project looks to the future of MIS and info systems

"There are aspects of information sharing that we feel haven't really been looked into yet," explains Professor Thomas Malone, project leader for "Information Lens." "One problem is not having enough of the information you really need. This problem happens often enough with people working on different parts of a large programming project not communicating well when some programming changes are made.

"The other side of the problem is having too much information," Malone adds. "And that's a problem a lot of us are already familiar with in our paper environment. If anything, electronic communications systems simply increase the likelihood of our having electronic junk mail because they make it so easy to send many copies of a message."

Malone claims electronic communications systems can follow one of two paths: they can either aggravate communications or radically increase the bandwidth of communications in a positive way.

"What 'Information Lens' does," Malone explains, "is take advantage of not only the capabilities of computer technology to transfer information faster and cheaper but also those capabilities of the

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Kolodziej is *Computerworld Focus's* senior editor.

technology [that enable it] to be more selective in the information that's being transferred."

Being selective is also being subjective. "What we do is let users specify rules about the kinds of information they'd like to see and the ways they would like to have it sorted and prioritized for them," Malone says.

"For instance, a programmer might set up a rule saying he's interested in any bug fix announcement having to do with an accounts receivable module or tape drive and so on. Such information can then be shunted into special electronic folders," he says.

Malone

To arrive at such rules, Malone and coworkers went out to several companies and conducted interviews with project managers and programmers about how they managed, assorted and prioritized the information they received, both with paper and with electronic systems.

"What we do is try and create a language in which people can express their own rules," Malone says. To help, Malone is providing users with a set of templates for different kinds of messages.

"A meeting announcement, for instance, would have a field for things like time, place, topic and so forth," Malone explains. "A bug report message would have fields for things like urgency, what system was being used and how to repeat the bug."

Involved in the MIT project for two years now, Malone says he and his colleagues have installed a prototype "Information Lens" system at a West Coast industrial research center. Malone adds that a number of companies are interested in incorporating some "Information Lens" ideas into their own products.

"Information Lens" research requires a lot of programming resources of its own. Malone is using a Xerox Corp. 1100 series system bundled with the Xerox Interlisp D language and the Xerox Loops artificial intelligence tool system.

Malone has another ambitious project under way, a study of organizational structures and how they could change with the widespread use of information technology.

Malone says such research is enormously important because information technology is providing new business opportunities for companies. Those firms that recognize opportunities can take advantage of them, providing a significant advantage over the competition.

"There are already a number of examples of interorganizational links between companies provided by information technology," Malone says. "An interesting example from our viewpoint is the airline [industry]. Both United Airlines and American Airlines have computerized reservations systems that link their computers and the computers of all the airlines to travel agents and sometimes even to travelers.

"Computer technology might be offering companies the ability to get into a new market or to radically change the way they do distribution or to change the communications infrastructure in their firms. Communicating the extent to which managers can see and implement the new possibilities is all-important."

Communications is also important to MIT's Richard Waters, whose "Programmer's Apprentice" project concerns itself with the way programmers talk to each other.

"A program is designed in the same way that you build a house," Waters explains. "In both cases, standard pieces are used and reused. In programming, we call these standard pieces cliches. Basically, these pieces are words that programmers continually use when they are talking with each other.

"With a house, when you say you want a certain vendor's windows, that's a definite term with definite meaning," Waters explains. "In programming, such a definite term is handled by subroutines. But when something a little more diffuse, like a concept, is used, there can be many implicit assumptions that go with it. In housing, the term 'Cape,' for example, relates to a whole set of implied facets that go with it, such as type of windows, roof design and so on. In programming, such diffuse terms are beyond subroutines. That's what we're working on."

And this project requires heavy-duty hardware and software in the shape of a Symbolics, Inc. LISP-based computer and bundled software. "Our program runs 40,000 lines of LISP code," Water says. "It takes the Symbolics machine to the limit."

The result of "Programmer's Apprentice" research to date is the Knowledge-Based Editor in Emacs, a program editor that lets a programmer communicate with other programmers in cliches.

Waters

"The end result of all this research will be faster, more reliable program development," Waters explains. "It's also a big plus for [software] maintenance because the system, remembering cliches as they are used, will make it easier for a new programmer to come in and understand what a previous programmer was doing."

The 1990s study includes other important projects. Professor John C. Henderson, for example, is trying to identify ways in which expert systems and decision support systems research interrelate and how the result is changing the scope of corporate management decision making as well as programming.

At another end of the spectrum, Professor Michael A. Cusumano is updating software factories, a concept from the 1960s. Originating in the U.S., software factories have since languished here but have flourished in Japan with companies such as Hitachi Ltd. and Toshiba Ltd. in the research forefront.

"Software factories contain the notion of centralizing large-scale software development into standardized, engineering-type environments," Cusumano explains. "The Japanese have shown remarkable software productivity gains with software factories, sometimes as much as five to 10 times that of U.S. counterparts."

Why did the software factory concept fade in the U.S.? Cusumano points to the reluctance of U.S. programmers to keep detailed catalogs of programming projects over several years, an important requisite of software factories and a way of keeping track of project costs and reusable software modules.

"The concept was imposed on programmers in the U.S.," Cusumano explains. "Management was never really behind it because it was expensive."

Cusumano says U.S. firms are now taking note. "There is a movement to rationalize more large-scale software projects," Cusumano explains. "Managers are under a lot of pressure to bring projects in on time and to make after-development maintenance easier. Software factories can do that."

Cusumano adds that such microcomputer software vendors as Microsoft Corp. are now showing an interest in software factories.

"Microsoft feels that it has to become more systematized in its software development," Cusumano claims. "Actually, it's not that farfetched. The operating systems for [Intel Corp.] 80386 microprocessor-based computers are going to be as long as mainframe operating systems were a decade ago. The same factory software concepts might be applied to microcomputer software application projects."

There will be some hurdles. Cusumano says software factories are more a methodology than an actual product or set of tools. There will have to be accompanying changes in managerial attitude before software factories gain widespread U.S. use.

"Project managers will still resist [the software factory concept] because it's expensive. But what is really needed is a total organizational commitment like the Japanese have given, not just a nod from MIS," Cusumano says.

Many of the MIT researchers say they are finding that much of software research has now reached a critical evolutionary stage in which psychology, linguistics and other humanistic disciplines are assuming more important roles, taking on as much, if not more, relevance as logic and mathematics.

"My own doctorate [degree] is in psychology," Malone says. "I think a lot of the new frontiers in the computer industry have to do with the boundary between computers and people. The limits of our understanding of how to make technology are in many cases less important than the limits of our understanding of how people will use technology. That opens research to a lot of disciplines."

What do the sponsors of the MIT study hope to gain from their participation?

"That depends on the sponsor," explains John Sifonis, national director of information technology consulting at Arthur Young. "There is the direct gain of channeling certain project results into a sponsor's product or services offerings. In our own case, we've used some of the expert systems research findings to bolster our own expert systems offerings. In hard currency, we calculate a $1.7 million payback from diffusing this information throughout our company."

To keep the flow of information from the MIT project coming in and fresh, Sifonis says Arthur Young schedules frequent briefing sessions across the corporate board and uses its education and training group as an information conduit.

Various paybacks

"I think you'll find there are different reasons given [by sponsors] about the effectiveness of the MIT program and what they are getting out of it," Sifonis explains. "I know one of the original corporate sponsors dropped out quickly because they felt they weren't getting anything directly from the program."

If Arthur Young gets direct product benefits, Eastman Kodak's payback is a little more ethereal but just as important, according to George Mayo, the company's director of information systems technology. Though Eastman Kodak has a substantial interest in the overall project's research into imaging technology, Mayo says, it is the process of research that is more important than the tangible product.

"We're not expecting major [imaging] products to come directly from the 1990s study work," Mayo explains. "What it is doing for us is helping us rethink our research. It has opened up our thinking. The dividends will follow."

With research scheduled to end in 1989, the fate of the "Management in the 1990s" undertaking beyond that period is still being debated, according to program manager Samuel.

"There is no expectation that we will have answered all of the questions we've uncovered at the end of five years," Samuel explains. "The 1990s project, however, will always be remembered as an important start." ◆

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It's a dirty job, but...

Someone's got to do maintenance

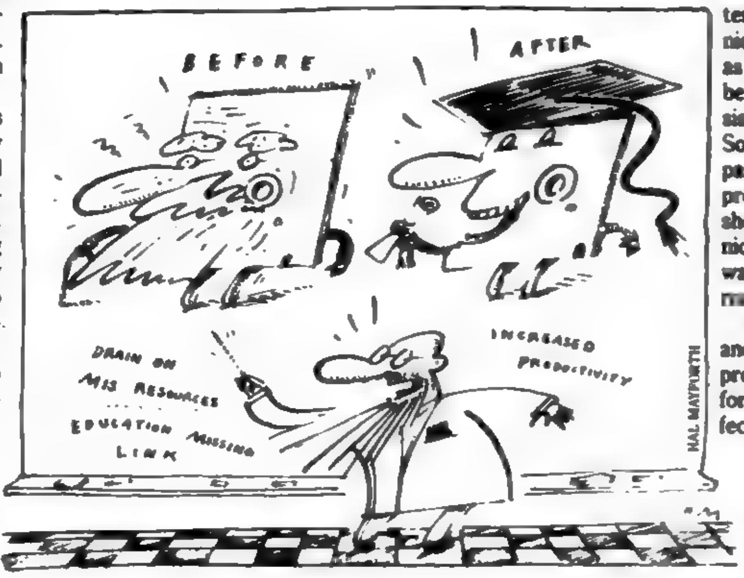
BY GIRISH PARIKH

Few of us really enjoy performing software maintenance. Just as "I don't do windows" became an infamous cry of housekeepers everywhere, software maintenance tops the list of programmers' least favorite duties. But with an increasing supply of products requiring corrective changes, modifications and enhancements to keep up with user demands and tight budgets, software maintenance is not going to go away. In fact, just the opposite is occuring.

The statistics are staggering: 50% of MIS/DP budgets are said to be allocated to software maintenance every year. Programmers reportedly spend 50% and, in some cases, 80% of their time on ongoing maintenance. Software maintenance is said to be a multibillion-dollar industry. Industry watchers contend that more than $30 billion is spent annually worldwide on maintenance. The U.S. alone spends more than $10 billion annually.

Recent work at MIT indicates that for every dollar invested in new system development, an additional $9 must be earmarked for maintenance during the system's life cycle.

The message is clear. Improving software maintenance productivity can save a fortune. But it is hard to face software maintenance problems. If you hide the problems in a closet and show a smiling face to your superiors, you are doing a disservice to your employer as well as to yourself. The MIS/DP department exists to serve the users and the organization. Maintenance is the service business that keeps the company competitive and prospering. Ignoring maintenance can threaten the survival of an organization. And setting the wrong priorities may cost you your job.



Even if software development is your priority, it makes sense to increase maintenance productivity. Every maintenance dollar saved by increasing productivity and by not cutting this essential service is a dollar available for development.

The keys to increasing productivity in almost any endeavor are the "three Ts" — techniques, tools and training. The three Ts are required for increasing programmer and manager productivity in both development and maintenance.

A collection of maintenance programming and management techniques is the essential base for increasing software maintenance productivity. The techniques can either be generic, such as problem-solving procedures, or be internal to the program or consist of external documentation. Some techniques can be specific to a particular software package or a programming language. A company should also put forth its own techniques for the effective use of software tools in a maintenance environment.

Programmers should demand and management should provide appropriate software tools for performing maintenance functions effectively, efficiently and economically. Most development tools can be continually used in maintenance, while some tools are designed primarily for the maintenance environment.

Without ongoing formal training of both programmers and managers in the use of maintenance techniques and tools, a company cannot achieve improvements in maintenance productivity.

It seems that the world of software

Parikh is a Chicago-based national consultant, lecturer and author specializing in software maintenance and programmer productivity.

maintenance tools is about to explode. Tools abound for Cobol; the most widely talked about Cobol tools are the restructuring products that convert unstructured programs into structured programs automatically.

The available Cobol products include Structured Retrofit from the Catalyst Group of Peat, Marwick, Main and Co. in Chicago; Superstructure from Group Operations, Inc. in Washington, D.C.; Recoder from Language Technology, Inc. in Salem, Mass.; and Cobol/SF from IBM. Some vendors claim their products can achieve up to a 50% reduction in software maintenance costs.

In the world of Cobol tools for the IBM mainframe, the Maintenance Programmers Workbench put together by the Federal Software Management Support Center at the General Services Agency (GSA) in Falls Church, Va., is a landmark. The GSA has classified maintenance tools in the workbench into 11 categories and procured 10 tools (one tool satisfies two categories) by competitive bidding.

The tools are integrated using the infrastructure of the Rand Development Center from Alameda, Calif.-based Rand Information Systems, Inc. Drawing from the pioneering work of the GSA, the MIS/DP departments in the industry and academia can also put together similar workbenches.

The following are the categories and the tools procured by the GSA:

- **Test coverage monitors.** The monitor the GSA procured is Analyzer from Aldon Computer Group in Oakland, Calif.
- **Translators.** Transit, the translator the GSA procured from Uccel Corp. in Dallas, converts most non-IBM Cobol to IBM Cobol.
- **Reformatters.** The reformatter the GSA procured is Hawkeye from Chicago-based Blackhawk Data Corp.
- **Data standardization tools.** The tool the GSA chose is Cobol Structuring Aid from Marble Computer, Inc., headquartered in Martinsburg, W. Va.
- **Cross-reference analyzers.** The tool the GSA procured is DCD II, also from Marble Computer.
- **Documentation tools.** The tool the GSA selected is Pathvu from Peat Marwick's Catalyst Group.
- **Source comparators.** The tool the GSA procured is Comparex from Sterling Software, Inc.'s Marketing Division in Rancho Cordova, Calif.
- **File comparators.** Sterling Software's Comparex also fulfills this category.
- **Data manipulation tools.** The GSA procured the Xpert data manipulation tool from XA Systems Corp., located in Los Gatos, Calif.
- **Restructurers.** The tool the GSA selected is Structured Retrofit from Peat Marwick's Catalyst Group.
- **Code analyzers.** The tool the GSA chose is Via/Insight from Phoenix-based Viasoft, Inc.

Standard documentation techniques and automated tools can help boost maintenance programming productivity. There should be a standardized method of communicating information about code and system to the community of programmers.

What companies need is a standard, graphics documentation technique and an automated, preferably interactive, tool to support it. The tool should be integrated in the infrastructure of a maintenance programmer's workbench.

However, all the technological tools and fixes in the world won't help your organization's software if the people performing the function don't know how to use them. Believe it or not, not many MIS/DP professionals are formally trained for a job that accounts for more than one-half of their job responsibilities — that of software maintenance!

This situation must change. The mass education of MIS/DP professionals in software maintenance is in order. Education and training can tie together the materials on maintenance technologies and tools and prepare professionals for performing the vital function of maintenance.

Professionals may pursue specialized training when appropriate. Also, general maintenance training should be ongoing. Companies need to develop education and training materials.

The programming profession is very demanding but at the same time exciting and sometimes frustrating. While meeting day-to-day demands — some requiring overtime — it is very difficult to think of anything else. But MIS/DP professionals should take some time off occasionally and try to look at their professional and personal goals. Some self-analysis can be revealing. Also, set up your own productivity improvement program. Such a self-improvement program can include studying articles and reading selected professional books regularly.

Multiskilled programmers are in demand, which puts a burden on programmers who want to specialize in one or two areas while having a working knowledge of other areas.

In addition to technical know-how, interpersonal skills are also required for an employee to survive and even flourish in DP/MIS environments. Verbal as well as written communication skills are necessary.

Proficiency in system/program design methods, data/data base design techniques and, last but not least, maintenance programming tools and techniques is also important, but in most environments, these skills take the back seat. Mastering all of these topics while designing and maintaining programs is a formidable, if not downright impossible, task.

One solution may lie in the concept of chief programmer teams, in which specialization can be encouraged.

However, just because you are keeping the software up and running, you are not indispensible. Job security is a myth. The key to real security is in becoming a productive professional.

Management should develop a positive maintenance attitude and motivate programmers. It should also provide the necessary tools and training to the programmers. With support from above and a positive outlook, MIS/DP professionals can make the most of the opportunity to solve the problems of software maintenance, rather than avoid this necessary chore. ◆

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Users debate 4GL virtues

WILBUR BULLOCK

BY REBECCA HURST

The fourth-generation language game draws a lot of attention, but few MIS professionals have come to the card table. Many who do, simply observe. Those managers who play the language game generally hedge their bets by using popular third-generation languages such as Cobol because, these users caution, the payoff from fourth-generation languages varies and is rarely immediate.

A good percentage of work in the mainframe environment is still written in Cobol, reports Dale Peacock, senior associate editor for Datapro Research Corp. in Delran, N.J. "Many [companies] are thinking about installing a fourth-generation language to handle their application backlogs," he says, but information systems managers have been slow to move, and money for new software is still tight. As a result, Peacock notes, "MIS is playing it a little cautious."

Another problem is that programmers are not ready for complex fourth-generation language application development, even if fourth-generation language products are, Peacock says. "Programmers don't have enough experience," he explains. "They feel more comfortable with Cobol or PL/I." Thus, only progressive companies that want to be at the leading edge of technology are working with fourth-generation languages.

"We were looking for tools that were state of the art," concurs Michael Johnson, director of information systems for Rochester, N.Y.-based Kodak Processing Laboratories, a business unit of Eastman

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Hurst is a *Computerworld Focus* senior writer.

Kodak Co. Kodak, along with Kawasaki Motors Corp. U.S.A. and Southland Corp., are three companies using fourth-generation languages.

Different approaches

In part, the three firms represent the different approaches users are taking with these languages. Like the larger pool of fourth-generation language users, their commitment varies. While Kawasaki and Southland develop IBM mainframe applications based on Cobol, Kodak uses Fortran to write software for its Digital Equipment Corp. VAXs.

Fourth-generation languages have quickly come to play a major role at the U.S. division of Kawasaki, which is based in Irvine, Calif.

At the beginning of 1986, Kawasaki was still a Cobol shop, recalls Roger Peterson, the company's director of information systems. In February, though, the information systems department brought in Laguna Hills-Calif.-based Pro Computer Sciences, Inc.'s Pro IV language.

Five months later, the department put the first Pro IV-built applications into action.

Following the first software introductions, Pro IV use rapidly escalated. From July 1986 through December of that year, Kawasaki's information systems group developed 243 Pro IV applications, Peterson reports. In that same period, the company only brought 19 Cobol-based applications into action. In the first four months of this year, Kawasaki added another 186 Pro IV applications, he says.

Productivity increases, particularly for on-line transactions, were a primary incentive behind the rising use of Pro IV, Peterson says. "An on-line transaction application that takes one month to write in Cobol takes two days in Pro IV," he notes. Still, Kawasaki does not plan to move exclusively to the fourth-generation language. "If it's more effective to modify the software using Cobol, we will," Peterson explains.

Fourth-generation language applications are applied more sparingly at Dallas-based Southland, a company best known for its 7,519 7-Eleven convenience stores throughout the U.S. and Canada. The company has been using ADR/Ideal from Applied Data Research, Inc., located in Princeton, N.J., since late 1983.

"We already had ADR's Datacom/DB [data base management system], so it made sense for us to choose Ideal," says David Karney, Southland's vice-president of MIS.

Although Southland has had Ideal for more than three years, the company primarily uses the language for simple applications such as on-line screens and uncomplicated reports, according to Karney. "Ideal is good, but it offers no advantage over Cobol for more complicated applications," he explains. "The bigger the project is, the less overall benefit a fourth-generation language provides." These languages do not address 75% of the application cycle, he says.

"A fourth-generation language has its biggest impact in only 25% of the application life cycle," Peterson agrees. "In the code-construction phase, 23 hours of programming in Cobol is equal to one hour in Pro IV," he says. In the remaining areas of the application cycle, third- and fourth-generation languages work about equally well.

Karney is more conservative about fourth-generation languages' advantages for smaller applications. "In a simple system without a lot of design and analysis, we see an average ratio of 5:1 in favor of Ideal," he reports. But, his assessment of Ideal's power is more optimistic than Peterson's. "In overall efforts, Southland sees a 2:1 improvement with Ideal," Karney says.

Kodak Processing Labs, a relative newcomer to fourth-generation languages, brought in Powerhouse in September 1986 after it won a copy from Ottawa-based Cognos Corp. Winning Powerhouse cut down on the fourth-generation language product evaluation process for Kodak because the firm was sizing up other languages at the time. More important, though, Powerhouse best provided the capabilities that Kodak required in such a tool.

The beta-test release of Powerhouse 5.04 met Kodak's requirements because its functions included support for variable length processing. The production version of Powerhouse that the company received in September fell short because it did not handle this type of processing, Johnson recalls. "Without support for variable length processing, we couldn't use it with our existing VAX systems," he says. Therefore, in December 1986, Johnson told Cognos that there was little it could do without this capability.

> **"It's the responsibility of MIS to look at the situation and make the right choice."**
>
> MICHAEL JOHNSON
> KODAK PROCESSING LABS

Cognos then offered Kodak the 5.04 beta package, which supports variable processing, and Johnson accepted it. Kodak has since developed two reasonably simple sales reporting applications. "My programmers figure they have had a twofold to fourfold performance increase using Powerhouse instead of Fortran," Johnson reports.

In the future, Johnson sees continuing roles for both Fortran and Powerhouse. "When you have an intensive on-line transaction-oriented application, Fortran is more efficient," he explains. These on-line transactions account for 25% to 30% of the systems developed. Another 30% to 40% of the software projects involve generating reports. "That's where Powerhouse comes into its own," he asserts. The remaining 30% to 45% is a gray area.

Kawasaki, Southland and Kodak also differ slightly in their assessments of who should develop software with fourth-generation languages. Kawasaki and Southland both say that information systems professional programmers will almost exclusively develop applications in their organizations. By contrast, Kodak's Johnson says that the Powerhouse query language is a good end-user tool.

However, the three DP professionals agree that allowing even experienced end users to write software with a fourth-generation language poses potential problems.

Concern about support

"Some of our experienced end users have the same kind of skills as our programmers and could develop systems themselves," Karney says. While these people are not limited technically, though, Karney is concerned about long-term support.

"If one person in a department develops a sophisticated system and then leaves the company, there's no one left who is familiar with that system," Karney explains. Even if the user remains, that person is primarily responsible for another job and may not have time to maintain or support the software for other users. Either way, Karney says, "We're left with the job of trying to support a product that we didn't build."

Johnson agrees that those concerns are valid. To avoid this problem, Johnson advises MIS professionals to be conscious of any end user building mainstream applications. "You need to talk with that user and get the application into the information systems [realm]," he says.

Although Kodak, Kawasaki and Southland differ in their commitment to fourth-generation languages and their availability to end users, the three companies share similar perspectives on their reasons for choosing these tools and the growth of these products' acceptance within the organizations.

All three firms cite a need to solve their application backlog problems with a fourth-generation language that is robust enough for the production environment. As such, that language has to handle both batch and on-line processing, they agree.

Tied in with these requirements is a need for limited performance degradation. "We were only willing to pay a 20% performance penalty by going to a fourth-generation language," Peterson says. Kodak would only accept a 10% to 20% increase in memory and CPU resources beyond that used by Fortran, Johnson agrees.

Other managers may have different requirements, though, Johnson suggests. "It's the responsibility of MIS to look at the situation and make the right choice." To assess a situation, managers need to compare the cost of memory and CPU resources to the cost of analysts and weigh that cost against a projected twofold to fourfold production improvement, he suggests. However, Johnson also notes that the decreasing costs of memory and hardware have made fourth-generation languages a viable alternative.

In selecting a fourth-generation language product, all three companies say they were concerned about compatibility with their existing software. For Kodak, a deciding factor was Powerhouse's ability to support all of DEC's data base file structures.

Compatibility for Kawasaki meant having a tool that could process IBM IMS data base management system files. The product also had to interface with a third-generation language. "I want to use existing Cobol programs as subroutines to the fourth-generation language applications," he explains.

Interfacing between Ideal and Cobol has been difficult, Southland's Karney says. To get the two to communicate, Southland must mesh Ideal and Cobol under IBM's CICS transactions. "That [situation] has limited the firm to writing only stand-alone applications with Ideal," he notes.

Once the three companies decided on a fourth-generation language and brought it into their shops, they each had similar experiences in getting their programmers to accept and use the language. All three DP professionals note that at least half of their systems analysts have begun working with the fourth-generation languages. All three also report that this usage was based primarily on project demands rather than specific design groups or preferences.

'They did not resist'

Many programmers in the firms were initially reluctant to use the fourth-generation language because they had worked so long with third-generation languages, the three DP professionals agree. But the Southland DP staff's reception was not a problem, Karney says. "Naturally, some programmers did not actively look for ways to use Ideal, but they did not resist it."

Programmers at Kawasaki accepted Pro IV in varying degrees. "Some had very strong concerns about it," Peterson says. "Others were eager to give it a try." Because staff members were used to programming in Cobol, a procedural language, many felt uncomfortable being confronted with nonprocedural Pro IV, he recalls.

In order not to discourage programmers, Peterson has allowed his staff to go at its own pace. Some have gotten over the learning wall in training classes, he says. Others do not get over until they finish their fifth or sixth application.

'Sense of satisfaction'

By that point, though, the programmers begin to realize that Pro IV gives them the ability to write applications a lot quicker than they could with other languages, Peterson says. "When they realized it was taking them a lot less time to solve problems, they began to get a sense of satisfaction."

At Kodak, Johnson saw a similar acceptance pattern among the DP staff. "The most difficult part was changing people's mind-set and convincing them that Powerhouse could do the same things as Fortran and make their lives easier," he says.

To bring in a fourth-generation language successfully, managers have to commit themselves and resources to educating and training their staffs. At Kawasaki, Peterson began indoctrinating programmers before selecting a fourth-generation product. "We kept the staff informed of what we were doing, our direction as the information systems department and what we were trying to accomplish. We informed them about the selection process and why we were choosing Pro IV," he recalls. "We wanted to minimize the impact of bringing in a fourth-generation language."

To make the actual training sucessful, managers must commit time as well as money, Kodak's Johnson asserts. "You have to make sure that you give your programmers sufficient time to go through the learning curve on their first applications," he says.

Developing the first application with a fourth-generation language will not be as easy as creating it with a third-generation language, Johnson claims. "If you expect a project to take 14 weeks, schedule 18 weeks," he suggests. With each successive project, managers can then bring the schedule back to 12 weeks, then nine weeks and less as they begin to see the productivity improvements vendors claim, Johnson says.

Kawasaki's Peterson concurs. "All of a sudden, you realize that you can develop a working application with very little development input, and that's where the payoff comes."

◆

Compiling the facts on toolboxes

Which product will ease the chore of coding for you?

BY WALTER KOZACHEK

Faster, better, cheaper. These three words make up the corporate mandate that MIS is expected to act upon. But sifting among the software choices to find the right work tool has become a confusing and exacting task.

Within the past several years compiler design, efficiency and documentation have improved dramatically. Cryptic or nonexistent documentation has given way to manuals that not only explain compiler operation but also give examples of language implementations, functions and usage.

MICHAEL BARTALOS

Compiler designers have even carried the structural elements found in Pascal and C to Basic and have added many built-in features and libraries to Pascal and C. Recent developments have included interactive compiler operation such as that found in Microsoft Corp.'s Quickbasic and in Borland International, Inc.'s Turbo Pascal, Turbo C and Turbo Basic. New source code debuggers such as Codeview from Microsoft help to pinpoint errors quickly.

While these products help to reduce the compile-edit-debug cycle time, however, the actual chore of coding, which is already greatly eased by modular structured languages, can be reduced even further by using toolboxes or programming utilities.

In their simplest form, toolboxes are prewritten and debugged routines that free the programmer from writing code. These modules range from small functions that deal with screen I/O to more elaborate procedures that set up complex data files.

If you are faced with a choice of coding from the ground up or purchasing a particular set of routines that suits your needs, there are many advantages in buying a toolbox product.

One chief advantage is time. Often, the time spent learning to use a particular toolbox is far less than the time it would take to actually code it. For example, writing an ISAM-like data management module would be far more work than learning how to set up record pointers for one.

Closely related to saving time is cutting expenses. The initial expense incurred in the purchase of a toolbox or utility and in learning time justifies the money saved in programming time. If some utilities seem costly, compare the cost to the cost of programming the same utilites in-house.

Because many vendors do not charge a royalty fee, the initial purchase price is the only expense. In addition, many toolbox vendors offer source code that may be altered to suit a special need, but some vendors may charge extra for this feature. However, adaptions of standard toolboxes that are too specialized may prove not to be worth the investment in programming time.

The modular approach to programming has proven an effective way to code, and programming utilities support this approach. The same routines can be used for different projects. In some instances, toolbox vendors offer products that can be used with different languages.

In fact, one of the most overlooked advantages of these routines is an increase in program execution speed by using a toolbox written in assembly language. The assembly language routine can be linked in with a program written in a higher level language. The programmer, programming in a higher level language, need only be concerned with correctly interfacing to

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Kozachek is an associate editor and analyst for "Datapro Reports on Microcomputers" a publication of Delran, N.J.-based Datapro Research Corp.

A Lesson in Accessing Public Data Networks

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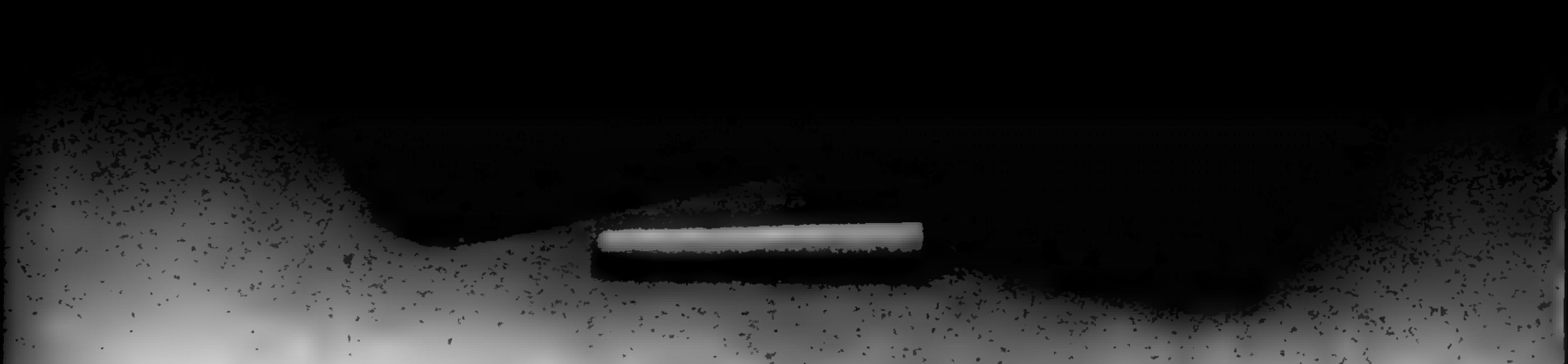

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the assembly language routine.

The selection of toolboxes and programming utilities available has never been better. Not only do major compiler vendors such as Borland offer toolboxes, but many third-party vendors such as Blaise Computing, Inc. in Berkeley, Calif., add to the diverse supply of utilities.

The types of programming utilities and toolboxes vary widely, from floating-point arithmetic routines for assembly programmers to windows routines for C programmers.

No forgetting Cobol

While file management, screen control and graphics packages are available for languages such as Basic and Pascal, programming utilities vendors have not forgotten Cobol. Although the range of products is smaller for Cobol, there is still a fairly good selection of utilities available, such as Memphis-based Tajeva Software's Cobwork and Juneau, Alaska-based Northern Computing Consultants' ScreenIO. In short, there are programming utilities, toolboxes or tool kits on the market for most of today's programming languages.

To a large extent, the decision to purchase a toolbox depends on the language used. C, with its modular design and sparse, built-in functions, lends itself to many graphics and windowing products. Many novice C programmers coming from a Basic or Pascal environment experience a kind of culture shock when dealing with tasks, such as screen I/O, that are an integral part of the C language.

There are no built-in GOTOXY or LOCATE statements in C as there are in Pascal or Basic; C, like assembly, requires you to communicate with the hardware directly.

Screen I/O in C can be a tedious job, which is why there is such a lucrative market for C libraries. Many companies offer tools to help the programmer with screen I/O, windows generation and other graphics capabilities.

Blaise Computing's C Tools 2, Richford, Vt.-based Creative Solution, Inc.'s Windows for C and San Jose, Calif.-based Amber Systems, Inc.'s VSI-The Window Machine are some of the many products that fall into this category.

C compiler vendors recognize the shortcomings of the language. While programs written in C will execute almost as fast as if they were written in assembly, like assembly, C is not particularly user-friendly.

Tool kits or C libraries can help alleviate the language's inherent unfriendliness, and as a result, many C compiler vendors recommend or list library products that work with their compilers.

Because the C language is one of the most popular programming languages for microcomputers and is a modular language built on libraries, the market for C toolboxes is a competitive one. In effect, toolbox vendors are willing to round out the C language with aftermarket routines. Most C compiler vendors welcome these products as enhancements for their own offerings.

However, languages such as Basic and Pascal have not gone unnoticed by toolbox vendors. Unlike many other language vendors, Borland International provides a full array of tool kit options for its Turbo Pascal compiler and will likely do the same for its Turbo Basic and Turbo C compilers.

Although languages such as Basic and Pascal may not require as much attention as C in the area of screen I/O, tool kit vendors often supplement these languages by enhancing their graphics features. Borland's Turbo Graphix Toolbox helps the programmer create better windows and business graphics in Turbo Pascal, as does Blaise Computing's Turbo Power Tools and Del Mar, Calif.-based Paragon Concept, Inc.'s Super Tools. Enhanced screen control for Microsoft's Quickbasic is a common feature of East Norwalk, Conn.-based Crescent Software's Quickpak and Qbase. Qbase is also available for Turbo Basic.

File management utilities for Basic and Pascal are also available. Borland offers the Turbo Database Toolbox, a B-Tree ISAM filing and quick sort routines for Turbo Pascal. DB/LIB from AJS Publishing, Inc., located in North Hollywood, Calif., and Basic Development Tools from Sterling Castle, headquartered in Marina Del Rey, Calif., bring prewritten data base functions to Microsoft's Quickbasic and Borland's Turbo Basic.

Companies such as Computer Handholders, Inc. in Arcola, Pa., and Alpha Computer Service in Cypress, Calif., offer file management and screen control utilities for Fortran compilers from Microsoft, Ryan-Mcfarland Corp. and Lahey Computer Systems, Inc. in Incline Village, Nev.

Buying precautions

With so many toolbox vendors supplying a large selection of products, you must take some precautions in buying.

First, make sure the routines do what you want. This advice may seem obvious, but nothing is more frustrating than purchasing a set of routines only to find out that they fall short of what you wanted to accomplish. This realisation could happen after you spend a lot of time learning how to use the routines. Not only will the purchase price be lost but so will the time spent learning the toolbox routine.

Try to get a clear idea of what the program needs to do and what the routines actually can do. An example of mistaken capabilities might be in buying a C windowing routine that only creates titled windows when you need overlapping windows.

If no off-the-shelf routines satisfy your project's requirements, investigate how difficult it would be to modify an existing routine.

You may have an advantage in this situation if you can find toolboxes that are written in the same language as the one in which you are programming.

> **Many novice C programmers coming from a Basic or Pascal environment experience a kind of culture shock when dealing with tasks, such as screen I/O, that are an integral part of C.**

Second, check what is included in the tool kit. Is the source code supplied? As mentioned, many vendors charge extra for this feature. However, source code may be essential if you plan to modify the routines. Is full documentation included? The more complete the documentation, the easier it is to learn the routines. Is there a tutorial or sample program included? Learning time can be reduced by reviewing good examples.

Third, many vendors offer package deals that group similar utilities together. These packages can save money and time and can be more convenient. However, make certain you understand what the package includes. For example, screen enhancements do not necessarily mean windowing capabilities.

Fourth, check for royalty payments. Most toolbox vendors do not charge royalties on their products, and, in most cases, this fact is clearly stated in their advertisements. However, doublecheck — it is better to be safe than sorry.

Lastly, ensure that the routines or utilities will be compatible with your compiler. Toolbox vendors often have several different versions of their products to accommodate different compilers. Also check for compatibility in the actual version of the compiler. This step is especially important if your compiler is not the current version that a company offers. Most compiler vendors publish lists of compatible products.

Some drawbacks

For all the advantages toolboxes provide, these products also have some drawbacks.

One disadvantage is the state of the documentation found in today's products. In general, toolbox documentation lags behind compiler documentation. Similarly, there are a variety of different programming utilities available, but a substantial amount suffer from poor or marginal documentation. The situation is improving, but documentation should be an important factor in your purchasing decision.

Furthermore, many times the comments in source code can stand improvement as well. C or assembly language routines with little or no commentary make the routines almost impossible for a programmer to alter or understand.

One of the biggest disadvantages of a toolbox routine is the amount of time required to learn how to use it. In addition to conquering the stigma attached to products not produced in-house, you must overcome the long learning curve required for complex toolboxes. Moreover, some people view the time spent learning the routine as time better spent writing it and consequently knowing the routines thoroughly.

Careful programming toolbox or utility selection can mitigate xenophobia and programmer cynicism and shorten program development time. ◆

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Humanizing the machine

AI bridges the man-machine gap

BY LARRY R. HARRIS

During the past 15 years, there have been many productivity aids introduced to benefit MIS, but none offers the long-term potential benefits of artificial intelligence technology. In a sense, although AI is merely a set of new programming paradigms, when it is combined with existing applications and data bases, it has a positive impact.

There are two major commercially viable AI market segments: natural language and expert systems.

A natural language computer system is one that understands and translates natural language into a formal computer language. The real power of natural language comes from the definitional structure on which the translation is based. The primary function of a natural language system is to map from the user's conceptual view to the data base management system's logical view, much like the function of the DBMS is to map from the logical view to the physical view.

Natural language technology benefits MIS in a variety of ways. The most obvious benefit is the indirect use of a natural language to reduce the MIS backlog by making end users self-sufficient. Instead of writing custom reports, major corporate MIS departments can simply maintain data bases and use a natural language to disseminate information. Once MIS gives users a tool that allows them to be self-sufficient, MIS may find that users are happier doing the work themselves. The result is a rare win-win situation between MIS and users.

Natural languages also offer many productivity benefits directly to MIS, including data base application development and maintenance, applications prototyping and IBM SQL code generation and training.

Perhaps the most important benefit of such tools is the use of natural languages for prototyping. Small mock data bases can be quickly defined inside the natural language system and presented to users. Giving users these mock data bases early in the development cycle allows them to determine what they want.

A natural language is also an excellent tool for enabling applications programmers to learn data manipulation languages such as SQL and to transfer the generated SQL into their application code.

Harris is chairman of Waltham, Mass.-based Artificial Intelligence Corp., a maker of AI software.

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A second AI segment that has commercial possibilities is expert systems technology. The simplest definition of expert systems is that they consist of four programming paradigms: backward-chaining inference, forward-chaining inference, object-oriented programming and hypothetical reasoning.

Backward chaining

The goal-directed, backward-chaining paradigm is the one most familiar to conventional programmers because it works much like a subroutine call mechanism. At any instant the system tries to determine the value of variable X. This is done by looking for rules that yield a value for X, that is, If A = 3 and B > 4 Then X = 2.

The If condition of each rule that yields a value for X is now evaluated to see if it is true. For example, the system would try to determine the value of A by looking for rules that yield a value of A. Once a value for A is found, if that value is 3, the system will seek to determine a value for B and so on. If one thinks of the evaluation of a variable as a subroutine call, it is easy to see how the system chains down until it finds an If test for which the values are either already known or can be asked of the user. At this point, the system begins returning these values up the calling sequence.

The forward-chaining inference approach to problem solving is as powerful as it is different from backward chaining. With forward chaining, whenever a data value changes, the set of active rules are scanned to find rules whose If conditions are now satisfied as a result of the new data value. The affected rules are added to the system's agenda. At each execution cycle, the Then portion of the top rule on the agenda is executed, which, if it changes a data value, will likely cause more rules to fire and be put on the agenda.

With this facility, one can trace a variable or graph its value as it changes. The following rule graphs X: If X = any value Then call graph (X).

Whenever X changes — and only then — the rule will fire, will be added to the agenda and will eventually be executed. Typically, we can define the priority of each rule to affect the order in which rules are executed on the agenda.

Intelligent data objects are at the core of expert systems' object-oriented programming paradigm, which extends the movement begun by data base technology of factoring out sharable data objects from applications. These intelligent objects know how to respond to a variety of different uses in different circumstances as well as how to relate other objects.

In their pure form, object-oriented applications send messages to objects, and the objects know how to respond to these signals. The objects may also have rules attached to attributes that may fire each time the attribute is needed or altered.

The hypothetical reasoning paradigm refers to a class of problem-solving techniques that involve reasoning about future alternatives to determine the best sequence of steps for attaining a desired result. The classic applications of hypothetical reasoning are planning applications.

All four types of AI reasoning can be provided in the traditional DP environment. There is no inherent need for a specialized AI language such as LISP or Prolog or even for specialized hardware such as LISP machines. While today most software systems that provide these AI paradigms are LISP based, these systems are available in conventional hardware and are written in conventional languages. With interfaces to data bases, teleprocessing monitors and standard programming languages, AI will become a well-regarded weapon in the arsenal of virtually every professional systems developer.

There are three major benefits that expert system technology provides MIS. These include the new class of applications expert systems can address, the improvement of existing applications and the availability of intelligent debugging aids.

With expert systems, MIS can now address a class of strategic, mission-critical applications. The AI programming paradigms have proven to be effective in simulating intelligent decision-making capabilities. Because of this ability, MIS can for the first time address such applications as credit assessment, insurance underwriting, financial analysis, product configuration and diagnostic applications.

If these programming metaphors handle tough, new applications, they should also be helpful on certain existing applications. In fact, for traditionally hard-to-maintain components of existing systems, the AI approach may well lead to more maintainable code.

Furthermore, regression tests of rule-based programs can store not only the correct answer but also the reasoning chain that led to the answer.

Whose error?

Thus, when MIS tests future versions of programs, if these programs fail a particular test, MIS can automatically determine which change in the program made by which programmer contributed to the error. This fundamental distinction of the rule-based paradigm may ultimately lead to a major advance in software engineering.

A financial application that leverages existing information in the corporate general ledger files ideally illustrates the productivity impact that natural language and expert systems provide. This example also shows the way in which these AI technologies must be integrated into the existing DP environment.

The basic nature of a general ledger application is to provide managers at all levels in a company with an automatic mechanism for identifying segments of the company that are not operating according to plan.

Each month the corporate general ledger produces a snapshot of the revenue and expense side of a company. This information, combined in a historical fashion, provides the basis for tracking trends and measuring the performance of various business units against plan.

Unfortunately, the complexity of such files is great. As a result, most corporations have not even been able to provide such information to managers on a query basis. Expert systems should do the work of querying the file from hundreds of different perspectives, analyzing answers, following implicit relationships between business segments and, finally, making and justifying its recommendations. This application allows management to spend most of its time focusing on those areas that require its attention.

Complexity arises

There are aspects of such applications that introduce considerable complexity, however. One is the time-series aspect that arises because data contains multiple general ledger snapshots over a variety of time frames. The other aspect arises because mainframe general ledger files always contain a mix of detail and summary records within the file. Both aspects put a considerable burden on the user who will have trouble mapping even simple business concepts onto a data base.

A concept such as "Variance" can be applied to a variety of things (variance in dollar sales vs. variance in unit sales) and can exist in multiple time periods. The concept of the "Eastern Region" requires understanding the chart of accounts and how to select in or out the proper summary level records. This is where the AI technology adds real value and where existing conventional software approaches fall short.

Conventional approaches such as fourth-generation languages, SQL or menus fail to solve this problem because they don't understand the intricate structures of such data bases and, as a result, they put too much of a burden on the user.

Although fourth-generation languages and formal query languages such as SQL are very powerful programming tools in the hands of a trained programmer, their application as end-user tools is limited only to the technically sophisticated. Use of these systems presumes a complete knowledge of logical data base design, which most end users do not have for even simple applications much less for an application as complex as a historical general ledger. These systems simply do not supply any support to the user in terms of mapping a simple business concept onto the data base.

MIS should not mistake an end user's lack of technical programming skills for a lack of business sophistication. The real problem is bringing the computer up to the level of sophistication of the user, rather than the other way around. For example, providing a menu system to a sophisticated business professional forces users to communicate complex concepts that they routinely manipulate one grain at a time via menu interaction. This procedure brings users down to the lowest possible level.

Spreadsheets and financial modeling systems represent the most viable conventional means for dealing with the general ledger application. But once again, the logical data structure's complexity pushes even these systems beyond their limits.

Two-dimensional personal computer-based spreadsheets immediately fail to cope with what is inherently an eight-dimensional logical data structure. At a minimum, each of the following are logical dimensions: fiscal year, actual or plan, month, sales dollars, sales units, region, branch, salesman, customer, product line and product.

Spreadsheets have been very successful at manipulating two-dimensional extracts of this much larger model. But any single spreadsheet fails to capture the entire model. Multidimensional financial modeling packages can represent the logical file structure but only by substantially increasing the complexity seen by the user.

The essence of the natural language approach is to have the system understand both the intricacy of the data base structure and the meaning of user terminology. It thus becomes possible to automate the mapping of a particular request, phrased in the user's own terms, onto the data base. Looking at the aspects of data base complexity will show how this applies to the historical general ledger.

The complexity due to the inherent time series structure of the data means that every attribute in the standard general ledger occurs many times and therefore must be more fully qualified. A typical field name in this file might be "1987 ACTUAL JAN SALES."

There is an inherent structure to this time series in the user's mind. Users rarely will fully qualify an attribute reference because, to them, the defaults are so obvious. It is important that the system understand the user's view of this time series, or it will be unable to understand the user's partially qualified attribute references.

A major advantage of this approach is that the system understands individual phrases such as JAN and ACTUAL. Understanding these words independent of specific fields in the data base is essential to understanding the level of user definitions that are layered on top of these words. The other aspect of the complexity of the historical general ledger problem comes from the fact that the data contains summarized and detailed facts. Once again, the natural language solution to this problem is to provide the system with a description of how the data is summarized.

No meaningless answers

Once this description is done, the natural language system can determine the proper records to retrieve to answer each user's request. If the desired subtotals are already precomputed, the answer can be retrieved directly rather than by passing much of the file to compute the subtotal. A side benefit of this approach is that the user will never be given a meaningless answer because the subtotals will never get mixed with the details.

At the end of each month, users can employ a natural language system to look for any area that is off plan. The goal of the expert system aspect of the solution is to automate this process to provide a report of business units that require management attention.

This goal seems straightforward until you realize that the data can be viewed in hundreds of ways and that the interactions can be very subtle. The problem gets particularly interesting after an anomaly is discovered, because the system must try to assess the cumulative cost of not fixing such a problem. This assessment requires knowing the interaction of the various parts of the enterprise.

These relationships, which are unique to each enterprise, can be represented within the rules of the expert system. By taking advantage of the platform provided by the natural language solution and layering on forward- and backward-chaining rules, it is possible to implement such an expert system. The system is an extremely high-level, strategic application from which any corporation can benefit.

By giving end users and DP/MIS professionals a tool that is powerful enough to address strategic business problems, AI can make a serious contribution to the productivity of DP/MIS and its entire enterprise. ◆

products

TECH TALK

Massive multiprocessor of use to mainstream DP

By Michael Tucker

This April, Cambridge, Mass.-based Thinking Machines Corp. introduced a new machine — the Connection Machine 2 (CM2). Essentially, this is an upgrade of an existing product, the CM1.

The CM2 is a monster multiprocessor — we're talking 64,000 processors. We're also talking about a price tag that starts at a cool million.

While a 64,000-processor megamachine is fascinating as a technology, it is not traditionally the sort of thing that MIS would choose for accounts payable. For that kind of task, a standard serial monoprocessor works quite nicely.

Yet two things compel me to write about Thinking Machines' product, both of which have to do with software.

One, because of its software, the CM2 may be the first massively parallel machine to demonstrate true utility to MIS. Two, the advances that were done to make the CM1 useful to MIS — and most of those changes were in its software — say some rather important things about how so-called advanced computing will enter mainstream data processing.

Asynchronous Unix and minicomputer technology merge in controller, page 59.

Thinking Machines got in its start in the early years of this decade when W. Daniel Hillis, an MIT computer scientist, wrote an acclaimed book entitled *The Connection Machine*. In it, Hillis argued for a radically new computer design — a non-von Neumann machine based on thousands of processors massively interconnected.

At about the same time, the U.S. government was becoming concerned about the U.S.'s ability to compete both commercially and militarily in an increasingly destabilized world. A number of projects were initiated to fund research and development in strategic areas. One of these areas was the Defense Advanced Research Projects Agency's (DARPA) Strategic Computing Program. DARPA was particularly interested in supercomputers.

The CM2 *5-ft cube houses 64,000 parallel processors.*

Enter Sheryl Handler, an entrepreneur. In 1983, she founded Thinking Machines, and Hillis, along with Marvin Minisky, became the company's founding scientists. DARPA chipped in research money, and some venture capitalists came out of the woodwork to invest. Shortly thereafter, and to the amazement of observers, Thinking Machines introduced its first machine, the CM1.

The CM1 was an impressive machine both technologically and aesthetically. Technologically, it was the first massively parallel symbolics processor. It was huge, fast and well funded. It was a supercomputer that could also fit in the artificial intelligence market just above such dedicated LISP machines as those from Symbolics, Inc. and Lisp Machine, Inc., both located in Cambridge. In fact, it used Symbolics workstations as front ends to its machine. But, unlike those workstations, the CM1 was composed of off-the-shelf hardware.

Aesthetically, the CM1 was interesting because, like the CM2, it looked the part of a supercomputer. Both machines are immense black cubes, glittering with tiny red lights. (The exact function of those little lights is unclear. The firm says they are used for certain diagnostics; cynics suggest they are just there to look pretty.)

It was blessed box, not the least because these were good times for AI and multiprocessors. Government grants, venture capital and initial public offerings were all easy to come by.

Then, in 1986, the bottom dropped out of the AI market. Makers of LISP engines found themselves in serious financial

Continued on page 63

PRODUCT CLOSE-UP

C tool cracks 640K limit

A C programming product from Natick, Mass.-based Rational Systems, Inc. may have finally put a crack in the 640K-byte programming ceiling that has plagued micro programmers and users for years.

Though IBM promised to smash the 640K-byte memory barrier with its OS/2 operating system, you may not need to wait.

Rational Systems claims its DOS/16M large memory development environment lets C and assembly language programs address up to 16M bytes of code and data under Microsoft Corp. MS-DOS Version 3.0 and up.

C compiler compatible

DOS/16M is said to be compatible with existing C compilers such as Microsoft's C 4.0 and Lattice, Inc.'s C 3.1 and 3.2 as well as with existing linkers such as Microsoft's Link.

Terence M. Colligan, president of Rational Systems, says DOS/16M serves up two advantages for programming at the micro level. "First, it lets commercial personal computer programmers access bigger data areas for existing programs without leaving MS-DOS 3.0," Colligan claims. "Mainframe and mini programmers can now run large programs needing more than 640K bytes of memory on Personal Computer ATs and compatibles. Developers don't have to wait for OS/2 to develop large programs. They can use existing compilers and linkers and develop programs in protected mode."

No need to wait for OS/2 to develop large programs, Rational Systems claims.

Colligan also says that assembly language and C programmers

Continued on page 58

BLUE
BEAT

Reality of OS/2

Deidre Depke

The OS/2 hoopla has died down, the announcement stories have been written and analysts have burst forth with their opinions.

In case you somehow missed all the excitement, let's do a short review.

OS/2 was announced on April 2 as the operating system of choice for IBM's Personal System/2. Because the system won't be available for a while, IBM and Microsoft Corp. also served up a new MS-DOS version that will fill the gap.

OS/2 was developed jointly by IBM and Microsoft, although it's a pretty good bet that Microsoft did a lot more work on it than IBM. It is a single-user, multitasking operating system that is made up of an operating system kernel and a Microsoft Windows presentation manager. Applications running under OS/2 can take advantage of 16M bytes of real memory or 1G byte of virtual memory.

But those are just the basics. There are a lot of additional facts that every MIS department has to keep in mind before it runs out and outfits the whole company with OS/2.

IBM and Microsoft may have a tough time delivering this product by its current deadline of sometime in the first quarter of 1988. Developers who have used early versions report that the operating system needs improvements. Besides, the software industry is notoriously bad at meeting deadlines in general, so don't hold your breath.

OS/2 isn't going to make Intel Corp. 80386-based machines

Continued on page 59

Sybase targets on-line market

Sybase, Inc., located in Berkeley, Calif., announced last May that it was entering the on-line products market. The distributed data base maker said it had modified its product, a Sybase data base management system, to operate in the commercial on-line applications world.

Specific markets that the offering will target include such I/O-intensive situations as commercial transaction processing.

This change in strategy is significant in that Sybase has traditionally existed on Unix machines and, more recently, on the Digital Equipment Corp. VAX. Both types of machines have been criticized for not having the I/O capacity necessary for heavy on-line transactions. Yet, Sybase officials claim that their product could provide the I/O muscle the hardware lacks.

In addition, the firm says it is also planning to port the product to IBM systems. Initial targets will include IBM's Personal Computer and 9370.

Originally, the Sybase data base management system's claim to fame was that it was one of the first fully functional distributed data bases.

The product, rolled out in 1985, stored data in one or more centralized host machines and ran as a front end on user workstations. In effect, it solved the distributed DBMS problem by centralizing the data and distributing the users.

Two modifications

To enter the on-line market, Sybase has modified its product in two ways. First, it has given the DBMS a multithreaded architecture. Second, the Sybase DBMS can store and use previously compiled procedures.

A multithreaded architecture can mean a number of things. Chief among these, though, is that the Sybase product effectively gives the host machine a separate data base operating system running above the native operating system. This DBMS operating system acts similar to a real-time executive. It is faster and smaller than the native operating system but takes care of all the data search functions of the application, which frees up a portion of the native operating system for non-DBMS functions.

Moreover, the DBMS operating system can process multiple IBM SQL statements at the same time. Thus, it is capable of rapid, multithreaded operations.

The Sybase DBMS can use stored and precompiled applications written in an extended version of SQL known as Transact-SQL. Sybase says that these stored procedures can eliminate up to 80% of query processing time.

High order throughput

The company is gunning for just about any market requiring high order throughput. Sybase officers talk about using the product in everything from order-entry situations to executive information systems to automated teller machine networks.

Sybase's success or failure in this market could have long-term implications for the industry. In the past, most vendors of DBMS for Unix and DEC machines have steered far away from on-line transaction processing.

The conventional wisdom has been that the technical requirements are just too demanding and the market is already controlled by mainframe software manufacturers, including, as of this year, IBM. Most of Sybase's rivals have been content with the existing microcomputer and minicomputer markets and with tools for developers working with IBM's DB2.

Should Sybase win its gamble, the conventional wisdom will be proved wrong.

Depending on the CPU involved, the Sybase DBMS is priced from $1,000 to $150,000. — Michael Tucker

Circle Reader Service Number 125

C Tool

Continued from page 57

can directly access more than 640K bytes of memory without performing a great deal of program modification, something that is required with OS/2.

No rewriting, recompiling

"Users do not have to rewrite or recompile their programs," Colligan explains. "They can just relink them with DOS/16M's library."

Colligan claims that user programs will still be able to perform typical operations such as executing direct I/O, signaling and handling interrupts and transparently accessing video random-access memory. Such operations, according to Rational Systems, can be handled in protected mode at the same speed as real mode.

DOS/16M does not carry a light price tag, weighing in at $29,000. Included in that cost is a royalty-free, runtime license to convert one commercial program to run in protected mode.

Rational Systems says that the license fee for additional protected-mode products for DOS/16M costs $10,000 per product. — Stan Kolodziej

Circle Reader Service Number 126

High Tech Advertising. When the

COLUMBUS, OHIO • 9:35 A.M.

After three years of development, the PC-based financial planning product of a multinational U.S. company is ready to be marketed in Western Europe and the Pacific Basin.

With a limited budget, the marketing director needs to develop an advertising plan that delivers maximum impact in targeted international markets. First, he needs to know his best prospects, then, how they view his company's products, and finally, what competition he will face.

His solution: Call **International Data Group.**

FRAMINGHAM, MASSACHUSETTS • 9:45 A.M.

The marketing director calls Frank Cutitta, director of **IDG Communications International Marketing Services.**

Cutitta decides that initial research is needed. He immediately contacts Mike Raimondi, director of Database Services for **International Data Corporation's Global Data Resources.**

Cutitta and Raimondi map out a comprehensive **QuikSurv** telephone survey which will poll both MIS professionals responsible for selecting and purchasing similar products in large corporations, and PC end-users who will actually use the product in Europe and Asia.

The marketing director authorizes the study.

E-Mail assignments are quickly sent to IDC's international offices in London, Paris, Munich and Sydney.

SYDNEY, AUSTRALIA • 11:30 A.M.

Cutitta discovers strong competition in Australia where similar but lower-level PC-based financial products are already on the market. He contacts Alan Power, vice president of **IDG Communications' Pacific Region** and general manager of *Computerworld Australia.*

Power recommends a two-tier advertising campaign highlighting the product's technical breakthroughs, and stressing the program's ease-of-use and strong local sales support.

LONDON, ENGLAND • 2:00 P.M.

At the request of Cutitta, Philip de Marcillac, director of **IDC's European Research Center**, prepares a forecast of PC-based financial planning product sales to provide critical information as the team determines how to best reach key corporate targets.

Minis get Unix mainframe link

Controller connects up to 256 asynchronous terminals

Pioneering users of Unix-based minicomputers are moving into mainframe territory, and they are bringing both Unix and mini technology with them.

"The mainframe Unix market is appealing to users who have outgrown Digital Equipment Corp.'s VAX," says Gig Graham, program director for the Gartner Group, Inc., a Stamford, Conn.-based consulting firm.

While mainframes support synchronous communications, many Unix users prefer the asynchronous nature of Unix and the minicomputer concept in which the CPU provides full screen character support, Graham comments.

In response to these users' demands, Emeryville, Calif.-based Unisoft Corp. is bringing out a communications controller that connects asynchronous terminals to Unix mainframes.

Unisoft's 9750 CU/X combines the software house's Unix I/O terminal driver software with Santa Clara, Calif.-based Intel Corp.'s Fastpath computer.

Reportedly, 9750 CU/X will increase speed and terminal support for Unix mainframes while reducing line costs. Traditional solutions provide support for up to 32 terminals at speeds of 1,200 bit/sec., according to Unisoft.

The 9750 CU/X allows the mainframe to support up to 256 terminals at 9.6K bit/sec., the company says. The Unisoft terminal controllers also reduce the cost of adding lines from $3,000 to a range of $500 to $1,000, a spokesman claims.

Supports Amdahl UTS

The 9750 CU/X was designed to operate with all Unix mainframes, but the first release is said to support computers running Sunnyvale, Calif.-based Amdahl Corp.'s UTS mainframe Unix.

The choice of UTS comes as no surprise for Unix industry followers. The CU/X software development has been led by Unisoft's president, Donal O'Shea, who came to the company from Amdahl where he headed UTS development. Several other Unisoft engineers came from Amdahl with UTS experience as well.

Background experience aside, Unisoft has also chosen to support perhaps the most well-established mainframe Unix operating system. UTS was the first commercially available mainframe Unix, and it also has developed the largest installed base to date. In 1986, Amdahl sold 70 new UTS licenses, according to the Gartner Group. IBM came in second with 50 new IX/370 Unix licenses in 1986.

Pricing for a 64-line 9750 CU/X unit for UTS costs $700,000 plus a one-time $5,000 installation charge and a monthly maintenance fee of $700.

Each additional 64-line increment costs $22,000 and carries a $500 installation charge and $200/mo. maintenance fee. — REBECCA HURST

Circle Reader Service Number 127

Blue Beat

Continued from page 57

work better, either. OS/2 capitalizes on Intel 80286 capabilities. A version utilizing native 80386 capabilities has not yet been announced.

There is no real difference between IBM's version of OS/2 and Microsoft's version of OS/2. However, IBM's OS/2 Extension does contain communications capabilities and an IBM SQL data base management system. So, if you don't want to tie your PCs into large IBM systems, buy earlier versions of OS/2.

On the other hand, if you're not a real pioneer, you will want to wait a while before buying anything. Early users report that the operating system needs both speed and performance enhancements. In fact, if you're looking for speed, put your OS/2 acquisition plans on hold. Developers say the operating system's compatibility box, which runs applications that are compatible with MS-DOS, is twice as slow as it is under MS-DOS.

If you already use personal computers with MS-DOS, the PS/2 line running with OS/2 is going to give you one big headache.

OS/2 applications will run on the PS/2, but not on PCs or compatibles. MS-DOS will run on both types of systems, but you're going to have to convert 5¼-in. MS-DOS applications to a 3½-in. format to run them on the PS/2. And conversion is neither a fun nor an easy job.

IBM and Microsoft have clearly provided the direction that will take personal computing into the next decade. But users are still left with a number of choices.

You can stick with the MS-DOS standard, which will surely evolve further this year.

Later, when questions on OS/2 are cleared up, you can make the move.

Or, if you're a real high roller, buy some PS/2s, throw an early version of OS/2 on them and accept the realities of an emerging standard.

Depke is editor of "IBM Watch," a biweekly newsletter published by IDG Communications, Inc.

World is bigger than your budget.

FRAMINGHAM, MASSACHUSETTS • 4:30 P.M.

Cutitta and Raimondi meet with IDC's QuikSurv's Ken McPherson and Judy Danielson to summarize the survey findings.

Sheryl Merchant, IDG Communications International Marketing Services sales and marketing support manager, uses IDG's global E-mail Network to check foreign currency exchange rates and closing dates for all international magazines.

UNITED STATES, EUROPE, ASIA • 4:45 P.M.

Cutitta initiates a global conference call to review final recommendations with IDC's regional offices in Sydney, London, Munich, Hong Kong and Framingham. His plan is to target MIS professionals by using *Computerworld Australia, Computerworld Asia, Computerwoche, Computerworld Italia* and *Computer News* in England. The PC end-user campaign will stress product documentation, reliability and service, and break in *PC World* editions in England, France, Germany and Australia.

COLUMBUS, OHIO • 5:30 P.M.

The marketing director accepts the IDG recommendation and notes that the media plan prepared by IDG will penetrate all target markets within budget restrictions. He gives Cutitta a final commitment for advertising space in the selected IDG magazines. All the ads will be placed centrally through IDG/IMS in the U.S.

His new product campaign will break in three weeks.

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CALENDAR

July 12-18

The Fourth Annual Information Center Conference & Exposition. New Orleans, July 12-16 — Contact: Information Center Conference, Weingarten Publications, Inc., 38 Chauncy St., Boston, Mass. 02111.

Maximizing the Potential of Your Messaging System. Minneapolis, July 13-14 — Contact: Business Communications Review, 950 York Road, Hinsdale, Ill. 60521.

Managing Your System 85/75. Chicago, July 13-14 — Contact: Business Communications Review, 950 York Road, Hinsdale, Ill. 60521.

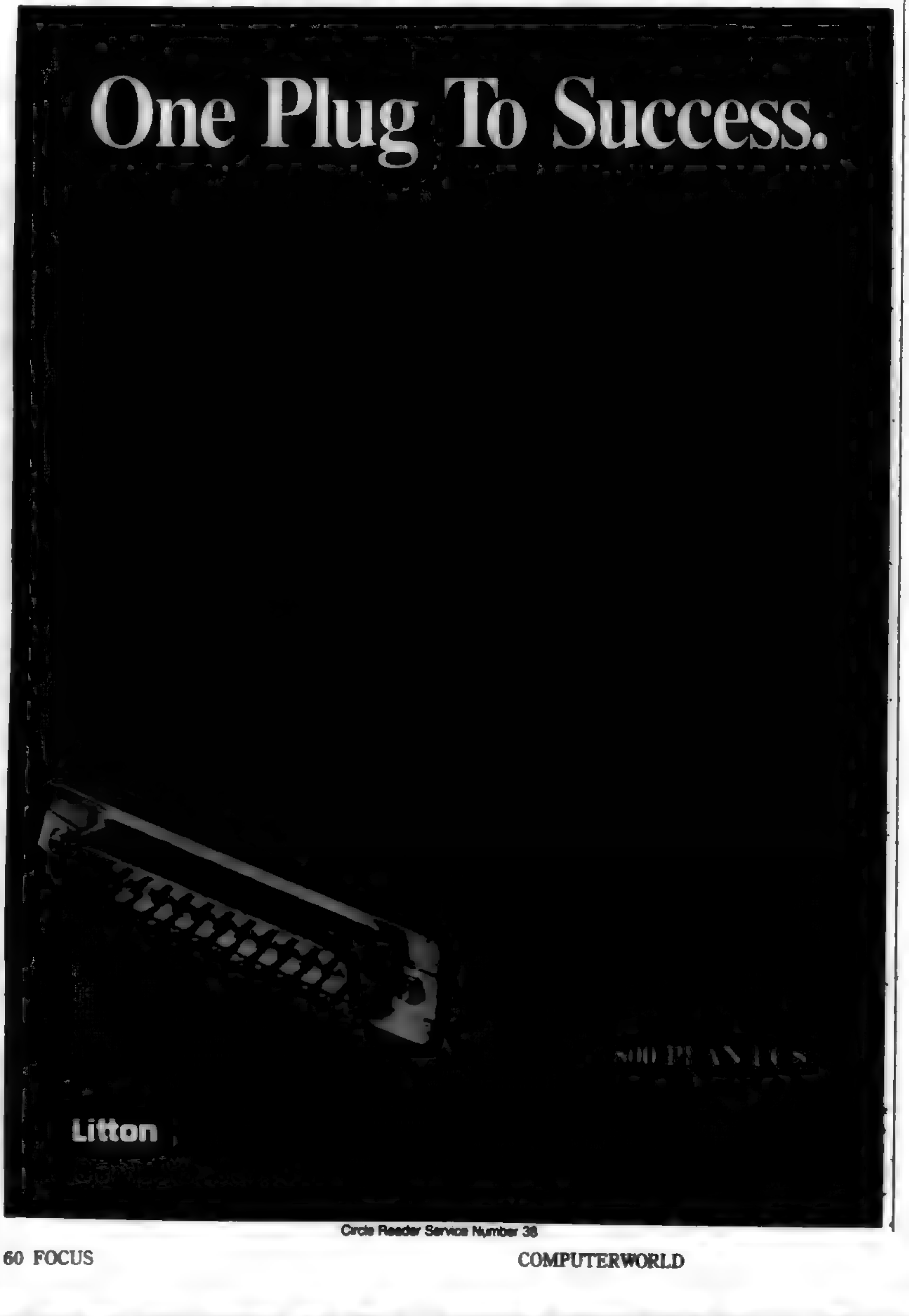
The New Standards: OSI and ISDN. San Francisco, July 13-15 — Contact: Technology Transfer Institute, 741 Tenth St., Santa Monica, Calif. 90402.

Simulation and Other Tools for DP Performance Evaluation. Washington D.C., July 13-15 — Contact: Technology Transfer Institute, 741 Tenth St., Santa Monica, Calif. 90402.

Data Communications: Basic Concepts. Saddlebrook, N.J., July 13-15 — Contact: Business Communications Review, 950 York Road, Hinsdale, Ill. 60521.

AAAI-87 Sixth National Conference on Artificial Intelligence. Seattle, July 13-17 — Contact: AAAI-87, 445 Burgess Drive, Menlo Park, Calif. 94025.

Intro to DMS/OS. Rancho Cordova, Calif., July 15-16 — Contact: Sterling Software, Systems Software Marketing Division, #100 11050 White Rock Road, Rancho Cordova, Calif. 95670. Also being held Sept. 23-24 and Oct. 28-29 in Rancho Cordova.



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Chief Information Officer: Teaming for Profit. New York, July 14-15 — Contact: William Smulsky, The Yankee Group, 200 Portland St., Boston, Mass. 02114.

Metropolitan-Area Networks. Los Angeles, July 16-17 — Contact: Business Communications Review, 950 York Road, Hinsdale, Ill. 60521.

July 19-25

Telecommunications Management. New York, July 20-22 — Contact: Business Communications Review, 950 York Road, Hinsdale, Ill. 60521.

Data Base: A Builder's Guide. Chicago, July 21-24 — Contact: Technology Transfer Institute, 741 Tenth St., Santa Monica, Calif. 90402.

Advanced Postdivestiture Symposium. Denver, July 22-23 — Contact: Michele Zbiegniewicz, The Aries Group, Inc., Suite 320, 1500 Research Blvd., Rockville, Md. 20850.

Making Connections: NOMDA '87 Convention. Atlanta, July 22-25 — Contact: Dana Andrus, Public Relations, National Office Machine Dealers Association, 12411 Wornall Road, Kansas City, Mo. 64145.

Cabling and Wiring For Local Communications. Boston, July 23-24 — Contact: Business Communications Review, 950 York Road, Hinsdale, Ill. 60521.

Financial Analysis for Telecom Equipment Acquisition. San Francisco, July 23-24 — Contact: Business Communications Review, 950 York Road, Hinsdale, Ill. 60521.

ISDN: Concepts and Applications. New York, July 23-24 — Contact: Business Communications Review, 950 York Road, Hinsdale, Ill. 60521.

July 26-August 1

Computer Associates' Second Annual User Conference. Orlando, Fla., July 26-31 — Contact: Barbara Peacock, Computer Associates, Inc., 711 Stewart Ave., Garden City, N.Y. 11530.

Fiber Optic Communications. Boston, July 27-29 — Contact: Business Communications Review, 950 York Road, Hinsdale, Ill. 60521.

August 2-8

X.25 in Practice. San Francisco, August 3-5 — Contact: Technology Transfer Institute, 741 Tenth St., Santa Monica, Calif. 90402.

August 9-15

Analytic Performance Modeling. San Francisco, August 10-12 — Contact: Technology Transfer Institute, 741 Tenth St., Santa Monica, Calif. 90402.

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PRODUCT CHECKLIST

Advanced Data Research, Inc. has introduced **Datacom/DB Release 7.5 and Datadictionary Release 2.4**

The Datacom/DB Release 7.5 data base management system provides several performance enhancements, including a faster set-selection optimizer to handle complex queries better, hashed buffer lookup techniques, reduced request processing path lengths and improved I/O drives that exploit dyadic and quadratic processors.

Datadictionary Release 2.4, which works with Datacom/DB, includes enhancements that reportedly allow users to establish, test, use, archive and refresh multiple test, production and history versions of data base definitions while retaining integrity and control.

Base prices for Datacom/DB with Datadictionary start at $147,100 for IBM VSE/SP and $185,500 for IBM MVS/XA.

Advanced Data Research, Rt. 206 and Orchard Road, CN-8, Princeton, N.J.

Circle Reader Service Number 128

Step Engineering, Inc. has released the **Metastep Language System.**

The Metastep Language System is a comprehensive language definition, design, programming and debugging system. The company has ported it to Sun Microsystems, Inc.'s Model 2 and Model 3 workstations operating under Sun's version of the Unix operating system.

Features include a free-form and position-independent syntax, listings of macro expansions, field assignments, default assignments, symbol cross-references and symbol table listings, automatic hardware-to-software bit-position mapping, field-checking facilities, pipeline delay facilities and constraint management.

The Metastep Language System costs $3,000.

Step Engineering, 661 E. Arques Ave., Sunnyvale, Calif. 94086.

Circle Reader Service Number 129

Team Engineering, Inc. has introduced the **Tiger user interface toolkit.**

Tiger, implemented in the C language, was designed to enhance application development on Sun Microsystems, Inc. workstations. It reportedly can serve as a tool for designing, developing and implementing user interfaces by providing interactive utilities and a library of data-driven subroutines.

Tiger is priced at $7,500 for the first license and $2,500 for each additional license. A development site license costs $22,500.

Team Engineering, 735 A Chestnut Ave., Santa Cruz, Calif. 95060.

Circle Reader Service Number 130

Honeywell Bull, Inc. has unveiled the **Computer Aided Publication (CAP).**

CAP software for large-scale mainframes operating under CP-6 reportedly integrates textual and graphical data to produce large documents such as technical manuals, engineering specifications and reports.

Text editing, computer graphics, automated page setting and other publication technologies are integrated with data base management software to provide a central repository of text and graphics.

CAP is available in Honeywell Bull DPS 8 and DPS 90 computers. It costs $50,000 plus a monthly fee of $400.

Honeywell Bull, P.O. Box 8000/A-79, Phoenix, Ariz. 85066.

Circle Reader Service Number 131

Electronic Text Corp. has rolled out **Wordcruncher.**

Wordcruncher, a text-retrieval software program designed for IBM Personal Computers and compatibles, is said to identify and gather specified data in Microsoft Corp. MS-DOS ASCII text files.

If the data is not in electronic form, it can be entered using an optical scanner from most printed sources. Wordcruncher can also work with voice synthesizers, the vendor said. Users can search a file for words, phrases, lists of words, substrings and contextually defined groups of words.

Wordcruncher costs $299.

Electronic Text, 5600 N. University Ave., Provo, Utah 84604.

Circle Reader Service Number 132

Microsoft Corp. has announced **Microsoft Cobol Compiler Version 2.2**

Microsoft Corp. has announced a version of a Cobol compiler for its MS-DOS and Xenix systems. The Cobol Compiler Version 2.2 comes with Microsoft Cobol Tools, a set of development tools and utilities that include a symbolic debugger, cross-reference generator, menu handler and mouse utility.

Microsoft Cobol Compiler users may choose from different file structures including IBM's ISAM, sequential line and relative.

The compiler includes a screen management section, an overlay memory-management module, the ability to link assembly language routines into the run-time environment and file- and record-locking capabilities.

The compiler for MS-DOS is priced at $700, and the Xenix version costs $995.

Microsoft, Box 97017, 16011 N.E. 36th Way, Redmond, Wash. 98073.

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Continued on page 62

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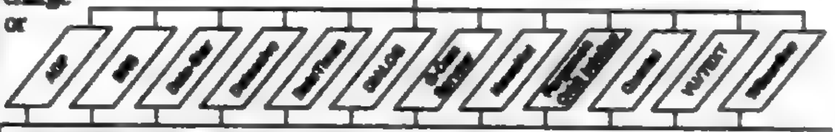

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FAQS/MVS job status monitor is out from Goal Systems International, Inc.

FAQS/MVS is an on-line job and status monitor for IBM and compatible mainframes.

The monitor provides IBM MVS/SP and XA users with commands for determining the status of systems or jobs within the systems. It also enables programmers to control the execution of their jobs from their terminals with no operator intervention.

FAQS/MVS costs $7,420.

Goal Systems International, 5455 N. High St., Columbus, Ohio 43214.

Circle Reader Service Number 134

Phase Linear Systems, Inc. has announced the Exec Productivity System (EPS).

EPS is a collection of integrated tools providing protection, security and function integration for programs written in IBM's Rexx or Exec 2 under the IBM VM/CMS operating system, the vendor said.

The vendor claims EPS can encode Exec programs and convert them to IBM CMS modules so source logic and other sensitive information, such as passwords and user identifications, are not accessible to other users.

EPS is priced at $3,500.

Phase Linear Systems, 1850 K St. N.W., Washington, D.C. 20006.

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HOT SEAT

The following question was solicited from a user and conveyed to the vendor for a response

Should the IBM 9370 be used as a company's only computer, particularly for an application that, on the one hand, is I/O intensive, processed in batch mode, requires heavy print (high-speed printers) and tape and disk access and, on the other hand, is highly interactive with program development and terminal access to data?

Michael Epstein
Martin E. Segal Co.
New York

IBM: All IBM 370 processors, from the largest 3090 to the smallest 9370, have multiple processors or subsystems under the covers of each CPU or central electronic complex. The IBM System/36 and 38 processors feature a similar design.

In both product families, the multiple processors or subsystems work together as a single system and enable the system to achieve a high level of performance and service for users.

The 9370, for example, features an integrated hardware design with both an instruction processing unit and separate I/O processors for handling I/Os. As a result, 9370 users [say they] experience consistent response time during stressful I/O workloads.

Thus, the decision as to which system a user should install — a 9370, larger 370 or System/36 or 38 — becomes a capacity, relative performance, application and environment (that is, compatibility within a large network) decision.

The Hot Seat column consists of product- and service-related questions that you would like us to ask a particular vendor.

Is a product not working? Do you think a program is missing a crucial function? Is your vendor providing adequate service?

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Tech Talk

Continued from page 57

trouble. The multiprocessor firms weren't doing a whole lot better. For instance, Enmasse Computer Corp. in Acton, Mass., folded in January, three days before it was scheduled to make major product announcements at the Washington, D.C., Uniforum trade show.

The reasons for these failures were partly because the slump finally caught up with the industry's front edge and partly because esoteric computing, particularly AI, had failed to deliver on the promises made by advocates.

Meanwhile, at Thinking Machines, the CM2 hit the streets.

The CM2 differs from the CM1 in only a few ways. It is a little more powerful, for instance. But, the big differences are really outside the hardware. First, the CM2 is now plugged into the Digital Equipment Corp. market, and second, the company is pushing the machine as the largest example of data parallelism.

To explain the importance of both, we've got to do a bit of historical research. Originally, in the glory days of AI and parallelism, the CM1 was an example of a standard or task-parallel system. In this approach, one takes any large problem, breaks it down into small subproblems, farms out those smaller units to individual processors and reassembles the complete answer at the end.

In theory, task parallelism could result in incredibly fast machines. In practice, writing the software for such systems can get expensive in terms of time and labor.

However, CM2 operates not under task parallelism but under data parallelism. In this approach, the computer operates as a multiprocessing but serial machine. Each of the 64,000 processors performs the same task but on different data. For example, to search a huge data base, the CM2 would divide the data base into 64,000 small sections. Then, each section would be searched by one processor. The result is one whale of a speedy search.

Tying into DEC VAXs

Indeed, it is apt to think of the CM2 as a data base engine. As it is now being marketed, the CM2 is an immense attached processor, to which DEC systems can be connected. Prior to April, Thinking Machines' supercomputers used a Symbolics workstation as a front end. The CM2, though, can attach to a DEC VAX as well as a Symbolics front end. And, you can modify existing VAX applications to exploit the CM2.

Thinking Machines will even sell you simulators that let you do CM2 program development inexpensively on the VAX. This capability gives the company a huge marketing advantage. Where before Thinking Machines was tied to Symbolics machines and the AI world, now it can exploit the much larger DEC market.

Because most DEC installations are also scientific and engineering installations, the CM2 will be used primarily in scientific and technical applications. For instance, at its introduction, CM2 beta users showed the machine doing modeling.

All this is fascinating if you're doing scientific and technical computing, but what if you are not?

The answer lies in what founding scientist Hillis said at the CM2 debut. He told the audience that his company's machine was not for everybody. "What is going on here is that we have a way of handling a particular type of problem . . . specifically, data-intensive problems," he said. "That's not to say that every problem in computing is that kind of problem."

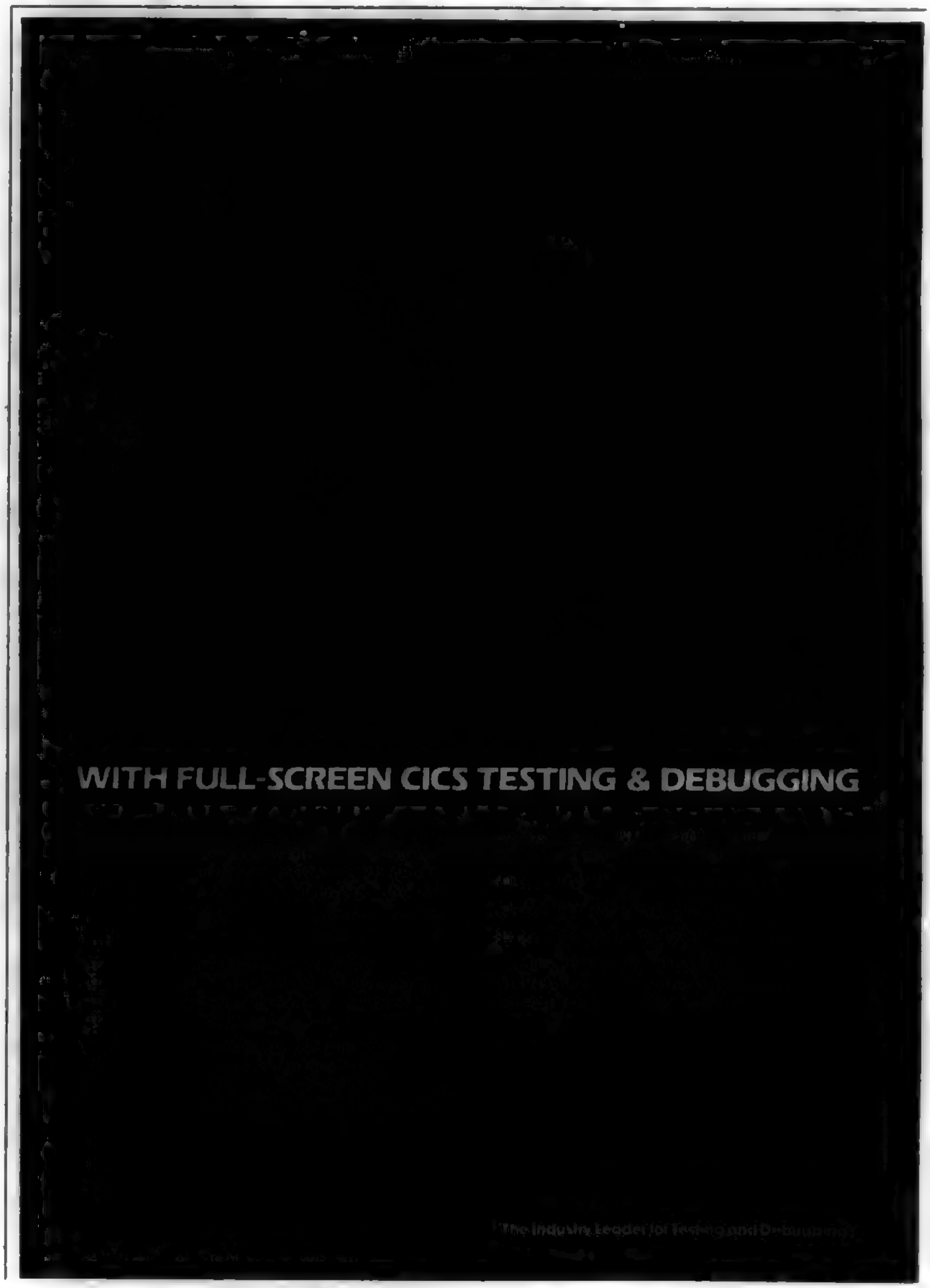
He then mentioned a few places in which the CM2 would be useful. Graphics would lend itself to this type of machine because "pictures are something that in principle could be stored on a computer, but in practice aren't because of the sheer volume involved. That's the kind of thing [the CM2] can handle in a fraction of a second because we can assign a different processor to each pixel of a display."

Text retrieval demo

Hillis also mentioned data bases — huge data bases. At the unveiling, Thinking Machines whipped together an application to demonstrate the way CM2 could handle full text retrieval. The vendor had the CM2 doing a word search of what amounted to an entire library. It had the machine searching a major on-line news service for every article recently published that mentioned, even in passing, a current event. The references came back instantaneously.

And that's why the CM2 is interesting to MIS. The Connection Machine may never show up in MIS departments. But it demonstrates that multiprocessing machines have real-world, commercial DP applications — at least, in so far as they are data base engines exploiting data parallelism. This engine may be prototypical of the sort of machine that MIS will govern in the future.

If there is one theme to the recent history of MIS, it is that applications development and the management of local information are being spun off to the departmental level. But the management of central, corporate data bases has become more important and complex. Multiprocessor and data parallel devices seem tailor-made to be the machines at that centralized, corporate data center.



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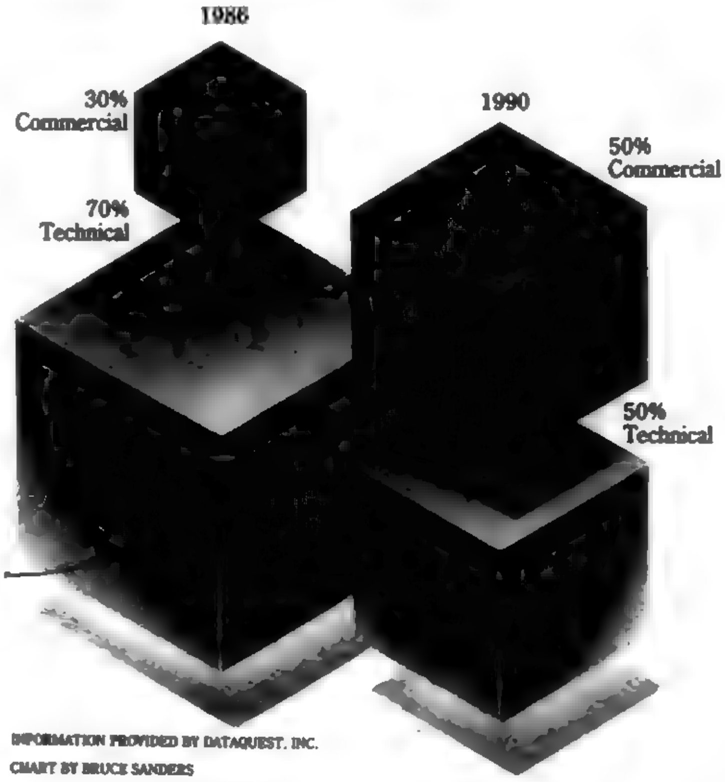

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next issue

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Paperless but pointless

Thomas Roberts

Office automation is built upon one central premise: The more paperless an office is, the more productive it will be.

Office automation's answer to the chaos of paper that descends daily on a worker's desk is the integrated office system, or IOS. An IOS consists of hardware, applications software and communications capabilities ideally working together in a distributed processing architecture. Its intention is to lessen the need to put information on paper. The less time an office worker spends converting data between printed and electronic media, the better.

To date, the most useful elements of every major integrated office system — including Wang Laboratories, Inc.'s Wang Office, Digital Equipment Corp.'s All-In-1, IBM's Professional Office System and others — are word processing and electronic mail.

However, in every major IOS on the market today, a host of other features surround the central word processing and E-mail functions. These peripheral features, which range from calendaring and scheduling functions to voice annotation, are the fluff of office automation.

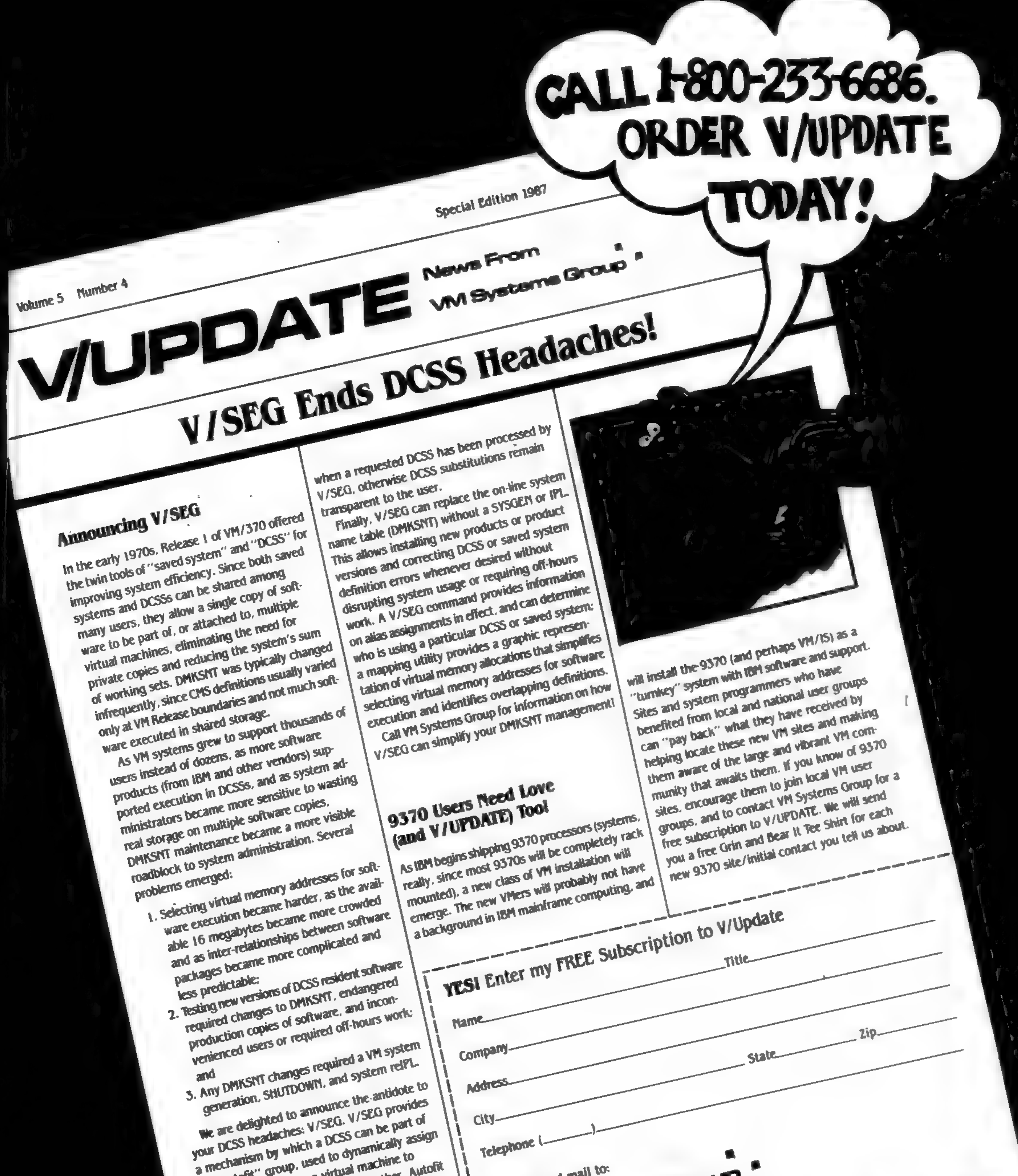
Centralized calendaring and scheduling, for instance, sounds like a great idea. To schedule a meeting you just supply the system with the names of prospective attendees. The software then scans each user's schedule until it finds a date and time that is available to all. Each user is booked for that common date and time and receives an electronic message with the details of the meeting. Automating this process has the potential to save considerable time in tracking people down and juggling busy schedules.

To work correctly, however, an automated scheduling function demands that every employee at a site be connected to the system. Moreover, every user must dutifully see to it that all aspects of their schedules are logged on to the system. If every user is not hooked into the system and instilled with superhuman discipline, automated scheduling simply will not work.

Voice annotation in the office is a feature that appears to be little more than a ludicrous capability. The marketing pitch is usually that voice annotation of text will become a replacement for the ubiquitous yellow Post-It-type notes. But the word processing capabilities of virtually every IOS already allow notes and addenda to be attached to electronic documents.

If you are planning to buy an integrated office system or expand the one you currently have, it is important to recognize where the real productivity benefits lie. Users find word processing and E-mail features as handy today as they have been for the past decade. However, users continue to find the more peripheral functions superfluous and simply end up ignoring them.

Roberts is manager of personal computer research at International Data Corp., a Framingham, Mass.-based industry research firm.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V/SEG Ends DCSS Headaches!

Announcing V/SEG

In the early 1970s, Release 1 of VM/370 offered the twin tools of "saved system" and "DCSS" for improving system efficiency. Since both saved systems and DCSSs can be shared among many users, they allow a single copy of software to be part of, or attached to, multiple virtual machines, eliminating the need for private copies and reducing the system's sum of working sets. DMKSNT was typically changed infrequently, since CMS definitions usually varied only at VM Release boundaries and not much software executed in shared storage.

As VM systems grew to support thousands of users instead of dozens, as more software products (from IBM and other vendors) supported execution in DCSSs, and as system administrators became more sensitive to wasting real storage on multiple software copies, DMKSNT maintenance became a more visible roadblock to system administration. Several problems emerged:

1. Selecting virtual memory addresses for software execution became harder, as the available 16 megabytes became more crowded and as inter-relationships between software packages became more complicated and less predictable;
2. Testing new versions of DCSS resident software required changes to DMKSNT, endangered production copies of software, and inconvenienced users or required off-hours work; and
3. Any DMKSNT changes required a VM system generation, SHUTDOWN, and system reIPL.

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COMPUTERWORLD

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Executive Report — How to design a data center while retaining your peace of mind. **Page 53.**

In Depth — Software maintenance begins to earn a good reputation. **Page 77.**

Oracle aims to beat IBM to the punch with software that is functionally similar to the planned Extended Edition of OS/2. Page 6.

Targeting a market ripe with "spectacular failures," Cullinet this week ships out beta-test versions of integrated banking software. Page 2.

Information Builders breaks off part of its Focus package as an application development system for IBM's DB2. Page 14.

IBM communications products chief Ellen Hancock clarifies and expands on recent product announcements. Page 43.

Compaq signs on for MS OS/2 but maintains that the old PC architecture is better than the new. Page 7.

Expertise in on-line transaction processing can mean big salaries for programmer/analysts and systems software specialists. Page 83.

Benchmark tests indicate the latest version of IBM's PC Network provides significant performance boosts for certain applications. Page 8.

Sun unit sears mini market at 10 MIPS

BY ROSEMARY HAMILTON
and ALAN ALPER
CW STAFF

NEW YORK — Sun Microsystems, Inc. set a new performance standard in the workstation market last week with the introduction of a 10-million-instructions-per-second machine offering power comparable to a Digital Equipment Corp. VAX 8800 — at one-tenth the price.

The Sun-4/200 series, with starting prices of $39,900, effectively offers double the performance of major competitors' products and is positioned to take on minicomputer offerings that now serve as engineering hosts, analysts said.

"This puts [Sun] in a very strong position to replace minicomputers in an engineering environment," said Robert Herwick, senior technology analyst with Hambrecht & Quist, Inc. in San Francisco. "They are offering a strong economic incentive to switch over."

An entry-level Sun-4/260 workstation, which is a deskside, diskless model, comes with 8M bytes of main memory and a 19-in. high-resolution monochrome monitor. A desk-side model with 32M bytes of main memory, a color monitor with resolution of 1,152 by 900 pixels, a 560M-byte disk subsystem and a 69M-byte ¼-in. tape cartridge is priced at $85,500.

Server configurations range from $36,900 for a pedestal model with 8M bytes of main memory to $199,900 for a high-end server with 2.3G bytes of disk storage, 128M bytes of main memory and a ½-in. tape drive. They support up to 25 workstations or 50 terminals.

A DEC VAX 8800 with 32M bytes of memory and no disk or tape drives lists for $650,000.

Continued on page 6

New home for Nomad

Users hope Thomson will halt D&B neglect

BY ALAN ALPER
CW STAFF

WILTON, Conn. — D&B Computing Services sold its Nomad line last week to Thomson SA, the French aerospace and electronics firm, in a move users hope will stem three years of declining support for the products.

Both companies declined to say how much Thomson paid for the Nomad line of fourth-generation language productivity tools, which was reported to have been for sale [CW, May 25]. Sources familiar with the negotiations said Thomson paid between $15 million and $20 million for Nomad technology, documentation and the physical assets required to support and enhance the product line.

Continued on page 4

Borland to buy Ansa

Deal draws bead on Dbase dominance

BY DOUGLAS BARNEY
CW STAFF

BELMONT, Calif. — Hoping to knock Ashton-Tate from its pinnacle atop the microcomputer data base market, Borland International last week agreed to acquire Paradox data base vendor Ansa Software in a stock swap valued at $38 million.

The entry of Borland into the microcomputer relational data base market will heat up competition dramatically, some observers said. Borland, which made its mark with low-priced accessory and language PC software, is an aggressive and innovative marketing firm with more than one million users.

Borland said that in addition to a marketing boost, it intends to use its existing product line to beef up Paradox and hopes to break the near stranglehold Ashton-Tate has on the market with its Dbase products. Unlike other Borland products, Paradox is expected to remain relatively high priced, at $495.

Borland's Turbo line of language products is to be adapted to serve as a set of development tools for Paradox, which already includes PAL, a built-in data base language. Borland will also rework Reflex, an analytical file manager, to serve as a front end to Paradox.

One-hit wonders?

Ansa was one of three companies to surface in 1985 and be anointed by some analysts as possibly the next firms to follow the path of Lotus Development Corp. But Ansa, Javelin Software Corp. and Symantec Corp. are all currently revising their strategies as the prospect of another one-product success story proves increasingly elusive (see story page 117).

Under terms of the proposed acquisition, Ansa will operate as a subsidiary of Borland. The two firms will develop products jointly and combine their sales forces. "We are in a much stronger position to compete against Ashton-Tate, and we will be doing so in a very aggressive manner," said Ronald S. Posner, president of Ansa and a former high-ranking Ashton-Tate executive. Posner will remain president of Ansa.

Ashton-Tate Chairman Edward M. Esber Jr. shrugged off the notion that Dbase is threatened by Paradox. "Ansa wasn't a big threat then and isn't a big

Continued on page 117

Ashton-Tate eyes low-end publishing

BY DOUGLAS BARNEY
CW STAFF

TORRANCE, Calif. — Ashton-Tate should make its expected move into the desktop publishing market by early August with a $395 package aimed at occasional desktop publishing users.

The firm, which currently has no desktop publishing offering, will avoid head-to-head competition with companies such as Aldus Corp. and Xerox Corp., which sell high-end packages that require full-featured microcomputers. Instead, Ashton-Tate said recently it has targeted the broader market of personal computer users interested in sprucing up spreadsheet, data base or word processing output.

Ashton-Tate's Byline was designed to run on Intel Corp. 8088-based monochrome systems with low-level graphics capabilities. The package does not use a mouse or require a hard disk drive and needs only 384K bytes of random-access memory, according to sources familiar with the product. Byline can reportedly create output using conventional dot matrix and daisywheel printers.

In contrast, most high-level desktop publishing packages require a mouse, high-resolution

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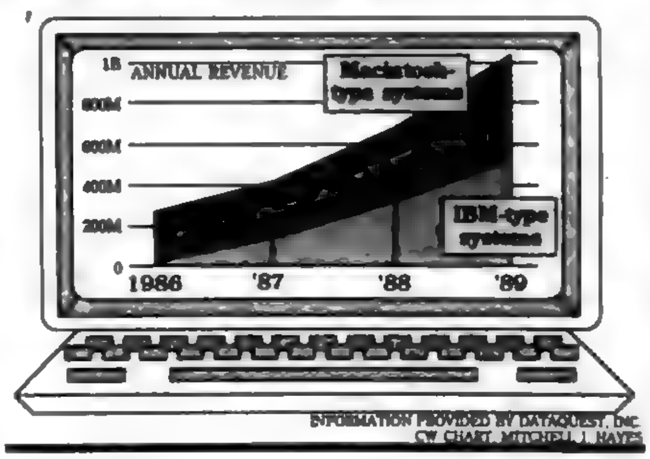
Printing money

Ashton-Tate hopes to earn a share of the desktop publishing market, which is projected to grow rapidly



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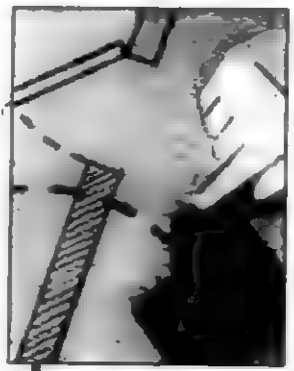

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LLOYD ERICKSON
PRESIDENT
OASIS, A NOMAD USERS GROUP

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Cullinet cashing in on banking tool market

BY JEAN S. BOZMAN
and ROSEMARY HAMILTON
CW STAFF

Cullinet Software, Inc. will take a shot at the highly competitive banking software market this week as it ships beta-test versions of its banking system to three major financial institutions.

The Cullinet banking system is said to run under IBM's MVS, MVS/XA and OS/VS operating systems in conjunction with Cullinet's IDMS/R data base. The modules will later be ported to IBM's DOS/VSE environment, Cullinet officials said last week.

Following about nine months of testing with Cullinet technicians present at each of the three beta-test sites, general shipments should begin sometime next year. However, Cullinet would not estimate a general availability date.

'Spectacular failures'

"This is a field with spectacular failures and false promises," said Charles Frumberg, an analyst with Mabon, Nugent & Co. Cullinet "will meet real skeptical buyers. In short, they simply have to deliver."

Cullinet would not provide an official general shipment date for the new system, and analysts said they do not expect the system to be commercially available until late 1988.

"I expect it to be beta tested for a long time," said Stephen McClellan, a vice-president at Merrill Lynch & Co. "They have wisely not stated a delivery date, and they have plenty of time because no one else has really produced a full-fledged integrated package."

Delivery dates are a sticky issue in the banking software market. Dallas-based Hogan Systems, Inc. met delivery dates in the early 1980s, but with incomplete products that sent it into financial chaos. Uccel Corp. missed a promised delivery date last month of its banking software that left more than 40 committed customers in the lurch.

Cullinet's banking products attempt to address five major areas: customer profile, asset tracking, liabilities tracking, portfolio management and interfaces with electronic banking terminals. Cullinet claimed any IBM-compatible terminal user will be able to build applications through an interactive selection process.

Through a series of preprogrammed screens and menus, the banking modules were designed to be used by banking managers, as well as by MIS staff programmers. "The intention is not to involve MIS, since that tends to be where the bottleneck is in applications development," said David Iacino, senior product manager for banking at Cullinet's Westwood, Mass., headquarters.

The price tag for each of the five components will be $450,000 for users who have IDMS/R. The entire system — including the IDMS/R data base management system — is priced at about $2 million.

Cullinet executives seem confident about their pricing schedule. "Banking customers have told us they can justify the products' cost in terms of increased productivity and an ability to reach the market quickly with new banking services," said Louis J. Muggeo, director of Cullinet's Banking Product Group.

This week's shipments mark the final phase of development for a suite of banking packages generated under Cullinet's ADS/Online and IDMS/R. A team of 18 programmers, half of them formerly from Bob White Computing and Software, Inc. in Oak Brook, Ill., wrote the two million lines of code that compose the mainframe-oriented banking package.

Bob White Computing was acquired in a takeover in 1984 and was renamed Cullinet-BWCS.

Hatching plans with DEC

WESTWOOD, Mass. — After having confirmed last month that it was cooking up a formal relationship with Digital Equipment Corp., Cullinet Software, Inc. went public with its plans last week, announcing that the two vendors have forged a "feasibility study" agreement.

Neither vendor would explain what such an agreement entails.

"Now we're putting our heads together with DEC," a Cullinet spokesman said.

DEC recently proposed a similar agreement to Management Science America, Inc. (MSA), according to Dennis Vohs, president of MSA's manufacturing division. MSA declined, he said, because discussions were already under way, and MSA saw no reason to formalize such a process.

ROSEMARY HAMILTON

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—Ken Daly, Director
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Nomad

FROM PAGE 1

The acquisition of Nomad by Thomson is expected to end three years of D&B Computing's benign neglect for the product line, customers said last week. During that time, D&B Computing reduced its Nomad sales force, cut back consulting and education efforts and lowered its level of support, according to Lloyd Erickson, president of the Oasis users group and an electronics engineer at the National Aeronautics and Space Administration.

"We were distressed by a very healthy product being hampered by a weakened company," he said.

The Nomad family will be marketed and supported by Must Software International, Inc., a new organization Thomson has established for the development and worldwide marketing of productivity software. Must International will continue to be headquartered in Wilton and operate as part of U3S International, Ltd., a Thomson software affiliate based in Paris. Must International is headed by Jean Luc Badault, president of the U3S group of companies.

As expected, D&B Computing retains its time-sharing and computer maintenance operations, which will continue under President David Fehr, who is also a senior vice-president of the firm's parent company, Dun & Bradstreet Corp. Those operations contributed approximately half of D&B Computing's $40 million in revenue last year, sources said.

Sources familiar with D&B Computing's reasoning said it sold Nomad because the line no longer fit in with its information services strategy and had not met corporate financial objectives. The centerpiece of the product line is Nomad2, a fourth-generation language data base management system used primarily in IBM mainframe environments that is installed in about 500 information and applications development centers worldwide and has a user base of more than 100,000.

Frank Sowinski, vice-president of finance at D&B Computing, said the decision to sell Nomad resulted more from Thomson's interest in the product line than from his corporation's desire to sell it. "It was a situation that created a solid home for the product and a solid future for employees and the customer base," he said.

Frank Fish, executive vice-president of the U3S group and general manager of Must International's North American and Pacific operations, said his firm intends to further enhance Nomad and provide increased support, consulting and training services.

U3S International's Princeton, N.J., development lab has engineered a number of enhancements for Nomad, he said, including a user interface that is easier to use, a more powerful distributed facility for the Nomad2 DBMS and more seamless integration between procedural and nonprocedural code.

"We're going to make the product easier to learn," Fish added.

PC Nomad porting plans
Must International also plans to enhance PC Nomad, the implementation of Nomad2 for personal computers, and is considering porting the relational DBMS to a variety of minicomputer environments, including Digital Equipment Corp.'s VAX VMS, he added.

Fish said Must International is considering acquiring products from other U.S.-based software companies to accomplish many of its goals. "As time goes on, we will acquire products that are synergistic with Nomad," he said. He declined to provide specifics.

Some observers said they are fearful that, with control of the Nomad line essentially in the hands of an overseas company, Must International may lose sight of domestic user requirements. Fish said such criticism is unjustified, noting that more than 90% of D&B Computing's Nomad personnel have agreed to join Must International.

Don Weimann, a staff systems analyst with Chevron Information Technology, the MIS unit of Chevron Corp. — one of the largest Nomad users — said he is encouraged by Thomson's plans for the product line. "We're pleased that Nomad2 will stay as an entity and was not sold to a big existing software company and carved up," he said.

NASA's Erickson said that since Thomson is a $9 billion firm with an engineering bent, it may be more inclined to invest in research and development than D&B Computing. "D&B is primarily an information company; they make money selling information, not software," he pointed out. "Anytime anyone needed resources in that corporation, it was the information side of the house that got it."

Analysts, however, said that as part of Thomson, Nomad might get even less attention than it received from D&B Computing, which is a smaller firm.

Thomson also recently initiated the "Must Project" to develop software products for the 1990s. The project's aim is to develop software to help facilitate the extraction of text, data and images from corporate data bases by ever-proliferating numbers of desktop and departmental computers, Fish said.

The Nomad line of productivity tools will become the foundation of the Must Project, Fish said.

At a glance

Thomson SA

Headquartered in Paris, Thomson is a $9 billion multinational electronics and aerospace company

[illegible]

CW CHART

M&D not for sale

D&B Computing Services' sale of its Nomad line last week in no way reflects Dun & Bradstreet Corp.'s intentions for its other software units, according to an executive at McCormack & Dodge Corp., Dun & Bradstreet's financial applications software subsidiary.

"This in no way changes Dun & Bradstreet's perspective on us, or Erisco, for that matter," said Robert Kelley, corporate vice-president with responsibility for strategic marketing. Erisco is another Dun & Bradstreet software subsidiary.

Kelley's comments were in response to reports that Dun & Bradstreet is seeking a buyer for M&D because it does not fit the firm's information services thrust. Speculation on M&D was revived during Thomson SA of France's negotiations to acquire Nomad [CW, June 15].

Dun & Bradstreet "looks at us as a growth sector," Kelley noted. "We've achieved better than 30% growth on a revenues basis and have reached our profit goals."

Kelley said the rumors regarding Dun & Bradstreet's intent to sell M&D have their genesis in competition. "When you're part of a large conglomerate, those questions are always raised," he said. "It's mostly market battle stuff; we're used to it."

ALAN ALPER

DG enters AI field via Gold Hill pact

BY CHARLES BABCOCK
CW STAFF

WESTBORO, Mass. — Data General Corp. last week said it has signed an agreement with Gold Hill Computers, Inc. to provide expert system development tools that develop applications capable of accessing mainframe data bases.

The expert systems can be developed on IBM Personal Computers and compatibles and other workstations supported under the DG Personal Computer Integration (PCI) networking scheme, announced June 2.

The Gold Works expert system development tools are available now to work on PCI networks, according to Charles B. Piper, DG's artificial intelligence product marketing manager.

The expert systems will be developed in Golden Common LISP from Gold Hill and will be capable of running on IBM or compatible PCs or a DG Eclipse MV minicomputer. The Eclipse, in turn, can connect to an IBM mainframe through Decision Connection and APIOU 6.2, DG's gateway products to IBM's Systems Network Architecture (SNA). "The customer has the capability of building an expert system on a PC and have it work in association with a LISP application on an MV Eclipse," Piper said.

Gold Works is priced at $7,500 for a single user. A $2,500 communication product, Golden Connection, ties the DG PCI network to the Eclipse MV. The Decision Connection and APIOU 6.2 SNA gateways are priced from $620 to $9,830 and from $525 to $8,360, respectively, based on processor size.

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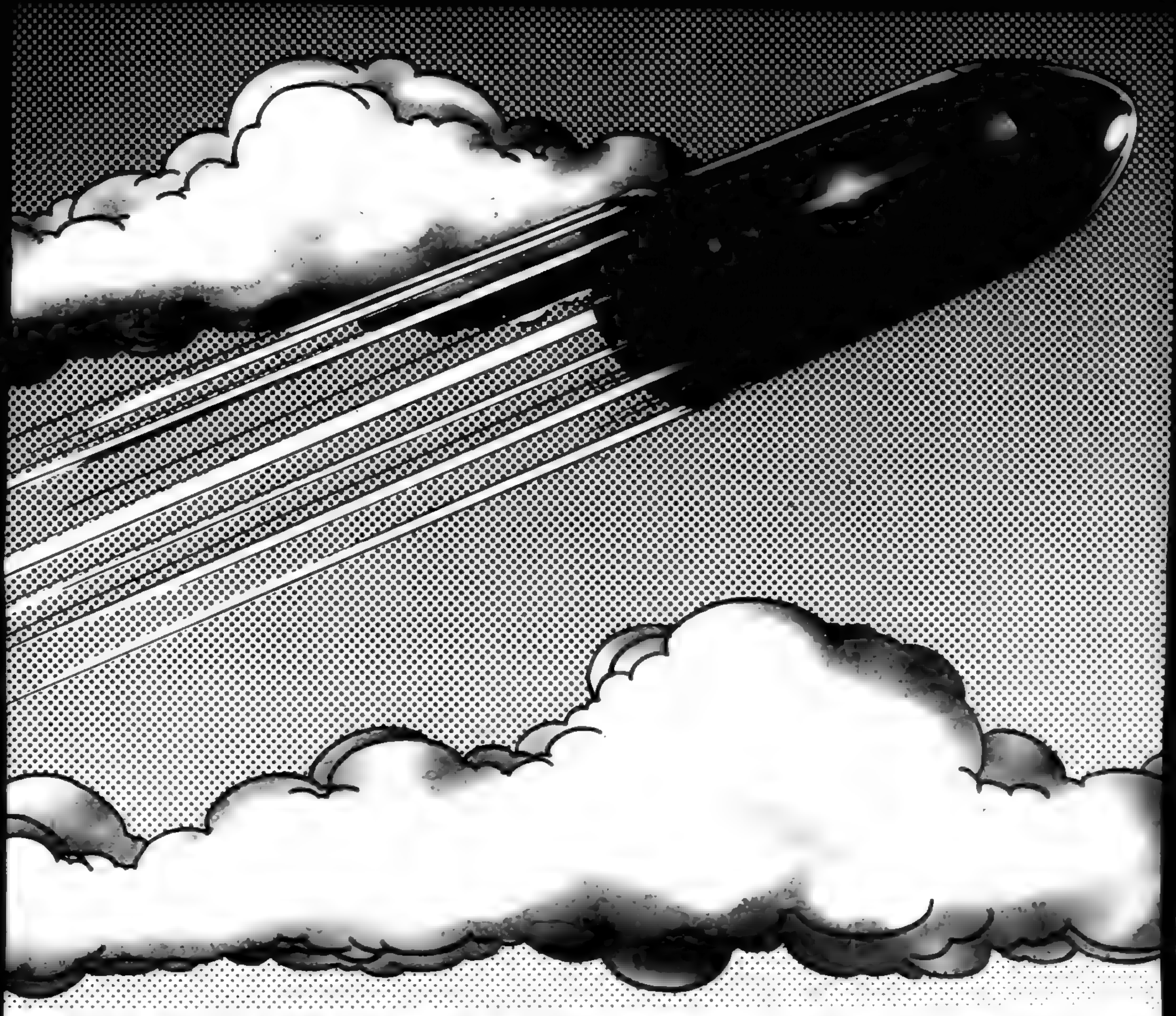

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Oracle racing to OS/2 market

Attempting to beat IBM, Ashton-Tate to the punch with data base support

BY ALAN ALPER
and CHARLES BABCOCK
CW STAFF

NEW YORK — Oracle Corp. is attempting to beat IBM to market with an assembly of products that provide a look-alike version of IBM's OS/2 Extended Edition operating system.

Oracle is hoping the combination, along with a set of tools for developing OS/2 applications, will establish the company in the emerging market for IBM's Personal System/2 computers and wrest part of it away from desktop data base management system giant Ashton-Tate.

Before even the base version of OS/2 is available, IBM Personal Computer XT and AT users will be able to develop OS/2-size applications using a currently available combination of Oracle software and discounted personal computer-insert boards. When the Standard Edition of the operating system becomes available in the first quarter of 1988, the Oracle products will allow PC XT and AT users to run OS/2 with an SQL-based relational data base, similar to what is slated for the Extended Edition version, Wall Street analysts said.

Not sitting still

Ashton-Tate is not sitting still in the face of Oracle's moves. The company has a more powerful version of Dbase under development to run with OS/2, although it has not committed to a delivery date. Conceding that he views Oracle as a serious competitor, Ashton-Tate Chairman Edward M. Esber Jr. claimed his firm has the advantage of knowing how to design end-user interfaces, while Oracle is used to dealing with minicomputer users. IBM has not announced a delivery date for OS/2 Extended Edition, which will include an SQL-based relational DBMS and a communications manager. It has said it will announce availability in the fourth quarter of this year; the operating system is presumed to be at least a year to 15 months away.

Oracle Chairman Lawrence J. Ellison promised at a news conference last week that an OS/2 version of Oracle will be available as soon as Standard Edition OS/2 ships in the first quarter of 1988. If that is true, Oracle will be offering a relational DBMS with communications facilities that resemble — if not match — IBM's Extended Edition product, Wall Street analysts said.

"We can't say they'll be compatible with [IBM's] Extended Edition, but everything they're doing falls within the standards IBM set in Systems Applications Architecture," said Christopher Mortenson, vice-president of Alex Brown & Sons, Inc., a brokerage house in New York.

Both Oracle's Ellison and Ashton-Tate's Esber appeared at a New York press conference convened by Compaq Computer Corp., whose Chief Executive Officer Rod Canion was seeking to dispel what he called "the nagging misconception" that only IBM PS/2s will run the OS/2 operating system (see story page 7).

Show of solidarity

In what was supposed to be a show of solidarity against IBM, Ellison said Oracle was going to become a big player in the microcomputer marketplace, which has long been Ashton-Tate's home turf, while Esber said that the OS/2 version of Dbase would "provide the performance of a minicomputer DBMS," a description that fits Oracle.

The components that Oracle plans to assemble to work with OS/2 Standard Edition include the following:

- An OS/2 version of Oracle, which currently runs on IBM mainframes, Digital Equipment Corp. VAXs, a variety of minicomputers and IBM PCs.
- A discounted version of the Professional Oracle tool kit for developing PC applications under IBM's PC-DOS that exceed the 640K-byte memory limit. Normally priced at $1,295, it is being offered through Aug. 31 at $199.
- In addition to software, Oracle is going into the discounted hardware business by offering OS/2 upgrade kits. For an IBM PC XT, the company will offer a SOTA Technology, Inc. motherboard with an Intel Corp. 80286 processor and 2M bytes of memory. For IBM PC ATs, it will sell an AST Research, Inc. Rampage286 memory board with 1M byte of memory. Normally retailing for $1,495 and $895 respectively, the products will be available through Oracle for $1,199 and $599.
- Oracle will announce next week a look-alike version of IBM's Query Management Facility, to be called QMX. It will allow Oracle users to formulate queries against IBM's DB2 as well as Oracle, company officials said. "Nobody else can allow you to develop large applications. Application developers don't want to continue working under 640K," said Oracle's Vice-President Peter Tierney. "Oracle's moves will appeal to software developers and leading-edge people now. When OS/2 is ready, many of them will say, 'Hey, we've had six months to play with this thing. We think we will go ahead with it.' "

Esber said an OS/2 version of Dbase will include a more powerful data base manager and an Apple Computer, Inc. Macintosh-like graphics interface to end users.

He also said Ashton-Tate plans to offer a data base server that will permit Dbase to become a multiuser system with distributed data base capabilities.

Mortenson said Oracle is already a multiuser, multitasking system with distributed capabilities. "It will be easier for Oracle to develop a friendly, end-user interface than it will be for Ashton-Tate to develop the distributed data base characteristics that a single-user system has never had to address," he predicted.

Sun unit

FROM PAGE 1

In typical configurations, the DEC 8000 series ranges in price from $141,000 to $836,000 and supports from a dozen to several hundred users.

"With the price and performance of this, they could really take some business away from DEC," said Michael Orsak, an analyst with Robertson, Colman & Stephens.

Last week's announcement also marks Sun's first step in its long-intended plan of becoming a broad range computing vendor.

The Sun-4/200 series more than doubles the performance of its current 4 MIPS high-end offering, and the vendor claimed that with the new microprocessor used in this system, it will be able to provide 100 MIPS machines by the early 1990s.

The Sun-4/200 series is based on a reduced instruction set computing (RISC) microprocessor that Sun designed with Fujitsu Microelectronics, Inc. Analysts said it is part of a bigger scheme under way at Sun that involves greatly expanding at the high-end with this technology while also broadening its low-end. The low-end move could involve an Intel Corp. 80386-based machine to be released later this year, analysts speculated.

While the Sun-4/200 series was applauded by many industry observers, some users and analysts raised concerns that the new proprietary system may depart from industry standards, which Sun has always embraced. Its previous machines have been based on Motorola, Inc. 68000-series processors.

Sun claimed the new line is source code compatible with current Sun workstations.

Sun's 4/200 series
Characteristics of the new high-end system

[1] Million instructions per second
[2] Million floating-point operations per second

INFORMATION PROVIDED BY SUN MICROSYSTEMS, INC.
CW CHART

It runs under the Sun version of the Unix operating system, and the vendor said approximately 90 third-party software developers have either already ported or intend to port their software to the new system.

The new workstations are aimed at compute-intensive and floating-point applications. Primary markets include mechanical and electrical computer-aided design and artificial intelligence development.

The workstations were designed around a 32-bit scaleable processor architecture for supercomputing workstations (Sparc), which uses typical RISC features such as single-cycle, simple-format instructions, delayed control transfer and optimizing compilers. Sparc's engine is a full 32-bit microprocessor with gate logic array that reportedly can process 10 MIPS at a clock speed of 16.67 MHz.

Since the new workstations use the same 12-slot backplane as the Sun 3/260, upgrades can be facilitated through a CPU board swap, the firm said. Cost of the upgrade is $13,900.

Sun also reduced prices by 5% to 19% on its Sun-3/200 workstation series. The company also launched what it called its Symbolic Programming Environment, which consists of software development tools for the development of AI applications on Sun workstations.

The repositioned Sun-3/200 workstation line now ranges in price from $28,900 to $36.900. The two 8M-byte servers in the family cost $25,900 and $26,900, respectively. It costs $3,500 and is set to be available on a site license basis.

Bell Atlantic revamps for enhanced offerings

BY ELISABETH HORWITT
CW STAFF

Aiming to get in shape for expansion into enhanced services and new business ventures, Bell Atlantic Corp. plans a major restructuring effort during the next six months.

The plan is to consolidate under one administration Bell Atlantic's divested Bell operating companies and their operating staffs; customer services, financial services and cellular services; and a newly formed Enterprises Information Group. The new group will manage new strategic initiatives and other lines of business, the company said in a recent internal announcement. All of these groups will report to a chief operating officer, as yet unappointed, who will be responsible for integrating and coordinating these operations.

The reorganization is being made "in response to and anticipation of changes we see happening in the regulatory and competitive environments," said Bell Atlantic spokesman Tom Healey. "It will allow us to provide new offerings and integrate them more easily."

Previously, the Bell operating companies formed a separate Network Services Group, while a separate division, Network Services, Inc., included the administrative staff. A third group, Enterprises Corp., was responsible for new business ventures.

Reduces costs

The consolidation of these groups will allow Bell Atlantic to both reduce costs by removing duplication of personnel and trimming organizational overhead and provide integration of resources for the regional Bell holding company's future efforts to expand into new marketplaces, according to Thomas E. Bolger, Bell Atlantic chairman and chief executive officer.

"The prospects of changing regulation and increasing customer requirements for high-value information and communications systems and services adds to the urgency of this move," Bolger said in an official statement to the company.

Potential new ventures that the future Enterprises Information Group will focus on include software, business support, hardware distribution and publishing, Bell Atlantic said.

The project will begin immediately, with overall implementation scheduled for Jan. 1, 1988.

Say 'cheese!' Compaq buddies up to MS OS/2

BY ALAN ALPER
CW STAFF

NEW YORK — Compaq Computer Corp. last week went on the offensive to stress its support for Microsoft Corp.'s MS OS/2 operating system while reiterating disdain for the new technology on which IBM has chosen to run the successor to IBM's PC-DOS and Microsoft's MS-DOS.

At a carefully choreographed press conference here, Rod Canion, Compaq's president and chief executive officer, went to great lengths to dispel what he called a "nagging" misconception that MS OS/2 was just an operating system for IBM's Personal System/2 line. Canion also contended that MS OS/2 will run better on Compaq's machines than on PS/2s, although he did not provide statistics to substantiate his claim.

MS OS/2, he said, was developed to take advantage of the multitasking, larger address space and other advantages of microcomputers designed around Intel Corp.'s 80286 and 80386 microprocessor architectures.

Compaq will offer MS OS/2 on its family of 80286- and 80386-based microcomputers starting in early 1988, Canion said. The firm has not yet set a price for the operating system, which will be offered as an option, a company spokesman noted.

The Houston firm also said it has started shipping, free of charge, a support kit for developers working on applications for MS OS/2.

Demystifying IBM

Canion also sought to demystify IBM's OS/2 Extended Edition, which includes advanced data base management and data communications functionality. The open design of OS/2 is intended to allow third-party developers to provide extended capabilities for the operating system, including data base management and communications functions.

Canion said the extensions made available by third-party software vendors would likely be more memory-efficient than IBM's OS/2 Extended Edition, which reportedly will require 3M bytes of random-access memory.

"For some users — especially IBM's captive mainframe customers — the Extended Edition will serve a purpose similar to IBM's other specialized products, like the 3270 Personal Computer and [PC] AT 370," Canion said.

To bolster his contention, Canion was joined by Bill Gates, Microsoft's chairman, and the top executives of other leading software companies committed to developing packages that run under MS OS/2.

Analysts said they saw Compaq's announcement as an attempt to solve a perception problem.

Compaq, which continues to enjoy robust sales and earnings, wanted to clarify its position on MS OS/2 before fear, uncertainty and doubt cut into its market performance, noted Tom Roberts, an analyst with the market research firm International Data Corp. based in Framingham, Mass.

"I think Compaq called in some IOUs from the software industry," Roberts said, in reference to the software executives sharing the rostrum with Canion. "They wanted to show support for the old [hardware] architecture and for [MS] OS/2 as well."

Canion said he expects MS OS/2 and MS-DOS to coexist for the next several years by virtue of the latter's installed base on some 6 million Intel 8088- and 8086-based micros.

"[MS] OS/2 has the potential to become the industry's primary operating system as it gradually unleashes more of the power of the 286 and 386 architectures," Canion said. "But this will be a smooth, evolutionary process over many years."

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PC Network speedup limited

Throughput gain only modest, but crowded networks get breathing room

BY ELISABETH HORWITT
CW STAFF

IBM's PC Network program Version 1.2 offers significant performance improvements over the older Version 1.12, but only in certain limited areas and for certain types of applications, according to a series of tests performed by an independent consulting company.

The tests — performed for *Computerworld* by Interconnect Network Consulting Group, Inc. in Pasadena, Calif. — found that the overall speed of workstation-to-server communications improved by as much as 840% when the newer PC Network program was used but that in most cases, network throughput would show only a 5% to 10% improvement. In some types of exchanges, such as read and write overlays of 512-byte records, throughput was actually slower with the new version of the program, the tests found.

Bruce Robertson, Interconnect's manager of products and services, and Judy Savage, manager of network engineering, conducted the tests at the headquarters of Sunnyvale, Calif., company Network General Corp., developer of the Sniffer protocol analyzer.

Popular benchmarks used

Robertson and Savage first compared the two network programs' overall performance through two widely used benchmark tools: the PC Magazine Bench Program and the Novell, Inc. Perform Utility. Next, using Sniffer, the consultants attempted to isolate the causes for the network performance differences by looking at packet activity on the network.

Tests showed that Version 1.2's buffer held 4K bytes, compared with Version 1.12's 512 bytes. The increased buffer space allowed a personal computer to collect multiple 512-byte records and send them in a batch, cutting down on the number of network transmissions.

This feature made a significant difference only during transfers of small records, however. During the PC Magazine test, Version 1.2 also demonstrated a 75% performance increase over Version 1.12 for sequential file writes and reads involving 512-byte records. But when 4,096-byte records were sent, the newer version upped overall throughput by only 5% for sequential file writes and 11% for sequential file reads. These results made the buffer's increased size less significant, Savage said, "because most records are 2K bytes or larger."

Version 1.2's larger buffer could be a drawback, since "waiting for the buffer to fill unnecessarily could even impede performance with small files," Savage said. For example, Version 1.2 performed worse than Version 1.12 in the Novell test for both read and write overlays involving 512-byte records. There is no need to load multiple records into a buffer during an overlay, since the same record is being repeatedly written to, or accessed on, the server's disk, Interconnect said.

IBM has also improved the program by cutting down on the number of packets needed to transfer a given amount of data over the network. Sniffer indicated that Version 1.2 used only 16 packets to write a 4,096-byte record to disk, while Version 1.12 used 24 packets.

Although cutting down on packets did not significantly improve throughput when network traffic was light, "it could make a big difference in throughput on a heavily loaded network by significantly reducing interrupts and data handling on the server," as well as saving on bandwidth utilization, said Network General President Harry Saal.

In previous tests by Network General, Sniffer found that Version 1.12 tended to waste time and bandwidth with unnecessary exchanges between the personal computer and the server, asking repeatedly for the same group of bytes when they had already been sent [CW, April 13].

'Still a long way to go'

The new PC Network program has "cleared away some of that repetitive asking, but it still has a long way to go," Saal said.

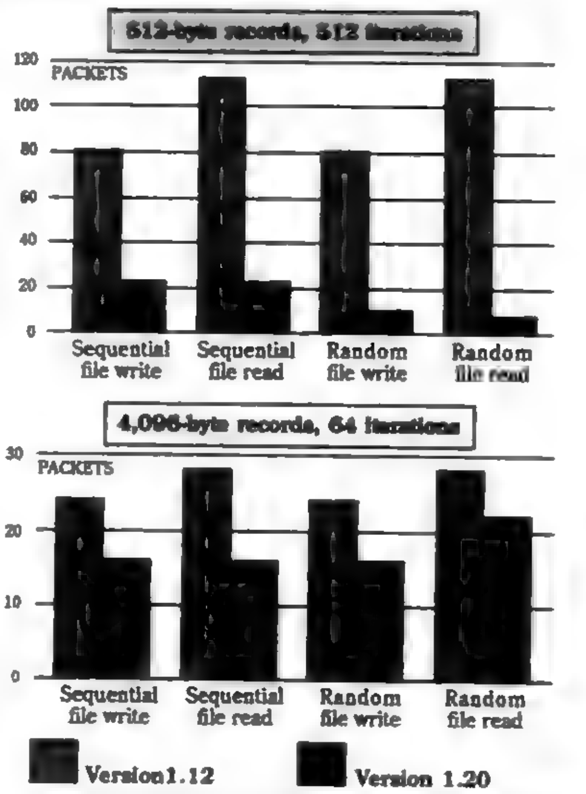
During the tests of Version 1.12 by the Interconnect consultants, Sniffer sensed at one point during a 512-byte random file read that no network activity was taking place. "We realized the problem was that the program was reading the same file into [random-access memory] over and over," Savage said. With Version 1.2, which showed a 54% improvement over Version 1.12 in the same test, IBM has eliminated some — but by no means all — of these unnecessary loops and exchanges, the consultants concluded.

"IBM has increased performance in the PC Network program significantly in certain specific areas and uses more state-of-the-art techniques in handling packets. However, in an actual user environment, the overall throughput improvement will only be moderate," said Mark Freund, Interconnect vice-president of design and engineering, who took part in the analysis.

The tests measured throughput for an IBM Personal Computer doing various types of disk access on a Compaq Computer Corp. Portable III file server across a PC Network. They measured the performance of PC Network Version 1.12 running with IBM's PC-DOS 3.1 operating system against the performance of PC Network Version 1.2 running with PC-DOS 3.3.

PC Network benchmark

Version 1.20 of IBM's PC Network demonstrates greatest efficiency improvement with small records in Sniffer bench tests



INFORMATION PROVIDED BY INTERCONNECT NETWORK CONSULTING GROUP
CW CHART

Lotus ups DB2 support, betters TAC

BY DOUGLAS BARNEY
CW STAFF

CAMBRIDGE, Mass. — Lotus Development Corp. last week added support for IBM's DB2 and improved the user interface of The Application Connection (TAC), Lotus's personal computer-mainframe data extraction and translation package.

By easily providing mainframe data to Lotus 1-2-3 users, TAC provides a key element of Lotus's MIS strategy. The company has developed a number of products that enhance 1-2-3 in its function as a standard interface to corporate data. They include a report generator, a natural language interface, some services that provide prepackaged data and a planned mainframe version of 1-2-3.

While TAC offers a relatively simple way for PC users to extract data from host systems, the lack of a DB2 connection and other shortcomings have kept many users away. Even at TAC's introduction last year, the need for a DB2 connection was clear.

"People have been testing DB2 for a while and are ready to go into production. But there are not a lot of useful tools. Users don't know SQL," said Maurice Shore, TAC product manager at Lotus.

Avoids mainframe syntax

In addition to releasing the DB2 connection demanded by MIS customers, Lotus has upgraded TAC's end-user interface, completely shielding 1-2-3 users from the complexity of mainframe syntax.

With the new release, 1-2-3 users can access mainframe data using the syntax native to 1-2-3 and without leaving the spreadsheet environment.

According to Shore, users have the ability to play "what-if" games with the mainframe from within a 1-2-3 spreadsheet.

Lotus has also made host-oriented enhancements to TAC, including limiting the number of records that can be pulled out of a mainframe data base, Shore said. Other enhancements include giving MIS the ability to adjust the ways in which null values are represented in a data base and the ability to control the resources allocated to a particular end-user request.

More tools promised

Future revisions will include the support of more host applications and will provide more tools for DP and MIS, such as automatic logging and report generation for chargebacks, Shore said. Also on the way is a connection to VSAM files, but Shore provided no time frame for delivery.

A feature that Lotus has done little to publicise is TAC's ability to extract mainframe data from minicomputers and high-end workstations. TAC extracts data by creating a request file, which can be created and sent by a variety of systems. "It doesn't matter where the request file came from. It isn't machine-specific," Shore said.

> "PEOPLE have been testing DB2 for a while and are ready to go into production. But there are not a lot of useful tools. Users don't know SQL."
>
> MAURICE SHORE
> LOTUS DEVELOPMENT CORP.

More competition is on the way for Lotus. Ashton-Tate is said to be planning to bring to market a product that extracts data from IBM System/36 applications and to extend this product to include connections to IBM mainframe applications. "We don't have our eyes on the System/36 market," Shore said, adding that, with Ashton-Tate's planned market entry, "It is going to be competitive."

One user is not running out to buy TAC. Steve Owens, national microcomputer coordinator for Price Waterhouse in Chicago, said the mainframe components of TAC are considered too "pricey." Most end users who need to download from a mainframe already have a facility for doing so, he said.

MVS versions of TAC are currently available, and a VM version will ship in the fourth quarter. The MVS/TAC Connection costs $13,000, the VM/TAC Connection costs $10,000 and optional modules for individual mainframe applications range from $8,000 to $15,000.

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	Syracuse	Jul 7
OH	Cincinnati	Aug 5
	Cleveland	Jul 16, Aug 13, Sep 17
	Columbus	Aug 4, Sep 30
	Dayton	Jul 21, Aug 18, Sep 22
OK	Oklahoma City	Jul 21, Sep 15
	Tulsa	Aug 11
OR	Portland	Jul 21
PA	Harrisburg	Aug 4, Sep 15
	King of Prussia	Jul 16, Sep 17
	Philadelphia	Jul 9, Aug 6, Sep 10
	Pittsburgh	Sep 8
RI	Province	Jul 8
SC	Charleston	Aug 12
TN	Memphis	Jul 29
	Nashville	Aug 6
TX	Austin	Aug 12
	Dallas	Jul 14, Sep 9
	Houston	Jul 9, Aug 6, Sep 18
	Lubbock	Aug 4
	San Antonio	Aug 13
UT	Salt Lake City	Jul 28, Sep 29
VA	Norfolk	Jul 14
	Richmond	Jul 8, Sep 8
	Virginia Beach	Jul 23
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NAS to plug mid-range gap with four CPUs

BY JEFFRY BEELER
CW STAFF

MOUNTAIN VIEW, Calif. — National Advanced Systems Corp. (NAS) tomorrow is expected to introduce four IBM-compatible machines to fill the price/performance gap between its high-end IBM 4381-class and low-end IBM 3090-compatible processors.

As previously reported, the four AS/VL series processors are expected to range in performance from 5 million to 17 million instructions per second and are intended to provide an upgrade path for existing 4381-class users who need to migrate to the 3090 line or its plug-compatible equivalent [CW, May 18].

The additions to NAS's hardware offerings are fundamentally identical to a CPU family that the vendor announced in March in Europe and that its Japanese equipment supplier, Hitachi Ltd., introduced later that month in Japan.

For customers whose 4381s are fast running out of gas, the AS/VL series' imminent debut should come as welcome news. "If customers can gain additional horsepower and, at the same time, postpone the change to a new operating system, they can save themselves a lot of grief," said Randy Sessler, senior systems engineer at Memorex Corp.'s Communications Group, a 4381 user.

IBM also fills hole

With the announcement of the AS/VL family, NAS appears to be seeking to counter a comparable move by IBM to fill a price/performance hole of its own. In a sharp departure from tradition, IBM recently closed a glaring gap in its processor line by extending the 4381 upward and simultaneously lowering the 3090's entry point with the introduction of the Model 120.

The closure marks "the first time in more than 20 years" that IBM has offered a smooth upgrade path between its intermediate and high-end systems, according to Rick Martin, research analyst with Sanford C. Bernstein & Co.

Both IBM's and NAS's efforts to link their 4381- and 3090-class CPUs come at a time when demand for systems in the AS/VL's price/performance category is rapidly growing.

The machines typically serve either as dispersed processors in the regional offices of giant corporations or as central hosts in medium-size businesses, according to Van Weathers, a Dataquest, Inc. industry analyst.

By providing a transition between the 4381 and the 3090, AS/VL-class processors "are creating a big new market for themselves rather than siphoning sales away from the high end," Weathers said.

Although NAS last week acknowledged tomorrow's announcement, it declined to release any details about the products, including their prices. But the machines are expected to maintain NAS's traditional 20% edge in price/performance over IBM's equivalent models.

As with previous NAS product announcements, the AS/VL series processors are appearing on the U.S. scene several months after their introduction overseas. The delay in domestic availability probably resulted from the need to modify the Hitachi machines slightly for the American market.

"Japanese customers aren't as demanding of total IBM compatibility as their U.S. counterparts," said Ulrich Weil, head of investment research firm Weil & Associates. "So before a machine that Hitachi made in Japan can be sold to American users, it usually needs some engineering changes."

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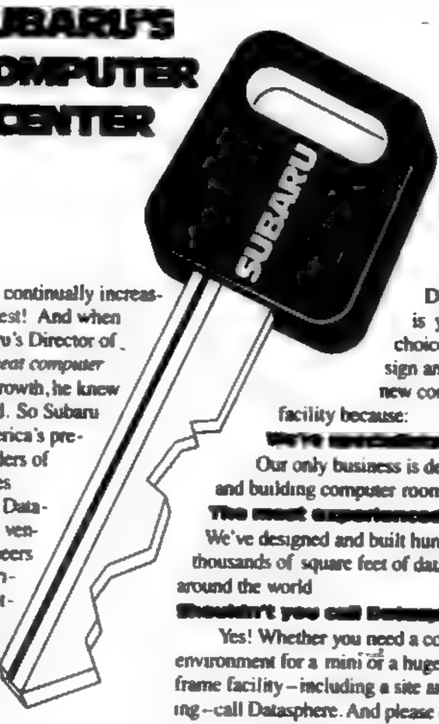

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Symbolics stressing MS-DOS links

Unix, Microsoft processor connectivity emphasized in 386 board

BY STANLEY GIBSON
CW STAFF

SEATTLE — Symbolics, Inc. will announce today software that would allow applications developed on a Symbolics workstation to run on Unix and Microsoft Corp. MS-DOS-based processors, according to a source close to the company.

In addition, the maker of LISP-based workstations will announce a board containing the Intel Corp. 80386 microprocessor, which will enable its workstations to run Unix and MS-DOS programs, the source indicated.

The announcements are two of several that the Cambridge, Mass.-based company is expected to make at the American Association for Artificial Intelligence show here. Symbolics will also reportedly announce IBM 3270 terminal emulation for its workstations, allowing them to connect to an IBM mainframe in a Systems Network Architecture network.

Team chip?

Symbolics will also reportedly announce that it will collaborate with Intel in microprocessor design. Symbolics has been searching for a chip maker to produce its design for a microprocessor containing all of Common LISP, but it is uncertain whether Symbolics will announce at this time that Intel has been chosen to make the chip.

Last week, Intel and Texas Instruments, Inc., a rival of Symbolics in the LISP-based artificial intelligence market, agreed to share technology for application-specific integrated circuits (ASIC). An Intel spokesman said ASIC activities and AI efforts are kept separate.

Symbolics is also expected to announce a C programming environment and support for the X Windows proposed windowing standard interface for Unix.

Several industry observers confirmed that the announcements will be made and said the moves show a change in strategic direction by Symbolics.

Welcome strategy

"This is the best strategy that Symbolics can have at this point," said Kenneth Sonenclar, an analyst with New Science Associates, Inc. in South Norwalk, Conn. "Symbolics has been severely lacking in simple office function," he said, explaining that by adding commonly used desktop functions to a Symbolics workstation, Symbolics could clear away one reason not to buy its workstation — that it does not do normal desktop tasks.

Most important, he said, is the software facility, which will enable a user to write applications on a Symbolics workstation that will be readable by an 80386 processor.

Another industry watcher was less enthusiastic about the new direction for Symbolics. "They are trying to get LISP into the hands of the masses, rather than telling the world they have the absolute best AI workstation," said Harvey Newquist, editor of "AI Trends," a newsletter based in Scottsdale, Ariz.

Newquist sharply criticized the strategy, saying it is a potentially disastrous departure from Symbolics' traditional strengths.

"They must go back to what they know best. The government, military and research and development groups are their market," Newquist said.

The high-end market, although small, will always be there, he said. But instead of concentrating on that field, Symbolics is going after the same market as Sun Microsystems, Inc. and Apollo Computer, Inc. "They've ceased to concentrate on being the most technologically adept," he said.

The 80386 board will reportedly cost approximately $6,000, and the software license for a single processor to develop programs to run on MS-DOS and Unix systems will be priced in the neighborhood of $7,000.

Jeff Canin, an analyst with Hambrecht & Quist, Inc., a San Francisco investment banking firm, said the Intel agreement, along with a recent $500,000 contract with the National Aeronautics and Space Administration and healthier bookings in the quarter just ended, paint a brighter picture for Symbolics.

In January, Symbolics laid off 160 workers; in October 1986, the firm took a $13.2 million write-off due to an abortive corporate move from Cambridge to Concord, Mass.

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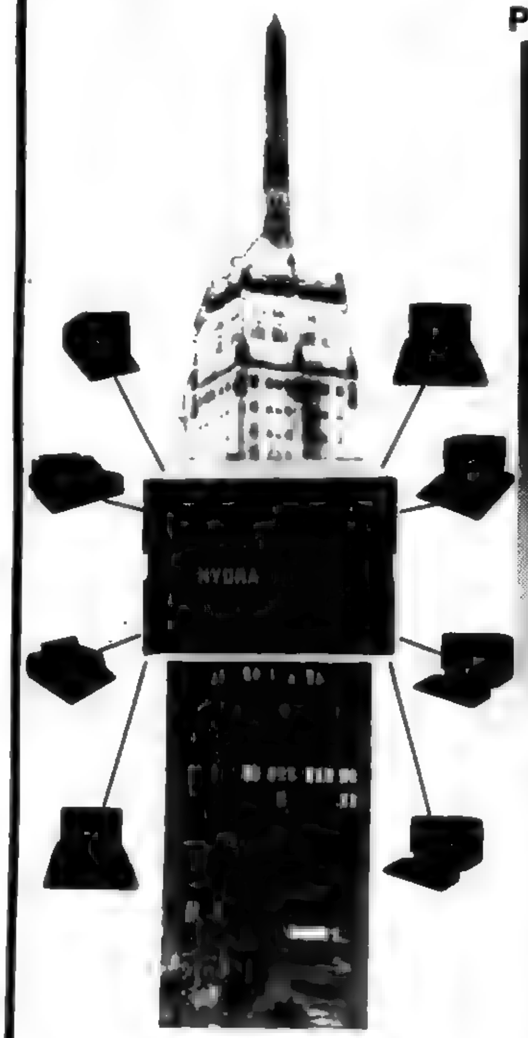

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Northern Telecom switches architecture

BY ELISABETH HORWITT
CW STAFF

NEW YORK — Attempting to out-position AT&T as chief equipment supplier for the divested Bell operating companies' anticipated invasion of the enhanced-service market, Northern Telecom, Inc. last week introduced a central-office switch architecture to support these future offerings.

The DMS-Supernode is a modular, digital central-office system that "will accelerate delivery of enhanced information services and permanently change the way that telephone networks are designed and built," said Roy Merrills, group vice-president for Northern Telecom's Integrated Network Systems Division.

The Supernode's modular architecture reportedly allows operating companies to add or delete processing nodes, switches, line cards and peripherals to support whatever features and services are in demand at a given central office. This should allow carriers to cost-justify enhanced services, according to Bart Stuck, a vice-president at Probe Research, Inc., a New York consulting firm.

Operating companies and their business customers can also implement applications and services on other computers and link them to the Supernode via standard telecommunications interfaces, such as Integrated Services Digital Network Primary and Basic Rate Interfaces and the Signaling System 7, said Alan Lutz, vice-president of group operations for Northern Telecom's Integrated Network Systems Division. "I could see a bank that wanted automatic access to data bases in three remote sites writing an interface to Supernode," Lutz said.

Stuck estimated that the Supernode could decrease the cost of installing a new service by as much as a factor of 10. "This will give AT&T a lot to think about," he said. AT&T is the largest central-office switch vendor in the U.S. market; Northern Telecom ranks second. While AT&T currently does not have a central-office system comparable to Supernode, it is "likely to come up with one," Stuck said.

The Supernode's architecture centers around Northern Telecom's 128M bit/sec. DMS-Bus, which supports multiple computing nodes, called DMS Cores, that can be implemented in modular fashion whenever a carrier wants to add services or switch capacity. For example, one DMS Core could control a CCITT X.25 packet switch, a second could control a DMS 100 digital switch, a third could control an 800-number service and a fourth could control a software-defined network.

A machine-independent software compiler will permit the Supernode to support other hardware processors in the future, including some based on reduced instruction set computing technology, the company said.

Northern Telecom will also, for the first time, release documentation for its development environments so that Bell operating companies can develop their own applications, Lutz said.

Northern Telecom reportedly has tentative orders for some 200 switches from various Bell operating companies. Not all of the holding companies are ready to sign on the dotted line, however.

After some initial conversations with Northern Telecom, Bell Atlantic Corp. is "cautiously interested" in the switch, according to company spokesman Larry Plumb. "It looks like an improvement, but we need more details," he said.

IBM enhances Convertible line with backlit LCD

RYE BROOK, N.Y. — IBM's Entry Systems Division announced last week an addition to its Convertible computer line that features a backlit LCD and an enhanced power supply.

The IBM Personal Computer Convertible Model 3 uses 3½-in. disk drives and is compatible with IBM's Personal System/2 family, according to an IBM announcement. The announcement also said the intensity of the display's internal illumination adjusts so information can be viewed with or without external lighting. The unit is available now for $1,695.

The use of low-power CMOS technology allows the Convertible Model 3 to operate, with average use, for up to four hours on the new backlit display or up to 10 hours on the reflective display used on the PC Convertible Model 2, IBM said. Both the backlit and reflective displays use supertwist technology.

The static CMOS memory is expandable to 640K bytes, IBM said. An optional internal modem supports both IBM's and Hayes Microcomputer Products, Inc.'s Attention command sets. The backlit display and enhanced power supply can be purchased as an upgrade to other models of the Convertible computer for $350.

IBM also announced last week a price reduction on the PC Convertible Model 2 to $1,395 from $1,695.

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Focus sharpened for DB2 development

BY ROSEMARY HAMILTON
CW STAFF

NEW ORLEANS — Information Builders, Inc. today is slated to introduce an application development system for IBM's DB2 that is based on Focus, the company's fourth-generation language and data base management system.

Information Builders "is acknowledging that DB2 is the de facto standard," said Shaku Atre, president of Atre International Consultants, Inc. in Rye, N.Y. "They are trying to say, 'We existed with IBM's IMS, and now we can with DB2.' "

Focus for DB2 does not include the data base portion of the Focus package, which marks the first time the vendor has offered such a tool for the IBM mainframe environment.

Applications for DB2 using 4GL

Focus is intended to allow users to develop applications for DB2 using Information Builders' fourth-generation language and programming facilities.

Today's rollout is set to take place at the Information Center Conference and Exposition being held here this week.

"There are a lot of users who don't use Focus and don't want a Focus data base on their system. They want a DB2 data base," said Vern Sheidler, marketing services manager at Information Builders.

The DB2 front end carries a license fee of $67,000. The vendor has been offering a DB2 interface for its current Focus package for $16,000. It was designed to work with the Focus system, which costs $66,000.

With the current products, a user can neither add nor delete records against DB2 without the Focus data base component, Sheidler said. Focus for DB2 will allow that capability, he added.

According to Sheidler, the new system will provide DB2 users with an easier environment in which to develop applications than is currently offered by IBM.

Not much faith in IBM

"IBM has never been known for developing good application development facilities, and that applies to DB2," Scheidler said.

Information Builders is said to be targeting the product at the growing DB2 marketplace, which Atre estimated will have an installed base of 2,000 by year's end.

"Users are still trying to get a handle on DB2," Sheidler said. "They've wanted DB2, but they don't like using SQL and Cobol to develop applications."

Novell unveils E-mail gate

BY PATRICIA KEEFE
CW STAFF

PROVO, Utah — Novell, Inc. took another step toward integrating its networks into corporatewide systems with its announcement last week of a gateway that transfers messages between Novell networks and a variety of electronic mail systems from IBM, Digital Equipment Corp. and other minicomputer vendors.

Scheduled to be available in September, the gateway reportedly will cost $3,000 and support multiple Novell networks and servers.

"Electronic mail is one of the most important links in a company, and this gateway [connects to] the most widely used messaging systems in corporate environments," said Craig Burton, Novell's vice-president of corporate marketing and development.

The link between Novell Netware-based networks and dissimilar mail systems will be provided by The Mailbridge Server/The Coordinator gateway, communications software installed in a dedicated personal computer acting as a network server.

Three vendors' products included

The gateway was jointly developed by Novell, Action Technologies, Inc. in Emeryville, Calif., and Soft-Switch, Inc. in Wayne, Pa. The message-transfer process actually incorporates products from all three companies.

Messages are created using Action Technologies' The Coordinator software, an E-mail, word processing and scheduling system that runs on Novell networks.

Messages are routed to The Mailbridge Server gateway on the network using Novell's Message Handling Service, a store-and-forward data transfer service announced in February.

The Mailbridge Server converts the message from The Coordinator format to an IBM Professional Office System (Profs) format, for example, and delivers it to the addressee on the Profs system, Novell claimed.

Messages can only be transferred to E-mail systems that also have a Mailbridge gateway. Soft-Switch's family of Mailbridge products provide document interchange and transparent interconnection of multivendor E-mail systems.

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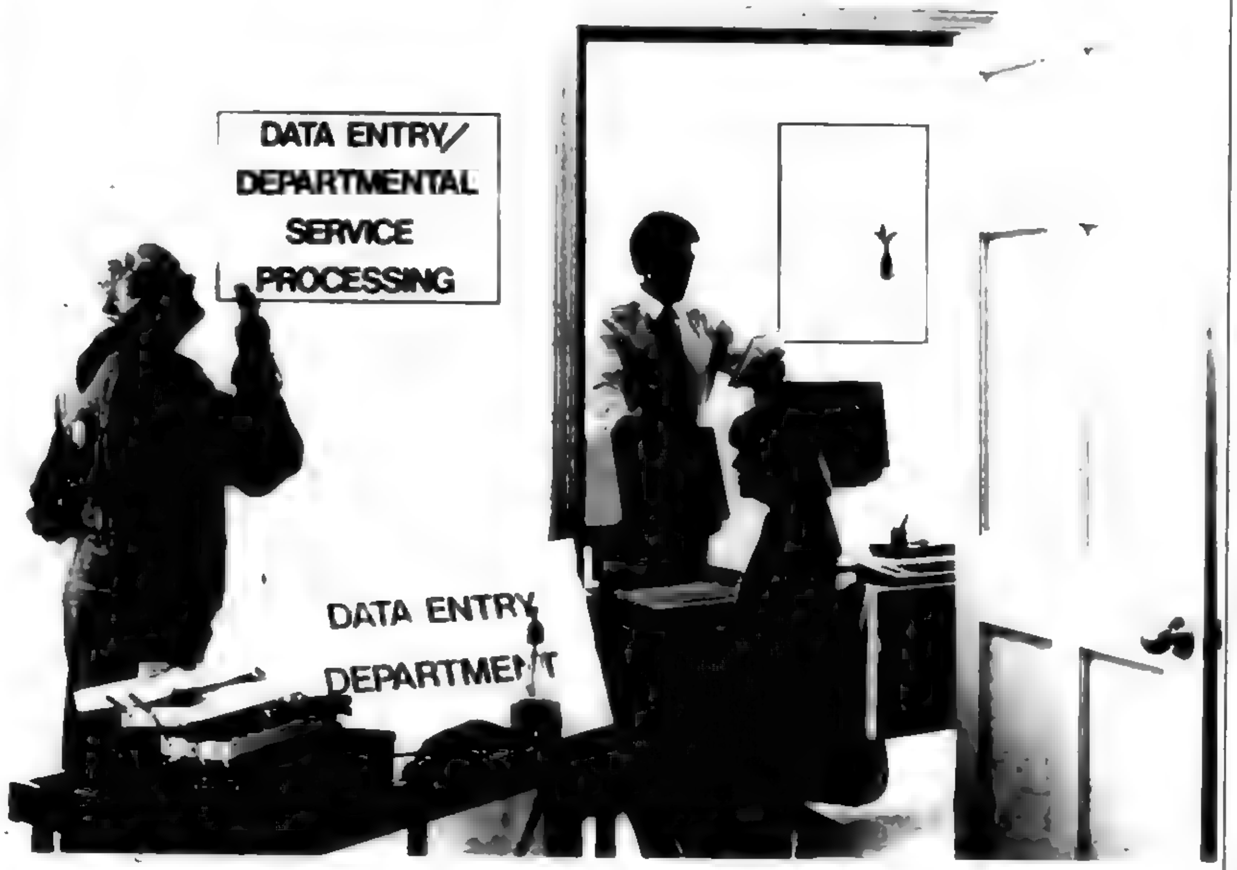

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DEC cuts Vaxmate prices in UK; no change here

BY JAMES CONNOLLY
CW STAFF

LONDON — Digital Equipment Corp. slashed the prices of Vaxmate personal computers sold in the UK by up to 24%, but DEC officials said last week that the move will not affect the U.S. market.

Observers in the UK speculated that DEC was repositioning the Vaxmate, an IBM Personal Computer AT-compatible system, in the wake of May announcements that lowered the entry point for its Vaxstation 2000 to $6,156 in the UK and $4,600 in the U.S.

The Vaxmate price cuts became effective July 1 and brought the price of a Vaxmate purchased in the UK down to $3,750. Previously, the PC had sold for $904 more in the UK than in the U.S. The current price in the U.S. is $4,045 for a Vaxmate with 1M byte of memory and a 1.2M-byte floppy disk drive. An optional expansion box housing a 20M-byte disk drive is available for $1,945.

UK observers claimed that DEC has had trouble distinguishing the Vaxstation from the less expensive Vaxmate. However, a DEC official in the U.S. said the difference is clear between the Vaxstation and Vaxmate markets.

"The Vaxstation 2000 is really an engineering workstation, and it hasn't impacted the Vaxmate as yet," said George Symula, office programs manager for DEC. Symula said the fact that Vaxmates carried a higher price in the UK than in the U.S. may have been a factor in the price cuts but emphasized that DEC marketing groups in each country make their own pricing decisions.

He declined to comment when asked whether similar price cuts are planned for Vaxmates in the U.S.

MS-DOS tied to Unix data

BY PATRICIA KEEFE
CW STAFF

SANTA MONICA, Calif. — Locus Computing Corp. and Network Innovations Corp. in Cupertino, Calif., have announced a joint, nonexclusive marketing and development agreement designed to allow users of applications based on Microsoft Corp.'s MS-DOS to access and retrieve data stored in Unix data bases.

Under the pact, the two firms will integrate Locus's PC-Interface and Merge 386 MS-DOS and Unix integration technology with Network Innovations' Multiplex data access software.

PC-Interface and Merge 386 provide transparent MS-DOS and Unix integration at the command and file-system levels. Multiplex allows users to query data on Unix data bases from MS-DOS applications.

Merge 386 will also be integrated with Multiplex. "The Merge 386 and Multiplex integration provides the same functionality for Unix systems based on Intel [Corp.'s] 80386 microprocessor and represents the first applications-level MS-DOS and Unix integration software running in the Merge 386 environment," said Michael Smith, director of marketing and sales at Locus.

The two vendors will jointly demonstrate but separately sell their products.

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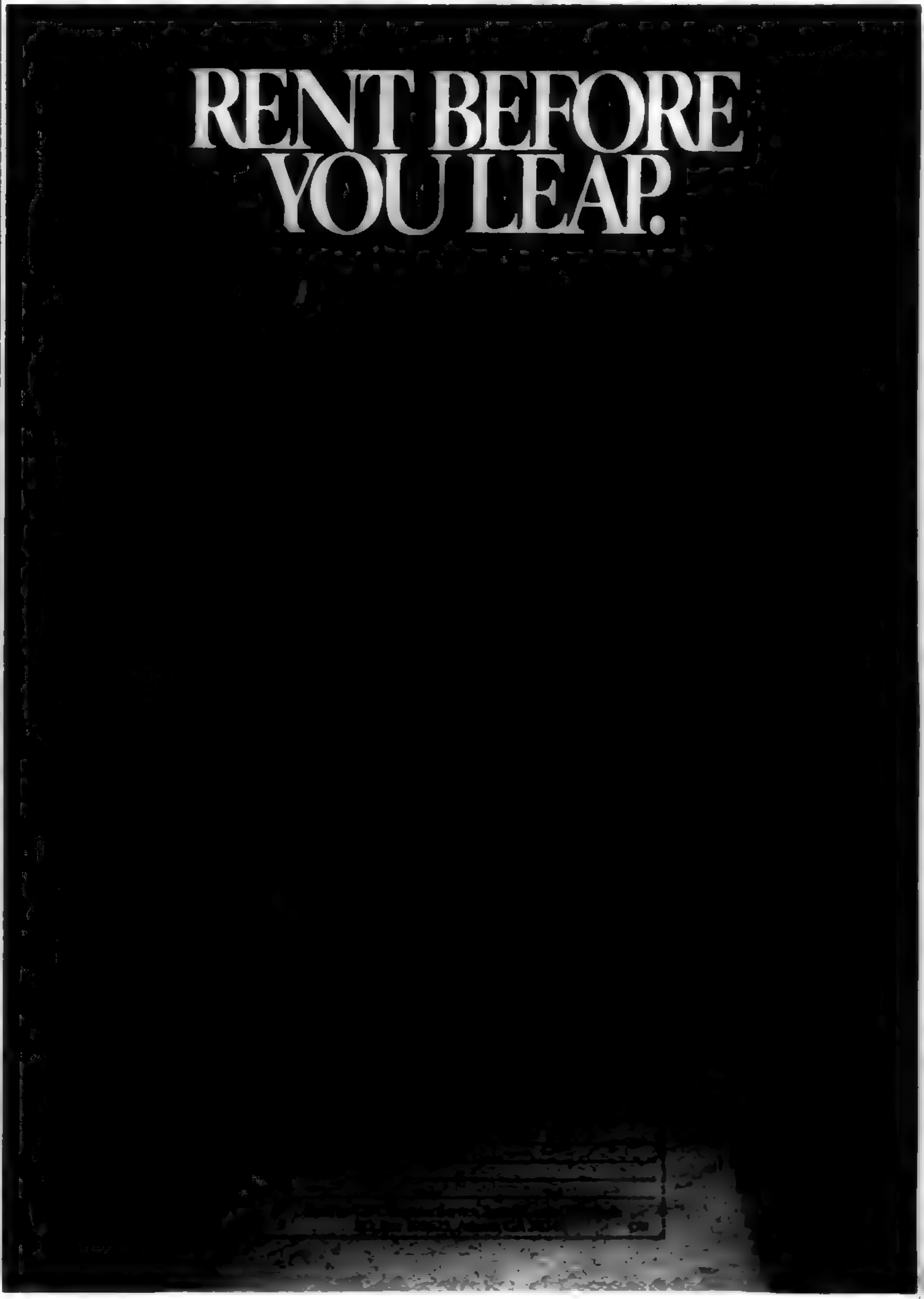

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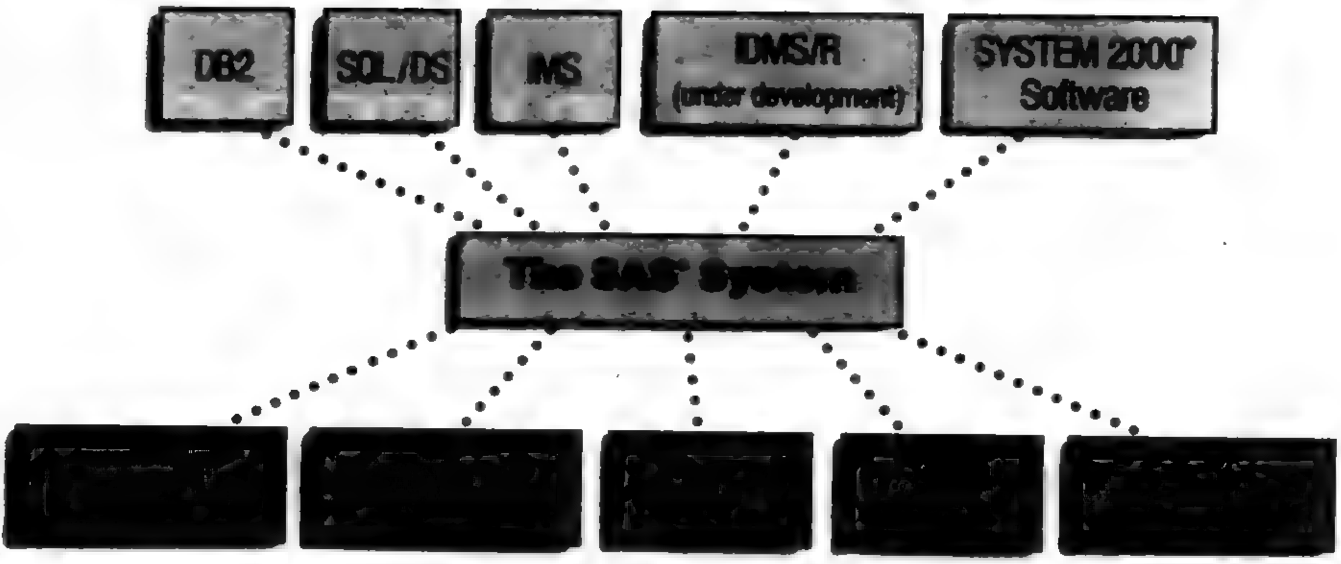

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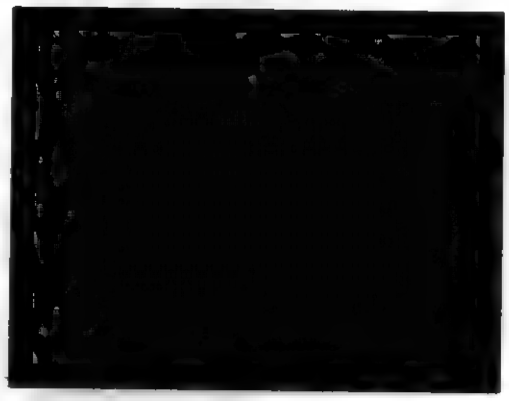

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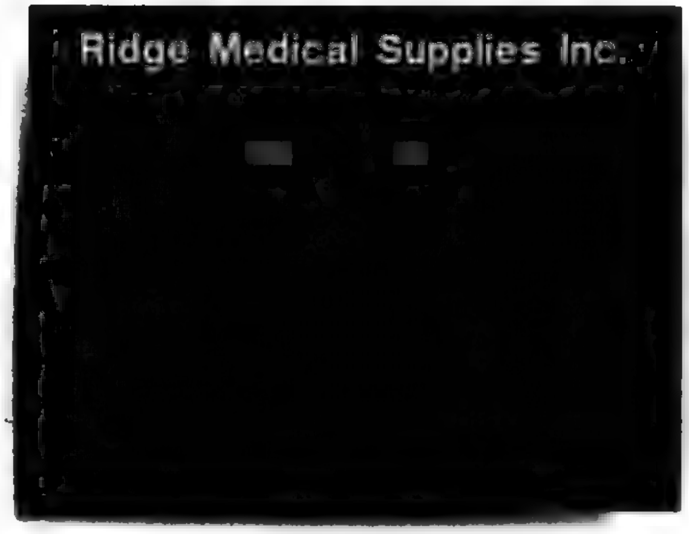

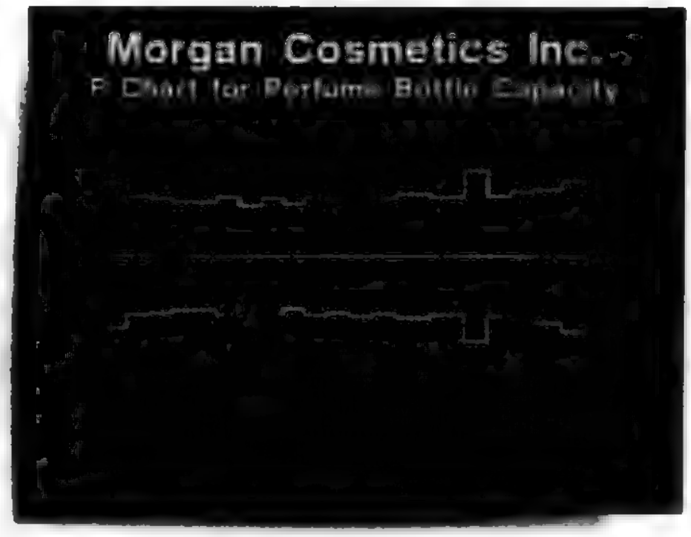

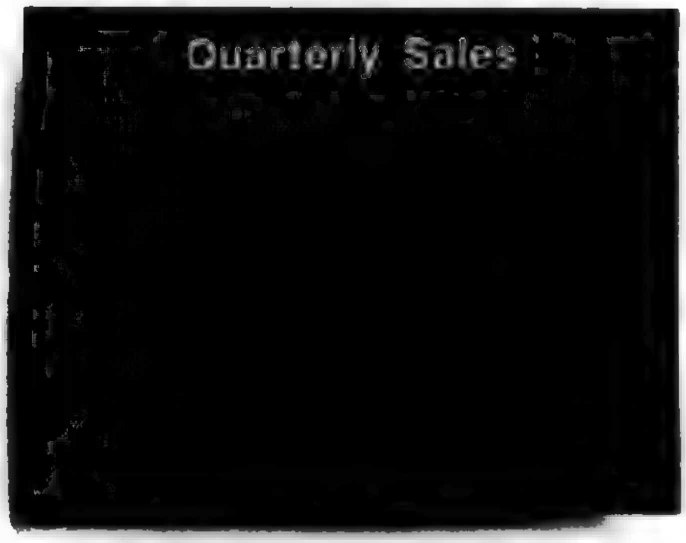

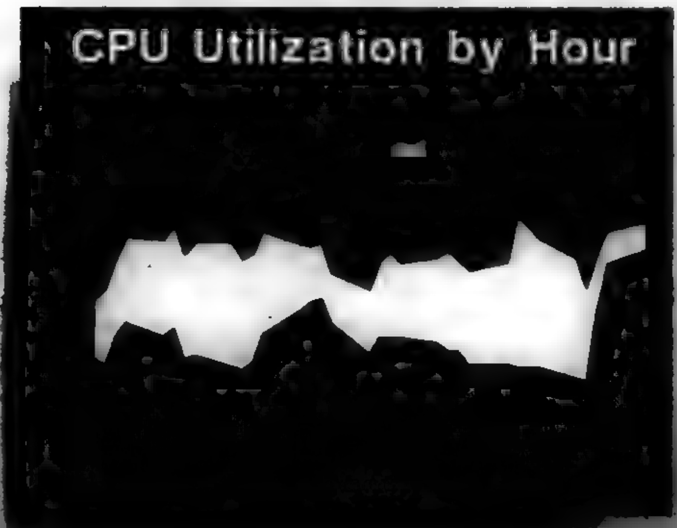

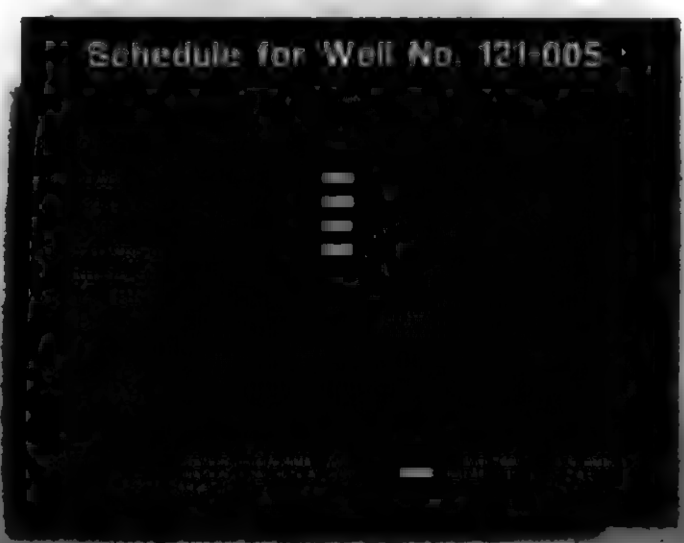

The SAS System runs on IBM Corp.'s 370/30xx/43xx and compatible machines, as well as minicomputers and personal computers.

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Turbolaser revamp incorporates Postscript

BY JAMES A. MARTIN
CW STAFF

IRVINE, Calif. — AST Research, Inc., last week announced that it will begin shipping in September a new version of its desktop laser printer, Turbolaser/PS, which includes Adobe Systems, Inc.'s Postscript page-description language that has become a microcomputer publishing standard.

AST said it will create a new price/performance standard in the increasingly competitive desktop publishing market. The firm claimed the Turbolaser/PS, retailing for $3,995 and offering 35 fonts, is the lowest priced Postscript printer on the market.

The Turbolaser/PS will be marketed as a stand-alone alternative to desktop publishing printers in a variety of processor environments, including Apple Computer, Inc.'s Macintosh, IBM's Personal Computer and Personal System/2 series and Digital Equipment Corp. products, among others.

In addition, the printer will be bundled with AST's desktop publishing package, Premium Publisher, the foundation of which is AST's Premium/286 microcomputer.

"We've broken a major price-point barrier by being under $4,000 with 35 fonts," claimed Charles R. Cortright Jr., director of marketing for AST's systems group.

Turbolaser/PS is an 8 page/min, 300 dot/in. resolution laser printer with Adobe's typeface libraries resident in a read-only memory (ROM) chip on the AST Postscript controller board. The 12.5-MHz controller board incorporates a Motorola, Inc. 68000 microprocessor, 3M bytes of random-access memory and 1M byte of ROM.

The controller board is available as a stand-alone product to upgrade existing Turbolaser printers for $1,995.

DEC strafing Air Force bid requirements

BY ADAM STONE
CW STAFF

Digital Equipment Corp. registered a formal protest with the U.S. Air Force recently, charging that the Air Force cannot legally require a vendor to supply AT&T's Unix System V.

At issue is an Air Force request for proposals (RFP) on a contract reportedly worth $3.5 billion. The RFP, issued in February, requires bidders' systems to conform to the Unix System V Interface Definition. DEC supports Ultrix, a version of Unix based on the University of California at Berkeley's Unix 4.2. System V and Ultrix are generally thought to be incompatible.

"The fact is that the RFP calls for an operating system proprietary to AT&T," DEC spokesman Frank Donovan said. Since AT&T is one of the bidders, DEC argued, the RFP disallows fair and open bidding and violates the 1984 Competition in Contracting Act, which specifies that government proposals must be written in functional terms, without trade names.

'Repeated requests'

"Since February, DEC has made repeated requests of the Air Force to modify the request," Donovan said. "The Air Force could have written the RFP in such a way that the operating system was discussed in terms of functionality."

According to Clarice Marie Burch, Unix System V product manager at AT&T, the Unix System V Interface Definition is the only published Unix operating system standard. In specifying this Unix definition, she argued, the Air Force used "the only standard they could use which would include multiple vendors with the same operating systems on their individual hardware."

According to Air Force spokesman Lt. Frank Kozlowski, the RFP is not restrictive to the AT&T system. The RFP, he said, calls for "20,000 standard multiuser small computer systems" and specifies that these systems must have "functional conformance" with the Unix definition.

According to Kozlowski, the Air Force defines functional conformity here as "the degree to which the operating system performs the functions identified in the [Unix definition] as measured by the System V verification suite."

And that, DEC claimed, is unfair. "When you say it has to meet that test specification, you eliminate a lot of people," Donovan contended. Burch argued that "the capacity for Berkeley [Unix 4.2]-based systems to be a contender for this bid is fair. The majority of the functionality is present in both Unix and Ultrix as defined by the [Unix definition]."

Computerworld has reported that DEC had offered Unix System V support to AT&T and regional Bell holding companies [CW, June 22], but Donovan said that does not affect DEC's protest. "We do offer System V to customers who request that. But when the government offers an RFP, we feel that the competition should be open."

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. . . the London, England office of UOP, via G/Remote Bridge.

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Says Dennis O'Brien, project manager/marketing services for UOP Inc., a unit of Allied-Signal.

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EDITORIAL

Blueprint for MIS

The formula for success in MIS management usually includes technical competence, business experience, human relations skills and management expertise. Rarely does it encompass a facility with a blueprint and T square.

But the process of physically designing a data center, as this week's Executive Report (page 53) points out, is one of the most important and challenging tasks an MIS department will confront. In a time when firms are increasingly viewing information strategically, it could also present a golden opportunity for MIS.

Designing a data center gives a company the chance to thoroughly examine the value it places on MIS. Those firms that hope to capitalize on innovative uses of information won't cut corners on such discretionary items as extra floor space and backup power supplies. However, constructing a data center is expensive, and the burden is on MIS to prove those costs are justified.

Experts point out that a data center should be built with the next five to 10 years in mind — a tall order when you consider that two generations of technology will pass in that time. Nevertheless, the structure must take into account what kinds of networks will be installed, how much processing power will be needed and where that power will be located. It must provide for more users, smaller machines, changing communications requirements and unforeseen economic trends that will affect computer use. And it must do it in an industry that is the most dynamic and unpredictable in the world.

It is incumbent for MIS to not only answer these questions, but to ask them in the first place. It is not enough to respond to future needs as perceived by top management. Rather, MIS must identify areas of growth that management may overlook. For example, has the company considered how it will automate its sales force? Will computer-integrated manufacturing be employed? Can on-line systems be used to link supplier and customer? Will all those personal computers on managers' desks communicate with each other, and, if so, will it be through a local-area network, minicomputer or mainframe?

These are difficult issues for MIS to tackle. They require a thorough grounding in available technology and a solid concept of where that technology is going. More important, they drive home the need for MIS to understand its business almost as thoroughly as senior management does. Yet the payoffs of a well-planned data center initiative for MIS are substantial. The process of determining user requirements can open clogged communication channels and enhance the image of MIS as a user-driven operation. The job of hammering out approval for a construction plan affords both management and MIS the opportunity to examine the value of information processing to the organization. But done right, a data center project can give MIS its day in the sun. It is a chance to map out a blueprint of an organization's information needs, with MIS positioned squarely at the center.

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YOU WANT TO SEE ALL THREE OF MY DAUGHTERS?!
LONG DISTANCE
INFO SERVICES
MANUFACTURING

LETTERS TO THE EDITOR

Standards needed

The frustration Charles Cresson Wood showed in his letter, "Security prudent" [CW, June 8], is understandable. However, management is not the total villain. One reason some organizations do not adopt security measures is that there are no accepted standards of due care for the protection of computerized data that current courts enforce.

Most nonlawyers are surprised to discover that, as a rule, one is not responsible in tort for the intentional misconduct of another that one might have taken steps to prevent, except in very restricted situations, and protecting data bases against hackers and the like who can cause financial damage to individuals does not qualify, at least not now.

Although computer security controls have been well known to practitioners for some time, they are not standardized, just as Cobol was once not standardized. Until standardization comes, there is little hope of recovery in tort for failure to protect computerized data, thus little incentive for some management to act as security practitioners would prefer.

Michael H. Argranoff
Stafford Springs, Conn.

Sprint rebound

The column "Too little, too late?" [CW, June 1] is an example of a notion that U.S. Sprint Communications Co. would like to dispel: that our efforts to penetrate the major customer market have fallen short.

Quite the contrary. In the 11-plus months of its existence, Sprint has not only increased its Fortune 500 coverage — we serve 476 of these at last count — but is also seeing a greater shift from lower usage to higher levels of large users than the column would suggest.

In fact, such companies as American Express Co., Automatic Data Processing, Inc., Formica Corp. and Sears, Roebuck and Co. depend on Sprint for all or a major share of their long-distance voice, video and data requirements. We think that speaks for itself.

As for new products, we recently announced our new 800 service, which will be the industry's only all-fiber 800 offering when our nationwide, all-digital, fiber-optic network is completed; and Telenet Communications Corp., despite the column's inference, also recently introduced its initial T1 integrated data and voice service.

Sprint has been moving aggressively since our joint venture with Telenet in July 1986, and I believe the best measure of our success is not the growth of our market share or our customer base but the recognition and reaction from our competitors to our presence in their once-exclusive territory.

Christopher E. Clouser
Senior Vice-President
Corporate Relations and Administration
U.S. Sprint Communications Co.
Kansas City, Mo.

Respond to crisis

I want to respond to some of the questions addressed in "Top students shunning MIS" [CW, June 15].

Although some business leaders and academicians are not sure there is a need for MIS professionals or in what direction MIS is heading, I am convinced companies cannot maintain or advance their posture in their industries without good hands-on MIS people directing their information resources because of the increasing interdependence of world economies due to global competition.

These companies must realize that they need to recruit and hire MIS people. As Ted Stohr, chairman of New York University's information systems arena, said, "But a lot of good jobs in MIS are going wanting."

Where are the good MIS people, and why is this happening? Is it because there are not enough good MIS people? Is it because companies cannot locate the

Continued on page 24

This week in history

July 11, 1977
A Senate bill that would create an independent government-financed standards board and a new Institute of Standards and Accreditation in the National Bureau of Standards is receiving strong support from the computer industry.

July 12, 1982
The microcomputer boom and growth of consumerism within the software industry is shifting the focus of new software development from the high end to the low end, analysts say. While the industry is still spending money on mainframe software, it is primarily for enhancements, with most new development focusing on products for the desk top.

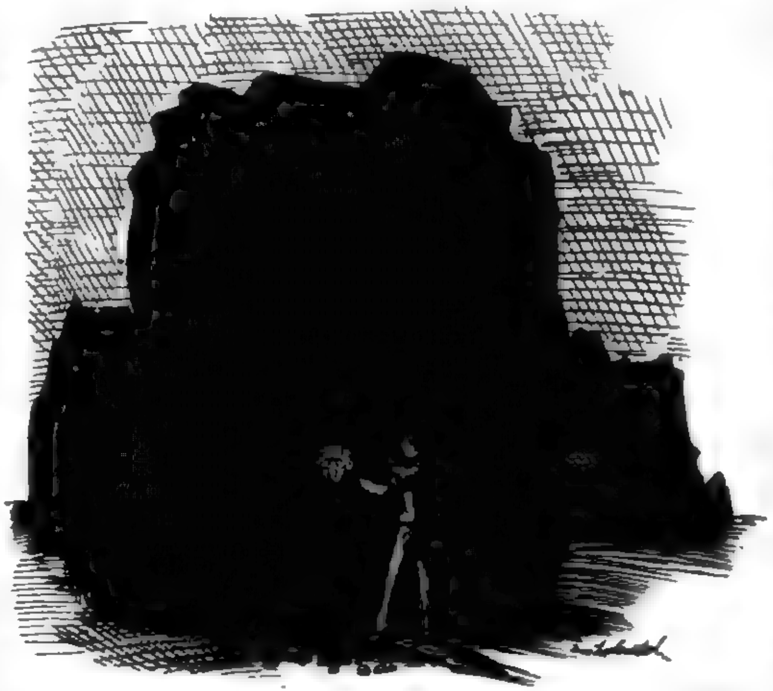
Finessing the small stuff

One man's list of companies that practice the art of product refinement

ASHLEY GRAYSON

I'd like to use this column to encourage vendors that understand how to finesse the small stuff; those that polish the little things that make an otherwise acceptable and possibly ho-hum product downright *useful* and worth recommending.

You know who I mean. . . . The appliance manufacturer whose power cord always reaches the outlet; the auto maker whose air conditioner runs at a setting between frost and not at all; the news magazine that tells you something you didn't already know.



TOM LULEVITCH

Sometimes such refinement leads to national acclaim, but often it is overlooked because a particular product lacks some superstar quality required by the critics. In the computer industry, such endearing qualities can come from careful, thoughtful design, but more often they show up in successive generations of the product. With today's short development cycles, iterative prototyping may become the new design technique. Prototypes are supposed to be confined to the lab, but some vendors believe in the theory of "Get it out, grab some market share, *then* fix it."

Sometimes, if the original product is close enough to market usefulness to make buyers want a better version, this approach works. But be too short on quality, and there won't be a second generation.

The nature of the product may also set limitations: You might be able to engineer by iterative prototyping with a laptop computer product, but you can't do it with a suspension bridge.

I applaud companies that prefer the bridge approach of doing it right the first time. For consistent elegance of design and execution, the award has to go to Hewlett-Packard Co. I've used a number of its products during the last few years, and they not only always work fresh out of the box, they work the way you expect them to work.

Nothing is counter-intuitive or oddball. When first released, HP's laptop computer had no sharp edges to tear your clothes or openings for dust or tobacco to enter and contaminate the innards. The laptops that did are no longer around.

HP printers don't make loud noises, leak ink or create dust. I've also taken a number of HP products apart and found them to be just as carefully constructed on the inside. Their Intel Corp. 286-based personal computer, the Vectra, is a case in point. I've used one almost daily for more than two years and never suffered a failure.

There are other ways to finesse the small stuff, such as solving the problem before anyone notices it and solving the wrong problem. Digital Equipment Corp. deserves mention in both of these categories. The first is for developing a solution — delivering on-line access to a controlled data base — before anyone noticed the problem.

Local-area networks of PCs and workstations are getting all the attention because of their difficulties in giving end users access to the corporate data base maintained by the MIS department. This problem is the one addressed by DEC's VAX Information Center and earlier "in-house time-sharing" products. The Decsystem-10 provided on-line capability in 1972, except there were no micros to talk to, only minis.

DEC's second award is for best solution to the wrong problem. The Rainbow was an elegantly overengineered hardware solution to the perceived software dilemma of CP/M vs. MS-DOS. DEC's traditional New England attitude of never discarding that which has intrinsic value apparently misled the company to design a system to salvage CP/M when the market was willing to bypass or ignore it.

The industry should study this misadventure carefully while it considers what to do about MS-DOS, OS/2, Windows and so on.

Who else fine-tunes the small stuff? Microsoft Corp.'s MS-Word 3.0 runs on both the IBM Personal Computer and Apple Computer, Inc.'s Macintosh. This lets me exchange complex documents with my Mac-fanatic associate. Here's a program that bridges hardware differences to everybody's benefit.

From a technical standpoint, MS-Word is one of those few programs that never run out of features when you need to do something difficult. We've laid out camera-ready copy for more than a thousand pages of technical manuals and never needed more than MS-Word. The product's slickness comes from being able to invoke additional features when the problem requires it. Too many software programs require you to know a lot before you can do a little.

Last but not least, Peter Norton Computing's Commander is the best bit of refinement of the Human/DOS interface I've seen. This small program makes DOS easy to use without replacing it with another massive system that has to be learned.

A perfect demonstration of the Less is More School of

Continued on page 24

Grayson is the founder of ADG, a San Pedro, Calif.-based organization that develops sales tools and programs for high-technology companies. Having spent 11 years marketing large systems for Digital Equipment Corp., he now works extensively with IBM-compatible micros.

Call it anything but a conspiracy

CHARLES P. LECHT

We have recently been treated to two events that cannot help but cause me to wonder who is kidding whom on the international trade issue. The first involves the alleged sale of computer systems by Toshiba Corp. to help the Soviets build quieter submarine propellers; the second involves the recent announcement by the Department of Commerce that it may fully lift the U.S. trade sanctions imposed upon certain Japanese products, including personal computers, small color television sets and hand-held power tools.

Together, these events confirm my feeling that there is no conspiracy afoot in the U.S. in its dispute with Japan on international trade in the computer industry, only ineptitude. In the case of the alleged sale of computers and software to the Soviet Union in violation of rules set down by the Coordinating Committee on Multilateral Export Controls (COCOM), we have every reason to be alarmed if it is true. However, it is not that sorry fact that sparks my interest; it is the results we seem to be obtaining by our reaction to Toshiba's alleged misdeed.

In the trade arena, the announcement by the Department of Defense that it decided to cancel an order for approximately 90,000 Toshiba laptops because the company was judged to be violating COCOM rules, seems far out. If it had been nine, 90 or even 900, I might have simply ignored the laptop order cancellation. But 90,000? In view of the hullabaloo concerning Japanese/U.S. trade, people may well wonder what the deuce was the DOD doing buying 90,000 computers valued at more than $100 million from Toshiba.

Morbid entertainment

Was there no U.S. company that could fulfill the DOD requirement? Or was the Toshiba offer so good that it couldn't be turned down? And are we to be treated to the morbidly entertaining phenomenon of yet another Japanese-industry dumping charge levied by our government against Toshiba for selling so many of its excellent laptop computers to the same government at what appears to be a very favorable price? As I reckon it, the price we were to pay for each had far less profit in it for Toshiba than for the DOD.

The action taken by the Senate to ban the sale of Toshiba products in the U.S. — except those deemed vital to our national defense — is of questionable benefit to our national interests, but is unquestionably bad for U.S. consumers. This decision will ensure the uninterrupted flow of Toshiba products to the DOD, but a cutoff of consumer products and spare parts to the U.S. public. If the Air Force selected the Toshiba laptop instead of anything made in the U.S. to grace 90,000 of its laps, we cannot help but notice that U.S. consumers have been left with second best by the prohibited sale of the product.

Sorry sight

But the larger issue remains unaddressed: the effect on future U.S./Japanese defense relations.

THERE is no conspiracy afoot in the U.S. in its dispute with Japan on international trade in the computer industry, only ineptitude.

The photograph of a group of U.S. politicians backing away at a Toshiba radio that graced the front pages of the worldwide press presented a sorry sight indeed, but not as much for Toshiba as for the politicians and the U.S.

Whatever they intended to achieve by this act posed and paid for the phony image of a split between the U.S. with its No. 1 defense ally, the ultimate result they will obtain can only serve to encourage the Soviet Union to continue to press forward to achieve a real split.

That a Toshiba subsidiary was engaged in an unwarranted sale to the Soviet Union may be true. That Toshiba seems to have admitted the deal was made and has taken punitive action toward those involved, is unquestionably true; the corporation's chairman and president have resigned.

But we may still have cause to wonder if the story is exactly as we've been told. Why? First of all, Japanese companies have found it convenient to quickly admit their guilt, whatever the charge, in lieu of arguing their

Continued on page 24

Lecht is chairman of Lecht Sciences, Inc./Japan, a Tokyo-based software think tank specializing in graphics. He is also an elected public member of the Hudson Institute and a free-lance writer on science topics.

Conspiracy

CONTINUED FROM PAGE 23

cases in what they perceive to be a kangaroo court in their largest marketplace.

Second, the protest caused by the murder of innocent U.S. sailors in the USS *Stark* affair pales in comparison with the uproar we have witnessed in the Toshiba incident, so we cannot help but wonder if trade, and only trade, considerations motivate the politicians that advise us in this case. Where were they after the *Stark* was attacked? Why was an "Excuse me" enough for these "patriots"?

Third, the notion that the Soviets had no alternative but to buy the Toshiba equipment seems highly unlikely to me; they didn't send men into space, explode hydrogen bombs and build atomic subs using an abacus.

Whatever the case, even if the event did take place as reported, and the harm that has been done is as we have been told, we would do better by focusing on how to avoid the situation in the future than trying to correct the past. Toshiba, one of Japan's premier science and engineering companies, isn't going to collapse because of the affair.

Regarding the sanctions issue, it is not the efficacy, or lack thereof, of the Department of Commerce's action to impose sanctions on Japanese industry that caught my eye this time. It was the announcement that the Commerce Department may just lift those sanctions if prices of Japanese-manufactured chips continue to rise, both in the U.S. and abroad. Great incentive for the people of the U.S.

First of all, the value of the sanctions, when viewed as a percentage of the value of overall trade between Japan and the U.S., could hardly have more than political meaning. They don't show up until the fourth decimal place, which assuredly is less than the margin of error in computing the trade volume. Clearly the sanctions were intended to feed the emotions of those in the U.S. who, for lack of an acceptable cause, blame their economic ills on Japanese industries.

Second, by offering a phony punishment of Japanese industries and a real one for U.S. consumers in the form of price increases, those perpetuating this myth show disrespect for the intelligence of the U.S. citizenry. Apparently, we are supposed to cheer the prospect of paying more for computer systems products than necessary because we are getting back at the Japanese in the process.

In both the trade sanctions episode and the Toshiba affair, we would be hard-pressed to say "planning" is how we found ourselves in these situations. "If you do not know where you are going, you'll probably end up somewhere else" we were told in a book title of the 1970s. We would do well to pay attention to this advice.

We appear to be headed unintentionally into a realm from which there is no escape except through a retreat from inanity. This means making peace with the Japanese high-tech community within which Toshiba plays a vital role and concentrating our efforts on avoiding war with our true adversaries.

The small stuff

CONTINUED FROM PAGE 23

Design, Commander shows a total understanding of how DOS is really used — by anyone, no matter what you are doing.

Other products that enable you to do many things before you have to learn everything include the following: Ansa Software Co.'s Paradox, which permits access to a data base without your understanding anything; Xerox Corp.'s Ventura Publisher, which makes a document look good whether you went to art school or not; and a gaggle of different vendors' laptops that make it possible to run PC software from anywhere you want to be.

Respond to crisis

CONTINUED FROM PAGE 22

right people? Is it because companies do not know how to recruit, select and hire qualified people?

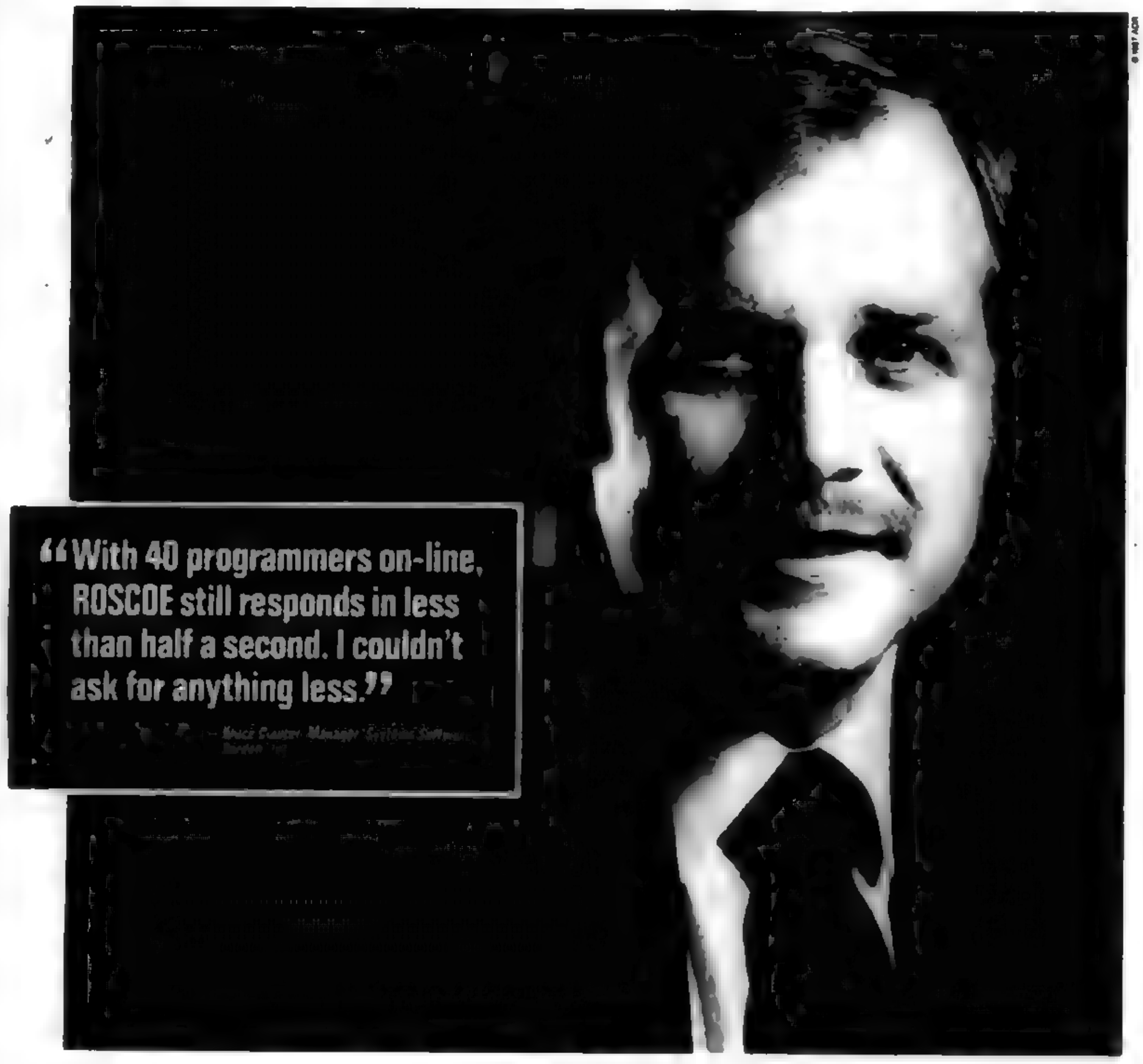
In response to the first two questions, I believe employers should not only look at the major universities but also pay more attention to the smaller private universities when hiring MIS people.

Because of the dynamic nature of the field, smaller colleges and universities are able to react more quickly to the changing conditions of MIS technology by virtue of their size and constraints and offer programs that are more compatible to the industry's current needs. Of course, this spells better qualified MIS personnel.

To shed some light on the third question, some companies and their personnel departments are emphasizing too much importance on people having specific machine skills when they should stress more importance on a person's overall background.

For instance, does one bring solid business skills that relate to the company's present or future needs, as indicated by the skill graph in the article? What is more important — specific machine skills that one can learn through in-house training within a few short weeks, or years of solid business experience that one brings to the marketplace? Corporate America: Wake up before it's too late.

Dale H. Duman
Graduate MBA/MIS student
City University
Portland, Ore.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SOFTWARE & SERVICES

SOFT TALK

Charles Babcock

On keeping software soft

There is a persistent theme running through the discussion of software development these days. Developers are trying to take a malleable material — software — and construct a tough, fail-safe structure on which companies may run their business.

And although it must be rigid enough to perform given business functions over and over again, it also must be adaptable. Hence, even after constructing bulletproof systems, we want software to be plastic.

Frederick P. Brooks Jr. caught the flavor of this when he referred to the pleasure of working "in such a tractable medium" in his book, *The Mythical Man-Month.* "The programmer, like the poet, works only slightly removed from pure thought-stuff. He builds his castles in the air, from air, creating by exertion of the imagination. Few media of creation are so flexible, so easy to polish and rework, so readily capable of realizing grand conceptual structures."

Brooks, who oversaw the development of IBM's System 360 operating system, the progenitor to today's family of mainframe operating systems, noted one sentence later in his book that "this very tractability has

Continued on page 30

Found: needles in a haystack

Memorex unstops system's baffling bottlenecks with Blue Line monitor

BY JEFFRY BEELER
CW STAFF

MILPITAS, Calif. — Until last October, the IBM 4381 that internally supports Memorex Corp.'s Communications Group was able to operate at only 20% of its potential capacity. Worse yet, the company was at a loss even to explain — much less remedy — the machine's unacceptably low level of performance.

Today, the same processor is running at 60% to 80% of maximum efficiency, according to Memorex senior systems engineer Randy Sessler.

The change that accounts for the increase in resource utilization is the firm's installation of a real-time performance monitor that runs under IBM's VM/SP. For the past nine months, Memorex has been using Blue Line Software, Inc.'s $8,000 Vital Signs to pinpoint areas of high resource contention or other systems problems so that the organization can take steps to alleviate bottlenecks.

The user organization is currently upgrading to the latest release of Vital Signs, which Blue Line formally announced July 6.

Memorex already uses the systems software's earlier version, which supports real-time displays of assorted performance measures and boasts a modeling capability that predicts the impact of alternative configurations on system behavior.

But now, the Minneapolis-based firm is enhancing its existing VM performance monitor to include a historical reporting capability that aids in the detection of long-term performance trends.

Also included among the enhancements is a menu feature that allows users other than systems programmers to summon data without entering complicated commands, according to Sessler.

Like IBM's equivalent moni-

Continued on page 29

Data View

Software acquisitions

User spending in the second quarter confirms trend toward third-party vendors

INFORMATION PROVIDED BY A PAINE WEBBER SURVEY OF 1,217 DATA PROCESSING MANAGERS ON BUYING PLANS
CW CHART: MITCHELL J. HAYES

Standard for CASE offered

BY ROSEMARY HAMILTON
CW STAFF

Cadre Technologies, Inc., a maker of computer-aided software engineering (CASE) tools, recently proposed an interface standard that would allow users of different CASE tools to exchange data.

The Providence, R.I.-based vendor has yet to gather support from other CASE vendors, but claimed that this "proactive role" will minimize its engineering efforts. "By doing this, we decrease the likelihood that a new standard will come out from somewhere else that we'd have to adopt," said Lou Reynolds, Cadre's vice-president of marketing.

Cadre demonstrated a prototype interface at the Design

Continued on page 29

Software packaged for 9370s

BY ROSEMARY HAMILTON
CW STAFF

ATLANTA — American Software, Inc. is offering prepackaged versions of its mainframe manufacturing and accounting software for the IBM 9370 departmental system that will cost from 10% to 35% less than its current products, company officials said recently.

American Software said the DS/9370 series, available now, will run under the IBM VSE operating system.

The product line, which includes manufacturing resource planning applications as well as the commonly used accounting packages, will be offered with a number of optional features, but the vendor said it will not tailor the software to a particular customer's needs.

'Fewer decisions to make'

American Software has offered its other mainframe products with optional features and a customization service. The DS/9370 packages, however, are "for users that want fewer decisions to make and a lower

Continued on page 30

Inside

- Tandem outlines systems-integration architecture. Page 28.
- Information Builders plans acquisition of expert systems development firm. Page 29.
- Honeywell Bull introduces Software Release 3000 of GCOS 8 operating system. Page 31.

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*[illegible]

Tandem seeks leadership role in CIM market

BY JEAN S. BOZMAN
CW STAFF

CHICAGO — Tandem Computers, Inc. claims it can put its own experience to work for customers in the developing market for factory computer systems.

At the Advanced Manufacturing Systems show here last month, Tandem positioned itself as a systems integrator for end users in the computer-integrated manufacturing (CIM) arena. The company outlined its systems integration architecture, called the Tandem Integrated Manufacturing Environment (TIME).

The architecture will combine Tandem hardware and systems software with third-party applications software solutions, Tandem said.

Making TIME

"The thing that really drove the development of TIME within Tandem was that our systems were able to track the things we made, instead of using the paper tags attached to products," said John Despotakis, manager of manufacturing industry marketing for Tandem. "It will track our customers' products, whether they are jet engines, printed-circuit boards or pharmaceuticals."

Although TIME packages will not be ready for shipment until next year, they will be based on the Tandem Nonstop fault-tolerant processors, Tandem's Nonstop SQL relational data base management system, a Tandem-IBM Systems Network Architecture communications facility called SNAX and Tandem's new Unix workstation, the LNX processor. Tandem said it will also announce a consulting service for its manufacturing customers, who accounted for 21% of Tandem's 1986 revenue of $768 million.

Tandem decided to sell its own approach to others following a prediction that the need for seamless CIM solutions would grow to a $20-billion plus market in the 1990s. And Tandem's own experience had shown that fault tolerance, a key customer requirement in buying Tandem systems, is also a critical CIM requirement.

"Fault tolerance is a manufacturing requirement," Despotakis said. "We're providing the specifications for three factory environments and then preconfiguring them to fit together with complementary pieces." The three environments are product and process document management, factory control and device control.

Using elements of the TIME system its Austin, Texas, terminal manufacturing plant saved Tandem nearly $25 million in overhead, an amount nearly equal to 4% of its 1986 revenue of $768 million, Despotakis said.

SAS listens to user demands for efficiency

BY CHARLES BABCOCK
CW STAFF

CARY, N.C. — SAS Institute, Inc. is claiming a 40% performance improvement with an enhanced release of the SAS System for Digital Equipment Corp.'s VAX after users called for efficiency improvements in the burgeoning SAS product.

The performance improvements in Release 5.16 are the result of a 20-member development team's efforts to streamline the one million lines of code now in the SAS System.

Release 5.16 is written in PL/I and assembler; Version 6.0, expected to go into beta testing in late 1988, will be written in C, like the current personal computer version of the base system, SAS spokesmen said.

Granting a wish

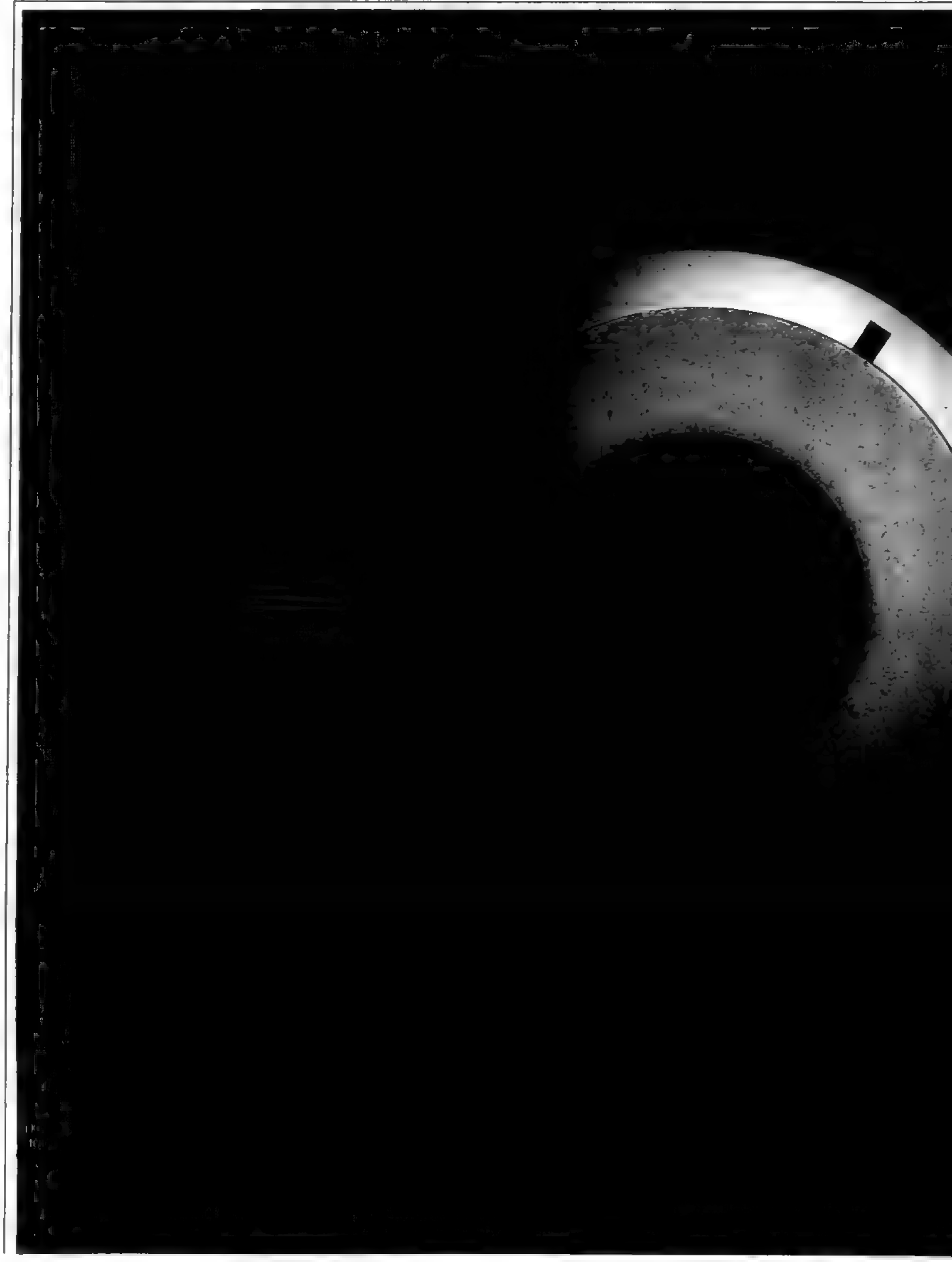
Performance improvements have been a frequently cited wish on SAS Institute's annual list of customer preferences, according to officers of the SAS System Users Group.

Other features of the release include a single-command file transfer method between VMS and an IBM PC-DOS users' version of the SAS System.

A separately priced tool is available to mainframe users in manufacturing to automate statistical analysis in quality control is now available to VAX users. Called SAS/QC, it gathers quality-control information, analyzes it and shows variations within given specifications. It is integrated with other components of the SAS System, company spokesmen said.

Release 5.16 supports DEC's Vaxstation 2000 and VT330 and VT340 graphics terminals, SAS said. A first-year license for the release is priced from $1,500 to $12,000, depending on processor size. SAS/QC is priced from $1,500 to $6,000.

Licenses for the SAS System on the VAX currently number about 1,700. The system still garners about 65% of its revenue from the IBM mainframe world, but sales to DEC users now account for about 20% of revenue and are growing, according to SAS Chairman James Goodnight.



SOFTWARE NOTES

Information Builders plans first acquisition

Information Builders, Inc. in New York reports that it is is planning to acquire expert system development company **Level Five Research, Inc.** in Indialantic, Fla.

Level Five is the first acquisition by Information Builders, which markets PRL3, an expert system development tool for the Digital Equipment Corp. VAX, and Insight 2+ for IBM Personal Computers and compatibles. Information Builders' Chairman Gerry Cohen said Level Five will help Information Builders offer more decision-support products to its Focus product lineup.

DBMS, Inc. and **Cullinet Software, Inc.** recently decided that cooperation is more profitable than litigation.

Cullinet sued the Naperville, Ill., company over its Developer Workstation, a personal computer-based system aimed at developing Cullinet IDMS/R applications.

The firms' differences have been composed out of court, and now DBMS is on Cullinet's list of registered consultants, DBMS spokesmen said.

Thomas D. Blondi, former vice-president of marketing for **Software AG of North America, Inc.**, has rejoined Sterling Software, Inc.'s **Answer Systems Division** as vice-president of sales and marketing. Blondi was previously with the division from 1973 through 1983.

Relational Technology, Inc. has turned to **Natural Language, Inc.** to come up with a product that will allow users to formulate queries and access the former's Ingres data base with English statements.

Natural Language's product is Datatalker, which translates queries into SQL statements.

Needles

CONTINUED FROM PAGE 27

tors, VMMap and Smart, the Blue Line product collects statistics about key systems performance variables such as CPU utilization, resource waits and I/O as well as paging rates. But unlike its IBM counterparts, which present their numbers in tables, Vital Signs displays its output graphically.

For Memorex, the graphs simplified the interpretation of its 4381's raw performance data and sped the diagnosis of the machine's problems. Within a few days of installing the monitor's first release, "we found that most of our system peaks were occurring on the same disk controller and channel," Sessler recalled. "So we simply added more devices, channels and controllers to our configuration to make sure that the user load is spread evenly across the system."

Considered alternatives

Had Memorex opted instead for a performance monitor that presents its output tabularly, the firm might still have been able to diagnose the cause of the 4381's inefficiency. But the burden of analyzing the resulting reams of raw statistics would have retarded the process and possibly "prevented us from seeing what impact our bottlenecks were having on the system's utilization," Sessler said.

Memorex's purchase of Vital Signs coincided with the start of a systems conversion effort that the company has yet to complete. While the firm was still a subsidiary of Unisys Corp., the Communications Group's VM-based 4381 was used primarily for engineering applications.

Now, however, Memorex is converting the processor into a business-oriented system that will integrate jobs such as order entry, inventory control and the standard accounting functions, Sessler said.

Memorex also uses copies of the performance monitor externally as a sales tool to help its systems engineers spot bottlenecks in their customers' current hardware and suggest alternative configurations to address the problems, Sessler added.

Standard

CONTINUED FROM PAGE 27

Automation Conference, held late last month in Miami, that exchanged data between its Teamwork software and Excelerator, a competing product from Index Technology Corp. in Cambridge, Mass.

Index Technology did not participate in the demonstration, and a company spokeswoman said the vendor has not yet announced its position regarding the proposed interface standard.

The proposed standard is an extension of an evolving user-backed standard in the computer-aided engineering (CAE) world called the Electronic Design Interchange Format (EDIF).

An EDIF users group was formed four years ago to create an interchange standard that would allow users of different CAE systems to exchange data.

The latest version of the proposed standard, EDIF 2.0.0, was recently published and at least two vendors, Mentor Graphics Corp. and Valid Logic Systems, Inc., have announced their intentions to support it.

Keeping

CONTINUED FROM PAGE 27

its own problems."

Nevertheless, he touches on the essential nature of software. Like the potter, the program developer models his object from a malleable substance. Unlike the potter, the programmer will spend a great deal of time keeping it soft. If the software developer wanted permanence, he could cast his product in silicon.

Instead, we want our models of reality, embedded in software, to remain flexible. We want to be able to modify the model as quickly as reality changes. Even if reality doesn't change, our perception of it will, hence, we arrive at an essential requirement for software.

Paul G. Bassett, vice-president of research at Netron, Inc., a Toronto computer-aided software engineering (CASE) tool maker, summed up the problem implicit in this requirement with an apt phrase — brittle software. "Software provides the means, both to approximate reality with dynamic models of arbitrary precision, and to alter them as rapidly as our perceptions change . . . [it] is the ultimate modeling medium.

"Unfortunately, the effective malleability of software has not been realized in practice. Lack of adaptability is the single most important factor underlying the current 'crisis' in the software industry. While much effort has been devoted to representation, little work has been done to automate customization and evolution," Bassett wrote in a paper.

Thus, those who produce application generators find themselves offering systems that can produce new models of reality quickly. But their clay is the quick-frozen type, one that forces the potter to adapt to its routines and language.

No one tool will help

Likewise, CASE tools speed development of applications, but once developed, no one tool will help us maintain and adapt applications to unanticipated change. To make significant changes, we have to go back and use a whole battery of tools all over again, and frequently they do not mesh.

"Curiously, like metal fatigue, the more you flex software, the more brittle and fragile it seems to get. In spite of our best efforts, subtle inconsistencies creep into hidden nooks and crannies of the code. To make things worse, once the original implementors depart, no one quite understands how certain modules work anymore," Bassett wrote.

Questions that go unaddressed in the plethora of products claiming to aid software development are: Can we incorporate adaptability into our systems? Will they be easy to maintain or merely quick to develop? Do the tools with which we design them help us modify them? How do we keep software soft?

Babcock is *Computerworld's* senior editor, software & services.

CPU tools

CONTINUED FROM PAGE 27

cost," said Paul Di Bono, vice-president of marketing.

For instance, the prepackaged version of American Software's Manufacturing Management System will typically carry a license fee of $220,000, according to Di Bono.

A comparable system for other IBM 370 mainframes costs $360,000, Di Bono said.

Single software prices affected

Price differences affect single software modules as well, American Software said. A typical accounts receivable module is priced at $75,000 as part of the DS/9370 series, while the module costs $110,000 for larger IBM mainframes.

Di Bono said that the DS/9370 packages will not be available for the IBM VM operating system, even though IBM currently is heavily promoting VM for the 9370 systems.

"At some point, if they make VM suitable for a heavy transaction processing environment, then we will follow that direction," he said.

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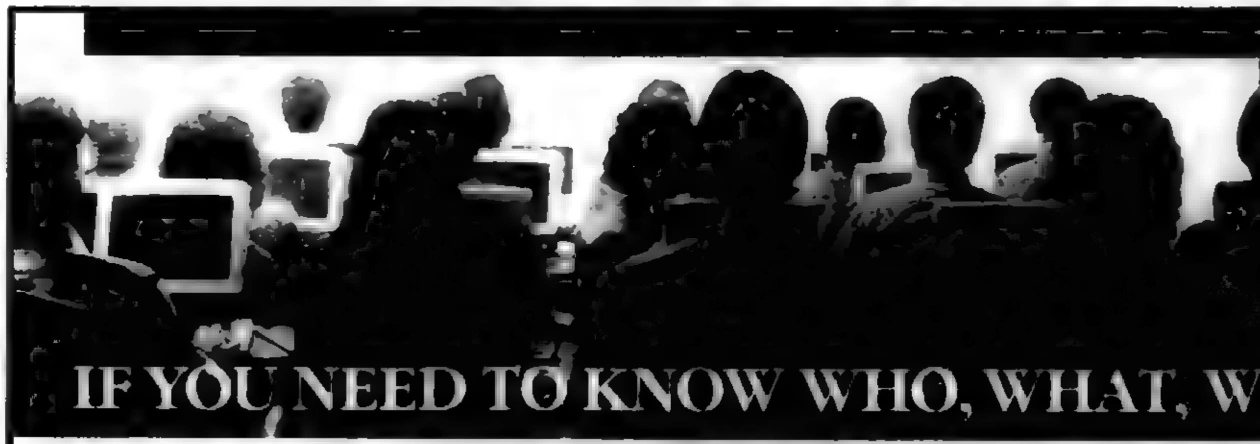

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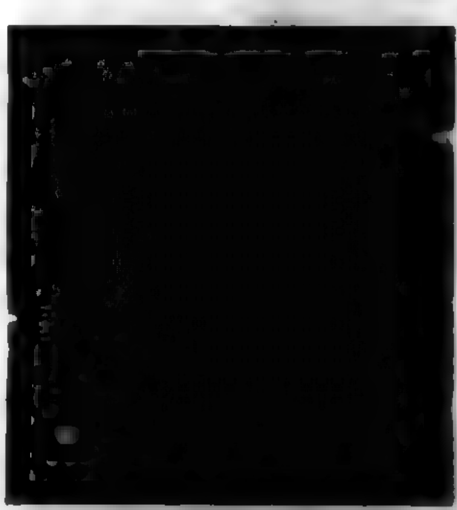

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NEW PRODUCTS

Systems software

Honeywell Bull, Inc. has introduced **Software Release 3000** (SR3000) of its GCOS 8 operating system for DPS 8, 88 and 90 computers.

SR3000 adds support of a personal computer link and Cobol 85 and Ada programming languages.

The Personal Computer Interconnect (PCI) link is host-access software. It provides a window manager, graphics, terminal emulation and script processing.

License origination fees for the GCOS 8 operating system range from $2,000 to $12,000. Monthly license fees range from $500 to $4,700. PCI costs $495. The license origination fee for the Cobol 85 compiler costs from $840 to $1,000. Monthly license fees range from $420 to $500. Initial license fees for the Ada language system cost from $40,000 to $50,000. Annual license fees range from $12,000 to $15,100.

Honeywell Bull, P.O. Box 8000/A-79, Phoenix, Ariz. 85066.

Applications packages

Sotas, Inc. has enhanced its **Fixed Assets** accounting system for Wang Laboratories, Inc.'s VS computer systems to include redesigned menus, prompts and data-entry screens and to address the first phase of the Tax Reform Act of 1986.

Fixed Assets accommodates new depreciation methods such as diminishing balance, accelerated cost recovery and straight-line mid-month convention. Other modifications include real-time inquiry into both company and individual asset data, on-line navigation through the entire Fixed Assets system and rewritten procedure language.

The new version of the Fixed Assets accounting package is priced from $8,000 to $25,000.

Sotas, 192 Merrimack St., Haverhill, Mass. 01830.

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Languages

Language Processors, Inc. has ported its **LPI-PL/I** compiler to the Apollo Computer, Inc. Domain workstation.

LPI-PL/I reportedly was designed for use as a conversion tool and is a full implementation of the ANSI PL/I X.374 1981 General Purpose Subset. It includes extensions for compatibility with mainframe dialects of PL/I to facilitate software conversion. According to the vendor, LPI-PL/I allows users to port PL/I applications running on other systems, such as IBM mainframes and Digital Equipment Corp. VAXs, to Apollo workstations.

LPI-PL/I is priced at $2,000.

Language Processors, 400-1 Totten Pond Road, Waltham, Mass. 02154.

Utilities

TRW, Inc. has introduced a system exerciser and utility package that provides on-line hardware testing and failure reporting capabilities for Digital Equipment Corp.'s VAX-11/700 series of computers utilizing DEC's Ultrix or the University of California at Berkeley's Software Distribution operating system software.

TRW USE includes a CPU test as well as exercises that identify malfunctioning DEC and plug-compatible peripheral devices. It also contains utilities for disk and tape-drive alignment. It operates on-line and resides on approximately 180K bytes of disk space. Normal processing operations can continue while the system is being exercised.

A single license of TRW USE costs $3,795 per copy. A general-use, multisite license costs $57,995.

TRW, 420 Hudgins Road, Fredericksburg, Va. 22401.

Target Systems Corp. has enhanced its **Target Calendar** quality-time and calendar-management software for Digital Equipment Corp. VAX/VMS systems.

The vendor said a new add-on software product, called Target Notify, provides Target Calendar users with an event notification system that automatically reminds users of the next scheduled event.

The vendor also announced that support for DEC's Decnet is now available for Target Calendar. For multisystem sites, Decnet support provides users with access to Target Calendar data files that reside on other nodes.

Target Calendar is priced from $395 to $795.

Target Systems, 33 Boston Post Road W., Marlboro, Mass. 01752.

Development tools

Enter/Act, a software package said to provide developers of interactive applications running under Unix with utilities for command processing, window management, menu generation and on-line Help, has been announced by **Precision Visuals, Inc.**

Enter/Act automatically generates code to handle the command prompts, command processing and program branching once the developer has specified the flow of-control through the program, the vendor said. It supports windows even on nongraphics terminals such as the Digital Equipment Corp. VT100. Prices range from $13,000 to $32,500.

Precision Visuals, 6260 Lookout Road, Boulder, Colo. 80301.

Are you prepared to supply a technical staff with each 9370?

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MICROCOMPUTING

SMALL TALK

William Zachmann

Unpacking OS/2 kit bag

As far as I know, this is the first column in a computer publication written under OS/2, the new operating system from Microsoft Corp. and IBM due out next year. But since I didn't have a protected-mode version of my favorite word processing software, I had to be content to construct this column using Wordperfect Corp.'s Wordperfect running in OS/2's compatability on an IBM Personal Computer AT compatible from NEC Corp. called the APCIV.

Without a doubt, OS/2 is the most important software event of this year thus far. The first form in which anyone outside of Microsoft and IBM can gain access to OS/2 is the $3,000 Microsoft OS/2 Software Development Kit, which I'm currently using. It includes all the tools required to begin developing OS/2 applications along with a prerelease version of Microsoft's MS OS/2.

Other micro vendors, such as Compaq Computer Corp., say that they will offer Microsoft's MS OS/2 for their systems

Continued on page 35

Expert system stalks killers

Developed to test rapid prototyping vs. knowledge acquisition

BY ALAN J. RYAN
CW STAFF

Serial killer: One who wantonly commits multiple murders over a period of time, often over a large geographic area, without any apparent reason or pattern.

TROY, N.Y. — A hunter tracking an animal can follow signs like tracks and broken twigs. But police hunting a serial killer are seldom so fortunate.

To ease the search, William Wallace and a former student, Paul Gutwald, at Rensselaer Polytechnic Institute (RPI) created an expert system to help officials track serial killers.

In most expert systems, a knowledge-acquisition process involving much research, inquiry and observation is used to create the system's knowledge base.

However, in an area like tracking serial murderers that boasts few experts, a knowledge base can be extremely difficult to build.

Wallace, chairman of the department of decision sciences and engineering systems at RPI, and Gutwald, who works in the artificial intelligence group at General Motors Corp. in Detroit, came up with Serial Murder Analysis and Recognition Techniques (Smart) — and put rapid prototyping to the test.

They constructed the system for use on the IBM Personal Computer AT under Scotts Valley, Calif.-based Borland International's Turbo Prolog development tool. The purpose of rapid prototyping, Wallace says, is to

Continued on page 34

Small firms' PC spending nose-dives

BY ALAN J. RYAN
CW STAFF

WEST HARTFORD, Conn. — The number of small businesses planning to buy microcomputers and supermicrocomputers took a 48% plunge from 1985 to 1986, according to a study conducted by Focus Research Systems, Inc., a subsidiary of Dun & Bradstreet Business Marketing Services.

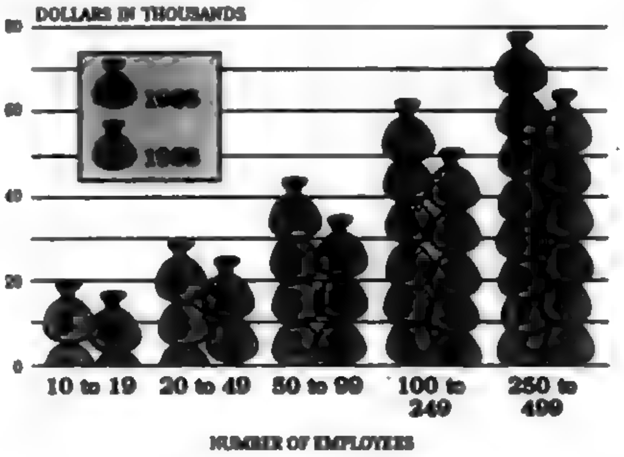
The findings were based on more than 100,000 interviews conducted by Focus Research. For companies with revenues between $2 million and $50 million per year, average budgets for new systems dropped 17% and total planned expenditures fell 57% from 1985 to 1986.

Small-business microcomputer systems budgets dropped

Continued on page 34

Micro purchases

Small businesses budget less for new systems



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CW CHART: MITCHELL J. HAYES

Ansa chief addresses 386, OS/2

Ansa Software boldly broke into the microcomputer software industry in 1985 with the release of Paradox, a data base product aimed at stealing market share from Ashton-Tate's Dbase line.

The venture capital-backed firm, which last week agreed to be acquired by Borland International, is trying to establish a beachhead in the local-area network data base market with its latest release of Paradox. Ansa is also developing a version of Paradox that takes advantage of the Intel Corp. 80386 processor but does not require OS/2, the unreleased operating system from IBM and Microsoft Corp.

Ansa President Ronald S. Posner, a former Ashton-Tate executive vice-president, spoke with *Computerworld* Senior Editor Douglas Barney prior to the Borland acquisition about competition with Ashton-Tate and the changing complexion of the data base market.

What is the biggest challenge for software devel-

Continued on page 40

Inside

- Zenith Data Systems develops portable PC with 10M-byte disk drive. Page 41.
- Fujitsu America unveils family of 24-wire dot matrix printers. Page 41.

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PC spending

CONTINUED FROM PAGE 33

from an average of $18,500 in 1985 to $15,900 in 1986 for companies with 10 to 19 employees. For companies with 250 to 499 employees, small-system spending fell from an average of $76,700 in 1985 to $65,100 in 1986, the study found.

False impression
Gene Talsky, president of Professional Marketing Management, Inc. (Promark) in Old Lyme, Conn., said that as major corporations continue to buy small systems, a false impression is given that companies of all sizes are making computer purchases.

As smaller firms cut back on purchases, the impact is passed on to value-added resellers (VAR), Talsky said. "An important thing to remember is that the drop in the small-company budgets represents roughly the margin that à VAR earns."

One analyst agreed with the thrust of the Focus Research findings but disagreed with the degree of decline. "I'm sure buying is down a significant degree," said analyst Aaron Goldberg, a vice-president of microcomputer services at International Data Corp. (IDC) in Framingham, Mass. But Goldberg said he has not seen buying plans decline by 57%.

Goldberg said a decrease in purchasing dollars in small companies could be attributed to several factors, including the purchase of lower priced systems.

From 1984 through 1986, VARs took a beating; many are now out of business. The distributors and manufacturers also felt the heat, said John Worthen, president of Focus Research. "The good news is, I think we now have a healthier set of organizations and a healthier overall manufacturing and distribution vehicle than we did three or four years ago."

The study listed 12 vertical market segments that are becoming saturated. At least 60% of the firms in each segment have installed small systems, according to Focus Research. These segments include business and professional organizations, accounting, public relations and engineering/architecture firms, automotive dealers, insurance agents, utilities, insurance companies, mining, brokerage firms, miscellaneous and business and professional services.

Although 60% of those businesses have computers installed, Promark's Talsky said, much of that installed base is in the larger companies. Many smaller companies may never make a computer purchase, he said.

Low saturation points
Additionally, the study listed 11 vertical markets that are saturated less than 40%, including grocery, liquor and clothing stores, restaurants, hotels, personnel services, car repair businesses, gas stations, physicians, health services and building maintenance.

Prospects for the overall computer market are much better than the demand in the small-business segment would indicate. IDC's Goldberg predicted that the overall personal computer market will grow approximately 8%.

IBM's Personal System/2 will play a part in future buying trends, Goldberg predicted. "The PS/2 will likely discourage some spending now, due to the problem that there is an issue in terms of what product to buy. Once everything with PS/2 and OS/2 comes together, you'll see a real desire on the part of customers to consider something new."

Promark's Talsky called the PS/2 "a nonissue in the small-systems marketplace. It is strictly a corporate issue."

Expert system

CONTINUED FROM PAGE 33

get into a field using basic information on procedures and systems. "It would be the kind of information a young detective might get in a handbook . . . very rudimentary," he says.

With the "book knowledge" in place, an interface was built. "We spent a lot of time on scenarios because we didn't have a data base," Wallace says.

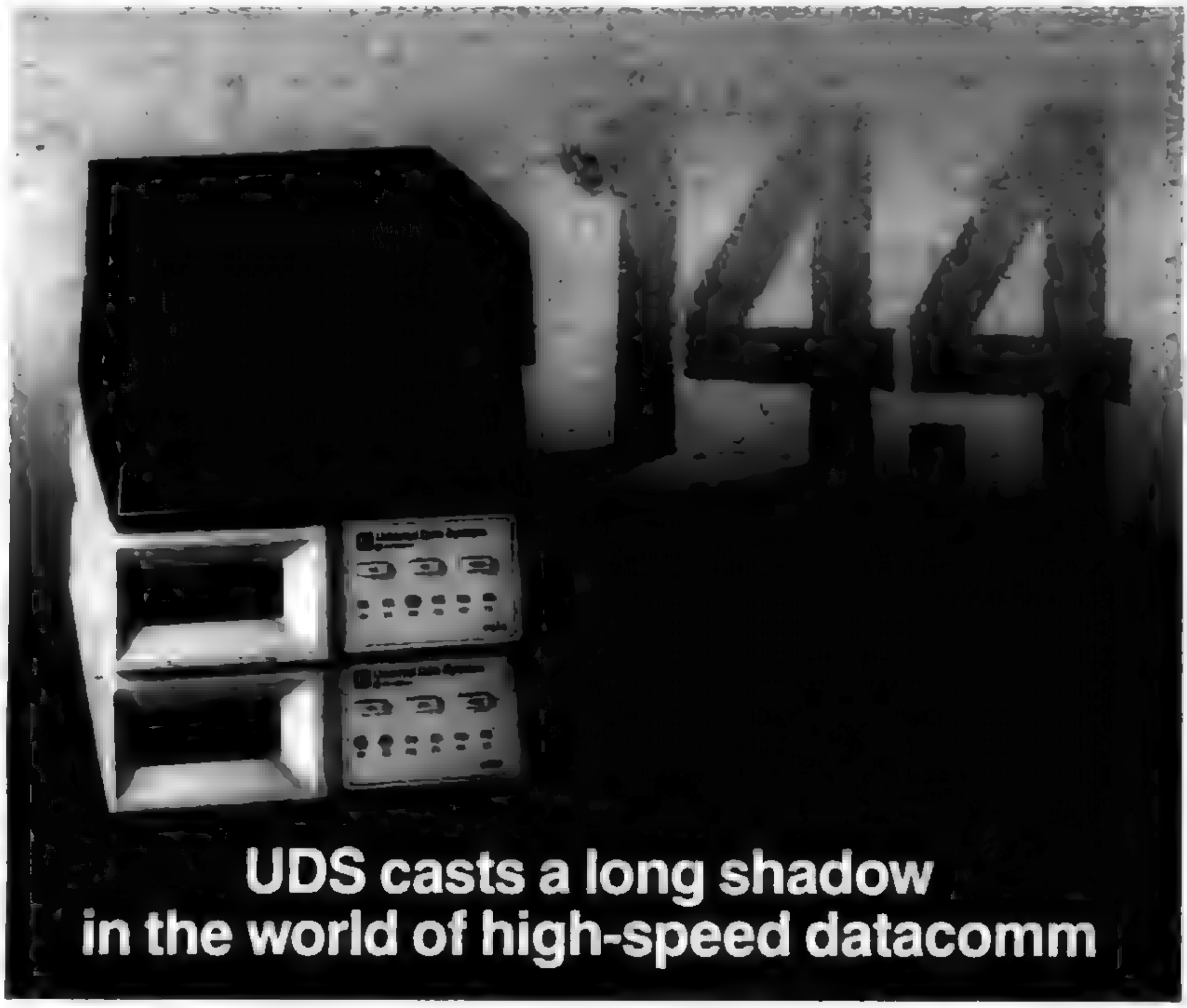
Originally, "We thought to catch the murderer, you needed to create a model of him" with the system, Wallace says. "But we found that detectives actually work from a reservoir of knowledge they build up based on the victims. They look very carefully at the characteristics of the victim."

At first, the developer says, the law enforcement community was skeptical. "It was disbelief that we could in any way, shape or form even help a detective," Wallace says. To date, the system has not been used in real applications; it is in its prototype stage and is being assessed by police officials in New York state.

Wallace says that while the system probably could not help an experienced detective, it is geared to be an operational tool for those who have not experienced that kind of activity — often officers working in smaller towns.

Users of the system work through a series of screens after a murder takes place. The information provided reportedly gives the user helpful information on what questions to ask and who to ask them of in order to find out if this murder might be linked to others.

"Our hope is that we prevent another murder," Wallace says. Smart lets a smaller community tie into a large data bank, which would likely reside in the criminal justice divisions of state police forces.



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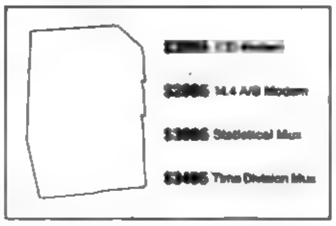

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OS/2 kit

FROM PAGE 33

under their own labels, presumably around the same time. There is no current indication, however, that Microsoft will sell OS/2 to users directly. On the contrary, it appears likely that Microsoft will continue to sell its operating system software only through the systems vendors (its OEM customers), as it has done in the past.

The Microsoft MS OS/2 Software Development Kit is primarily intended to help software developers get started on applications that make use of the new features of OS/2, such as the full protected-mode address space of the Intel Corp. 80286 microprocessor and multitasking. In the first instance, this means software developers at firms that develop PC software to sell.

Commercial users of PCs have also shown a high level of interest in the OS/2 development kit. The vastly lower ratios of price/performance of PCs, relative to traditional mainframe and minicomputer systems, make it economically desirable to put serious applications on PCs whenever possible.

What the Software Development Kit offers — albeit at a fairly stiff price — is an early opportunity for users to get their feet wet with OS/2.

Currently, the Software Development Kit is shipping without the OS/2 Presentation Manager, an update of Microsoft Windows that is closely integrated with OS/2. It is scheduled to follow next month.

The kit includes the Microsoft OS/2 LAN Manager, a compatible upgrade to the MS-Net software under DOS 3.0 and higher. This includes additional capabilities for higher level resource sharing over local-area networks. Development tools include the Microsoft C Optimizing Compiler, the Microsoft Macro Assembler, Microsoft's popular Codeview debugger and a variety of utilities.

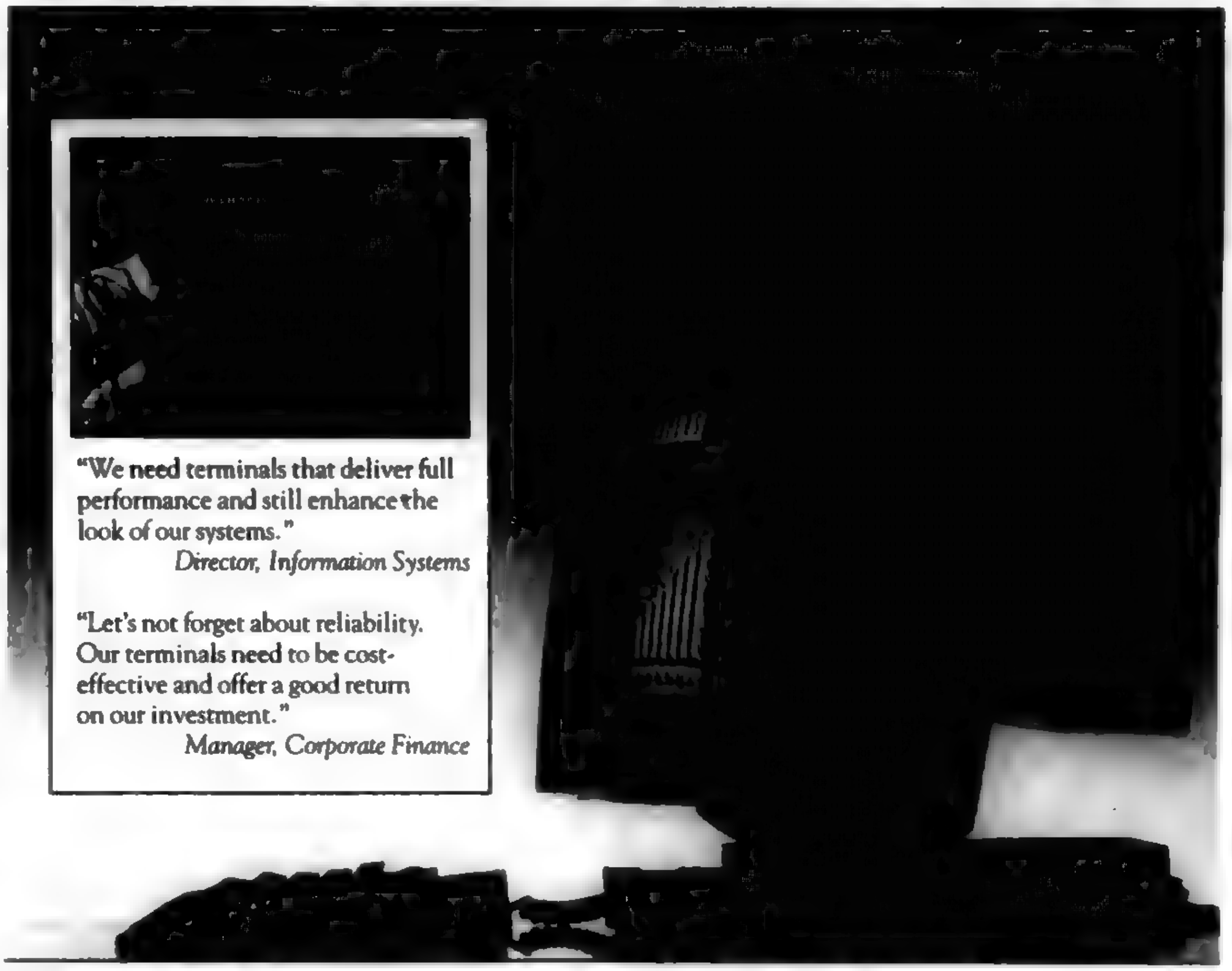
The Microsoft OS/2 Software Development Kit is more than just the software and documentation, however. Its $3000 price also allows one user to attend a Microsoft OS/2 Developers' Conference. Purchasers of the development kit also receive updated releases of the software as they become available.

The final element of the kit is a one-year subscription to Microsoft's Direct Information Access Line System, which is an on-line, dial-up technical-assistance service There probably isn't a better way to keep up with what's hot with OS/2.

The OS/2 Software Development Kit is currently slated to be supported by the IBM Personal Computer AT, the Compaq Deskpro 286 and 386, Portable III and Portable 286 and Zenith Electronics Corp.'s Z-241, Z-248 and Z-386.

Even with slightly less than one week's experience with the Microsoft OS/2 kit, there is no doubt in my mind that it offers an excellent opportunity for anyone who wants to get an early start on OS/2 and is willing to pay the price.

Zachmann is vice-president of research at International Data Corp.



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Ansa chief

FROM PAGE 40

opers in entering the OS/2 market?
The biggest challenge is making sure that whatever you build under OS/2 actually offers true end-user benefits. If you are not careful, you could build an OS/2 product that actually slows down the performance of the product.

What is the logic behind moving to 386-based alternative operating systems?
If we can improve the performance of Paradox three to four times, which we think we can, that is a clear end-user benefit. Right now, we do a lot of code-swapping. If OS/2 applications don't start to appear until the end of 1988, that gives us a clear 12-month or longer head start. And since OS/2 may actually slow down the product because of protected mode, we might have that performance benefit there for a long time.

We are focused on what we can do today. You don't have to wait for all the great things that are coming down the road. It has been my experience that the promises of how great it is going to be in the future always take two to five years longer than anyone predicts to realize.

Ronald S. Posner

Will people who move to a 386 implementation need to move to OS/2?
They may not need to or want to. You will see many end users who stay with the 386 in the [Microsoft] MS-DOS environment by using the extenders because they realize that they are getting all the benefits of OS/2. The only other benefit is multitasking, and not all users necessarily feel they need multitasking.

What is your opinion of Unix?
Unix is a growing market that is here to stay. We are getting a lot of requests from some of our OEMs, like Tandy Corp. and AT&T, to do a Unix version, and I suspect before too long we will announce a Unix version.

Unix has all the features of OS/2, although it is more cumbersome.

What are your expectations for the network market?
I think by the end of this year, we will be shipping more network versions of our product than Ashton-Tate will be shipping of theirs. Their product doesn't work well on the network, and they just aren't emphasizing it from a marketing point of view.

Who is buying Paradox on a network?
It is mostly end-user departments with a recommendation from MIS or the information center manager.

What is your opinion of the concept of a distributed data base?
What is important for us is to be able to get at data on other environments. Our focus is to allow the user to access data wherever it resides in the corporation and bring it down to the the personal computer. We don't need to have Paradox running on the mini and mainframe to do that.

How serious do you think IBM is about the microcomputer data base market? The company detailed the Data Manager component of its OS/2 Extended Edition, and that appears pretty ambitious.
I think IBM is serious about it, and it is ambitious. IBM will do well with the pieces that tie into the operating system. If you look historically at IBM with their data base extension on their larger systems, they have done well with the pieces that are heavily tied in with the operating system component. They haven't done well with any of their end-user application pieces. We envision the market splitting, with IBM and others focusing on the back-end data base functions, the extensions to the operating system and the server functions. We will continue to focus on the front end, or the end-user component. In fact, we have some discussion going on with IBM right now about how we will marry the front end of Paradox to all their back-end activity.

Do you buy the argument that with the OS/2 Extended Edition, IBM is back to bundling?
I am not concerned with IBM bundling, and it is not clear that they are bundling. They are charging a hefty price for the OS/2 Extended Edition.

What does Ashton-Tate have to do to stay on top in the micro data base market?
The biggest single challenge they face will come when they can no longer just add on features to Dbase and have to completely rewrite it to take advantage of OS/2 and the Presentation Manager. It requires a new technology. The question is: Can they keep the applications compatible? With new technology, they may not be able to keep that compatibility. In fact, I suspect they won't, because applications under MS-DOS are not going to be fully compatible with the Presentation Manager. Will the incompatibilities make it a whole new ball game and put everyone on a level playing field?

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- E Office Automation Systems
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338738-8

NEW PRODUCTS

Systems

A portable personal computer featuring a 10M-byte internal hard disk drive and offering from two to five hours of battery operation on a single charge has been announced by **Zenith Data Systems.**

The **Z-183** includes an Intel Corp. 80C88 16-bit processor operating at 8 MHz, switchable to 4.77 MHz. It comes with 640K bytes of random-access memory (RAM) and 16K bytes of video RAM. Other features include a 10½-in. diagonal LCD, serial and parallel ports, 5¼-in. external floppy disk drive interface and Microsoft Corp. MS-DOS 3.2. The Z-183 costs $3,499.

Zenith also announced it has enhanced its **Z-181** portable computer with an 8-MHz clock speed, battery operation from four to seven hours and a hard disk drive interface. The Z-181 costs $2,399.

Zenith Data Systems, 1000 Milwaukee Ave., Glenview, Ill. 60025.

Software applications packages

Intex Solutions, Inc. has announced a Lotus Development Corp. 1-2-3 add-in said to provide users with the ability to create graphics from 1-2-3 data.

The software, called **3-D Graphics**, is said to transform 1-2-3 spreadsheet data directly into three-dimensional bars, joined bars, financial bars, lines and surface charts. Graphics features offered include automatic or manual selection of axis, addition of titles and axis labels and a choice between color or black and white. A range of Z-scale formats is also included.

3-D Graphics runs on IBM Personal Computers supporting Lotus 1-2-3 Version 2.0 or higher. It requires a Color Graphics Adapter, Enhanced Graphics Adapter or Hercules Computer Technology, Inc. card.

3-D Graphics costs $79.95.

Intex Solutions, 568 Washington St., Wellesley, Mass. 02181.

Software utilities

Armor Systems, Inc. has announced the **Bravo Import Data Bridge** for use with its IBM Personal Computer-based Bravo business system for retailers.

The Bravo Import Data Bridge is said to allow users to import any standard ASCII file containing virtually unlimited amounts of data. It features a fill-in-the-blank format so users can design their own templates to import only the desired data into either the Bravo Retail Management System or the Bravo General Accounting System files.

The Bravo Import Data Bridge is priced at $395. The Bravo Retail Management System and the Bravo General Accounting System cost $695 each.

Armor Systems, 324 N. Orlando Ave., Maitland, Fla. 32751.

Software enhancements

The Exim Toolkit Version 2.1, a collection of assembler and Basic routines designed to simplify programming done with Microsoft Corp.'s Quickbasic or IBM's Personal Computer Basic compilers, has been announced by **Exim Services of N.A., Inc.**

The routines include multiuser data and index-file management as well as screen, memory and window managers.

The Exim Toolkit Version 2.1 is priced at $65.

Exim Services of N.A., P.O. Box 5417, Clinton, N.J. 08809.

Training

A training program for learning Microsoft Corp.'s MS-DOS, said to translate 90 English commands into valid MS-DOS commands, has been announced by **Info Designs, Inc.**

DOS Step by Step is a computer-based tutorial that provides lessons in the MS-DOS file-naming conventions and syntax, MS-DOS for floppy-disk systems, MS-DOS for hard-disk systems and advanced DOS features including batch files.

Also included is a quick reference guide featuring 32 on-line commands.

DOS Step-by-Step is priced at $39.95.

Info Designs, 445 Enterprise Court, Bloomfield Hills, Mich. 48013.

Data storage

Maximum Storage, Inc., has announced the **APX-3000** series of 5¼-in. optical drives and subsystems.

The APX-3000 product line was designed for IBM Personal Computers and compatibles in applications that require extended on-line storage capacity and removable media. It is available in host-mountable and external stand-alone configurations. Software compatibility is with IBM PC-DOS and Microsoft Corp. MS-DOS Versions 2.0 through 3.2. The 244M-byte drive comes with the vendor's Maxsys-PC system software.

Single-quantity pricing for the APX-3000 is $2,695. Media is priced at $75.

Maximum Storage's *APX-3000*

Maximum Storage, 5025 Centennial Blvd., Colorado Springs, Colo. 80919.

Printers/Plotters/ Peripherals

Fujitsu America, Inc. Computer Products Group has unveiled a family of 24-wire dot matrix printers.

The **DL3300** is an 80-col. printer, and the **DL3400** is a 136-col. printer. Both feature a Centronics Data Computer Corp. interface and printing speeds ranging from 288 char./sec. in high-speed draft mode to a letter-quality speed of 72 char./sec. Other features include a programmable front panel, a built-in bidirectional tractor and automatic sheet load.

The DL3300 costs $795, and the DL3400 costs $995.

Fujitsu America, 3055 Orchard Drive, San Jose, Calif. 95134.

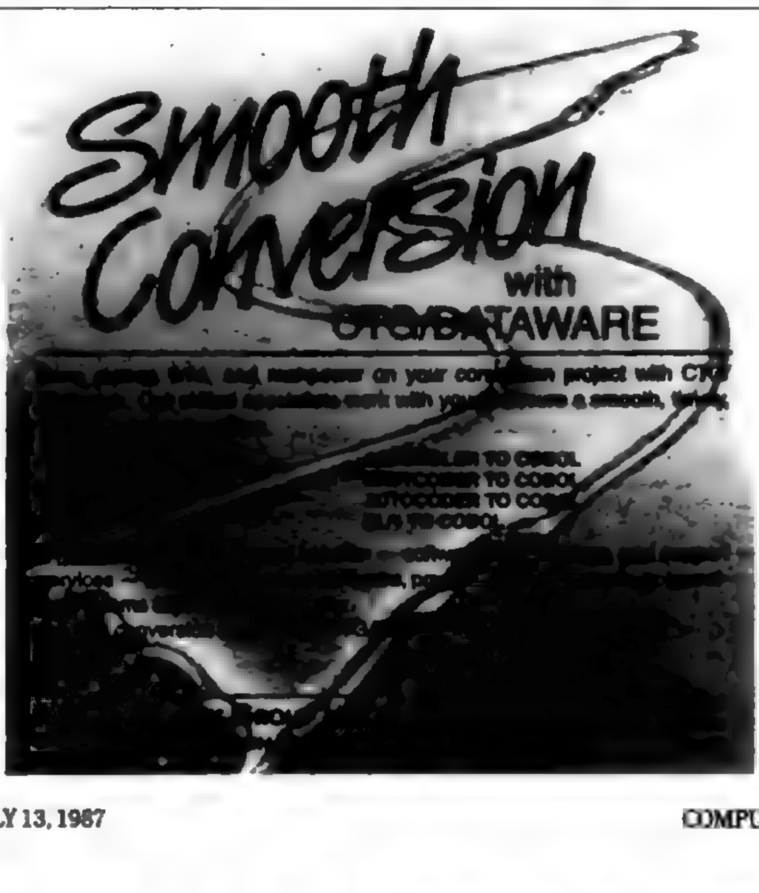
Board-level devices

STB Systems, Inc. has announced the **Dual Serial Adapter**, a single board said to combine two synchronous serial ports.

The adapter features two independent serial connectors intended to allow users to connect serial devices such as a modem, mouse or laser printer to an IBM Personal Computer, according to the vendor.

The Dual Serial Adapter is priced at $149.

STB, Suite 210, 1651 N. Glenville, Richardson, Texas 75081.



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NETWORKING

DATA STREAM

Patricia Keefe

Microsoft out on a limb?

Analysts who spoke to *Computerworld* two weeks ago were pretty hard, and not without reason, on Microsoft Corp.'s OS/2 LAN Manager — possibly the most grandiose, if not vaporous, networking scheme to be revealed outside of IBM's Systems Application Architecture.

The OS/2 LAN Manager is championed by Microsoft and compatriot 3Com Corp. It was unveiled two weeks ago as the future open standard for personal computer network operating systems.

There are formidable obstacles standing in the way of the OS/2 LAN Manager. It is overly optimistic, to say the least, for Microsoft or 3Com to suggest that the product could become *the* microcomputer networking operating system without the obligatory nod from IBM. And chastizing outspoken analysts for saying so isn't going to change that.

Many observers say they expect IBM to address the same areas targeted by Microsoft's OS/2 LAN Manager with IBM-

Continued on page 46

IBM's Hancock fills in the gaps

Division president explains strategy of latest communication products

Several weeks ago, IBM made a flurry of communication product announcements that filled in some critical gaps in its unfolding distributed processing strategy, particularly in terms of network management and the integration of IBM's peer-to-peer networking scheme with the traditional Systems Network Architecture (SNA) hierarchy.

The president of IBM's Communication Products Division, Ellen Hancock, clarified and expanded on the significance of some of these key introductions during a recent interview with *Computerworld* Senior Editor Elisabeth Horwitt and West Coast correspondent James A. Martin.

Hancock has been with IBM for more than 20 years, having joined the company as a programmer in its internal teleprocessing network group.

Ellen Hancock

In general, what was IBM's strategy with the most recent communication product announcements?

What we did in the June 16 announcements was to enrich our 370 support by providing those protocols within our VTAM access method that will make it easier for IBM and our customers to have applications in the 370 host communicate with applications in a lot of different systems, whether they are [the] Series/1, System/36 or Personal Computer.

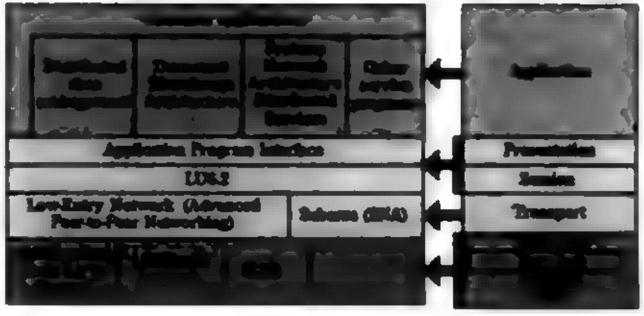
Across the product line, we've enhanced the ability to build a network and to do logical applications through LU6.2 and enhanced the PU2.1 low-entry networking.

Does IBM intend for Advanced Peer-to-Peer Networking (APPN) to be a prototype for the method

Continued on page 45

Data View

Network architectures



IBM/Systems Network Architecture (SNA)
International Standards Organization/Open Systems Interconnect
Application Program Interface
LU6.2
Low-Entry Network (Advanced Peer-to-Peer Networking)
Subarea (SNA)
Application
Presentation
Session
Transport

INFORMATION PROVIDED BY INTERNATIONAL DATA CORP.
CW CHART

Fox merger opens door

BY PATRICIA KEEFE
CW STAFF

DAYTON, Ohio — The pending merger of Digital Communications Associates, Inc. and Fox Research, Inc. could lead to an OEM contract between the former and Ing. C. Olivetti & Co. [CW, July 6], providing Digital Communications with an *entree* into overseas markets.

Continued on page 44

Users say suppliers dawdling

BY PATRICIA KEEFE
CW STAFF

CAMBRIDGE, Mass. — Computer equipment suppliers for major Fortune 1,000 firms, including IBM and Digital Equipment Corp., are not meeting users' personal computer connectivity needs, a recent survey of 100 of those firms found.

"For example, most users will tell you that IBM's VM Solutionpac is not true PC integration as people define it today," said John McCarthy, director of research at Forrester Research, Inc., based here.

Regarding DEC's VMS Services for Microsoft Corp.'s MS-DOS, users surveyed said the product is slow and very DEC VAX-oriented. "It took DEC nine months to deliver a card for IBM Personal Computers and compatibles to let them play in VMS Services. If you want to store DOS files on a VAX," McCarthy said, referring to MS- and IBM PC-DOS files, "you

Continued on page 44

Inside

- **Southwestern Bell opens lab for testing other vendors' ISDN features. Page 44.**
- **Gateway Microsystems sends out multiprotocol, synchronous communications adapter for PS/2. Page 47.**

MAINFRAME

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The mainframe compiler uses standard IBM linkage conventions. Assembler programs, MAIN routines in other high-level languages, and packages such as IBM's ISPF and GDDM can be invoked directly from C.

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BIT BLAST

Bell rings for ISDN; GM gets E-mail

Today, **Southwestern Bell Telephone Co.** is set to open a facility for testing Integrated Services Digital Network (ISDN) capabilities on different vendors' digital switches. Southwestern Bell's Advanced Technology Lab in St. Louis reportedly will test central-office switches from **AT&T**, **Northern Telecom, Inc.**, **Ericsson, Inc.** and **Siemens Information Systems, Inc.**

Once tested, the features are to become part of the operating company's commercial offerings. So far, **Tenneco Oil Co.**, **Shell Oil Co.** and AT&T have signed up for Southwestern Bell's commercial ISDN services, which should go on-line next year.

General Motors Corp. subsidiary **Electronic Data Systems Corp.** (EDS) said it plans to make **Western Union Telegraph Co.'s** Easylink electronic mail service available to 35,000 GM users.

The auto maker will use Easylink to exchange documents with other businesses within the U.S. and abroad via the service's telex interface. Access will reportedly be provided through EDS's Diamond Communications interface.

A Transmission Control Protocol/Internet Protocol (TCP/IP) controller for IBM 370-class mainframes reportedly is being jointly developed by **Advanced Computer Communications Co.** (ACC) and **Intel Corp.'s Systems Interconnect Operation.** The product is said to use Intel's Fastpath 9750 control unit and ACC's Access/MVS communications software to allow IBM hosts to communicate with other systems that support TCP/IP.

The V.32 9.6K bit/sec. dial-up modem market saw a price drop recently when **Gandalf Data, Inc.** introduced a full-duplex unit priced at $2,295. Earlier products were priced at approximately $3,500.

Available now, the Access Series V.32 supports either asynchronous or synchronous communications over either dial-up or leased lines.

Fox merger

FROM PAGE 43

At the very least, the merger could boost plans to introduce four more Fox products this year. Although Digital Communications said it has no plans to integrate Fox products with its own Irma line, both product families are compatible, and the two companies reportedly will work closely together on selected large corporate accounts.

Fox President Greg Goodall, who has worked closely with Olivetti for several years in the European markets, said Olivetti's initial reaction to the proposed merger was to characterize it as "a good move."

"There's a lot Fox can do to bring Digital Communications into the fold with Olivetti," Goodall said, adding that his company is very interested in the Olivetti-Fox relationship.

Meanwhile, Digital Communications reportedly will help Fox speed development of an IBM Micro Channel-compatible version of Fox's 10-Net adapter card. It is scheduled for release at Comdex/Fall '87.

Once Fox revamps the 10-Net cards, it will move on to four other projects, Goodall said. Fox's 10-Net is generally considered an entry-level network, and Goodall said his company plans to take advantage of that perception.

First, he said, Fox expects to offer 10-Net Version 4.0, an IBM Netbios-compatible version that is already in beta testing, in September. This release is expected to cost $695, support Microsoft Corp.'s MS-DOS 3.3 and be compatible with existing Fox boards. The vendor said Version 4.0 will also include software caching to enhance performance. The software-caching module reportedly will be unbundled for sale to users of 10-Net Version 3.1 who do not want Netbios compatibility but do want performance improvements.

Fox is said to be working on an intelligent 10-Net card that will feature an on-board processor and random-access memory and that will serve as the basis for two bridge products under development. The intelligent board will go into beta testing in July and will retail for $995, Goodall said.

Next, Fox will introduce an enhancement board designed to allow any existing 10-Net installation to bridge to a full Ethernet environment, such as an enterprisewide Ethernet backbone or Digital Equipment Corp. VAX environment, Goodall said. The Ethernet bridge reportedly will support thick and thin Ethernet and is slated for fourth-quarter delivery. Pricing is not yet available.

Fox said it plans to kick off the new year with a second bridge product, this one linking 10-Net to IBM Token-Ring environments. It is slated to ship in the first quarter of 1988, and pricing is not yet available.

The Digital Communications merger may serve to fuel Fox's limited interest in supporting Apple Computer, Inc.'s Appletalk network and Macintosh computers. Digital Communications introduced Irmalan for the Mac at Comdex/Spring '87. "We have not ourselves had the resources to work on a Mac product," Goodall said. "It's very difficult because of the Mac architecture. But we will be analyzing [that market] strategically with Digital Communications."

Dawdling

FROM PAGE 43

have to know VAX commands, which is absurd for users to know."

The grades that major computer manufacturers received as providers of personal computer integration products dropped an average of 7% in comparison with data from the same survey conducted a year ago by Forrester.

A multitude of reasons were cited as contributing to the drop in user satisfaction. "In some cases, vendors have been dragging their feet; in others, they are too minicomputer-oriented," McCarthy explained. "We used to be bullish on the departmental resources processor, for minis to reorient themselves away from the time-sharing business and service PCs. But these vendors have just dropped the ball."

Some vendors, such as Data General Corp., Prime Computer, Inc. and Wang Laboratories, Inc., have been late getting into the personal computer integration market. "They have only done so in the last two to three months," McCarthy recalled.

Delivery dates annoying

Users are also frustrated by availability dates. IBM's Personal System/2s are not scheduled to play on the company's 9370 until December, along with the 3270 Personal Computer emulation program, McCarthy said. In addition, the 3270-PC workstation program reportedly will not be available on the PS/2 until March 1988. "The PS/2 is supposed to be IBM's big machine; it's supposed to be optimized for connectivity," he said.

Users have become less patient with the major computer vendors, primarily because they have viable alternatives that provide relatively more direct and quick solutions today; for example, file and print sharing without having to learn minicomputer commands, McCarthy said.

The departmental computing and PC integration shortcomings of the minicomputer vendors are forcing users to recompile their lists of preferred suppliers.

The old guard — Wang, DG and Prime — is being replaced by Novell, Inc., 3Com Corp., Sun Microsystems, Inc. and other start-ups, the report said. "This has allowed [the younger companies] to take business from DEC, Hewlett-Packard Co., IBM [and others]," McCarthy said.

For example, Novell, working with a tiny value-added reseller, was able to beat out both IBM and DEC to win a million-dollar contract with Aetna Life & Casualty Co. in Hartford, Conn., last year.

LAN vendors enter scene

Meanwhile, local-area network (LAN) vendors are positioning themselves to move upmarket, providing links between their local clusters and IBM's Systems Network Architecture, IBM 3270-based hosts and remote locations.

"The rise of the LAN vendors, coupled with the arrival of IBM's 9370, will cause a shakeout among the minicomputer players," Forrester predicted.

The report is part of Forrester's "Professional Automation Report and Bulletin," which focuses on technology management within the Fortune 1,000.

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IBM's Hancock

CONTINUED FROM PAGE 43

of allowing a variety of hosts to know where other nodes and resources are on a multinode peer-to-peer network?
First of all, some of the functionality of APPN — the ability to find out where things are, the ability to dynamically change the system — is a requirement across our product set, including the 370 or the System/36.

In the June 16 announcements, we did add functions to the VTAM network to allow it to add elements to the network just like the System/36 does. We also provided a way to merge [a VTAM-based network with an APPN-based System/36 network].

The System/36 can do its own networking and management using APPN but can also come into the SNA backbone network as managed by VTAM. So the customer can now pick whether he wants the System/36 to be in charge or the VTAM host.

Will IBM be offering any packaged applications for communication between the 9370 and the 370 systems?
As part of the Netview offering we're making, we're including some internally developed assistance using Netview — things that some of our own users have been doing.

We'll be including some sample Clists that have been used by our own operations staff to utilize the system. Those three things address the question of our own packaging for the system. There's a network definer we announced that simplifies a customer's ability to generate a system using VTAM and Netview.

What about a conversation between the two? One user we talked to said he is interested in making sure a token ring is up and running before he downloads important data from a 370 to a network.
The Netview Clist is a mechanism for the customer to add procedures to be used by Netview, so he can do a fair amount to determine the status of the 9370 before he wants to send it a work load. The customers are telling us they intend to make extensive use of the Clist capability in Netview and also the [new] capability of Netview on a 9370 to communicate with Netview on a [370] host.

Does the 9370 deal directly with IBM's LAN Manager? Is that how it collects network management data from the IBM Token-Ring?
The 9370 has an integrated Token-Ring LAN interface. It can collect error and usage information off that LAN and can determine who has a problem with a LAN; and Netview would then be aware of the LAN problem.

Will Netview capabilities be brought down as far as the Personal System/2 level?
We do have network management applications on the PC via Netview/PC. When you ask, "Will IBM port Netview specifically down to each [type of computer]?" I don't think the answer would be yes. If you ask, "Shouldn't the Netview *functions* be ported down to the System/36 and the PS/2?" The answer is yes.

We are enhancing the PS/2 and the System/36 with network management capabilities. We are driving our architecture across that range of products, and we will provide the customers with that network management capability across the product line, although some of the particular functions may change based on the types of things a 370 does vs. what a PS/2 does.

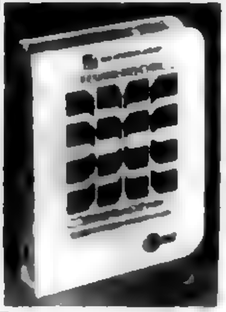
Some users have indicated that it would be nice if Netview were extended to whatever manages the bandwidth on a T1 link as a way of having more centralized control of a voice/data network. Do you agree?
One of the reasons we went with [an agreement to resell T1 switch equipment from] Network Equipment Technologies Corp. (NET) is that they do support the Netview/PC. The Netview/PC will communicate with Netview and give it information as to what is occurring on that particular T1 link.

We were also concerned about integration of T1 functions.

Most of these T1 multiplexers do networking among themselves with proprietary protocols. We have the right to incorporate NET's protocols into IBM equipment. That will help us ensure that the NET box really conforms to the SNA network and that the T1 resource manager supports the type of networking done by our SNA hosts, so that the MIS customer can have control of voice and data networking.

What is IBM's position on Integrated Services Digital Network (ISDN)?
We actively support ISDN as an international standard. We've volunteered into the standards committee's standard recommendations for network control and participated in tests in the UK and Belgium; and this summer, we'll have a test in West Germany.

We think it's important. We support it. But the true impact on our customers and, therefore, the timing of its acceptance, is going to depend on all those other factors. But we're not holding back. We are investing in ISDN.



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Microsoft

CONTINUED FROM PAGE 43

developed products, including the proprietary Communications Manager component of IBM's OS/2 Extended Edition. So much, they say, for Microsoft's hope that IBM will incorporate LAN Manager into the OS/2 Extended Edition.

Also promoting skepticism is the project's proposed ship date — the first half of 1988. Talk about preannouncements. The OS/2 LAN Manager will undoubtedly go to the top of industry vaporware lists. And, as was noted two weeks ago, a lot can happen in nine months.

Of much less significance, and annoying to some, is Microsoft's unfortunate decision to use the name LAN Manager. It's confusing because IBM also has a different product called LAN Manager.

Nonetheless, MIS managers and network administrators should closely track the development of the OS/2 LAN Manager. Even if it doesn't set PC and PS/2 networking on its ear, the OS/2 LAN Manager is likely to garner a respectable market share. It could also set the stage for significant developments in network applications. At least that's what 3Com and Microsoft are betting on.

'New generation' of applications

Ingredients sure to attract MIS's attention to the proposed "platform for advanced computer networking" are backwards compatibility and the "new generation" of distributed applications.

Many Fortune 1,000 companies use a mix of IBM Personal Computers, compatibles and PS/2s. Multiple networks, most compatible with IBM's Netbios and some portion of Microsoft's MS-Net protocols, proliferate at the department level. The installed base is considerable, and the OS/2 LAN Manager is promising compatibility with most of the above, including networks based on Microsoft's Xenix Networks protocols.

Under the Microsoft/3Com scenario, future users could expect to link generations of microcomputers and their assorted operating systems, including Xenix, running on Ethernet, IBM Token-Ring and Apple Computer, Inc. Appletalk networks.

Having eased the worst fears of MIS and PC managers, the OS/2 LAN Manager is also projecting advances in an area in dire need of some help — network applications.

The problem with many popular PC applications is that they are available only for single-user environments. And those applications that have been ported to a networking, or multiuser, environment have generally proven less than satisfactory.

Enter OS/2 LAN Manager, a single-user, multitasking operating system. Microsoft says users will be able to take their single-user applications, load them into an OS/2 LAN Manager-based file server and distribute the applications across the network. It will no longer be necessary to port single-user programs over to the network, says Paul Maritz, general manager of Microsoft's networking business unit.

Also, by using an interprocessing communications scheme called Pipes (sound familiar, Unix fans?), two programs can be run at the same time, either with both at the workstation or with one at the server.

Of course, the OS/2 LAN Manager would not circumvent copy protection schemes, but developers who find it easier to port to OS/2 vs. the network may be more willing to provide server-based licensing. 3Com's relationship with a number of these companies could prove helpful.

3Com and Microsoft are also promising to develop applications "that make sense only on networks," such as distributed data base, directory and gateway services. Microsoft proposes to do away with the need for two user interfaces — one for the stand-alone workstation (DOS in its many forms) and a second for the network (Novell, Inc.'s Netware, 3Com's 3+, and so on). This would eliminate user resistance to having to purchase two separate programs and then learn two different sets of commands, Maritz says.

If the OS/2 LAN Manager lives up to its billing, it will probably be more than a little successful, even without IBM's blessing. But to truly make an impact, Microsoft and 3Com need to gain support among third-party applications developers. The fact is, many of these players have a vested interest in preserving Novell's lead in the network software market.

But don't count the OS/2 LAN Manager out just yet. Microsoft is the largest publisher of microcomputer software and wields considerable influence among third-party developers. 3Com recently embarked on a successful campaign to get developers of most of the popular network applications to develop 3+-compatible ports. These same developers are prime candidates to support OS/2 LAN Manager.

Microsoft and 3Com also have to face up publicly to questions concerning IBM connectivity, an area of critical concern to the Fortune 1,000. When this duo comes a courtin', MIS should demand they provide a blueprint for how their networking scheme fits in with IBM's. Insisting on support for IBM's Netview/PC and LU6.2 might be a good place to start.

Keefe is a ***Computerworld*** *senior editor, networking.*

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NEW PRODUCTS

Local-area network hardware

Computer Pathways, Inc. has begun shipping its **Grapevine** high-performance work group local-area network (LAN) for small to medium-size businesses.

Offering users the ease of use of standalone software, the LAN links as many as 50 IBM Personal Computers or compatibles without requiring a dedicated file server, the vendor said.

With Grapevine, a user can exit an application and gain access to a pull-down menu with a single keystroke. Options for sending or receiving electronic mail or for changing printers are then available. Returning to the application is accomplished with a single keystroke.

Grapevine sells for $595 per station, not including wiring or cabling.

Computer Pathways, 19102 N. Creek Pkwy., Bothell, Wash. 98112.

Links

SST Data, Inc. has ported its **Handshake III** software to the IBM RT PC, allowing users of the RT PC to interface with an IBM System/34, 36 or 38 using 5251 terminal emulation.

According to the vendor, the terminal emulation allows the RT PC user to log on to the IBM system and function as an online terminal.

Handshake III offers file-passing capabilities as well as on-line Help and built-in security features.

Access is via either twinaxial cables or RS-232 connections. Operators may use either a standard 5251 keyboard layout or a customized keyboard layout. Users can also select an interface device with up to seven ports.

Handshake III 5251 costs from $1,930 to $4,735, depending on the number of ports.

SST, #201, 250 S. Main St., Thiensville, Wis. 53092.

Protocol converters

A multiprotocol, synchronous communications adapter for the IBM Personal System/2 series has been shipped by **Gateway Microsystems, Inc.**

The $295 **Microchannel Communications Controller** Adapter supports both binary synchronous communications and IBM's Systems Network Architecture/Synchronous Data Link Control protocols on one card. It was designed for the PS/2 Models 50, 60 and 80 and future models of the PS/2 that will incorporate IBM's Micro Channel architecture, Gateway said. The card allows PCs to access a host via either IBM's 3270 or RJE protocols.

Gateway Microsystems, Suite 105, 9501 Capital of Texas Highway, Austin, Texas 78759.

Modems/Multiplexers

Cermetek Microelectronics, Inc. has reduced the price of its CCITT V.32-compatible **9600/V.32 Trellis Modem.**

The modem permits 9.6K bit/sec. operation at full duplex over telephone lines in the Public Switched Telephone Network. It reportedly features trellis-coding near-end/far-end echo cancellation, adaptive equalization and automatic-to-manual fallback.

The 9600/V.32 Trellis Modem costs $2,495.

Cermetek Microelectronics, 1308 Borregas Ave., Sunnyvale, Calif. 94088.

Okidata Corp. has announced the external **Okitel 2400** and the internal **Okitel 2400b** 2.4K bit/sec. personal computer modems and the **Okitel 1200b** 300 and 1.2K bit/sec. internal modem.

The asynchronous, full-duplex modems feature autodial and autoanswer capabilities as well as automatic disconnection of the phone line when a call is complete. Users can program the modems with a delay that bypasses spurious line interruptions, including call-waiting signals, to maintain the phone connection.

The Okitel 2400 costs $599; the 2400b costs $549; and the 1200b costs $389.

Okidata, 532 Fellowship Road, Mount Laurel, N.J. 08054.

Diagnostic equipment

Dataprobe, Inc. has introduced the **Auto-Net** network-restoral system and the **K-56** A/B switch.

Auto-Net is said to be an automatic network-oriented dial backup system for up to 48 leased data circuits.

It detects degradation or failure of communication and automatically initiates dial backup. Auto-Net can also intiate a mode-substitution sequence, switching to spare modems at both ends of the circuit, the vendor said.

Aoto-Net reportedly switches the modems back to leased service when the leased line is restored.

The K-56 is a microprocessor-controlled switch designed to provide backup to 56K bit/sec. circuits. The K-56 units at each end of a circuit perform bidirectional security verification.

The Auto-Net costs $1,350 per circuit, and the K-56 costs $625.

Dataprobe, 110 W. Palisades Blvd., Palisades Park, N.J. 07650.

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SYSTEMS & PERIPHERALS

HARD TALK

James Connolly

They stoop to conquer

The scenario that has personal computers migrating into application areas served by more costly and complex systems has taken a bizarre twist.

It is easy to see how stand-alone and networked PCs based on Intel Corp. 80286 and 80386 microprocessors meet user needs previously addressed by 16-bit minicomputers and how those PCs can handle more work previously done on mainframes. But several vendors have been modifying that script by suggesting a new class of computer will squeeze the standard PC from above.

Those vendors are the makers of engineering workstations, such as Apollo Computer, Inc., Sun Microsystems, Inc. and Digital Equipment Corp., that hint that their high-powered CPUs and graphics display stations can replace PCs as the price gap narrows between the two types of systems. The vendors dropped the hints as they slashed their entry-level, diskless workstation prices to below $5,000, which pits those

Continued on page 50

Everybody into the coolant!

Fidelity Systems makes big splash by using pool to hold backup supply

BY STANLEY GIBSON
CW STAFF

LAS COLINAS, Texas — Michael Simmons, president of Fidelity Systems Co., has a real war story to tell. It is about the time fellow employees tossed him into the air-conditioning coolant of Fidelity's data center here.

No, it was not a cruel practical joke. And it was not just a nightmare — it really happened.

But Simmons took his dunking in stride. It took place at a party celebrating the opening of the swimming pool, which serves as the backup coolant supply for Fidelity Systems' data center. The computer center was opened here in March by the data processing subsidiary of Boston-based Fidelity Investments, Inc.

Fidelity Systems' *Texas-style peripheral*

The data center houses two IBM 3090 Model 200 mainframes, an IBM 4381 and a Stratus Computer, Inc. XA 600 minicomputer. The water supply services 22 air conditioners that cool the firm's computing center. The 3090s do not draw on the water supply but have their own refrigeration units for cooling the water pumped through their thermal-conduction modules.

The center was designed to provide a fail-safe backup for Fidelity Systems' main data center in Boston. The Texas center has its own electrical generating facilities, consisting of three 1,200-horsepower diesel engines that can work together or separately, according to data center Director Gail Glass. If power is cut off, a battery supply that is continuously on-line would be drawn on immediately, providing a power bridge for what should be only 10 seconds until the diesel engines restart, Glass says. The 70,000-square-foot data center building reportedly cost $14 million.

The unorthodox idea for coolant storage was arrived at logically enough, to hear Simmons recount it.

The mother of invention

"Necessity was the mother of invention," he says. "We wanted to build a data center that was fully redundant. But you can't make water fault-tolerant."

However, a water supply could be duplicated, Simmons reasoned. The primary water supply is kept in water towers on the roof of the two-story data center. At first, the plan called for a seperate set of tanks in the ground nearby. But Simmons says when he realized that the supply would have to be filtered and chlorinated, the thought occurred to him: "Why not build a pool?"

Turning the backup water supply into a recreational pool changed what would have been a straight expense into a workplace quality-of-life improvement. Once committed to a pool,

Continued on page 51

MIPS adds high-end RISC units

SUNNYVALE, Calif. — MIPS Computer Systems, Inc. last week added a high-end Unix-based applications server and CPU board to its family of reduced instruction set computing products while cutting prices of existing offerings by up to 40%.

MIPS introduced the M/1000 system, which was designed to process up to 10 million instructions per second. The M/1000 is used as an applications server in high-performance Unix systems. It includes 16M bytes of memory, which can be expanded to 64M bytes, and a 12-slot VMEbus card cage. It costs $35,900 in single quantities.

MIPS also announced the R2800 CPU board, on which the M/1000 is based. The single-quantity price is $10,000.

The 40% price cuts affect the base configurations of MIPS's M/500 and M/800 systems and R2300 and R2600 CPU boards. The company claimed that 40 OEMs are designing systems based on its products.

Inside

- Dataserv president says firm will not offer discount program. Page 50.
- CDC integrates electronic, mechanical CAD. Page 51.
- Honeywell rolls out compact TDC 3000 control system. Page 52.

Rexon shipping 32-, 64-user systems

VME-based Summit 4000 features 386 chip, 12-slot PC AT bus

BY STANLEY GIBSON
CW STAFF

CULVER CITY, Calif. — Rexon Business Machines Corp., a division of Rexon, Inc., is now shipping 32- and 64-user versions of its Summit 4000 multiuser system based on the Intel Corp. 80386 microprocessor. The system was announced last fall.

All Summit 4000 configurations include a VMEbus, a 12-slot IBM Personal Computer AT bus and card cage, a 600W power supply and an Intel 80286-based communication processor board.

Also included are five boards designed to plug into the VMEbus: the 16-MHz 80386 processor board, a dual-ported memory board including the interbus bridge processor, a system controller, a disk controller and a small computer systems interface controller.

The system can be customized with 1G byte of Winchester disk storage, 125M-byte cartridge-tape drives, VMEbus memory expansion boards in 2M- and 4M-byte increments and intelligent eight-port serial communication boards. The system can also accept off-the-shelf enhancement boards designed for the IBM PC AT.

Wyse Technology Model 60 terminals are sold separately with a suggested list price of $595 each. The terminals communicate with the processor at 19.2K bit/sec.

Through dealers and distributors, Rexon is offering preconfigured systems of the 32- and 64-user models. A 32-user system with 2M bytes of main memory, a 344M-byte disk drive, a 125M-byte ¼-in. cartridge tape drive and dual parallel ports is priced at $49,990.

The 64-user model with 4M bytes of main memory, 500M bytes of disk storage, the cartridge tape unit and two parallel ports is priced at $57,950.

Rexon said it intends to announce a 128-user system using dual 80386 chips by early 1988 but refused to name a price for this system.

Mentor bases design system on new Apollo workstations

BEAVERTON, Ore. — Mentor Graphics Corp. recently doubled the performance of its previous electronic design automation workstations with the introduction of systems based on the Apollo Computer, Inc. Domain Series 4000 workstation, which was introduced late last month.

Mentor Graphics said it has integrated its design automation products with Apollo 32-bit platforms.

The systems are available under the names Idea Station, which is for schematic capture and local simulation; Chip Station, for custom very large-scale integration circuit design and layout; and Board Station, for printed-circuit board design.

The company claimed that compute-intensive applications such as its Quicksim logic simulator run twice as fast on the Series 4000 as they do on earlier processors.

Graphics-intensive applications such as the company's Chipgraph circuit layout editor run more than 1½ times as fast on the Series 4000, according to Mentor Graphics.

Prices for the Series 4000-based systems start at $42,500. For example, an Idea Station with schematic capture, local simulation, documentation tools and a 170M-byte hard disk drive starts at about $54,000.

Dataserv doesn't see discounts in own future

Says it won't follow downward pricing trend, will focus on expanding current accounts

BY STANLEY GIBSON
CW STAFF

MINNEAPOLIS — Unlike IBM and other third-party maintenance rivals, Dataserv Computer Maintenance, Inc. will not be offering a discount program, according to President Phil Hinderaker.

"We do not intend to follow IBM on a downward spiral on pricing," Hinderaker said in a recent interview. He described IBM's Corporate Service Amendment (CSA) as an "aggressive price action," but asserted that Dataserv will not change its discounting structure in response.

Although Dataserv will not codify its prices, Hinderaker said that the price for maintenance quoted to a customer with network and problem management facilities would be less than the price quoted to one without such measures. Discounts are given to customers who have these measures under IBM's CSA program.

"Dataserv doesn't have a price book. We price according to what the user has," Hinderaker said. Dataserv prices are generally slightly less than IBM's with CSA discounts, but could be as much as 12% more than comparable IBM CSA prices, he said.

Targeting current accounts

Rather than cut prices, Dataserv will try to expand in its current accounts by stressing quality of service, Hinderaker said.

He said Dataserv's market is primarily those installations with $25,000 per month in maintenance expenses. "Fifty of our customers provide 92% of our revenue," he pointed out.

Don Goodspeed, president of Computer Maintenance Consultant, Ltd. in White Plains, N.Y., said Dataserv's approach could find a receptive audience. "Many businesses, such as banks, want high-level service and are not concerned with cutting the last nickel out of it."

Hinderaker said the point of CSA is to get users to buy more IBM computers, based on the premise that the person who controls maintenance controls the client's purchasing power. He said the CSA is intended to further this end by eliminating competition from the maintenance market.

Dataserv Computer Maintenance reported $39 million in sales last year. A subsidiary of Dataserv, Inc., it was launched in 1980.

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Conquering

CONTINUED FROM PAGE 49

products against the upper half of the PC class — although it is obvious $5,000 buys a more fully configured PC than engineering workstation.

Major differences still exist between workstations and general-purpose PCs in terms of price and application. Workstations are cheaper than ever, but there are still relatively few micro users who need to jump to a Motorola, Inc. 68020-based workstation. But workstation vendors may not be too far off base when they toss out comments such as those Apollo officials did when they said they will place a workstation on every professional's desk, or as DEC executives promote their Vaxstation 2000 as a terminal on a larger VAX.

Workstations are expanding their market appeal beyond computer-aided design and engineering. The systems appear in areas such as finance houses and technical publishing and now run general-purpose IBM Personal Computer-compatible software. Analysts note that the workstations were designed from the beginning for communication with each other and with larger systems in a corporate environment, which is an advantage in comparisons with PCs.

True, Apollo and other 68020-based vendors have to prove they can make it in the PC business. Those vendors are at least a product generation away from enjoying the economies that make such a venture possible. They even deny they want to go into the general-purpose market, except when they can leverage their technical computing expertise.

But there also is something familiar in the hints about replacing PCs. The concept of placing a high-powered workstation on everyone's desk may be no more bizarre than the idea of replacing dumb terminals with intelligent PCs sounded five years ago. And PC makers are offering products that incorporate more and more of the features found in workstations. IBM's 80386-based Personal System/2 Model 80 has CPU power and a base price comparable with an Apollo, Sun or DEC workstation.

So while PCs continue their upward thrust, it is interesting to see another class of machines driving downward. What looms still more interesting is the collision that could take place in a year or so.

Connolly is *Computerworld's* senior editor, systems & peripherals.

Merged firm announces supermicro

BELMONT, Calif. — Fortune Systems/SCI Technology, Inc. recently announced a supermicrocomputer as one of the organization's first products since SCI Systems, Inc. agreed to acquire Fortune Systems Corp.'s hardware technology three months ago.

The Formula 4000 is intended for use by office work groups of two to 20 users and is based on the Motorola, Inc. 68020 microprocessor.

The Unix-based system reportedly runs applications written for Fortune's Formula 8000.

Entry level gets 40M-byte drive

The Formula 4000 is available in an entry-level configuration with a 40M-byte disk drive for $9,900.

A full configuration features a 145M-byte disk drive, 4M bytes of memory, a 60M-byte streaming tape drive and the Fortune Office Automation software. It costs $19,900.

The system, which will be distributed through the company's reseller network, was designed to compete with supermicrocomputers made by Altos Computer Systems and Convergent Technologies, Inc.

Coolant

CONTINUED FROM PAGE 49

Fidelity Systems also threw in a whirlpool, gazebo and locker rooms for employees.

Simmons claims the idea is original; Fidelity Systems did not get the idea for the swimming pool from any other computer center. He adds, however, that using such bodies of water as reflecting pools for emergency water supplies is not a new concept.

He says the dirt and debris that normally collect in pools can easily be filtered out before the water is fed into the center's cooling system.

In the hot, dry Texas summer, however, evaporation is a serious problem. Even though the rooftop tanks are covered, they can lose 45 gallons per minute in the heat of the summer.

Naturally, the pool water can evaporate as well, but it would take 72 hours for the pool to be emptied of its 76,000 gallons of water at the maximum evaporation rate, according to Simmons' calculations. In that worst-case scenario, Simmons says, a water tank truck could refill the pool daily.

An option Fidelity Systems considered but did not choose was to warm the pool during cold months with heat drawn from the computers. That step did not seem warranted by the expense involved, Simmons says.

In its short life, the pool's water supply has been tapped on four occasions, two of which were actual air-conditioning emergencies. However, in the course of a normal day, Glass says, it keeps 10 to 15 Fidelity Systems employees and their family members cool.

CDC integrates electronic, mechanical CAD

BY STANLEY GIBSON
CW STAFF

MIAMI BEACH — Control Data Corp. in Minneapolis recently announced the integration of electronic and mechanical computer-aided design (CAD) on a workstation with its Cyber 910 Model 300 system.

At the same time, CDC announced that the Electronic CAD suite of its Integrated Computer Engineering and Manufacturing (ICEM) software series can run on the Cyber 910 Model 300 workstations and Cyber 180 departmental and mainframe computers.

Previously, Electronic CAD had been available only for personal computers running Microsoft Corp.'s MS-DOS, according to the vendor.

Eliminates re-entering data

"ICEM now combines Electronic and Mechanical CAD in a truly integrated computing environment. Users benefit by not having to re-enter data when moving from electronic to mechanical design, or vice versa," said John Willey, manager of electronics marketing for CDC's computer-integrated manufacturing division, in a prepared statement.

The software was demonstrated at the Design Automation Conference, which was held here recently.

ICEM electronics software for Cyber 910 Model 300 workstations will be available after Sept. 1, CDC said.

Prices for the three major software products, ED-Schematics, ED-Layout and ED-Router, will be $10,000 each, CDC said. Prices for the PC versions of the software packages run from $4,000 to $6,000 each.

The Cyber 910 Model 300 workstation, introduced last year, features three-dimensional real-time graphics and a Unix operating system. Prices start at approximately $40,000.

National
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GTE Communication Systems connects with National Advanced Systems

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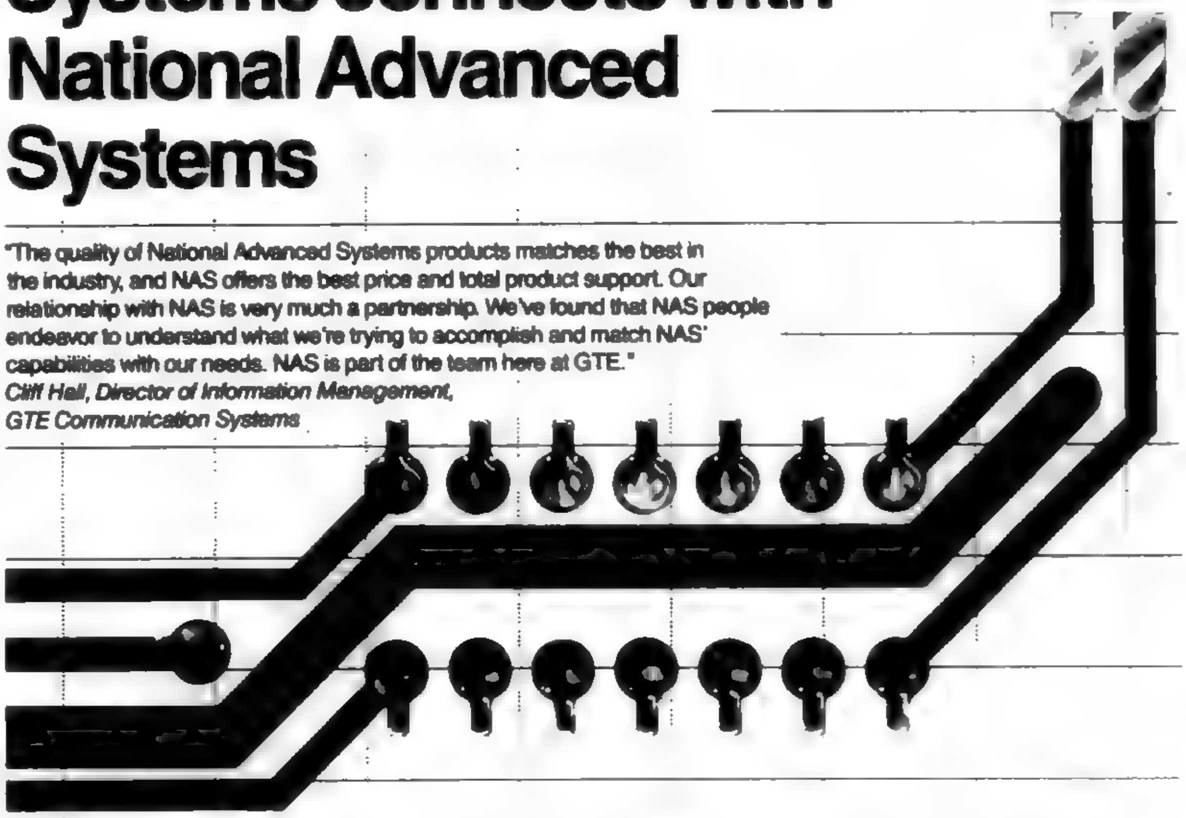
Cliff Hall, Director of Information Management,
GTE Communication Systems



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The GTD-5 EAX is designed to meet the objective of less than one hour's downtime in 20 years. Because GTE's engineers demand comparable reliability from their computing systems, GTE Communication Systems has installed hundreds of gigabytes of NAS 7380 Disk Storage Subsystems. These 7380s have provided millions of disk accesses with virtually no failures.

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NEW PRODUCTS

Turnkey systems

Honeywell, Inc. has introduced a compact version of its TDC 3000 control system designed specifically for small-plant and unit-level operations.

Called the **SPX Series**, the product is said to be made up of standard TDC 3000 components. Capabilities include batch or continuous control, prioritized alarm management, historical data collection and reporting and trending, demand logging, single-step display access and touch-screen display call-up, the vendor said.

One basic configuration includes an operator station with 19-in. color CRT, touch screen, keyboard, dual floppy disk drive and printer. A second configuration adds an additional workstation.

Prices begin at $70,000.

Honeywell, 16404 N. Black Canyon Highway, Phoenix, Ariz. 85023.

Processors

Two processor-accelerator products for AT&T 3B2 computer systems have been announced by **Congruent Technologies, Inc.**

The **CPU/500** is a replacement processor chip set utilizing 14-MHz components — CPU, Memory Management Unit and Clock Crystals. The **MAU/500** is a companion Math Accelerator Unit.

The CPU/500 costs $3,750. The MAU/500 costs $1,780.

Congruent Technologies, 9065 Jollyville Road, Austin, Texas 78759.

Data storage

Optotech, Inc. has reduced the price of its **write-once optical disks** designed to provide permanent transportable storage of data and images for users of Optotech's 5¼-in. optical disk drive.

The 400M-byte double-sided disks have been reduced in price from $225 to $125 each. The 200M-byte single-sided disks have been reduced from $125 to $65.

Optotech, 740-770 Wooten Road, Colorado Springs, Colo. 80915.

Terminals

Spectragraphics Corp. has enhanced its **Designset 1080** family of graphics workstations with a 19-in. color monitor featuring a high-contrast ratio and a neutral-density screen.

The DS 1080 workstations use a raster-scan graphics system that provides 1,024- by 1,024-pixel resolution in 256 colors with local three-dimensional transforms and area fill.

The DS 1080 workstation, including the 19-in. color monitor, is priced from $12,900.

Spectragraphics, 9125 Rehco Road, San Diego, Calif. 92121.

Printers/Plotters

The **Pinwriter Model P8300** 24-wire dot-matrix printer with printing speeds of 480 char./sec. in draft mode and 170 char./sec. in letter-quality mode has been announced by **NEC Information Systems, Inc.**

The P8300 offers built-in forms-handling capabilities including an integrated tractor, a tear bar and auto-load capacity. The vendor said mean time between failure is 7,000 hours.

The P8300 is priced at $2,795.

NEC Information Systems, 1414 Massachusetts Ave., Boxboro, Mass. 01719.

Power supplies

Electronic Specialists, Inc. has expanded its line of **Unattended System Power Interrupters.**

Designed to protect unattended computer systems from power fluctuations or outages, the interrupters disconnect alternating current power when irregularities occur, according to the vendor.

The interrupters are priced from $210.

Electronic Specialists, 171 S. Main St., Natick, Mass. 01760.

What's the Score in Data Path Management?

		Data Switch	Other/
1	Is the vendor able to offer complete Data Path Management systems including computer [illegible] communications switch [illegible] performance management, fiber-optic channel extension systems?	Yes	
2	Can the vendor provide a central, multi-user control system that manages all the data paths in your network?	Yes	
3	In computer switching, does the vendor offer a choice between a single crosspoint module (1x1) architecture and a full-featured switch including test I/O, channel activity monitoring, and integrated channel extension?	Yes	
4	How many switching systems has the vendor installed?	4,500+	
5	Does the vendor provide a full range of fiber-optic channel extension systems that separate computers and control units at distances from 2 to over 60 miles?	Yes	
6	Can the vendor deliver a *proven* distributed communications matrix switch that offers a fully operational non-blocked 2,048-port capability with integrated performance monitoring—*and back up its claims with over 200 units shipped?*	Yes	
7	Are manual patching and switching products also available for smaller applications?	Yes	
8	Is the vendor able to offer an *affordable*, industry-accepted network performance monitoring system that provides extensive performance, utilization, and availability information for *all* levels of your network, including up to 255 software applications and sub-applications?	Yes	
9	How large is the vendor's own nationwide service organization?	75	
10	Does the vendor offer remote diagnostic centers in the United States and Europe?	Yes	

The combination of Data Switch and T-Bar has created the most enhanced line of end-to-end Data Path Management systems available in the world.

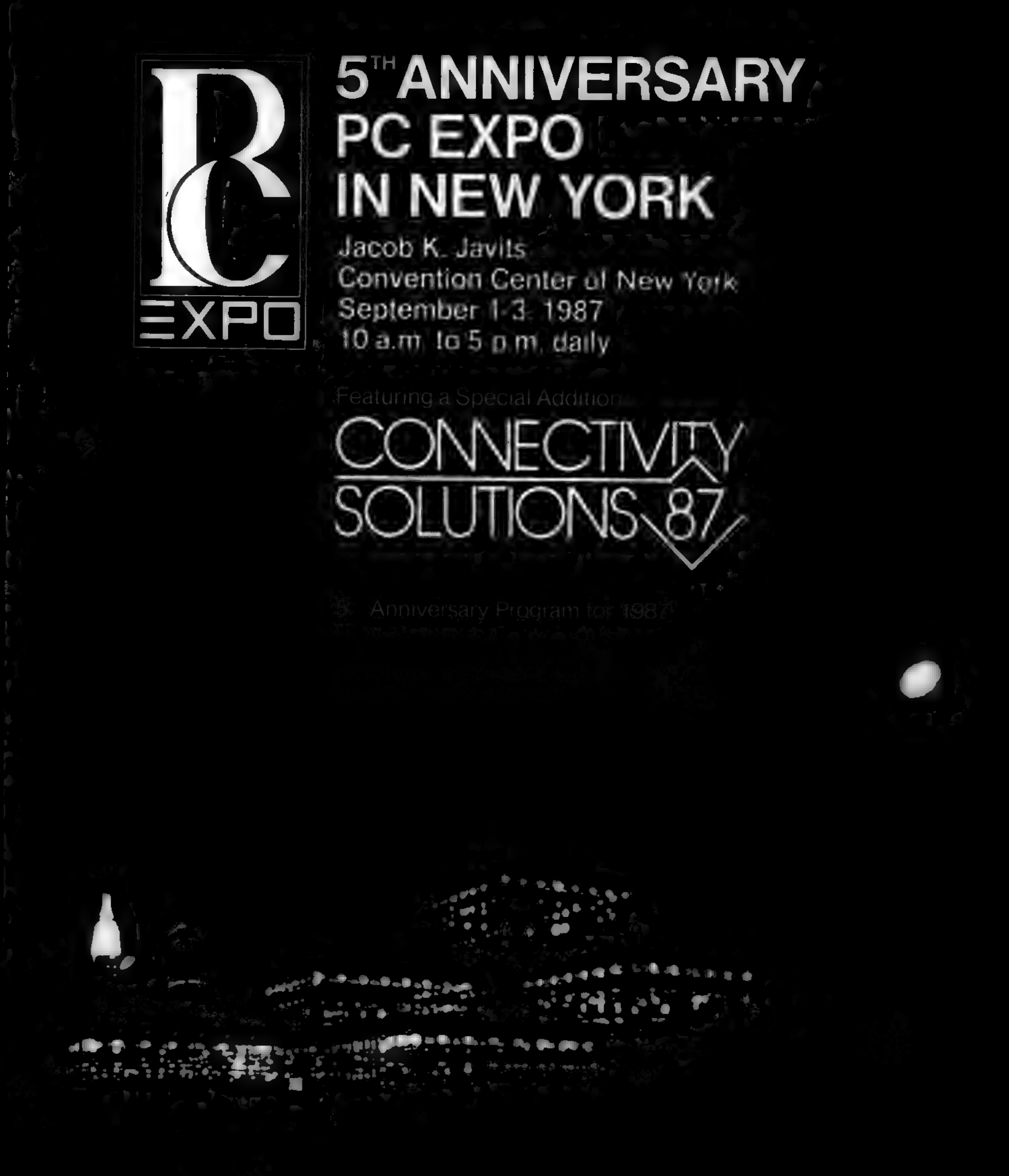
What is Data Path Management? Data Path Management is the discipline by which you organize, plan, and control your information processing resources from central computers to remote terminals. Our families of integrated computer and communications switches, performance monitoring systems, fiber-optic channel extension, and control systems can help you manage your resources to deliver the best possible service to your users—efficiently and with the best price performance.

The largest dedicated servicing organization in our marketplace. At Data Switch, we back up our Data Path Management solutions with the largest, most experienced in-house service and technical support organization in our markets. Our Data Path Management Specialists work with you from configuration planning through implementation to ensure continuous data path reliability and availability.

Join our family of over 1,000 customers. Data Switch's complete, total Data Path Management capability is unmatched in the marketplace. System compatibility allows you to start with one Data Path Management solution and add more capabilities as your network expands. Add up the score for yourself. Then call us for more information at [illegible]. In Connecticut, 929-1601. Or write: Data Switch Corporation, Dept. 30, One Enterprise Drive, Shelton, Connecticut 06484.

DATA SWITCH [illegible]

The Data Path Management Company



5TH ANNIVERSARY
PC EXPO
IN NEW YORK

Jacob K. Javits
Convention Center of New York
September 1-3, 1987
10 a.m. to 5 p.m. daily

Featuring a Special Addition

CONNECTIVITY
SOLUTIONS 87

5th Anniversary Program for 1987

Celebrating its fifth anniversary in New York, PC EXPO makes a great leap forward to an exhibitor base that is half again larger in 1987 than 1986. It is the largest computer show in New York. This has been accomplished without compromising the integrity of the show: only principal vendors presenting computer systems, hardware, software and services are included. There are not any exhibitors who are resellers. Consequently, corporate volume buyers and resellers are assured that PC EXPO remains the one marketplace that serves the computer trade with everything worth seeing and more of it.

This makes it possible for qualified people, like you, to talk to major suppliers, put your hands on their products, and get down to business on a volume buyer level. No undue crowds, no long wait to see the right person. No hassle. PC EXPO continues its policy of qualifying attendees as volume buyers who influence the purchase of product. Buyer convenience is maximized because the show is focused for you.

There is not even the smallest doubt that if you want to see everything in PCs, systems, peripherals, hardware and software — in one place at one time — PC EXPO is the one computer industry trade exposition you can't afford to miss.

WHO SHOULD ATTEND PC EXPO?

Volume buyers of PCs, systems, hardware, software and services are invited to attend the show and conference.

RESELLERS:

PC EXPO is for OEMs, systems houses, software developers, dealers, distributors, VADs, VARs, turnkey systems developers, consultants, office product dealers, manufacturers' reps, and other volume resellers.

CORPORATE:

PC EXPO is for corporate buyers. If your organization uses PCs by the basketload or by the truckload, and you must exercise influence in their acquisition, you cannot afford to miss PC EXPO. It is crucial to the acquisition process that you maintain an up-to-date knowledge of what works best today and what's coming "down the pike" tomorrow.

WHAT WILL YOU SEE AT PC EXPO?

As always, PC EXPO will present factory exhibits of microcomputers, minicomputers, networks, graphics, printers, computer related communications equipment, many hundreds of advanced software applications, maintenance service, and educational services, focused on manufacturing, accounting, financial operations, credit, education, R & D, retailing, design, engineering, education and government, among many other industries. You will be able to check out over 300 *new* or *improved* products and product lines at the 1987 show.

IT'S THE BEST SEMINAR SERIES IN THE BUSINESS. IT IS FREE. IT INCLUDES

CONNECTIVITY
SOLUTIONS 87

If PC EXPO's 1986 conference program was as good as attendees told us it was, then we would have to invent some Hollywood-type words to describe what's coming up this September 1-3. Our 22-person advisory board has outlined three general categories that strike at the hearts of the major concerns volume buyers must address: Connectivity Solutions '87, PC management and technology. But it's the sub-category topics that are specifically on-target and meaningful. All the details start on the next page. Take time now to select the sessions that are of most interest to you, then register and mark your calendar for three worthwhile days at PC EXPO.

Please remember, if we receive your registration form by July 31, we will mail your badge to you in advance. You won't have to wait on any line, and you will save money, too, because on-site registration costs 25% more. And for your planning convenience, you will receive by mail a special preview edition of our show daily, "PC EXPO Today," that will update the show's events and list of exhibitors.

A CADRE OF COOPERATIVE SPEAKERS AND PLANNERS

Over 200 speakers are ready to present PC EXPO's most ambitious conference program since the event was inaugurated. It's a fifth anniversary edition that brings together acutely aware end-users, consultants, and vendors. Their combined expertise will contribute synergistically to the store of PC knowledge under the direction of PC EXPO's 22-member board.

THE PC EXPO ADVISORY BOARD FOR 1987

Steve Sanazaro
Systems Manager
American Bankers Association

Leslie Fiering
Manager Advanced Technology
Bankers Trust Co
Co-chair, Connectivity Solutions '87

Theodore Klein
President
Boston Systems Group Inc
Director
Society for Management of Professional Computing

Roger Bender
Assistant Vice President
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Microcomputer Managers Association

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Managing Editor
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Release 1 0

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Vice President
Advanced Technology
Shearson Lehman Brothers

[illegible]
Editor
Software News

John A Ferro
PC Coordinator
U S Congress

[illegible]
Info Center Consultant
University Hospital
Suny at Stony Brook

The most important challenge facing MIS professionals and executives in the face of today's new technologies and standards will be to organize and manage the various non-compatible elements of their large scale and very large scale installations into a fully integrated environment where mainframe, mini, PC, peripheral equipment and software systems are effectively "connected" and utilized.

Therefore, PC EXPO is planning to help its large volume corporate buyers and resellers meet the "connectivity" challenge. We invite you to participate in a new and exciting addition to PC EXPO in New York for 1987. As you choose your seminar sessions, take a close look at those highlighted with the special **Connectivity Solutions '87** Banner.

12:00-1:20	1:30-2:50	3:00-4:30
Is the Information Center a Micro-Based Training Backwater?	**CD ROM and Beyond: The Impact of Optical Memory on Personal Computers**	**Portables: Vest Pocket ATs Right Now**
How to Buy a LAN — User Views CONNECTIVITY SOLUTIONS '87	**Desktop Publishing Needs: Putting Your System Together**	**Network Strategies: Picking Network Configurations that Work** CONNECTIVITY SOLUTIONS '87
Micro-to-Minicomputer Links: Problems and Solutions CONNECTIVITY SOLUTIONS '87	**AI on PCs: What, Where, When?**	**End User Support: Organization, Staffing Techniques and Concerns**
What Corporations Want From Software in 1988	**DBMS: Is the LAN Mine a Gold Mine?** CONNECTIVITY SOLUTIONS '87	**Determining Data Residence in the Integrated Office** CONNECTIVITY SOLUTIONS '87

10:30-11:50	12:00-1:20
Getting the Message Across: Electronic Mail and Beyond CONNECTIVITY SOLUTIONS '87	**Softline: Candid Comments from Industry Leaders**
Application Development Productivity Tools and CASE: A Primer	**Resellers and End Users: Achieving the Delicate Balance**
Getting the Most Out of Your LAN CONNECTIVITY SOLUTIONS '87	**Departmental Systems: When End User Computing Gets Out of Hand, What's an Information Center to do?**
Mass Storage Requirements of Emerging Computer Environments: Coping With Change	**LAN Bridging** CONNECTIVITY SOLUTIONS '87

Program subject to change without notice

Cigarette smoking will be permitted in the exhibit hall

PC EXPO Keynote Address

Bill Gates, chairman and CEO of Microsoft Corporation, will be speaking on the future direction of personal computers in the marketplace. Specifically, Mr. Gates will discuss his vision of how PCs will make their impact in several key areas within the industry, such as how PCs impact corporate buyers and how those corporate buyers will be able to leverage the many new technologies available today.

1:30-2:50	3:00-4:30
Desktop Publishing Applications: What Corporations are Doing?	Choosing a Local Area Network: Technical Solutions Through Case Histories CONNECTIVITY SOLUTIONS
80386: At Last, Answers Instead of Questions	Project Management Software: User Perspectives
Data Threats and Security in a Microcomputer Environment	Artificial Intelligence and the PC: The Practical, Commercial Viewpoint
End-User Computing: Making the Case to Management	Using Enhancement Products for Lotus 1-2-3

10:30-11:50	12:00-1:20	1:30-2:50	3:00-4:30
Forging New Paths to the Mainframe CONNECTIVITY SOLUTIONS	Costs and Benefits of PCs	Software Support and Upgrades	Meeting the Challenge of Workgroup Computing CONNECTIVITY SOLUTIONS
Cutting Edge Legal Issues in the Technology Field	Current Issues in PC Training	Corporate Publishing: The Options from PC to Mainframe	Modem Clones and the Corporate Marketplace
Executive Information Systems: Do They Support Executives?	LANs and Multiuser Systems CONNECTIVITY SOLUTIONS	Computer Graphics for Effective Presentations	Getting the Most Out of Your Modem CONNECTIVITY SOLUTIONS
Gutenberg at the Desktop, 1990	Application Development Productivity Tools and CASE: A Roundtable Discussion	New Lives for Old: How to get Rid of your old computer when it's time for a new one	Keeping an Eye on the Optical Market

Tuesday, September 1, 12:00-1 20

Is the Information Center a Micro-Based Training Backwater?

Moderator Shaku Atre, president, Atre International Consulting
Gerald Marrone, vice president, Citibank
Jim Valentine, vice president, Metropolitan Life Insurance

Now that 75 percent of the billion-dollar corporations have implemented information centers in one form or another, it is time to review IC goals and establish a direction for the mature information center. Unfortunately, the information center stereotype can relegate it to a limited, rather futureless function. Is that why some organizations have not implemented at all or have dismantled the established information center? This provocative session will challenge the belief that training is the only function of an information center, point out the dangers of that belief, and suggest directions appropriate for the strategic IC of the future

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Tuesday, September 1, 12 00-1 20

How to Buy a LAN — User Views

CONNECTIVITY SOLUTIONS 87

Moderator. Aaron Brenner, editor, *LAN Magazine*
Allan Karan, manager of office systems, Sperry & Hutchinson
Larry Stouder, Continental Grain
Dennis Eccleston, systems engineer, New York Power Authority

Buying a LAN gets easier every day. But there are still some things to know before you buy. First: what do you need and what type of LAN fits those needs? Next, you should evaluate different offerings, once you know the type of LAN you want. That includes things like benchmarks, test drives and RFPs. Finally, you have to know how to buy the LAN you want from the vendor you've chosen. Our panelists will leave you with at least 25 "things-to-know-when-you-buy-a-LAN"

Tuesday, September 1, 12:00-1·20

Micro-to-Minicomputer Links: Problems and Solutions

CONNECTIVITY SOLUTIONS 87

Moderator· George V. Kotelly, editor-in-chief, *Mini-Micro Systems*
Hugh Mackworth, workgroup communications manager, 3Com Corp.
Philip M. Lumish, senior vice president, CXI, Inc.
David Hunter, vice president, R & D, IDEAssociates, Inc.
Michael P. Krieger, senior product marketing manager, AST Research

As more and more personal computer users need access to the departmental mini-computer, systems equipment connectivity and integration become demanding corporate communications issues. Microcomputer-to-minicomputer links can satisfy these issues. But with the maze of methods and equipments available, managers must sift and sort through many options to obtain suitable solutions. This seminar will present the experiences and expertise of leading industry experts who will offer tried and true methods of addressing thorny micro-to-mini applications.

Tuesday, September 1, 12·00-1:20

What Corporations Want From Software in 1988

Moderator: Bill Lohse, publisher, *PC Magazine*

In 1988 there will be three business operating systems for PCs: MS DOS, MS OS/2, and OS/2. What software is being developed for which OSs? Which will be bought by which corporations? Why? Will OS/2E (IBM's OS with relational DB and Communications extensions) be introduced in 1988, and if so, how will that affect software developers and buyers? (Is the Applications Program Interface of 1988 Presentation Manager Windows?) What of the character based programs (e.g. 1-2-3) in 1988? What useful impact beyond speed will the 386 have? What new problems will arise (e.g. networks, distributed data) and what kinds of software will be needed to solve them?

Tuesday, September 1, 1:30-2.50

CD ROM and Beyond: The Impact of Optical Memory on Personal Computers

Moderator: David Bunnell, chairman, PCW Communications, Inc.
Gary Kildall, founder, Digital Research, Inc.
Alan Boyd, president, Owl International
Stan Cornyn, president, The Record Group

The optical memory revolution is coming, but when and in what form? CD ROM, CD-I, and GDI promise to bring new vitality to the personal computer. WORM technology is already here in the form of an IBM WORM drive. Will optical memory impact the high-end corporate PC market, or will it revitalize the home computer market? The possibilities are mind-boggling while the realities are sobering. Learn what the experts have to say.

Tuesday, September 1, 1:30-2·50

Desktop Publishing Needs: Putting Your System Together

Moderator: Rick DeCoyte, manager, Desktop Publishing Specialty Division, Management Information Software
Michael D'Agostino, vice president, Marketing and Sales, Princeton Graphic Systems
Richard Amen, president, DEST Corp.
Carolyn Grossman, product business manager, Desktop
Representative from IBM Corp.
J. Eisenberg, AM Varityper Corp.

The boom in desktop publishing has produced more questions than answers when it comes to setting up your PC systems. Do you need to upgrade your PC? Do you need a scanner or full page screen? Is higher processing speed necessary? Why do you need a laser printer? Do you need PostScript? This seminar will give you a clear view of all the elements necessary to start up your desktop publishing system, and answer many of the questions brought up by the desktop publishing phenomenon.

Tuesday September 1, 1:30-2:50

AI on PCs: What, Where, When?

Moderator Neal Goldsmith, Ph.D., research analyst, Gartner Group
Renee Barling, project director, Corporate Research and Development Group, Equitable Life Assurance
Chris Quinn, senior systems analyst, General Electric Credit Corp.

Until recently, large scale knowledge-based system development on a PC was inconceivable. Today, vendors and users alike are scrambling to keep up with new application, tool, language, and hardware developments. In this session, experts will shed light on what products are available today, where these technologies can be applied for competitive advantage in business, and when major new technological advances will likely be attained. A corporate panel representing both enthusiasts and skeptics will provide case experiences

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Tuesday September 1, 1:30-2:50

DBMS: Is the LAN Mine a Gold Mine?

Moderator Ed Bride, editor, *Software News*
Cheryl Currid, manager, Sales Systems Planning and Information, Coca-Cola Foods
Donna Staas, assistant vice president, manager of Office Systems Planning, FBS Information Services
Rick Segal, software specialist, Aetna Life and Casualty
Dan Spiner, CEO, Management Information Software

After all the talk about local area networks in the past decade, large users are finally reporting real-world applications, the most promising of which are based on database management systems. But, just as with any other evolving technology, implementing LAN-based applications is fraught with hazards. After an overview presentation by a corporate distributor of PC software, a panel of users discusses some of these hazards, and how they approached such areas as new applications development, file-sharing, data security, data dictionaries, the role of the mainframe, and the impact of mainframe processing. Time is allotted for audience interaction.

Tuesday, September 1, 3:00-4:30

Portables: Vest Pocket ATs Right Now

Moderator Gene Talsky, president, Professional Marketing Management
Thomas O'Brien, president, Portable Computers
Anthony Ottavio, director of information systems, McKinsey & Company, Inc.

Advances in technology and manufacturing have enabled manufacturers to deliver full PC power and capabilities packaged in both battery-operated laptops and AC powered compact, light-weight "luggables." This session will cover the capabilities and limitations of these advanced portables and provide examples of how they are being used to fulfill application-specific business needs, as well as their growing use as general-purpose personal computers.

Tuesday, September 1, 3:00-4:30

Network Strategies: Picking Network Configurations that Work

Moderator. Mary Petrosky, west coast correspondent, *Network World*
Nathan Roseman, president, LAN Services, Inc.
John Good, manager of distributed systems, The Turner Corp
Arthur Silverglate, PC coordinator, Bank of Montreal

How you configure a local area network depends largely on what you're trying to accomplish. Are you cabling a new building or looking to use installed wiring? Do you have a need for wide area communications? Do you want network services supported on a single server or spread across several servers? In this session, network consultants will discuss configuration considerations and general guidelines, and network users will share their successes and failures with different network topologies.

Tuesday, September 1, 3:00-4:30

Determining Data Residence in the Integrated Office

Moderator Thomas White, president, The Seybold Group, Inc.

As workgroup computing becomes the standard of the late 80s and 90s, an important decision facing information processing professionals is how to determine where information will reside. Does the data stay with the corporate mainframe? Do we offload it to the nearest minicomputer or is it stored on the departmental processor? With the advent of more advanced data storage equipment that is affordable at the workgroup level, this decision becomes even more complex. This session will provide practical information on how to evaluate your requirements and develop a strategy that fits your organization. Specific information will also be given on currently available and future hardware and software technologies.

Tuesday, September 1, 3:00-4:30

End User Support: Organization, Staffing Techniques and Concerns

Moderator: R. Bruce Johnson, manager, PC Resource Center, Deloitte Haskins & Sells
Steven Sanazaro, systems analyst, American Bankers Association
Frances C. Lapinski, information systems manager, Depository Trust Co.
Robert R West, president, Micro Support Resource Corp.

Supporting PC users is rapidly becoming a major management challenge. How many support people do you need? Are they part of MIS or a separate organization? Where do you get good support people? How do you measure the effectiveness of a support function? The support organization has to mesh with the structure, geography, politics and business objectives of the end user organization. The panel members are all involved in the day to day management of a support function. They represent a variety of industries and organizational structures. They will discuss what works for them and why.

Wednesday, September 2, 10:30-11:50

Getting the Message Across: Electronic Mail and Beyond

Moderator Susanna Opper, telecommunications analyst and consultant
Sandi Fischer, quality assurance engineer, Eastman Kodak
R. Bruce Johnson, manager, PC Resource Center, Deloitte Haskins & Sells

The field of business communication is changing fast, and the personal computer is leading the revolution. Soon total connectivity won't mean just networked PCs and mainframes; it will also mean networked executives, managers, and staff. Now that you have the hardware in place, you can kill telephone tag, tie geographically dispersed work groups together and speed critical information to the right place in seconds. But there are hardware, software, and people decisions you'll need to make first. Using case studies from various corporate settings, panelists will reveal the do's and don'ts of electronic communication.

Wednesday, September 2, 10:30-11:50

Application Development Productivity Tools and CASE: A Primer

Speaker: Conny Wylie, president, Conny Wylie Corp

The writing is on the wall for MIS/DP. The demand for information resources has become such a dominant concern in business today that application developers and management are constantly seeking new ways to improve system development productivity and quality. Thanks to the PC's new found power, the likelihood is strong that applications will increasingly be developed on desktop workstations sporting a growing range of Computer Assisted Software Engineering workbenches and tool kits for specification, design, prototyping, version management, programming, testing, debugging, documentation and maintenance: the entire application development life cycle. CASE technology represents complete architecture for addressing the application development productivity issue: an era where application development is done with "computer assistance"; and a breath of new life for backlogged MIS/DP. Mr. Wylie's CASE primer includes the technologies it embraces, product categories and its productivity potential.

Wednesday, September 2, 10:30-11:50

Getting the Most Out of Your LAN

CONNECTIVITY SOLUTIONS 87

Moderator: Robert Clark, vice president, The Seybold Group Inc.
Harry Saal, president, Network General Corp
Mark Calkins, director of marketing, Novell, Inc
Linda Stewart, product marketing manager, Excelan
Peter Kraus, vice president, LAN Services, Inc.

In their simplest form, LANs can be thought of as a group of PCs interconnected by some type of cabling for the purpose of sharing hardware resources and information files. The degree of success which network PC users experience in sharing data and hardware resources is largely dependent upon the size of the network, the communication requirements of the users, and whether they have implemented network management procedures and tools to effectively control the resources of the network. This session will look at several of the more popular network management products and how users effectively manage their networks with these tools.

Wednesday, September 2, 10:30-11:50

Mass Storage Requirements of Emerging Computer Environments: Coping with Change

Moderator: Andrew Seybold, chairman of the board, The Seybold Group, Inc.

Wednesday, September 2, 12:00-1:20

Softline: Candid Comments from Industry Leaders

Moderator: Esther Dyson, editor, *Release 1.0*
Irene Greif, resident technician, Lotus Development Corp
Gordon Eubanks, president, Symantec

Hear the leaders in the PC software business discuss the issues that concern them, and then ask them about the issues that concern you. This session will not feature product pitches, or prepared presentations, with a short Q & A. Rather, it will present 80 minutes of lively, interactive discussion among panelists and audience.

Wednesday, September 2, 12:00-1:20

Resellers and End Users: Achieving the Delicate Balance

Moderator: John Russell, executive editor, *Computer Reseller News*

With the average computer store generating 70 percent of its annual revenue through outside sales, a greater number of large and medium-sized corporations are regularly receiving sales solicitations from resellers. What do these end users expect from dealers in the areas of service and support? How do corporate buyers differentiate the attributes of computer-store-sales reps from manufacturers' direct-sales forces? In turn, what do resellers see as the key selling points needed to penetrate corporate markets? Is there any formula that guarantees success from both sides of the equation? This session will be composed of resellers and end users offering their views on these sensitive and provocative topics while attempting to find the common denominator that could help achieve a delicate balance.

Wednesday, September 2, 12:00-1:20

Departmental Systems: When End User Computing Gets Out of Hand, What's an Information Center to do?

Moderator: Theodore Klein, president, Boston Systems Group; director, Society for Management of Professional Computing
Barry Fischler, vice president, Bankers Trust Co.
George F. Colony, president, Forrester Research, Inc.

As end users grow more and more sophisticated, often with the help of training provided by the information center, there is a growing tendency for end user development of complex microcomputer software. These evolving systems often take on a much larger role in the support of departmental operations, although many times they are inefficiently designed, inadequately documented, and difficult to administer. This panel discussion will focus on recognizing and effectively dealing with the inevitable proliferation of PCs and the growing complexity of end user systems.

Wednesday, September 2, 12:00-1:20

LAN Bridging

CONNECTIVITY SOLUTIONS 87

Moderator: Roger Bender, assistant vice president, Citibank
Mark Westerhoff, micro manager, Electronic Data Systems
Leslie Fiering, manager, Advanced Technology, Bankers Trust Company
Katherine Merriam, Fell Computer

One of the promises of the LAN is the ability to integrate a variety of hardware and software systems into a single entity. Using a microcomputer's intelligence, the LAN has the potential to provide gateways and bridges between the IBM world, VAXs, Data General, Prime and other environments. What has actually been implemented? What is on the horizon? What is and will remain vapor for the forseeable future?

Wednesday September 2 1:30-2:50

Desktop Publishing Applications: What Corporations are Doing

Moderator Susan Gubernat editor, *Publish*
Rule Johnson Morris, director of office automation, SSC&B Lintas Worldwide
Yoram Lirzman, assistant treasurer, Bankers Trust Company
Barry Katz, microcomputer manager, Price Waterhouse

Desktop publishing can truly be called a revolution only when users can testify to the significant impact this much-touted technology has had on their work lives. This panel of hands-on desktop publishers will explore the myths and realities of PC-based publishing. They'll discuss their own experiences with time and money savings, learning curves, changing job roles, and the issues of quality and compromise they've faced with this exciting new application.

Wednesday September 2 1:30-2:50

80386: At Last, Answers Instead of Questions

Moderator Bill Machrone, editor, *PC Magazine*
Richard Bader, general manager, Intel PCEO
Michael Dell, chairman, PC's Limited
Richard M. Smith, president, Pharlap

IBM has finally dropped the other shoe, in the form of the PS/2 Model 80. It is a boon or bane? What is its effect on Compaq, the '386 add-on boards, and VM-86 control programs? Who's buying '386 machines and why? What is the real performance capability of the '386, especially against the Motorola-powered work-stations? Panel members represent both the hardware and software points of view, and their diverse backgrounds cover all aspects from the chip level through advanced application programs.

Wednesday September 2 1:30-2:50

Data Threats and Security in a Microcomputer Environment

Moderator Dr. Harold Joseph Highland, editor-in-chief, *Computers & Security*
Bernard P. Zajac, Jr., database data security manager, Abex Corp.
Stephen Hicks, president, United Software Security, Inc.
Belden Menkus, executive editor, *Journal of Systems Management*

Preventing security infractions in a microcomputer environment requires a comprehensive, multi-pronged approach. Following a demonstration of a systems attack by a computer virus and presentation of ways to protect the security of programs and data, several aspects of computer security will be presented by nationally known specialists. The problems addressed include: implementing a corporate microcomputer security program, an auditor's approach to microcomputer data security, and steps to take to protect evidence when a security breach has been discovered. A question-and-answer period is included.

Wednesday, September 2 1:30-2:50

End-User Computing: Making the Case to Management

Moderator Naomi Karten, president, Karten Associates
Kenneth Ross, president, Atrium Information Group
Raymond Glath, president, RG Software
Leslie Fiering, manager, Advanced Technology, Bankers Trust Company
Representative from Ford Environmental and Safety Engineering

User demands and expectations are increasing. But most micro support centers are understaffed, underbudgeted, and unable to adequately support user needs. It is likely that PCs will end up being unused, underused or – worse – misused. Many micro managers feel that the root of the problem is lack of management support of their efforts. But most micro managers are unsure of how to document and communicate the value of their services. What does management want to hear? What will help them understand the benefits of effective PC use and the risks of misuse? This panel will evaluate how to gain management appreciation of the successes of the micro support center and management support of its needs.

Wednesday September 2 3:00-4:30

Choosing a Local Area Network: Technical Solutions Through Case Histories

CONNECTIVITY SOLUTIONS '87

Moderator Dan Spiner, CEO, Management Information Software
Bob Buchanan, product manager, 3+ Network Operating System Software, 3Com Corp
Ray Noorda, president, Novell, Inc.
David Mahoney, president, Banyan Systems
Hank Kee, vice president, Chemical Bank
Representative from Merrill Lynch

Local area networks are becoming more important in the day-to-day operations of large corporations. The existence of different types of data and equipment necessitates hooking up systems which may or may not be compatible. Meanwhile, technological advances are changing the face of microcomputer connectivity in general. This panel will present the design and implementation solutions of local area networks, with emphasis on network architecture, cabling systems, network operating software and protocols available to solve connectivity problems.

Wednesday September 2 3:00-4:30

Project Management Software: User Perspectives

Moderator. Harvey A. Levine, principal, The Project Knowledge Group
Bill Haydock, manager, Information Systems Services, Peat Marwick, Main & Co.
Steven Manne, assistant vice president, New York City Transit Authority
Steven Crans, Boeing Computer Services
Diana Quinn, industrial engineer, Eastman Kodak

Project management software *users*, at several levels, from varied industries and backgrounds, talk about their satisfactions and frustrations with commercial, PC-based project management software. Panel members will discuss what they were looking for from their software and how well it did the job, comment on the preparations, training and changes required to implement a project management software system in order to maximize achievement of their objectives; evaluate the overall benefits gained from their implementations of project management software systems, and offer suggestions for vendors.

Wednesday, September 2, 3:00-4:30

Artificial Intelligence and the PC: The Practical, Commercial Viewpoint

Moderator Dan DeSalvo, senior staff, MCI Telecommunications Corp.
Wendy Rausch-Hinden, president, Hi-Tech Editorial Inc
Herb Edelstein, partner, Euclid Associates
Randy Manner, American Management Systems, Inc

This panel of experts will present a realistic discussion of what can, and what should, be done with artificial intelligence software on PCs. The panel will discuss how to evaluate the technology, when and where to apply for it, and the process involved in planning and building practical AI applications on the PC.

Wednesday, September 2, 3:00-4:30

Using Enhancement Products for Lotus 1-2-3

Moderator Rick Gibson, executive director, The Consortium Inc.
Michele Preston, vice president, Salomon Brothers
Dr. Thomas Byers, general manager, Turner Hall Publishing
Mitchell Russo, president, North Edge Software
Bob Raferty, marketing director, Tele-Ware West
Ned Prendergest, director, Companions Products Group, Lotus Development Corp.
Joseph A. King, Jr., vice president, Citicorp.

It is estimated that there are approximately 4-6 million users of Lotus 1-2-3. Many users are now using software add-ons that combine with Lotus to make them more productive in their work. These enhancements add capabilities such as: error-checking, spreadsheet saving, recovery, and learning, data crunching, enhanced graphics and scheduling, English documentation, time and billing, tax-planning, decision-support, instant macros, mainframe links, expanded memory, word-processing, vertical applications such as accounting, as well as dozens of excellent utility products. Panel members take a look at how to get the most out of a wide variety of enhancement products.

Thursday, September 3, 10:30-11:50

Forging New Paths to the Mainframe

CONNECTIVITY SOLUTIONS 87

Moderator: David Ushijima, technical editor, *MacWorld*
Robert Millstein, president, VM Personal Computing
Douglas Lifton, product manager, Digital Communications Associates
Charles Morel, chairman, CXI, Inc.
Isaac Kong, president, Network Software Associates, Inc.

The new generation of PCs, along with extensions to OS/2 from both IBM and third parties, will open new doors for communications between PCs and mainframes. This session will explore some of the ways in which new operating system developments will let PC users access and transfer information much more transparently than ever before. Panelists will offer current solutions to mainframe integration problems as well as analyze trends and improvements in the user interface.

Thursday, September 3, 10:30-11:50

Cutting Edge Legal Issues in the Technology Field

Moderator: John Yates, partner, Vaughan, Roach, Davis, Birch & Murphy
Kenneth A. Wasch, executive director, Software Publishers Association
Michael W. Mattox, senior council, Digital Communications Association
Robert H. Kohn, corporate council, Borland International

This presentation addresses recent legal developments affecting computer users and vendors. Panelists include leading legal and industry experts involved first-hand with major computer law issues. Among the topics to be addressed are the protection of software and "look and feel" issues, software piracy and corporate liability, shrink-wrap licensing, and tax and accounting considerations. The presentation will focus on practical pointers for users to reduce legal liability and for protection of legal rights in the computer area.

Thursday, September 3, 10:30-11:50

Executive Information Systems: Do They Support Executives?

Moderator: Naomi Karten, president, Karten Associates
David Friend, chairman, Pilot Executive Software
Robert Petrie, vice president, Manufacturer's Hanover Trust Co.
Robert Martin, manager, Executive Support Systems, Eaton Corp.

There's plenty of data out there. But executives don't want data. They want information, and they want it quickly and with push-of-a-button simplicity. Executives need systems which can track and display key corporate indicators, identify deviations from expectations, monitor performance over time, and summarize and aggregate data in various ways. Can executive information systems (EISs) that meet these needs be developed? What issues and factors come into play in identifying executive needs and developing an EIS? Panel members will discuss these and other issues revolving around the type and the reality of executive information systems.

Thursday, September 3, 10:30-11:50

Gutenberg at the Desktop, 1990

Speaker: Marshall Harmon, president, Harmon Kemp

Desktop or personal publishing has created a plethora of opportunities for PC users and managers. But beware of the poorly designed documents that will surely proliferate with everyone becoming a publisher. Newsletters, proposals and reports will be generated lacking the visual logic necessary to invite the audience to read or even consider reading the information printed on the page. This session will convey some fundamental principles of visual logic to assist the business person in avoiding bad design.

Thursday, September 3, 12:00-1:20

Costs and Benefits of PCs

Moderator Dan DeSalvo, senior staff, MCI Telecommunications Corp
Robert Farrar, budget & procurement officer, U.S. Senate Computer Center
Herb Edelstein, partner, Euclid Associates
James Naughton, president, Expert-Knowledge Systems, Inc

This panel discussion will address the concerns of managers, administrators, and systems developers who need to evaluate the benefits and drawbacks of PC implementations. Expert panelists will speak from their broad experience in private industry and government, and topics will include methods for evaluating costs and benefits, justifying requirements, and streamlining PC administration

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Thursday, September 3, 12:00-1:20

Current Issues in PC Training

Moderator Jane Stein, editor, *Data Training*
Chester Delaney, vice president, Systems Human Resource Division, Chase Manhattan Bank
Ralph Ganger, president, CES Training Corp.
Kenneth J.P Burkhouse, computer training manager, Boeing Aerospace
Norm Ohren, president, Tectra Training

Just a few years ago the job seemed pretty straightforward: take a few hundred innocent new PC users, send them to class to learn a handful of DOS commands and the basics of a couple of standard software packages, and send them back to their offices to run spreadsheets and write reports to their hearts' content. Now, the varieties of hardware and software in the workplace have proliferated. LANs and links are looming on the horizon, some users are demanding advanced training while others are still coping with computer anxiety, and management wants to know when all that increased productivity is going to start showing up. Some people claim PC training is about to become obsolete while others insist we haven't even begun to address the real training needs. This panel will discuss these and other second-generation PC training questions such as the need for the systems training for PC users, the incorporation of real-world business problems, executive-level training, media selection, and the information center versus DP versus training department turf debate

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Thursday, September 3, 12:00-1:20

LANs and Multiuser Systems

CONNECTIVITY SOLUTIONS 87

Moderator Steven Moore, features editor, *Network World*
John Carosella, consultant, Network Strategies, Inc.
William Heuser, director, Corporate Information Systems, Pneumo Abex
Ian Ebel, president, Microserv Technologies Corp.

Users and vendors square off in this session to argue key departmental networking questions raised by the new generation of Intel 80386-based personal computers. Should you buy a LAN composed of multitasking PCs, or a minicomputer that supports PCs instead of dumb terminals? Where do diskless PCs fit in? Will third-party vendors succeed in hanging dumb terminals onto multitasking PCs and selling them as multiuser systems? Finally, what new management issues are brought to the fore by today's proliferation of multiuser alternatives within corporate peer-to-peer networks?

Thursday, September 3, 12:00-1:20

Application Development Productivity Tools and CASE: A Roundtable Discussion

Moderator Conny Wylie, president, Conny Wylie Corporation
John Ferro, PC coordinator, U.S. Congress
Paul Bassett, vice president of research, Netron Inc.
Stephen G. Perry, CEO, Mainframe Micros, Inc.

This panel will focus on the powerful set of applications development productivity tools and workbenches that make up a CASE development environment. This session dwells on real-world CASE experiences and implementations and reviews different perspectives on improving application development productivity with a CASE platform. CASE implementors will share their experiences and insights from actually installing and operating workbenches in their environments with examples of how these workbenches are being used, as well as dealing with the human issues that are coupled to CASE technology introduction. A notable consultant in this area, as well as a leading CASE vendor will be on hand to present experiences with CASE successes and failures.

Thursday, September 3, 1:30-2:50

Software Support and Upgrades

Moderator Peter Hansen, vice president of marketing, Corporate Software Inc.

Software costs begin with the initial product purchase, but all too frequently the costs of training new users, responding to their phone calls, keeping up with version changes, and upgrading to new versions tax the resources of most Information Center managers. Until recently, software vendors have given little thought to the unique support needs of corporate customers. However, in the last year, most vendors have unveiled support programs for corporate customers that are tailored to their needs — at a price. This panel will discuss the changes that have occurred in the last year in software support and upgrade policies from the perspectives of both vendors and corporate information centers

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Thursday, September 3, 1:30-2:50

Corporate Publishing: The Options from PC to Mainframe

Moderator Fritz Dressler, senior analyst, The Seybold Group Inc
Stephanie Kott, microcomputer manager, Lord, Geller, Federico, Einstein, Inc
Mark Skiba, president, American Programmer's Guild
David Boucher, president, Interleaf, Inc.
Bob Castellano, office systems manager, Reader's Digest

All companies are in two businesses, the one they think they're in and publishing. Publishing is part of every company. Here's a look at the spectrum of options all the way from individual PCs to PCs integrated within companywide systems. Emphasis is on the integration of the publishing function and company activities, and on the technical demands of companywide publishing. Presentations are based on case studies "Here's what's available, and here's how and why it works." Topics include integrating graphics into word processors, creating business graphics using small publishing teams and PCs, and publishing on a companywide basis.

Thursday, September 3, 1:30-2:30

Computer Graphics for Effective Presentations

Moderator Douglas Barney, senior editor microcomputing,
Computerworld

Powerful personal computers are already ushering in a new age of presentation graphics — led by desktop publishing, high-resolution displays and three-dimensional graphics. This session looks at what state-of-the-art products are available on PCs now, and how buyers can navigate the confusing range of options to choose the software and hardware that are right for them

Thursday, September 3, 1:30-2:30

New Lives for Old: How to get rid of your old computer when it's time for a new one

Speaker Alex Randall, president, Boston Computer
Exchange

What do you do when you're ready to upgrade your computer? You need a faster processor…a bigger hard disk…a better quality printer …a faster modem. The gear you have is perfectly OK, but you have outgrown it. This seminar will tell you how to "out-place" your computer equipment to make room for the new system you want. You'll learn what to do with the equipment to prepare it for sale, who can assist you, what problems to avoid, and how to protect yourself. Along the way, you'll learn about how to save money buying that new system, how to pick the best time to sell, and where to get accurate price information for used computer equipment.

Thursday, September 3, 3:00-4:30

Meeting the Challenge of Workgroup Computing

CONNECTIVITY SOLUTIONS 87

Moderator, Frank Derfler, connectivity editor, *PC Magazine*
Dr. Marv Schwartz, president, Chi Corp.
Jay Weil, director, product marketing, Excelan Corp.
Gregory Ennis, vice president, engineering, Univation

This session tackles the important technical issues of workgroup connectivity. Topics include improving workgroup productivity through networked utilities, workstation alternatives such as Lanstations and clustered CPU systems, and special emphasis on linking to corporate mainframes. Featured will be a close look at the use of NetBIOS in workgroup connectivity (both circuit switches and media sharing LANs) and plot industry trends and standards.

Thursday, September 3, 3:00-4:30

Modern Clones and the Corporate Marketplace

Moderator. Kevin Ferguson, managing editor, *Computer Reseller News*
Mark Litvinoff, director of PC support & technology, MONY
Financial Services
Rhonda Lindenthal, assistant treasurer, Bankers Trust Co

Has IBM really changed the rules with its new Personal System 2 line? How has it affected the clone market, particularly the low-end "clone-killer," the Model 30? Will there always be a true clone market, or will the Taiwanese, Korean, and Singaporean manufacturers now in their glory burn out very quickly? In addition to these topics, panelists will address, specifically, how corporate end-users are reacting. Some corporate users feel that they've been betrayed by the latest round of products and have seriously considered something they've never done before: buying non-IBM equipment to work with their installed bases of IBM equipment

Thursday, September 3, 3:00-4:30

Getting the Most Out of Your Modem

CONNECTIVITY SOLUTIONS 87

Moderator: Jules H. Gilder, editor-in-chief, *Computers in Accounting*
Scott Walcheck, product marketing, Migent, Inc
James Warner, product marketing modems, Digital
Communications Associates
Dale Walsh, vice president engineering, U.S. Robotics
John McMullen, McMullen & McMullen
Representative from Ven-Tel, Inc.

As the use of personal computers in business increases, so does the need to transfer information between them. Modems are a crucial part in the computer-to-computer link. With a wide range of choices now available, selecting a modem is no longer easy. Do you need a modem that features high speed, small size or error correction? Will a "plain vanilla" modem do or are extra features necessary? How do you pick the modem that's right for you? And, once you've picked it, how do you use it effectively? These and other questions will be answered at the session

Thursday, September 3, 3:00-4:30

Keeping an Eye on the Optical Market

Moderator: Harry Miller, editor, *PC World*
Michael Minor, vice president, Business Development,
Microcomputer Specialists, Inc.
Mike Kaufman, director, Tallgrass Technologies Corp.
Jeffrey Dulude, director of marketing, Optotech, Inc.

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Local Bus Service

Some hotels are within walking distance of the show; however, there are public buses serving Javits Center near all PC EXPO hotels. Additionally, the show has shuttle buses (free) each evening on open show days leaving the building between 4 and 5:30 p.m., that stop at all official hotels. Shuttle bus signs will be posted in the show lobby.

Public buses from the East River to Javits center are the M42 and M34. The M42 runs along 42nd Street, the M34 runs along 34th Street, and both stop on all corners. The M42 also serves Grand Central Station, and the M34 serves Pennsylvania Station. Fare is $1.00 each way in coins or token only.

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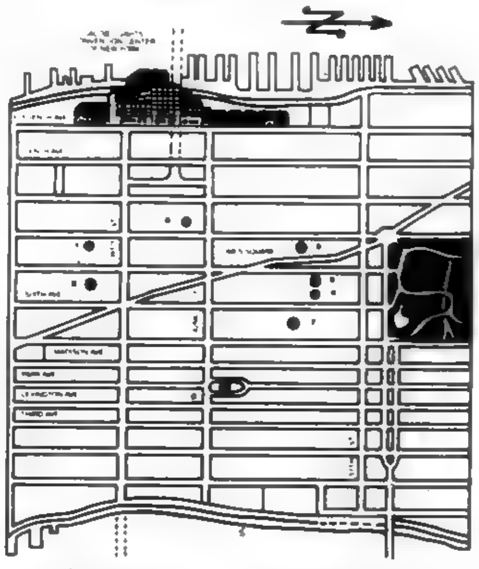

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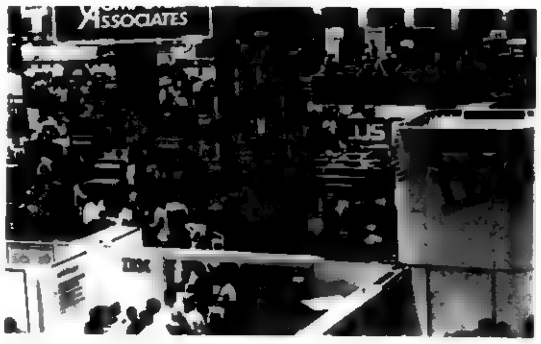

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STEVE LYONS

BY PHILIP J. GILL

Designing a data center is not a job for the weak of heart. If, as an MIS manager, you are about to supervise such a project, expect to function as more than a technologist and a manager — you will also have to take on the duties of construction engineer, architect, facilities planner, project manager, cost analyst and more. Most MIS managers will not have to play these roles more than a couple of times in their careers, but the roles will be among the most important and difficult jobs they ever undertake.

Norm Lansing's story is more atypical than typical. As the data center manager for TIE/Communications, Inc., a maker of digital private branch exchange and telephone key set equipment, Lansing has managed at least 20 construction projects, ranging from a simple remodeling to the top-to-bottom construction of a new data center in his 20-year career in DP. He even devised a plan — in 24 hours — to move an entire data center.

Lansing, who works at the company's Shelton, Conn., headquarters, says that in growing multinational firms, MIS professionals should expect at least one construction project — ranging from remodeling or refurbishing existing facilities to the construction of a completely new center or an entire building — at least once a year.

However, not all veteran MIS professionals have had to move their data centers so often, and not all choose to take such an active role. At the other extreme is Ron Brzezinski, vice-president of Quaker Oats Co., a Chicago-based food concern. He, too, is a 20-year DP professional. Brzezinski reports, however, that his spanking-new data center, part of the Quaker Oats headquarters in downtown Chicago, is only his second data center construction project. His advice: "Don't do it yourself." Consultants can often play a major role in large design projects.

A well-designed center starts with well-thought-out plans. Tom Rice, director of the computer hardware planning department at Com-Site International, Inc., a Beltsville, Md., data center design and construction firm, stresses the importance of an initial planning and feasibility study. During this study, in-house MIS professionals or an outside consultant can assess the needs and requirements for the data center, which "helps flesh out the design parameters," Rice says.

To help MIS focus its requirements, Tom Lalor, a partner at the St. John's Consulting Group,

INSIDE

Tips for building a bug-free DP facility
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Cutting through the wiring miasma
Page 67

How to keep it cool and put the fires out
Page 72

Gill, former editor in chief of *Unix/World* magazine, is a free-lance writer with more than seven years of experience in the computer industry. He currently resides in San Mateo, Calif.

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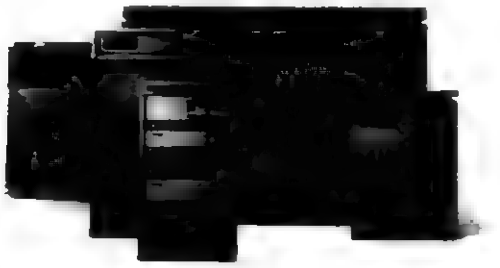

HP 3000 family. Micro 3000 XE, Series 52, 58, 70, 930 and, not shown, Micro 3000 and Series 950

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Blueprint

FROM PAGE 53

a Westfield, N. J., data center design consultancy, strongly advises that managers begin by assembling a series of comprehensive lists. A data center design checklist should include a description of the work load going in and out of the computer room, cabling schematics, heating, cooling, water and security requirements.

In addition, Lalor says, managers should keep track of the following:

- All the local building codes, the Office of Safety and Health Administration safety codes and the like. Do not rely on architects, engineers or consultants who say they know, because in some cases they don't.
- All the applicable union rules, if union construction is involved.
- References of past customers, especially those of designers, architects and engineers. Ask particularly for references of jobs the firm did two to three years ago. "Computer rooms always look beautiful when they are brand new," Lalor comments. But, in truth, it's not until a few years down the road — when daily wear and tear begins to show the strain — that the quality of construction and flexibility of design begin to show as well.
- Make sure, if the office space is leased, that the lease terms protect MIS. Traditional leases often give the landlord 90 or even 180 days to determine what to do with office space after a fire. No company can be without its computer facilities for that long, and few firms can afford to use third-party "hot backup" services for that length of time. MIS needs the flexibility to find other space right away.

Also, make sure the landlord guarantees the structural integrity of the computer room for the life of the lease, provides 24-hour-a-day, seven-days-a-week access to the computer room and will not run pipes of any kind through the room.

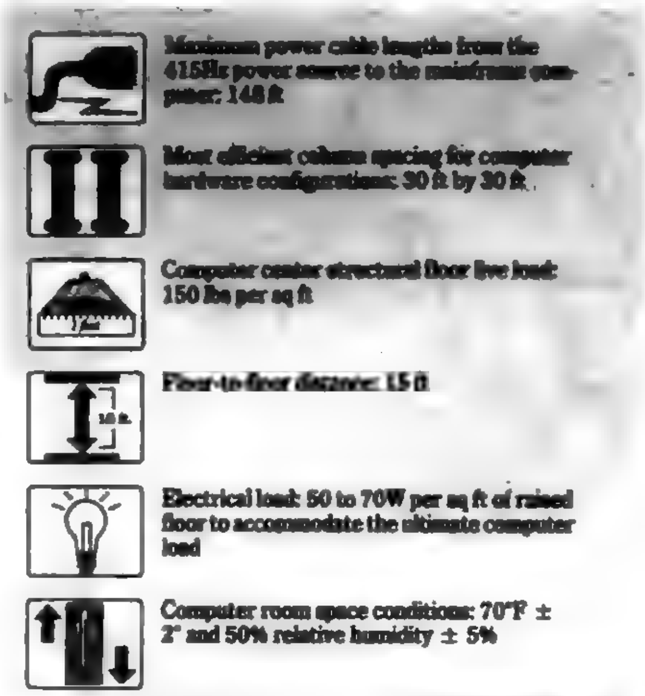
- Ensure nothing computer-related is grounded to the structural steel of the building. It may be the simplest and cheapest way to go when building a data center, but it is also the most hazardous; frequent power interruptions can be expected.
- Make sure drains have check valves or indirect connections. This assures that water will not back up into the computer room.
- Go to each computer vendor for assistance and systems-assurance checks before you put out architectural, engineering and construction bids. Double-check with the vendor for computer-room requirements by showing the vendor the actual room specifications before it bids.

> A DATA CENTER design checklist should include a description of the work load going in and out of the computer room, cabling schematics; heating, cooling, water and security requirements.

Lalor says the more comprehensive and detailed these reports are, the better.

Moreover, the reports have an added benefit unrelated to the architectural or engineering concerns of building a new data center: Senior management, particularly those controlling the purse strings, will have a better idea of what's at stake and what's involved when building a new data center, how much it will really cost them and why. "If you can present them with all the facts," Lalor notes, "you'll have an easier job."

Typical computer center space requirements



Maximum power cable lengths from the 415Hz power source to the mainframe computer: 148 ft

Most efficient column spacing for computer hardware configurations: 30 ft by 30 ft

Computer center structural floor live load: 150 lbs per sq ft

Floor-to-floor distance: 15 ft

Electrical load: 50 to 70W per sq ft of raised floor to accommodate the ultimate computer load

Computer room space conditions: 70°F ± 2° and 50% relative humidity ± 5%

INFORMATION PROVIDED BY THE KLING-LINDQUIST PARTNERSHIP, INC.
CW CHART: MITCHELL J. HAYES

Size and space

One important ingredient in the plan is the size and space requirements for your new data center. You know you're cramped today and a few more square feet are needed here and there to allow for the IBM 3090 on order or for better access to existing equipment. But what about two, three, five or even 10 years down the road? Do you know how many square feet you will need then?

Determining size and space requirements is probably the single most difficult task in designing a new data center. The only rule of thumb MIS professionals and consultants recommend is that a company first survey its existing needs and equipment and then forecast growth for the next few years.

The length of the forecast depends on the company. Some suggest it should be closely allied with the company's own corporate business plan. Certainly, a historical look back at the growth of a company's computer usage will be helpful, but with computers, the past isn't always a good judge of what may happen

Continued on page 62

No more cut and paste: Using software to design IBM shops

BY JEAN BOZMAN

For years, data processing professionals designing a data center or planning major change in the layout of their IBM computer room had to contend with stick-on plastic cutouts called templates.

The templates, offered by IBM, were intended to allow MIS managers to move around computers and peripherals on an engineering drawing. The problem was, the cutouts often fell off at inconvenient times. "You try to haul those templates to a room upstairs for a management review," one Los Angeles DP executive says, "and you hope it doesn't fall apart. You have to play cut-and-paste with those things."

In another corner of the city, Steven Graves had a better idea. A field service engineer with Quadtronix, Inc., Graves often thought about computerizing the process of planning IBM computer rooms.

In 1985, Graves began what would eventually become 4,000 hours of programming work to write Easimap — Equipment and System Installation Management and Planning. Available since September 1986, the $1,000 product is being sold by Graves's company, 21st Century Innovations, Inc. in Mission Viejo, Calif.

Stores IBM templates

Run in conjunction with Autodesk, Inc.'s Autocad software on an IBM Personal Computer, Easimap has stored within it the content and form of IBM's templates. It has been designed in such detail that users can elect to view drawings of the hardware systems, the underlying electrical connections or a three-dimensional color representation of the equipment.

Easimap is part of Autodesk's third-party applications support program and is priced at $2,850 for IBM PC AT-class machines.

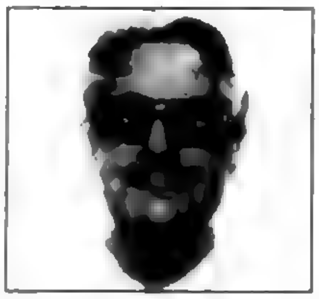
"I wrote 20 layers of information for each IBM product," Graves says. "You can turn all the layers off if you want to. But when you are designing a computer facility, you leave the layers on to check if there is enough space between units or if the doors on one cabinet will hit another when opened." The electronic drawings are scaled ⅛ inch to the foot, rather than the ¼-inch scale used in the IBM templates, Graves says.

Details, details

Easimap, Graves claims, is a collection of thousands of details about IBM hardware. There are eight floppy disks in the program, all of which are needed to load data onto a hard disk of 2M bytes or more.

"Easimap is a three-dimensional symbol library that you use with Autocad to draw your computer room," Graves explains. The level of detail is so great, he says, that it took him a month to program the multitude of hardware specifications of the top-of-the-line IBM 3090 mainframe.

The minutiae include the essential information on the IBM equipment's power and cooling requirements. This means that when users complete their drawings, they can then call up a report on how much electrical capacity the current plan would require.



> "EASIMAP is a three-dimensional symbol library that you use with Autocad to draw your computer room."
>
> STEVEN GRAVES
> 21st CENTURY
> INNOVATIONS, INC.

Early users, among them oil companies, banks and airlines in the Los Angeles area, are pleased with their new-found ability to make design changes electronically before committing to plot out new drawings of the computer room.

"It's a more convenient way to lay out the computer room," says John Hershner, manager of facilities and administration at CCS Automation Systems, a subsidiary of Texas Air Corp. CCS, an independent airline reservations operation, is in the middle of a move to a renovated bank building and has been using Easimap since early spring.

"We are able to make additions and deletions easily," Hershner says, "and we are able to view different layouts to compare them."

At Arco's Petroleum Products Division, Easimap has been in use for about a year. Senior technical analyst Mel Shutt says he feels the program will have a continuing use at the facility.

"In most data centers, nothing stays stagnant," he says. "It's costly to change things on detailed engineering drawings. Now we can view the computers themselves as well as the floor plan — and see everything down to the smoke detectors, the water pipes and the wiring." •

Bozman is *Computerworld*'s Chicago-based Midwest correspondent.

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PC Magazine, April 28, 1987

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Fixed Disk Drive	40 MB	40 MB	40 MB
Diskette Drive	5.25 inch (360 KB, 1.2 MB)	3.5 inch (1.44 MB)	5.25 inch (360 KB, 1.2 MB)
Expansion Slots	7	7	7
Operating System	MS-DOS*	PC-DOS	MS-DOS
Future Operating System	MS-OS/2*	OS/2™*	?
List Price	$3,495	$5,295¹	$4,999²

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¹Price does not include DOS

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CW 7/13/87

You Guessed It. AST

What can go wrong? A checklist to help you anticipate construction problems

BY GEORGE HARRAR

A data center is the most difficult — and most expensive — building the average company will ever construct.

The general contractor, fresh from putting up a speculative office high-rise or condominium complex, just will not know the complexities of the computer environment well enough to construct a bug-free building.

So how can a supervising MIS manager avoid total catastrophe? The best way is to know what can go wrong and develop a system to test for all problems, large and small.

Chip Ralston designs data centers as managing principal for computer projects at The Kling-Lindquist Partnership, Inc., an engineering and design firm in Philadelphia.

Kling-Lindquist has built computing facilities for such organizations as Merrill Lynch & Co., Morgan Guaranty Bank, United Airlines and the International Monetary Fund, as well as a $200 million data center in New York City for Shearson Lehman Brothers, Inc.

Ralston says a simple, overlooked problem can delay the construction and opening of a finished building or perhaps go undetected until an emergency arises.

The following suggestions from Ralston and other Kling-Lindquist experts could be key to the successful construction of your data center:

> "A 100,000-sq-ft data center with a 50,000-sq-ft computer room would take about a year to design — that doesn't count any of the client's prethinking. . . . We would recommend the client run a fast-track project."
>
> CHIP RALSTON
> THE KLING-LINDQUIST
> PARTNERSHIP, INC.

Start to build before the design is completed.

Because of long lead times in ordering major equipment, it's possible for construction to begin before the design is actually completed.

"A 100,000-sq-ft data center with a 50,000-sq-ft computer room would take about a year to design — that doesn't count any of the client's prethinking before he comes to us. We would recommend the client run a fast-track project rather than waiting until our design is 100% complete," Ralston says.

Halfway into the data center's design phase, the architects and engineer will have developed enough documentation to start the excavation process and the foundation work, as well as order some of the long lead-time equipment, such as the uninterruptible power supply, switching gear and heavy electrical/mechanical equipment. These items can take eight to 10 months to arrive on-site.

Test equipment at the factory.

When ordering equipment, it is critical that engineering and fabrication tests are conducted at the factory. These tests can consume a month in the procurement cycle.

Ralston says that of equipment shipped to a site, "In one or two out of 10 major pieces, there are mistakes generated at the factory."

Mistakes caught on-site can delay construction; mistakes that go unnoticed may not be uncovered until after the building is occupied.

Ralston recalls that one company spent four months trying to pin down a problem. "In an office building," he says, "you can go for two years and live with hot spots; you can live with the chiller conked out. People will either move to a cooler spot or leave for the day while it gets fixed. When these computers go down, you can lose $2 million to $4 million in revenue in two or three hours."

Evaluate equipment safety devices.

Once vendors are chosen, evaluate their equipments' safety devices to ensure there is not something mechanical in an individual product that might shut down the entire system.

Ralston says this problem is common and points to Shearson Lehman as an example.

"When the generators came on, the chillers went off-line and came back on after two minutes. If you brought all of those chillers on at one time — they are 1,500-ton units — you would get such a surge of electricity that [it] would stall the generators. So we had to bring the chillers on, first one and then another — a soft start. We started the first one fine, we started the second one fine, but the third, fourth and fifth wouldn't start," he explains.

Ralston found in the air conditioner manufacturer's starting manual a mechanical safety device that allowed only a minute and a half for start-up.

Finally, the manufacturer had to be called in to redesign the safety.

Develop a stable operations team.

No architectural, structural, mechanical or electrical system should be put into the building without first developing a stable operational unit — the facilities staff — that can support the level of technology being installed.

At Shearson Lehman, the facilities staff practices emergency operations monthly. Such frequent emergency-mode training is all too unusual, according to Ralston.

Consider performance and energy requirements.

Because the computer center requires performance and energy capabilities five times greater than the rest of the building, place it near the primary utility center.

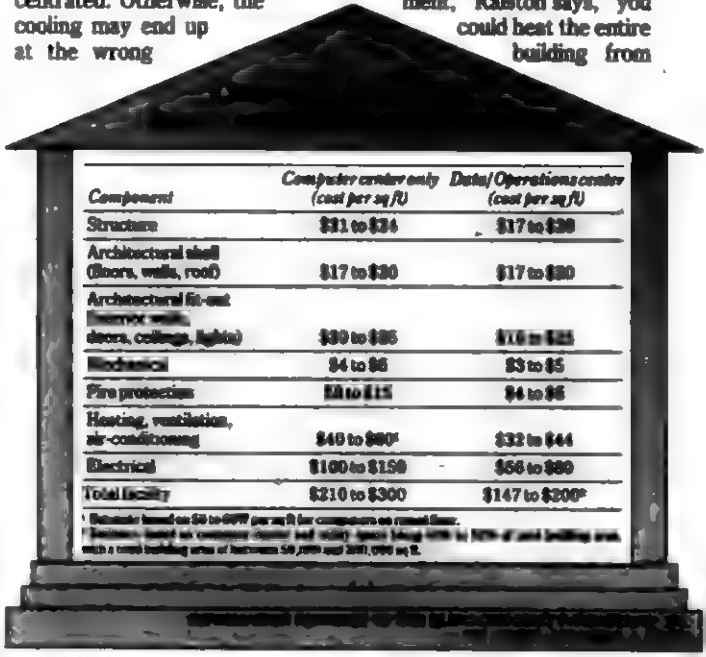
Set up separate electrical sources.

Rather than relying on a single electrical source, seek out two electrical services from two utility stations or from one station with separate busses. These services should enter the building at two different points.

Recognise wattage needs.

Average computer-room watt densities range from 30W to 60W per square foot, according to Ralston. However, the electrical load for any section of the room may reach three or four times the average watt density.

Individual cooling units must be able to be moved within the facility to where the load is concentrated. Otherwise, the cooling may end up at the wrong end of the floor.



Component	Computer center only (cost per sq ft)	Data/Operations center (cost per sq ft)
Structure	$21 to $24	$17 to $20
Architectural shell (floors, walls, roof)	$17 to $20	$17 to $20
Architectural fit-out (interior walls, doors, ceilings, lights)	$30 to $35	$16 to $25
Mechanical	$4 to $6	$3 to $5
Fire protection	$8 to $15	$4 to $6
Heating, ventilation, air-conditioning	$40 to $60[1]	$32 to $44
Electrical	$100 to $150	$56 to $80
Total facility	$210 to $300	$147 to $200[2]

[1] Estimate based on 30 to 60W per sq ft for computers on raised floor.

[2] [illegible] with a total building area of between 50,000 and 200,000 sq ft.

Scrutinise Halon use in emergency detection systems.

Halon is heavier than air, so when it dumps, it comes out at 350 pounds per square inch, equivalent to a 200-mph wind, Ralston estimates. Such a force can blow out the ceiling tiles, so they need to be clipped in.

In addition, Halon will bleed through cracks, door openings and other holes unless the facility is perfectly sealed.

Ralston admits that using Halon in an actual emergency will rarely occur, but the use of Halon due to erroneous conditions — human error — can be expected at least once a year.

There should be a high degree of error-checking in the fire-detection system so that the first sensing of an event can be confirmed prior to any response by either the system or people.

A computer operator covering the facility on a Sunday night, for instance, should be able to respond to alarms by going to the indicated location of the emergency, lifting the floor tile and ascertaining whether there is a problem.

A Halon discharge caused by a real or imagined emergency could cost Shearson Lehman's data center more than $100,000.

Remember backup water supplies — they are often overlooked.

Determining the level of backup for water requires analyzing the municipal support system as well as intra-company resources and outside options.

"Shearson Lehman has used its backup water supply twice," Ralston says. "That's not uncommon."

Use heat byproducts.

Heat produced as a byproduct of cooling the computer room can be put to functional use.

"If a building has 10% of its space as computer environment," Ralston says, "you could heat the entire building from that computer space. Projections for Shearson say the building can be heated 98% of the time by their internal heat."

The byproduct is not high-grade heat, though, and won't effectively warm open areas such as loading docks or vestibules.

Consider filtration systems.

Special filtration setups can handle paper and ink dust and paper mites that accumulate in the ceilings in heavy printing environments.

Clean under the raised floor.

About every six months, the space under the floor should be professionally cleaned. Such cleaning is even more crucial after the building's construction — before activating detection systems. Dust, Ralston says, will cause false alarms for months after construction.

Brave the rigors of on-line testing.

On-line testing is a good gauge not only of a data center's systems integrity but of an MIS director's mettle.

As Ralston says, "With most of our clients, if we say, 'We want you to test your generator,' the facilities man will say, 'Oh no, Sunday morning I'll shut my computers down and you can test them.' Shearson will actually do it on-line. Very few clients will do that." •

Harrar is *Computerworld's* features director.

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ortant than computers.

Blueprint

FROM PAGE 56

in the future.

TIE/Communications' Lansing says MIS should consult all the resources at hand to help determine size and space requirements for a new data center. "Then lick your finger and stick it up in the air," he advises. "It's still pretty much educated guesswork."

Square foot

In the computer industry, more is less when it comes to disk storage and processing capacity, but that hasn't necessarily translated into more in less square footage.

Lansing says miniaturization hasn't actually reduced the square footage needs for any data center project he's been involved with; all it has done, he says, "is allow us to put more in the same space."

Although it is unusual, downsizing the computer room is possible, and improvements or advances in technology can help.

Richard Kolm, director of MIS at New York's WNET, a public broadcasting system television station, says that IBM's new disk-storage technology, which allows rack-mounted drives to be stored on top of each other, has enabled his new data center to be 30% smaller and, at the same time, provide more processing power and disk storage.

> "A WET computer is better than no computer at all. You can always dry it out."
>
> RICHARD KOLM
> WNET

Kolm says WNET felt it had no choice but to downsize the computer room in order to keep the data center close to its user base.

Otherwise, the station's only alternative would have been to move the data center out of its expensive Manhattan facilities to New Jersey, where office space costs half or less of what it does in New York. However, the telecommunications costs between the data center and the user base that would be consuming those resources "would have eaten up the difference," Kolm maintains.

Don't get landlocked

Even with miniaturization and other technological advances, some companies are growing so rapidly that "better bang per square foot" won't hold back the computer room's walls for very long.

A key point to remember is to always build with the idea that you will eventually need to expand the data center. Make sure the surrounding areas are departments that are not as difficult or as costly to move as the data center. Often, these might be offices for systems programmers or similar employees.

Specifically, St. John's Lalor advises MIS to make sure that at least one data center wall can be expanded.

He says many firms, particularly those that are moving toward interactive or on-line transaction processing environments, have placed the corporate data entry function on one side of the data center.

The thinking is that the corporate data entry function is a dated area that "will go away by itself," thereby leaving a ready-made space for expansion that will cause little, if any, pain to corporate personnel and facilities and will minimize the costs of the data center's expansion as well.

Other facilities commonly placed alongside data centers today include conference rooms.

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libraries and corporate archives.

The moral of the story is: Don't get landlocked, or else you may find yourself building another new data center much sooner than you expected.

Design requirements

Local building codes will, for the most part, determine structural requirements for the walls around the computer room as well as other areas. Most of these codes are based on the National Fire Protection Association's (NFPA) Standard Document 75, which outlines information on construction standards for rooms that will house computers and other DP equipment.

Most local building codes today comply with the NFPA's Standard Document 75, according to David Doyle, a senior architect for Digital Equipment Corp.'s Decsite Services. Decsite, headquartered at the firm's Westboro, Mass., facility, provides users with data center consulting, planning, design and construction services.

Doyle adds that many localities have begun using an updated version of the document adopted by the NFPA in 1986. Both versions call for a one-hour fire-rated wall around the computer room and a two-hour fire-rated wall around tape storage facilities.

You might find other design requirements will be driven by your company's insurers. For example, WNET's Kolm says his previous employer installed a Halon gas fire-protection system in a new data center — not because the building codes required it, but because the insurance company demanded it. Without the Halon system, insurance rates were sure to go up. With it, they went down.

Wiring needs

Wiring has become a two-pronged issue. First, large computers require a lot of cables, and that means a raised floor. Of course, raised floors also serve as an air plenum to keep cool air circulating around the computer.

St. John's Lalor, however, notes that raised floors were never originally designed into computer rooms for any of these reasons. Rather, raised floors were conceived so that buildings could support the additional weight of a computer and its peripherals, which often exceeded the building's pounds-per-square-foot specifications.

For whatever reason, raised floors are here to stay. In fact, more than one data center consultant and user say raised floors are going up, from the current norm of 12 inches to 18 or even 24 inches, in some cases.

Com-Site's Rice says many companies are raising the height of their floors because of the larger channel cables and the increasing number of cables attached to many large mainframe computers today that require it. He also notes that many companies are elevating raised floors so that when the time comes to replace those cables, they will simply disconnect the old ones and lay the new ones on top.

> "THE primary determining factor for DP center placement is the loading dock and freight elevator."
>
> TOM RICE
> COM-SITE INTERNATIONAL, INC.

The second issue in wiring is the impact of general office wiring on the data center design — that is, which local-area network (LAN) medium goes throughout an office building or facility.

TIE/Communications' Lansing says that how network devices interact with the main DP center, what kind of wiring they

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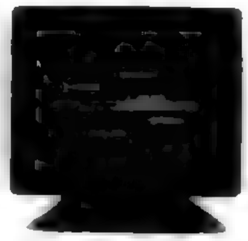

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use, whether it is all digital or a mix and other factors about LANs will affect the design of the data center. And that, he adds, can be a problem, since so many companies are confused as to which way to go when wiring their buildings with LANs. "It's up to MIS to make that decision for them," he advises.

The following is a list of fire protection systems and the pros and cons of each.

Water and Halon gas. Users and consultants say the driving force behind wider use of automatic Halon gas systems is the insurance industry. Halon gas, however, should not be viewed as an end-all in fire protection. Sprinklers are still required. "You must protect human life as well," notes Sally Gonzalez, director of information systems at Hogan & Hartson. This law firm, one of Washington, D.C.'s largest, recently relocated its office. Gonzalez recommends Halon as the first line of defense, but insists that a computer room should also have an adequate sprinkler system as "a last resort."

WNET's Kolm points out that a wet computer is better than no computer at all. "You can always dry it out," he says.

Power and cooling. Once again, there is a complex web of decisions to be made, for not all of today's cooling systems are air-based. IBM's newest mainframe, the 3090, is water-cooled, so both air- and water-cooling systems may be required for your new data center, depending on the equipment used.

In general, though, MIS should survey other users in the locality where the new data center is to be built, talk to current customers in the local power grid about their experiences and even consult the local power company or public utility for available data. All of these resources have such information readily available, so use it.

MIS will also have to determine how to "clean" local power for glitches. Because a computer needs a constant flow of current or else it will crash, MIS has to add equipment to alter problems with power if it is not up to expected standards. In addition, you will have to determine whether your company will pay for a generator or full-scale uninterruptible power supply system to back up the computer in the event of a power failure. This will be determined by overall corporate business objectives, the need for continuous processing (how critical is it that the company's data processing resources stay up all the time?) and budget for data center construction.

DP center placement

When placing a data center within a new facility, keep it away from the cafeteria, smoking areas and any other locations that might pose environmental hazards of any kind. Try to place the data center close to a freight elevator or, if possible, a loading dock, so that computers and supplies can easily be moved in and out.

> "IN growing multinational firms, MIS professionals should expect one construction project . . . at least once a year."
>
> NORM LANSING
> TIE/COMMUNICATIONS, INC.

In addition, keep data centers away from outside walls if at all possible, although this type of location may be unavoidable in high-rise office buildings.

The primary determining factor for DP center placement, according to Com-Site's Rice, is

Continued on page 71

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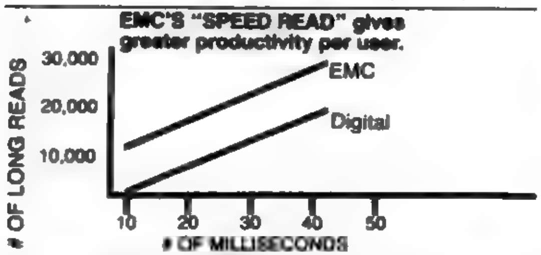

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Cable systems: Ties that bind

BY JAMES Y. BRYCE

The cable system you install will become the most permanent part of your new data center. Computers, software and people will come and go, but cables will always be with you.

The costs and disruptions of this kind of installation can represent a significant expense. In addition, larger cable systems require careful documentation and design. Add to these factors the expense of full-time administration and maintenance, and you will see the need for carefully planning these systems from the beginning.

The basic types of cable used in data communications are twisted pair, coaxial and fiber optic.

Twisted pair. The common twisted-pair telephone wire found within most existing buildings is difficult to characterize because of the variety and quality of twisted-pair installations. Therefore, its usefulness as a data-cabling option for a new data center design can be debated.

One reason is because this often old and discarded wire is unshielded, which means that it is susceptible to electromagnetic interference. In addition, the wire may go through a number of connecting points, or punch-down blocks, that can handle the low frequencies of telephones quite well but present a poor connection to high data-rate signals.

Because of variations in common twisted-pair wire quality, you might expect to pass data at 19.2K bit/sec. as a rule of thumb. This is not a fast transmission speed, considering that the advent of the microcomputer sounded the death knell of terminal-to-host communications. Every device tied to your cable is now expected to be a computer capable of pumping several hundred kilobits into the line — and several tens, and then hundreds, of megabits in the near future. If that line can only take 19.2K bit/sec., you will be in trouble.

Couple this with the fact that many of your cables must handle not one but a large number of machines in a bus or ring topology, then add all the data rates and probabilities of access of the machines together, and you arrive at an idea of the total capacity required of the cable system. This is the hundreds-of-megabits range.

High-quality twisted-pair cables, such as those specified for the IBM Cabling System, are also available. Data rates on the IBM Token-Ring network are currently 4M bit/sec. A move to 16M bit/sec. is expected soon. As long as the twisted pair is limited to runs to individual machines and the overall number of machines is limited, this cabling scheme should work for the short term.

What might give managers reason to hesitate in their decision concerning the use of high-quality twisted pair is the possibility of machines and fiber networks in the near future that could send ultrafast peer-to-peer data transmission.

Coaxial and fiber optics. Only two types of cable can carry signals in the hundreds-of-megabits-per-second range across sizable distances such as is required among the floors of a building or across a campus. These are coaxial and fiber-optic cable.

Coaxial may generally be relied on for 300M to 500M bit/sec. transmission. Fiber optics are often good for several thousand megabits. Since IBM has stated its intent to phase out coaxial in the near future, this leaves fiber optic and high-quality twisted pair as the choices for new data centers, with twisted pair being phased out within the next 10 years as knowledge about fiber optics increases and the costs of the associated electronics decrease.

But what about today?

First, plan for your future cable system to have a fiber-optic cable capable of transmission in excess of 100M bit/sec. as its backbone.

Second, become familiar with the IEEE standards for local-area networks (LAN): 802.3 (essentially Ethernet), 802.4 (token bus) and 802.5 (token ring).

If you work in an office environment, 802.3 or 802.5 should be your choice. By avoiding nonstandard systems, you avoid nonstandard cabling. Ethernet was originally designed to run on coaxial cable, and most Ethernet installations do use coaxial cable. However, several companies are offering products to run Ethernet on twisted-pair and fiber-optic cable, so you're safe if you choose the IBM Cabling System and use Ethernet.

If you choose the token ring, you will find it is made to work on the twisted-pair/fiber-optic environment, and you'll be off and running.

If you're involved with a factory environment, Manufacturing Automation Protocol, the standard established by General Motors Corp., and others, dictates using the token bus and the more complex, and expensive, broadband coaxial-cable system. There is a move under way, one especially promoted by Digital Equipment Corp., to use Ethernet in the factory, but the outcome of this option is seriously in doubt.

Currently, either the original or third-party manufacturer offers methods that will connect virtually any computing device to Ethernet. Soon, similar products will appear for the token ring. Since Ethernet can be implemented on either its original coaxial system, fiber optic, high-quality twisted pair or any combination of the three, selection of either the Ethernet coaxial system or IBM-type cabling system will offer maximum flexibility. (IBM-type equipment includes not only the products that follow the IBM specifications but also well-designed variations, such as those designed by AT&T and others that use less expensive equipment like modular plugs.)

Ultimately, you must plan for end-to-end connection with fiber-optic cables. Currently, multimode 62.5-micron cable appears to be the leading contender. If your budget allows, install a pair of such fibers in each workstation site; some vendors offer fiber optic and twisted pair within one cable sheath. Even though you do not place connectors at either end in the initial installation and run only the twisted pair, in the future you can install a connector on a cable with less cost and far less disruption than pulling additional cables.

Consider also putting one or two coaxial cables of the proper type for thin Ethernet and for broadband cable drops alongside your existing cable should you anticipate use of those systems in the near future.

In the long run, the goal is to avoid a situation in which it costs from $500 to $1,500 each time you install or move a workstation because of cable installation. The new LAN designs, either Ethernet or token ring, offer a simplicity and flexibility far beyond that of earlier terminal-to-host systems. They also offer the prospect of meeting future standards such as the ANSI Fiber Distributed Data Interface standard that will provide a 100M bit/sec. token ring. •

IN THE LONG RUN, the goal is to avoid a situation in which it costs from $500 to $1,500 each time you install or move a workstation because of cable installation.

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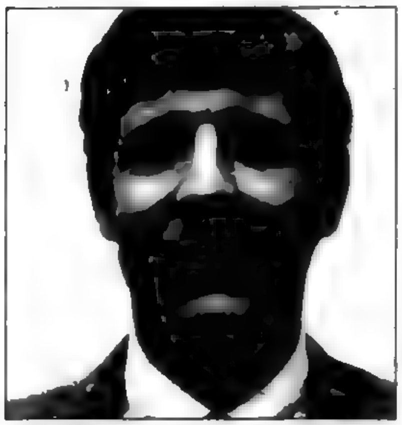
CONTINUED FROM PAGE 66

the loading dock and freight elevator. His firm has worked on more than 1,200 high-technology building sites.

Hogan & Hartson's Gonzalez takes a different perspective. For her, the ideal location for a DP center is dead center — meaning at the center of north, south, east and west or even up and down, if the building is a multistoried corporate facility. In her case, she said she recommended the company do just that but was overruled by senior management. The company placed the data center in one corner of the east tower, a decision that cost the company $250,000 for extra wiring and limited its future technology choices: the firm wanted to install a point-to-point, twisted-pair, token-ring network to tie its general offices into the central data center, but now it can't run a ring through the entire office area as the company is in two separate towers.

Consider also the size of hallways and doors in the center's immediate area. "You don't want to be surprised by doors that aren't high enough or by corners that aren't wide enough for large equipment," TIE/Communications' Lansing says.



McCormack & Co.'s Tim Casey

> "THE IDEAL location for a DP center is dead center — meaning at the center of north, south, east and west or even up and down, if the building is a multistoried corporate facility."
>
> SALLY GONZALEZ
> HOGAN & HARTSON

Consultants' input

According to Quaker Oats' Brzezinski, most MIS managers simply don't have the expertise to handle all the facets of designing and constructing a new corporate data center. He advises that MIS professionals seek a consultant's help early on, as well as the guidance of architects and engineers specializing in data center design and construction.

St. John's Lalor suggests that managers who hire consultants check not just the references of the consultants, but also the references of the architecture and engineering firms that they have hired to assist in the effort. Moreover, he recommends that the individual, personal references of those assigned to the project be checked as well.

Not all managers who have experienced a data center design recommend the use of outside experts. Some say that when you assign a project manager, it is preferable to have someone from the inside — an individual who knows how the company works and knows the personalities and politics involved.

If you choose an insider to handle the project, however, expect to have to relieve that individual of most, if not all, of his regular duties for the duration of the construction project. "Too many decisions have to be made on the spot," Gonzalez says. "You can't reassemble the original design team every time a decision has to be made."

As her center's project chief, Gonzalez says she gave up most of her day-to-day operational responsibilities as the firm's director of information systems and handed them over to a subordinate. "One person has to be designated project manager and relieved of most of the rest of their duties, and someone else has to be brought in or moved over to fill in."

Cost management

The best way to contain costs is to develop a good, comprehensive plan from the outset. Another way is to avoid rushed moves from one data center to the new one. Tim Casey, director of the computer utility at McCormack & Co. in Baltimore, says users can save a great deal of money if they can do a "design bid" rather than a "design build."

With a design bid, the user is able to go out ahead of time and get several bids on a proposed new data center. In this way, the MIS manager can play one construction firm against another and come up with the best price. This, however, requires the luxury of time.

A design build, on the other hand, occurs when the new data center has to be designed and built at practically the same time. "A design build is virtually always going to cost you more," Casey says. "It

Continued on page 74

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Capone remembers, "We experimented with various means of dial-up connections, but they were not convincing."

Robert Capone
Senior Vice President

Robert Northam
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Al Lynch
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"You're looking smarter than ever, JCPenney," is more than advertising, it's how users throughout the company view their MIS department, and the EIS they've created. Dow Jones is a major reason it rates above average

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Other corporations, such as ConAgra and IBM, have followed their lead.

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Two burning issues: Fire control, air-conditioning

BY BECKY BATCHA

The last thing an MIS manager wants to think about when he draws up plans for his shiny new data center is the prospect of it burning down. And perhaps the last thing he is *inclined* to think about is the lowly air-conditioning system.

But neither fire suppression nor environmental control can escape notice for long. If an MIS manager tries to ignore the two issues, data center design firms, insurance underwriters, local fire marshalls and even data processing equipment vendors — through their strict warranty clauses — will hound him until he toes the line. These groups require data center owners to address both concerns early on and in great detail.

Fire-suppression systems. Most experts in data center design and construction agree that, since a fire can bring business operations to a halt, users should buy as much protection as they can possibly afford. In calculating that amount, MIS managers should ponder one vital question, says Ralph Smole, manager of technical research for Total Assets Protection, Inc. (TAP) in Arlington, Texas: "Should the data center go down . . . what is the impact on your business?"

The best fire-suppression scheme a company can buy is one with two lines of defense, according to Jerry Gallagher, senior vice-president in charge of engineering for Com-Site International, Inc. in Beltsville, Md. Gallagher recommends a total-flooding Halon 1301 system and a special type of water sprinkler known as a preaction, dry-pipe system.

- Halon gas. Halon vapor serves as the first line of defense. By interrupting the chemical process that causes objects to burn, Halon — a colorless, odorless, electrically nonconductive halogenated hydrocarbon — extinguishes electronic fires instantly. For DP environments, however, its biggest redeeming quality is that it puts out fires without harming electronic equipment. According to the National Fire Protection Association, computer equipment's power can be kept on straight through a Halon discharge.

Halon cleanup, moreover, is a breeze. To get rid of it, the MIS crew need only ventilate the room. Sites that are extremely sensitive to downtime find this feature especially attractive, Gallagher says. Some municipalities require special fans for Halon removal, but, for the most part, natural room ventilation alone will normally provide enough of an outlet for the gas.

Still, Halon alone cannot offer an absolute defense against fire. Once a Halon system discharges, its effectiveness ends. If the gas cannot extinguish a fire, or if the fire re-ignites after being extinguished, the data center has no protection left.

- Water. The second line of defense, a water-sprinkler system, comes into play at this point. Water is the single best agent for extinguishing fires, Gallagher says. A constant flood will squelch almost any fire before it can spread through a building.

Water will not permanently damage computer equipment or pose any threat of electrocution if the sprinkler system is rigged to shut off computer room power before any water can discharge. Preaction, dry-pipe sprinkler systems provide a double safeguard against water catastrophes. All pipes connected to a computer room's sprinkler system remain bone dry until two independent sensors trigger two separate release mechanisms.

Once water does enter the computer room, an MIS manager can count on a laborious and lengthy cleanup process. Most sites will need at least 24 hours to disassemble their soaked machines, wipe excess moisture and residue off each electronic component, blow-dry all components and put everything back together.

Raymond Dixson, president of Raymond Dixson & Associates, Inc., an engineering consultancy in Mission Viejo, Calif., says he knows of a large defense contractor whose sophisticated surveillance radar system was down for two weeks after an accidental sprinkler discharge.

Because most on-line sites cannot afford even an hour of downtime, the two-pronged system Gallagher recommends allows water to flow only as a last resort — and never by accident.

To gain the protection of a dual fire-suppression system, an MIS manager must agree to commit a lot of money. Halon systems alone cost approximately $10 per square foot of coverage, and preaction sprinkler systems cost an average of $4 per square foot, Gallagher says. Each manager must decide on his own whether $14 per square foot is acceptable or excessive.

If a site cannot afford to install two systems and must choose one instead of the other, an MIS manager will find himself bombarded by the prejudiced arguments of two camps. Because they are concerned with the protection of human life and building structures, local fire marshalls and insurance underwriters tend to

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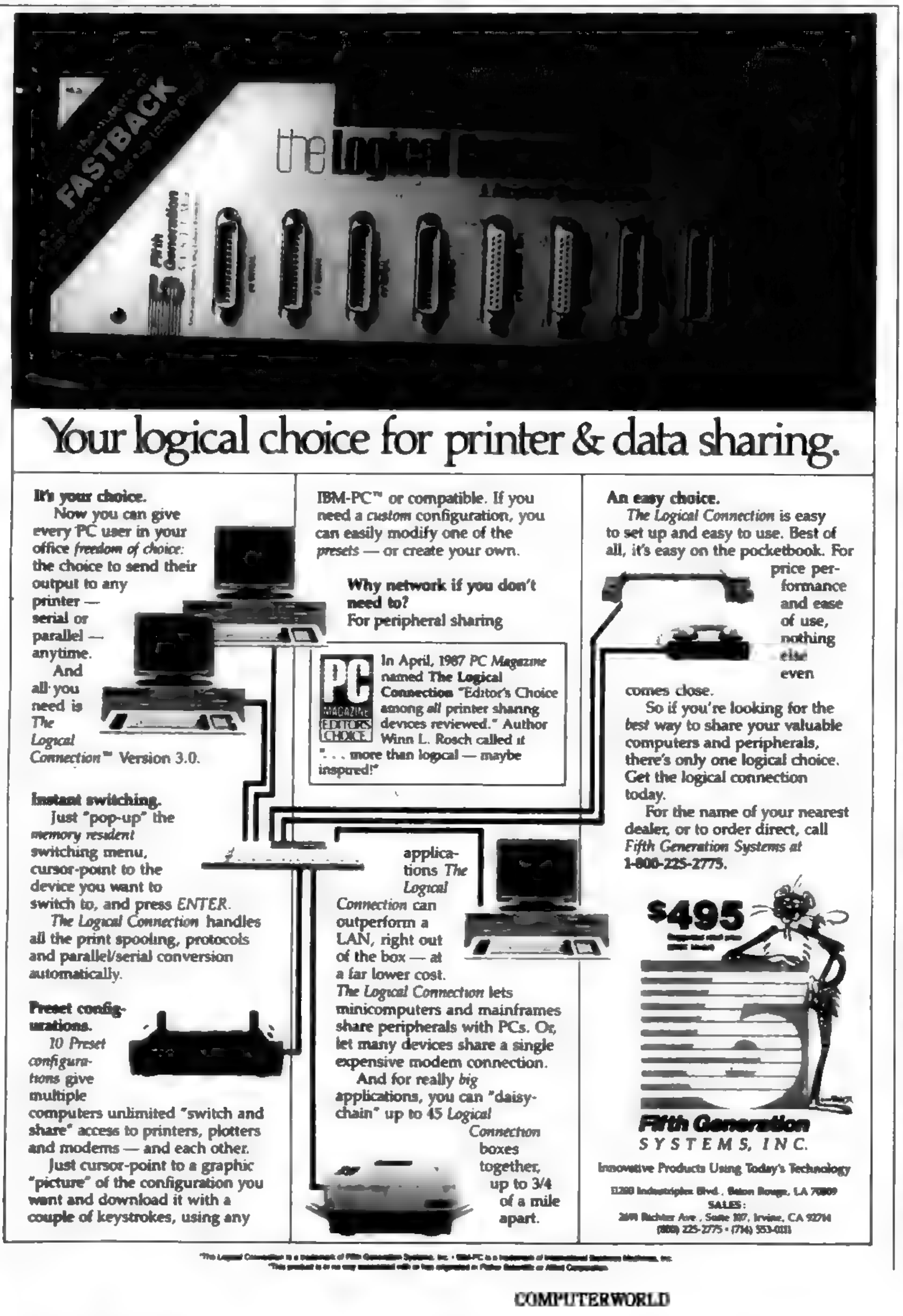
Batcha is a free-lance writer based in Boston.



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prefer sprinkler systems. Specialists in data center design, on the other hand, worry more about damage to computers and loss of business operations and typically recommend Halon.

Absolute budget constraints and downtime considerations should serve as guides to which system makes more sense. Relative costs should also enter into the equation. For a national airline with 300 terminals on-line to its hosts, $50,000 for a Halon system is a meager investment for the peace of mind it offers, TAP's Smole says.

For companies that choose sprinkler systems instead of Halon, expense is not always the decisive factor. Thanks to the availability of dry-pipe setups and sophisticated monitors that allow for localized reactions to fire, sprinklers no longer threaten a site with a massive water dump. Given the low probability of a fire originating in a data center and the high likelihood that water will extinguish any fire that does start, these users feel sprinkler systems make more sense than Halon systems, regardless of price.

For many, choice never enters the picture. Insurance providers and fire regulations sometimes mandate that a site install sprinklers. If a manager can only afford one or the other, the local fire code alone can make up his mind for him. "Fire marshalls have a lot of power in this country," Com-Site's Gallagher says.

TAP's Ralph Smole

Air-conditioning systems. The conditions most likely to force a manager's hand in his choice of environmental-control systems are the vendor's warranty and the equipment's extreme vulnerability to even slight fluctuations in heat and humidity.

Every computer equipment manufacturer expects its machines to be maintained in a suitable environment, typically at a temperature of 70° to 75° Fahrenheit and a relative humidity of 50%, according to Tom Cusic, chief mechanical engineer at Com-Site. If a site lets the standards slip, vendors will invalidate the warranty.

The American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc., a leading source of information in this field, says air conditioners that can control conditions within plus or minus 1° Fahrenheit and plus or minus 5% relative humidity should keep most computer vendors happy.

Gauging the proper amount of air-conditioning for the computer room is a relatively straightforward operation. First, the user calculates the total amount of heat in BTUs that will be radiated by computers, disk drives, printers, people, wires, walls and even the air conditioners.

It is also helpful to calculate the anticipated growth in air-conditioning needs. Peter Fidelman, MIS director for ADT Corp. in Parsippany, N.J., suggests this approach: Look at corporate growth plans for the next three to five years and extrapolate the percentages to the data center. Increase the BTU equation by the proper amount. Add an additional 30% to 40%. "You will always grow faster than you thought," Fidelman says.

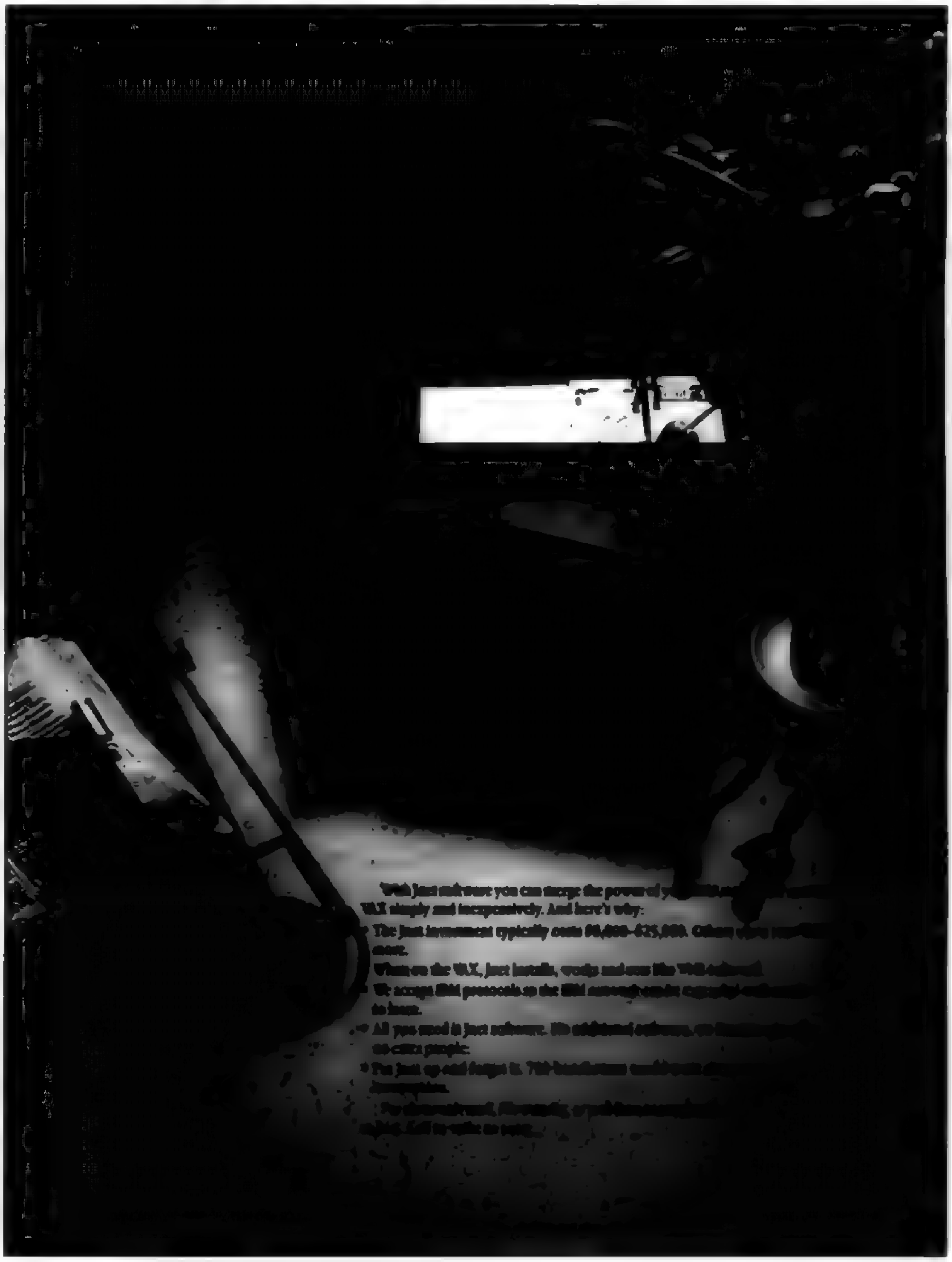
The next step is to convert the total number of BTUs into a number of "tons" — 12,000 BTU/hour — and match that figure with the tonnage of specific air-conditioning units.

To determine a unit's overall reliability, a careful MIS manager will look beyond the machine's mean time between failures. Users' reliability ratings should take into account vendors' repair and customer service organizations, Cusic says. Extra credit should go to a vendor that maintains a large repair depot in the city where the data center is located.

Although a quiet risk, air conditioner failure is one of the most likely disasters to befall a data center — about 200 times more likely than fire. Managers should keep two types of backup on hand:

- Redundant air conditioners. Extra units allow a site to keep operating if mechanical failure puts one machine out of commission. ADT's Fidelman keeps four units on hand but only needs three, making one redundant. The chance of two breaking at once is so slim, he says, that he feels sufficiently protected.
- Backup power supplies. Should the power in the computer room fail and the computer switch to standby power, the air-conditioning units will require backup as well. Dixson says that because modern DP shops require constant uptime, backup power for air-conditioning units is an absolute necessity.

In addition, he says, backup power must be sufficient to run every air conditioner, not just a select few. Because most computers and storage devices are networked and interactive, users cannot target just one machine as their central computing source, Dixson says. They need to run — and cool — all of them. "You don't know which one's got the goodies," he says. ●



Blueprint

CONTINUED FROM PAGE 71

usually happens when someone says, 'You've got to move to a new data center in three months.' "

McCormack, a $1 billion spice and diversified products firm, is planning a move to a new corporate headquarters in about a year, which is plenty of time for a design bid, according to Casey.

This approach already has sliced $30,000 to $35,000 off the design cost of the new data center by allowing time for competition in design bidding, according to Casey, who says he expects even bigger savings when the construction bids go out.

WNET's Kolm points out that users can also significantly save money by digging out the vendors' environmental requirements for accuracy. He recounts waging a battle with IBM over the air-conditioning requirements for his System/38 minicomputer. He says that IBM's stated cooling requirements would have required him to install a second air-conditioning unit.

Upon inspection, however, he determined — and finally convinced IBM — that the firm's cooling specifications were based on servicing a model that was no longer offered and that his site did not use. That model had a disk-storage unit that generated excess heat, and without that unit, cooling requirements and costs were more than halved. •

St. John Consulting's Lalor

Protection: Water rules the waves

Conventional wisdom says that if an MIS manager can afford Halon fire protection, he should by all means buy it. But, if the fire-suppression systems chosen for two new data centers are any indication, conventional wisdom may be due for some renovation.

In ADT Corp.'s 4-month-old data center in Parsippany, N.J., and Putnam Companies' 7-month-old data center in Quincy, Mass., water sprinkler systems won out over Halon systems hands down..

Peter Fidelman, MIS director at ADT, says he wanted the most reliable protection he could buy. He knew water was a more effective agent than Halon for putting out fires, and he was not overly concerned with the possibility that a water dump might ruin his computer systems.

"The danger of fire destroying equipment is much, much greater than the danger of water destroying equipment," he says. Once the electricity in the computer room shuts down, about the worst thing water can do is wet the machines' components, and components are easily dried.

Moreover, the preaction, dry-pipe sprinkler system ADT installed in its data center features so many safeguards against a massive water dump, Fidelman says, that the likelihood of water ever coming in contact with the firm's computers is very small.

Shree Navkal, senior vice-president and MIS director at Putnam, echoes Fidelman's sentiments.

Through the use of sophisticated monitoring systems that can pinpoint a fire's location, Navkal says, Putnam's MIS staff can respond to localized fires before they spread. Portable Halon extinguishers can easily handle such fires, thereby rendering the firm's dry-pipe sprinkler system unnecessary.

In addition, Navkal says he has never heard of a fire that started inside a data center. With this in mind, he says, protecting the data center from fires that break out elsewhere is at least as important as guarding against computer room fires. Putnam surrounded its new data center with two-hour-rated walls, ceilings and floors.

Water sprinklers do not meet every fire-suppression need at ADT or Putnam. Both firms installed Halon systems in their tape-storage vaults, taking into account the special protection a company's data requires. Neither ADT nor Putnam felt it could afford a minute of inaccessibility to its data, according to Fidelman and Navkal, and a water dump could put tapes out of commission for hours until they dried. "You don't want anything to happen to your tapes," Fidelman says.

BECKY BATCHA

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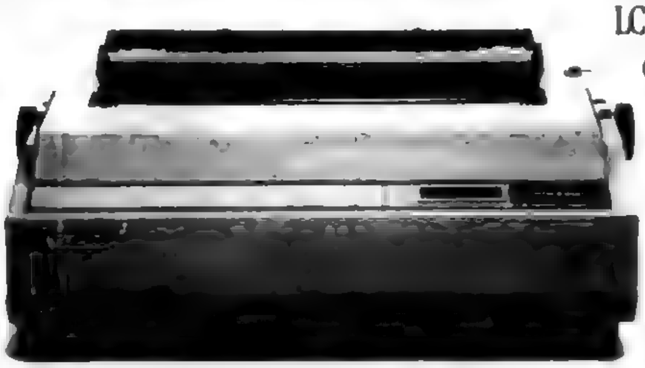

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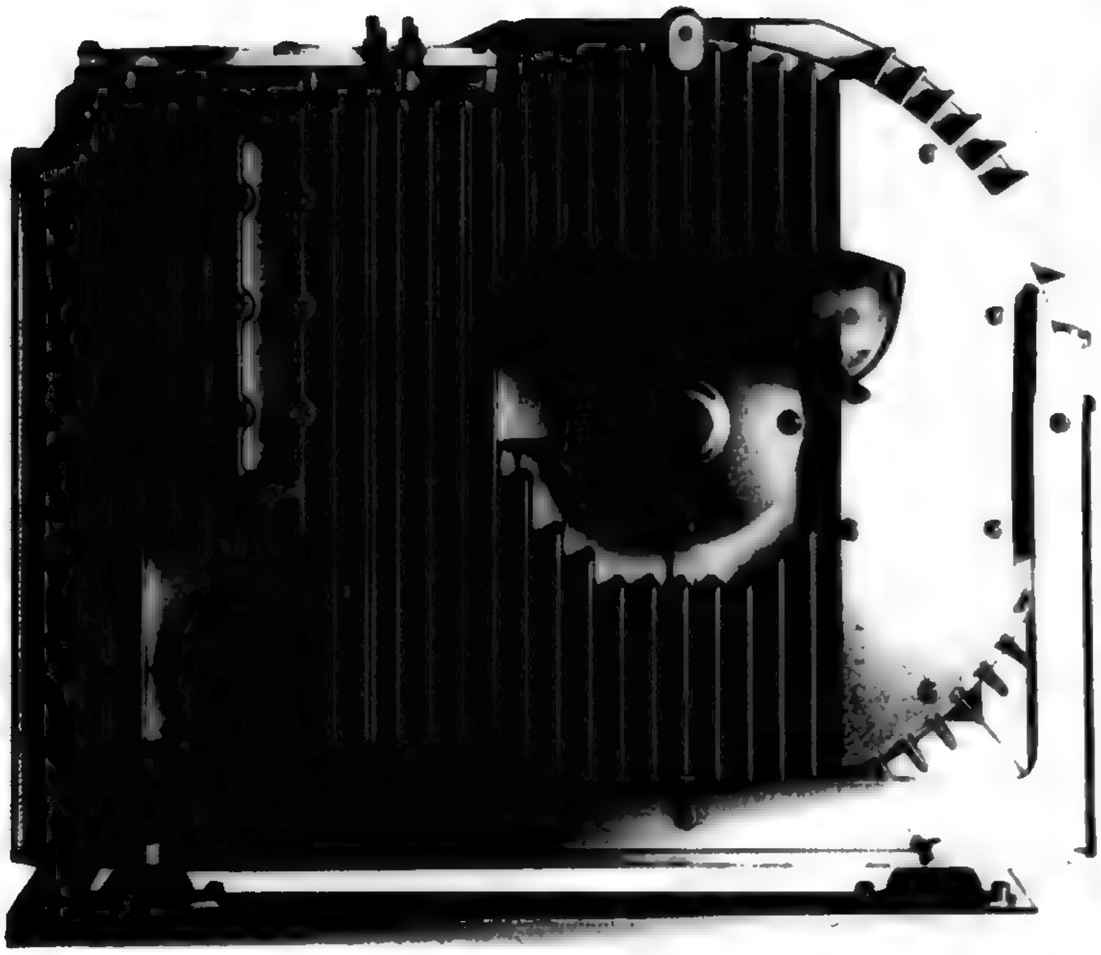

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IN DEPTH

Software maintenance: Thriving on respect

Image building boosts staff's creativity, keeps turnover low

BY WILMA OSBORNE

Software maintenance has long been viewed as unimportant, unchallenging, unrewarding, uncreative work that went unappreciated by users as well as the rest of the DP organization. In the past five years, however, this perception has changed noticeably.

Maintenance is now considered worthy of the efforts of experienced, well-qualified, dedicated professionals; it is no longer solely the responsibility of new or junior staff members. With the development of more multipurpose, complex software systems comes a recognized need for software maintenance programmers who can readily understand the entire system.

Maintenance is no longer a dirty word.

In 1982, the National Bureau of Standards (NBS) Institute for Computer Sciences and Technology (ICST) conducted two surveys of federal and industry software development and maintenance organizations. The first, a survey of eight government organizations and two industry firms, was performed by ICST staff members. The second, a survey of five government organizations and six industry firms, was performed by Science Applications International Corp. as part of an ICST contract effort.

Each of the surveys consisted of in-person interviews with managers and programmers. The surveys attempted to provide a representative sampling from the spectrum of software maintenance activities and associated problems.

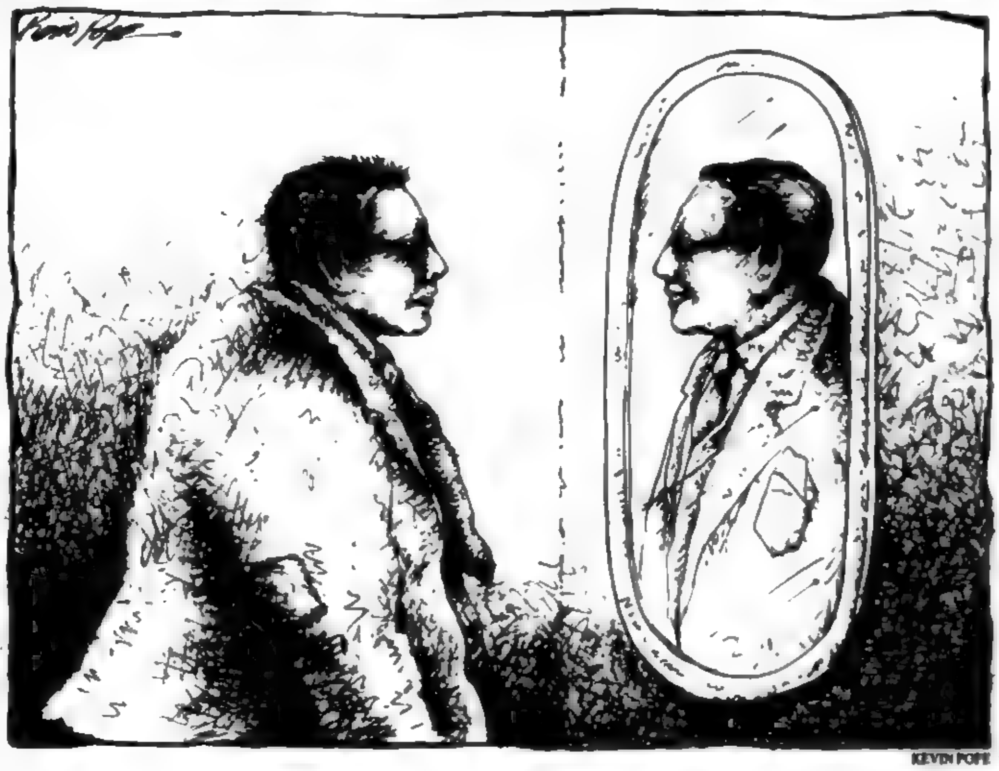
Recently, several of the participants were contacted again to determine whether maintenance issues and problems have changed significantly in the past five years; their comments are interspersed throughout.

Key to delivery

Traditionally, management rewarded software maintenance employees less generously than employees performing development. It was generally thought that systems analysts, designers and developers were responsible for the most difficult and challenging tasks and therefore must be more capable. While this attitude is still common, management is becoming increasingly aware of the importance of software maintenance to an organization's successful operation.

The maintenance programmer is the key to successful delivery of the product promised by management and desired by users. Indeed, maintenance programmers are the most important members of the application software staff. Often, they are responsible for large amounts of code, much of which was developed and previously maintained by someone else. This code is generally old, unstructured and often patched and inadequately documented. The potential for errors, delays and unhappy users is considerable.

Management has begun to acknowledge the importance of maintenance in terms of both the position's value and function. The consensus of the participants in the 1982 surveys as well as those reinterviewed recently was that software maintenance has gained more status in their organizations. Ephlyn Brooks, deputy director of Housing and Urban Development (HUD), notes that 55% to 65% of software costs for HUD this year went to maintenance, a percentage that has remained fairly



KEVIN POPE

Osborne is software maintenance project leader for the Software Engineering Group of the National Bureau of Standards Institute for Computer Sciences and Technology in Gaithersburg, Md.

- **Software maintainer key to development**
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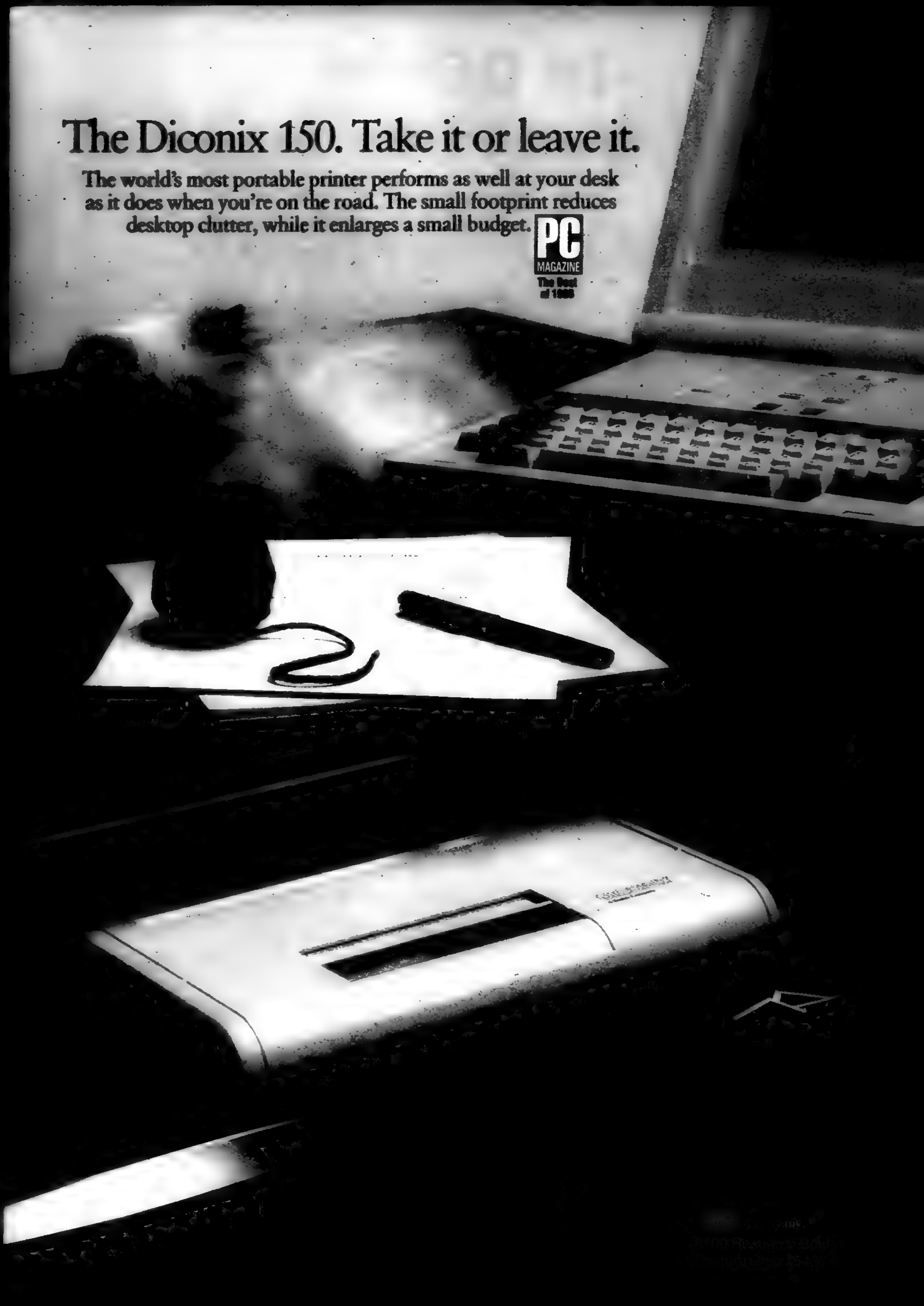

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constant during the past few years. Most change requests are generated by users and can be categorized as adaptive changes or enhancements. She adds, however, that there have been improvements in maintenance quality.

Arnold Levin, chief of the systems software division at the U.S. Bureau of the Census, says that software maintenance at the bureau has improved as a result of placing "emphasis on simplicity rather than efficiency. The software changes must work well, and the code must be easy to understand." Levin adds that these two criteria are far more important than developing code that runs faster.

Perks and classes

In reaction to the changing status of maintenance, managers are taking action in the form of image building and management initiatives. DP managers are increasingly applying the same criteria to maintenance programmers that are applied to software and systems designers or other highly sought-after professional positions. If an individual is productive, consistently performs well, has a good attitude and displays initiative, it should not matter whether the project is development or maintenance.

> WHILE some organizations attempt to improve the morale and image of maintenance simply by renaming the maintenance function, this is a superficial approach.

Survey respondents indicated that their organizations are placing their more highly skilled personnel in maintenance positions. Some organizations now consider maintenance to be more demanding than development and require their maintenance programmers to have worked within development before assigning them to maintenance tasks.

While some organizations attempt to improve the morale and image of maintenance simply by renaming the maintenance function, this is a superficial approach. It does not alter maintenance programmmers' perception of the function or improve management support.

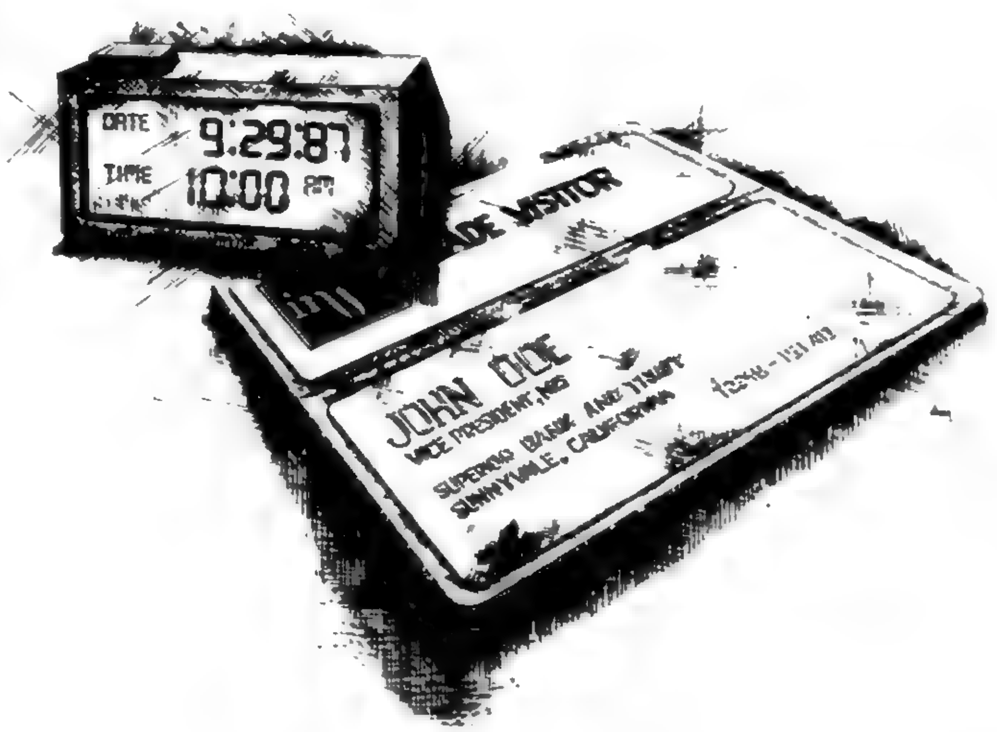
Other organizations are taking a more positive approach by acknowledging the importance and value of good maintenance with career opportunities, recognition and compensation. In the surveys, a number of managers indicate that praise and recognition are often as important as salary and challenging assignments in retaining good analysts and programmers.

Managers and programmers agree that work assignments need to offer growth potential. Continuing education is considered to be a requirement at all levels to ensure that not only maintenance employees but users, managers and operators thoroughly understand software maintenance. Training should include programming languages, standards and guidelines, operating systems and utilities.

According to the surveys, career paths for maintenance programmers are much more visible. Managers are now recognizing the correlation between the complexity of the maintenance task and that of development. Promotions are also now being based on performance, as are salaries; salaries at some agencies are as high as or higher than those of development staffs.

Jim Lowrie, director of application systems at the U.S. Bureau of Public Debt, says that within his agency more managers are now recognizing the importance of the software maintenance activity. In addition, turnover of maintenance programmers is no higher than that of any other professional staff. He attributes this to the fact that maintenance programmers and developers work on many of the same projects and are assigned the same types of tasks.

Lowrie points out that the effort currently devoted to software maintenance at his agency is substantially less than it was in 1983. He attributes this to a freeze on maintenance work resulting from the installation



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of a new system.

What is heard more and more by DP managers discussing software maintenance is that the following points cannot be overemphasized:

- Maintenance is as important as development and is just as difficult and challenging.
- Maintenance programmers should be highly qualified, competent, dedicated professionals. The staff should include both senior and junior personnel. Do not shortchange maintenance, and do not isolate the maintenance staff.
- Maintenance should not be used as a training ground where junior staff members are left to sink or swim.
- Staff members should be rotated so they are assigned to both maintenance and development. It takes a good developer to be a good maintenance programmer and vice versa.
- Rotate assignments as well. Do not permit a system or a major part of a system to become someone's private domain.
- Good maintenance performance and good development performance should be rewarded equally.
- The staff should be well trained in order to keep performance at an optimum level and help minimize morale problems.

Staffing for maintenance

Selecting the proper staff for a software maintenance project is as important as the techniques and approaches employed. Managers debate as to whether an organization should keep separate staffs for maintenance and development. Many managers surveyed indicate separate staffs can improve the effectiveness of both functions. However, the realities of organization structure, staff ceilings and budget considerations often preclude it.

According to the surveys, one trend within the federal government is to use contract workers as maintenance programmers, with in-house personnel being used in nontechnical, management-oriented positions.

HUD's Brooks says that the DP staff at HUD has changed little in the last three years. Currently, the in-house staff consists of senior analysts and programmers who serve as contract monitors. Maintenance activities are performed primarily by contract personnel. Brooks notes that the amount of contract work is likely to increase as a result of federal "recompete procurement" directives. These directives require certain types of services to be opened for bid in the private sector; if a private vendor can provide such services at a competitive cost, the services must be procured from that vendor.

The Census Bureau's Levin says he believes software maintenance can best be performed in-house and should not be contracted out as a discrete function. His reasoning is that it takes too long to bring a contractor up to speed for the environment and the subtleties of the organization.

Listen to the user

Users are often unable to express exactly what they want from an application system. The initial requirements definition and design often lack the detailed specificity that would enable the developer to create a system that accurately performs all of the functions that users need. Thus, an incomplete system is placed into production. These problems can be significantly reduced if users are more involved in the software requirements definition and design.

Excessive, conflicting or vague user requests for changes and enhancements greatly affect the maintenance of an application system. Users are often unaware of how one change can affect both the system and the maintenance work load. The number of user change requests for a specific system is usually in direct proportion to the success of the original system and previous maintenance efforts. A thorough management review of change requests is essential to control the software maintenance level and ensure adequate feedback to users on the cost and consequences of each request.

Even if a system is well specified, well designed, well implemented and meets users' needs, users will always find something else to add. The old adage, "Nothing succeeds like success" holds true for software development and maintenance. If the system works well, users will constantly demand more features. If it does not work well, there will be an equally constant demand for remedial action to make it function properly.

Who drives software change?

Software maintenance is an important function that supports and contributes to the organization's ability to meet its goals. Although many software maintenance problems originate from the attitude that maintenance is there to fix what the software support staff can "never get right," this is no longer the prevalent view. The emphasis is now on the concept that software maintenance is essential to the organization's success and to its expanded capabilities to use existing systems. A number of forces drive the demand for software change. Users are almost never completely satisfied with a system: Either it does not perform up to expectations or, as they gain confidence in the system, they find additional features for the maintenance staff to add. This is a normal evolution in all software systems and must be considered when developing budget requests and resource allocation schedules.

Upper management drives the maintenance process by requesting enhanced features that must be incorporated into existing application systems. Once again, these requests are a normal part of any

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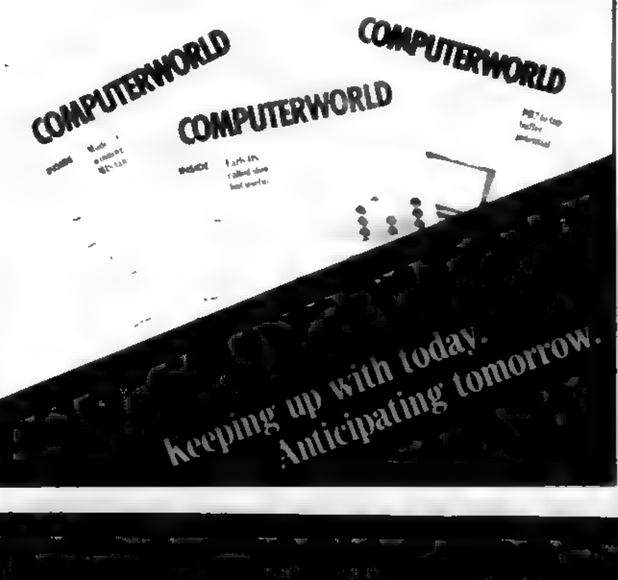

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organization's functioning and must be planned for in the maintenance budget.

Upper management, however, must be kept informed of the overall success of the software maintenance effort and the degree to which maintenance supports and enhances the organization's ability to meet its objectives. In dealing with upper management, one of the software maintenance manager's primary responsibilities is to see that maintenance is viewed in a positive perspective.

Finally, the maintenance staff drives the maintenance process. As a maintainance programmer works with a system, he often finds inefficiencies and potential problems. While not requiring immediate attention, these problems could, at some time, significantly affect either the functioning of the system or the ability to maintain it.

Thus, cleaning up code — often referred to as "preventive maintenance" — is an important aspect of the process that should be planned for and included in the resource allocation schedule. This undoubtedly will make future maintenance easier.

A model programmer

The characteristics of the ideal maintenance programmer include the following:

- **Flexibility.** Adapts to changing styles of coding, user requests and priorities.
- **Self-motivation.** Initiates complete work assignments independently.
- **Responsibility.** Performs tasks reliably in a dependable, timely manner.
- **Creativity.** Applies innovative ideas that result in practical solutions.
- **Discipline.** Performs consistently; not prone to trying haphazard approaches.
- **Analytic prowess.** Applies well-thought-out analyses.
- **Thoroughness.** Addresses small details so that all aspects of the problem are understood and tested.
- **Experience.** Demonstrates exposure to a variety of applications and programming environments.

WILMA OSBORNE

Knowing how and why a system works is essential to good maintenance. If requirements and design specifications are missing or incomplete, the maintainence programmer's task will be more difficult. Products will not perform as intended, which means users must request new changes and enhancements.

It is, therefore, essential that management establish and enforce controls to ensure that change requests are justified and do not interfere with the maintenance work load. One approach used in many of the organizations surveyed is to implement a software management policy.

According to the surveys, those environments that enforce a software management policy appear to have higher morale and more effective software maintenance. This is evidenced by survey responses from various levels within the organization, although it was expected that managers would see the picture differently from maintenance personnel.

The critical policy

Not surprisingly, both groups surveyed agree that the maintenance activity is critical to an organization's success and that more resources and support for the maintenance process are needed. The managers surveyed agree that standards need to be employed that describe the responsibilities, authorities, functions and operations of the software maintenance organization. Several managers indicate that software management policies should be comprehensive enough to address any type of change.

To be effective, the policy should be applied consistently and must be supported and promulgated by DP management to the extent that an organizational commitment to software maintenance is established. Without exception, each manager surveyed supports the use of software standards for both development and maintenance. When supported by upper management, such standards help direct attention toward the need for greater discipline in software design, development and maintenance.

The software management policy requires that the maintenance process offer, one, a documented need and justification for changes, two, designated responsibility for making the changes and, finally, use of modern programming practices, techniques and tools.

The policy should describe management's role and duties in software maintenance and define the procedures for controlling changes to the software after the baseline has been established. The policy helps to enforce adherence to rules regarding the software and documentation from initiation through completion of the requested change.

Once this is accomplished, it is possible to establish the milestones necessary to measure the effectiveness of the maintenance process.

Policies and plans are of little use if they are not followed. Most of the organizations surveyed periodically conduct

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reviews and audits to ensure that software management policies and plans are being carried out; quality assurance testing currently is conducted on a regular basis.

> ALTHOUGH it is the most important function of an application system software support activity, software maintenance receives far less attention when it is done well.

Following are some standards for establishing a software maintenance policy.

Review and evaluate all requests for changes. All user and staff requests for changes to an application system (whether enhancements, preventive maintenance or errors) should be requested in writing and submitted to the software maintenance manager. Each change request should include a description of the requested change and a full justification for it. These change requests should be carefully reviewed and evaluated before any actual work is performed on the system.

The evaluation should consider available staff resources vs. the estimated work load of the request; the estimated additional computing resources required for the design, testing, debugging and operation of the modified system; and the time and cost of updating the documentation. Of course, flexibility must be built into the process.

Plan for and schedule maintenance. The review of all change requests should generate a priority assignment for each request and an updated schedule for meeting those requests. In many DP organizations, there are simply more work requests than staff resources to meet them. Therefore, all work should be scheduled and every effort made to adhere to the schedule rather than constantly changing course in response to the most visible crisis.

Restrict code changes to the approved work. In many cases, there is a strong temptation to change other sections of the code as long as the program is undergoing revision. The software maintenance manager must monitor the work of the software maintenance staff and ensure that only authorised work is performed.

To monitor maintenance effectively, the maintenance manager must monitor all activities — from the change request form to the final revised source program listing. Permitting software maintenance staff to make changes other than those authorized can cause schedules to slip and may prevent other work with higher priority from being completed on time. It is difficult to limit the work done on a specific program, but doing so is imperative to the overall success of the maintenance function.

Enforce documentation and coding standards. Some programmers do not like to document and others are not good at it, but documentation suffers primarily because of too much pressure and too little time. Complete communication of critical information between all personnel involved with the system is essential.

The most important media for this communication is documentation and source code. It is not enough simply to establish standards for coding and documentation. Those standards must be continuously enforced via technical review and examination of all work performed by the software maintenance staff. In scheduling maintenance, sufficient time should be provided to fully update the documentation and satisfy the established standards and guidelines before a new assignment is begun.

The ideal programmer

Software maintenance is the lifeblood of a DP organization. Maintenance employees must effectively meet the challenge of maintaining a software system while keeping the users satisfied, the costs down and the system operating efficiently.

Maintenance is an activity in which everything that can go wrong eventually does. Problems will surface and enhancements will be requested for as long as the system is used.

The maintenance programmer's task is difficult, both intellectually and technically. Maintenance employees should be extremely knowledgeable about the system before attempting to change it. They must be able to analyze the problem and its impact, determine the requirements and design changes necessary for the solution, test the solution until the desired results are obtained and then release the revised software to operations or users.

The maintenance programmer also serves as the intermediary between application systems support staff and users. Unlike development, maintenance cannot start with a clean slate: It is affected by decisions already made and work already done. It often takes a great deal of time and patience to analyze users' needs and the system and then carefully and adequately implement changes.

Although it is the most important function of an application system software support activity, software maintenance receives far less attention when it is done well. It deserves to be recognized not just when it fails but when it succeeds. ■

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MANAGEMENT

TAKING CHARGE

David Ludlum

Users slip their bonds

"The proletarians have nothing to lose but their chains."

Karl Marx wrote those words in trying to rally laborers of the 19th century to escape the hardships and drudgery that characterized much of the work of the early Industrial Age.

More recently, users of information systems have sought to escape the ties that have bound them to MIS organizations as desktop computers offered liberation through the power of individual processing.

One of the roots of Marx's theory was the principle of the dialectic advocated by the German philosopher Georg Hegel. *Webster's Ninth New Collegiate Dictionary* defines it as "the Hegelian process of change in which a concept or its realization passes over into and is preserved and fulfilled by its opposite." The idea is that one development tends to generate a reaction in the opposite direction, creating a process of compromise that can be likened to a swinging pendulum.

Whatever the merits of Marx's application of this notion to history, the concept seems to portray the conflict between managers of information systems and end users and may provide a glimpse of things to

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Guide slates forum on 1990s

Symposium to compile variety of views on MIS-user relationship

BY DAVID A. LUDLUM
CW STAFF

Guide International Corp., the independent group for users of large IBM systems, will sponsor an international symposium in September to explore issues that will affect the management of information systems in the 1990s.

The symposium, to be held in San Francisco, is directed at members of nine organizations for users of IBM equipment worldwide and will feature addresses by chief executive officers, information systems executives, authors, economists, government officials and four IBM group executives.

The speakers include David T. Kearns, chief executive of Xerox Corp.; Frederick W. Smith, CEO of Federal Express Corp.; former U.S. Sen. Paul Laxalt and former Federal Communications Committee Chairman Mark Fowler, who will speak on the government's role in information systems; U.S. Sen. Frank Lautenberg (D-N.J.), speaking on information technology in government; and economist Arthur Laffer, who will speak on how world economics affects information systems.

The Information Systems Perspectives Symposium is open to employees of corporate members of Guide; the International Users Group Council; various international affiliates of Guide and Share, Inc. — another group of users of large IBM systems; Common, a group of users of smaller IBM systems; and the National Rolm User Group.

In a letter to Guide members, James J. Pitchell, past president of Guide and chairman of the symposium, suggests information systems managers attend with senior executives to address the effect of information technologies on corporate strategies, including questions such as whether the technologies are strategic and whether information systems managers can communicate effectively with users.

RESPONSE-TIME GUARANTEES

Avoiding contract disaster

BY LEE GRUENFELD
SPECIAL TO CW

Disputes between buyers and sellers of computer systems are almost never the result of bad faith but of bad contracts.

The simple truth about contracts is that the more that gets out on the table and written down — and the sooner in the acquisition process that occurs — the greater the probability of a successful installation. And while it is true that hammering out a detailed contract has caused more than one deal to fall through, it is better to part company at an early stage than after the waiting disaster has occurred. Nobody ever lost out by getting a lurking misunderstanding out in the open.

Even so, in many agreements between

Continued on page 88

CHRIS DEMAREST

Big bucks for on-line experts

BY DAVID A. LUDLUM
CW STAFF

A shortage of programmer/analysts and systems software specialists with expertise in on-line transaction processing is leading companies to search worldwide for the experts and pay them annual salaries of $75,000, according to a recent survey.

Firms across the U.S. are having difficulty finding data processing professionals with experience in configuring and supporting automated teller machines, retail point-of-sale applications and reservation and transaction systems for airlines, hotels and car rental agencies, according to Edward Perlin Associates, Inc., a New York compensation consulting firm.

Some companies are paying as much as $75,000 a year for employees with five years of experience working with specific on-line transaction processing software packages, according to the firm's recent survey on salaries of DP professionals.

"It's difficult to find these people with four or five or six years of experience. We are seeing a few installations running with a separate salary structure from the rest of the corporation," said Roger O'Connor, a spokesman for Perlin. Companies are seeking such employees in Europe and particularly in England, he added. "There is a good degree of piracy going on."

The overall turnover rate for DP professionals this year remains about the same as the 17% level reported for last year, according to the survey.

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MANAGERS ON THE MOVE

Melitta, Dollar-Dry Dock Savings appoint CIOs

Chalk up two for the forces championing the appointment of chief information officers. Two companies recently bestowed that title on newly hired information systems executives.

Melitta, Inc. in Cherry Hill, N.J., which sells coffee and coffee-making products and is the U.S. subsidiary of Melitta-Werke Bentz & Sohn in West Germany, has appointed **William Wacker Jr.** as chief information officer (CIO).

Wacker says the significance of being CIO is that he reports to the subsidiary's chief executive officer. He does so with three other executives: the vice-presidents for coffee development, plant operations and finance.

That relationship is appropriate, given Melitta's dependence on a commodity product, Wacker says. "The information flow is so critical, particularly in a market that is so competitive — coffee. In order to compete successfully, you must have information quickly and accurately."

Wacker says he is looking beyond management information, however. "Marketing gets very little out of data processing, and that's got to change," he says. "Distribution is very important. If you can't get distribution, you're dead in the water, because it takes some time to fill the pipeline. If your ad is on the air and you're not in the stores, you've just wasted every dime."

William Wacker Jr.

One move Melitta may make in that area is equipping the sales force with laptop computers. "This way the people in the field have a little more timely information," Wacker says.

Wacker studied accounting at Rutgers University in New Jersey and first worked for Melitta in that field. He later took over the data processing systems as an independent organization after he had been asked to set the systems up.

He left Melitta and worked as a consultant and a systems engineer for IBM as well as director of data processing for Resorts International Hotel, Inc. in Atlantic City before returning to Melitta as CIO.

In a telephone interview, Wacker's comments suggested he gets involved in business issues at Melitta, such as marketing. "Grab the coffee some day," he says. "You won't believe the difference."

Dollar-Dry Dock Savings Bank of New York in White Plains, which has assets of $4.3 billion, has appointed **Joseph J. Campbell** senior vice-president and CIO, with responsibility for systems development, computer operations, computer telecommunications, information systems client services and check processing.

Campbell says the significance of having a CIO is that the head of information systems is elevated to "a more corporate level," taking on strategic planning and integration of the information systems plan with the corporate plan.

"Before, [the role] was to try to support. Now there's a recognition that information systems are an integral part of delivering the bank's products," he says.

That is relevant to Dollar-Dry Dock because it is in the process of converting 23 traditional bank branches into what Campbell calls financial centers, which offer brokerage services, insurance and travel services.

Joseph J. Campbell

The bank's information systems organization will provide employees with tools aimed at saving time for customers, Campbell says.

He adds that his chief project is developing a systems strategy that, he says, will help turn tellers into "more marketing-oriented salespeople" by automating relatively mundane accounting functions.

Campbell, 40, received a degree in economics from Allentown College of St. Francis de Sales in Pennsylvania and spent 18 years working for Chrysler First, Inc. (previously Finance America Corp.), where since 1981 he had been vice-president of corporate systems planning and development.

He also appears to have a flair for marketing. "We're moving in the direction of the bank of the future," he says of Dollar-Dry Dock's corporate plan. "We're putting it into today."

Benjamin J. Costa has been named vice-president for information systems at **United Stations Radio Networks** (USRN).

In the newly created position, Costa will be responsible for management information systems at the networks and will advise all departments on systems and procedures.

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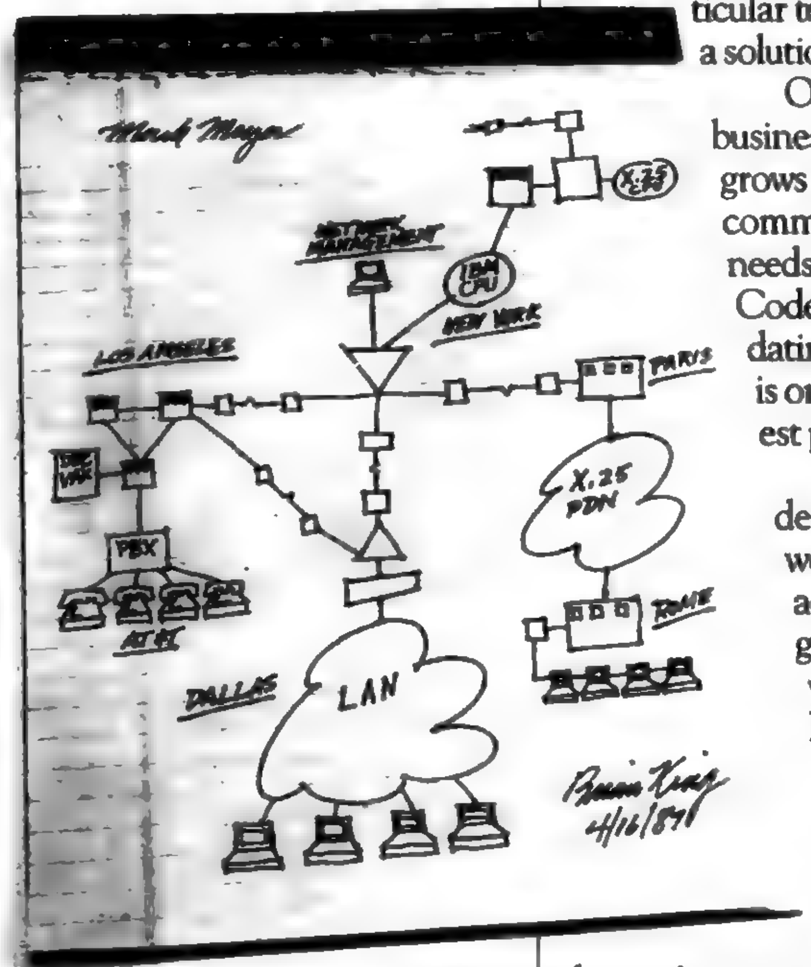

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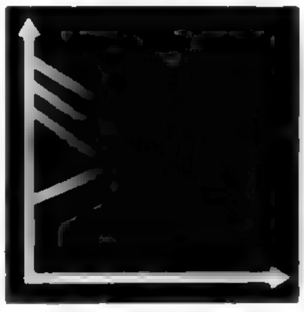

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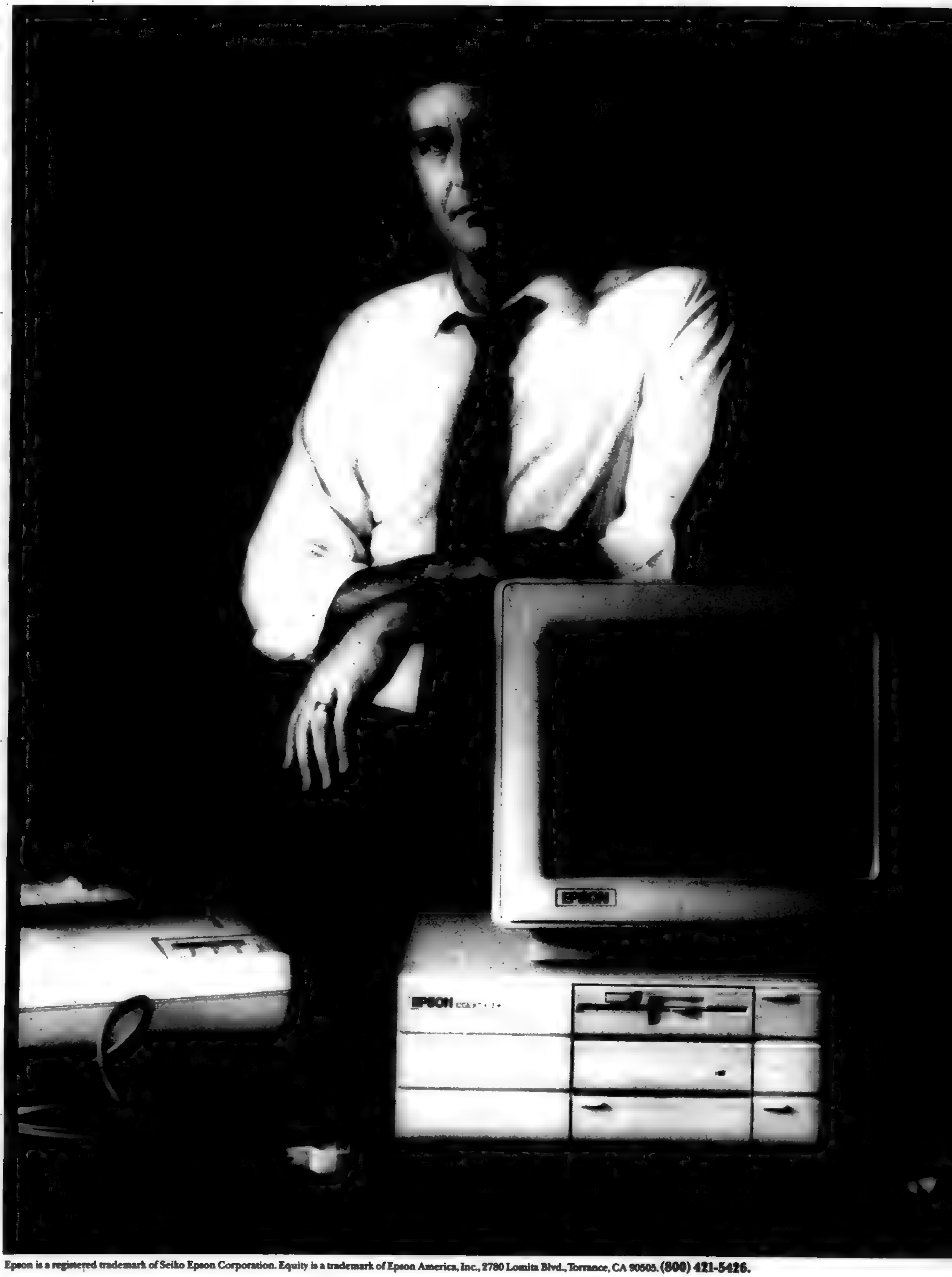

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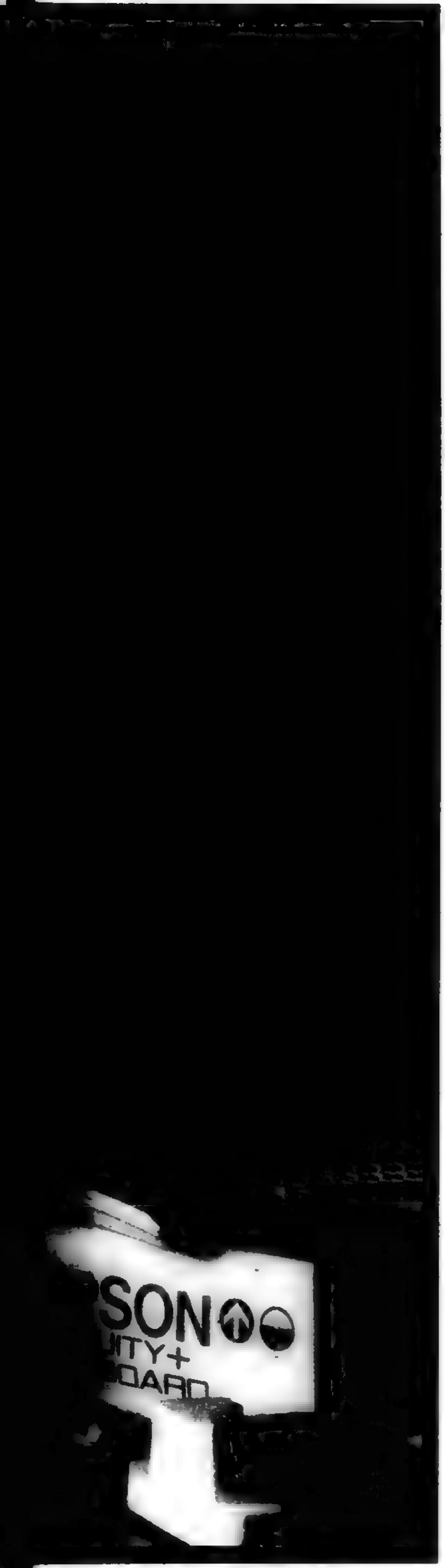

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Contracts

FROM PAGE 83

MIS and computer vendors — particularly in small- to medium-scale turnkey environments — one of the most vital aspects of system performance is still being overlooked, and that is throughput or response time.

System response time is the measure of how much work can be pumped through an on-line system per unit of time. And the failure of the system to live up to its throughput expectations can be as serious as failure to meet its functional goals. Consider the following scenario:

Ace vs. Superior

Ace Manufacturing contracts with Superior Systems for the delivery of a turnkey system to automate Ace's manufacturing and distribution functions. Superior recommends a HAL 90 computer to go with its off-the-shelf software package, which it demonstrates to be a perfect fit for Ace's business requirements.

Superior readily agrees to incorporate the user manual into the contract, which guarantees that the software will perform as represented. Superior's price is substantially below that of its closest competitor. So far, both parties are acting in good faith with the best of intentions.

After the system is installed, Ace complains of response times so slow that the company cannot get all of its on-line transactions in during a normal business day.

Superior responds that it only expected 16 on-line terminals, and Ace is using 32. Furthermore, reports and utilities are being run during the day; everyone knows that should not be done.

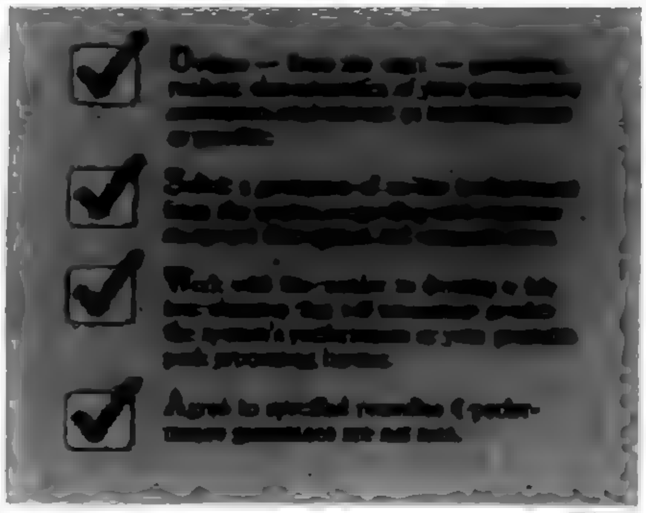
Ace counters by saying that Superior had access to knowledge of Ace's normal business practices and should have known better. Superior looks at the system and says response time is actually pretty good. If Ace wants it faster, the company has to move to a Model 95. Ace says that had it known, it would have picked a competitor.

And on and on. This dispute cannot be resolved simply, because no objective definition of throughput performance exists. Ace and Superior will probably wind up in court; one of them will lose, and neither of them really deserves to.

One possible solution to this problem would have been for Ace to solicit a guarantee of on-line performance prior to signing the agreement.

Tips for writing a no-fault systems contract

Or how to avoid taking your vendor to court



CW CHART

However, Superior might have balked at the notion because of all the vagaries of attempting to define performance and all the liabilities attendant on breaching the agreement. This is perfectly understandable not only because it appears that all the risk is with the vendor but also because it adds to the complexity of marketing: Superior would be forced to walk a tightrope between keeping its bid competitively low and protecting itself against the fairly serious consequences of nonperformance. Further, a prospect's estimates of its own requirements are often notoriously inaccurate, and how can a vendor be responsible for that margin of error?

On the other hand, Ace needs to be sure that the vendors are not proposing dangerously underpowered hardware in order to keep the total price attractive. Otherwise, Ace would have no way of knowing whether it will get stuck with a sizable bill for a hardware upgrade, which it must swallow if it becomes operationally dependent on the system before the problem is discovered.

A much more serious situation would ensue if the initial hardware configuration consisted of the most powerful computer in the line. Still, Ace is skittish about predicting its own needs in quantitative terms.

Both buyer and seller face serious dilemmas. MIS doesn't want to buy a system without some assurances of performance, and the vendor is reluctant to commit to throughput guarantees because of the vague nature of the buyer's description of its business environment and the difficulty of trying to predict system performance.

Logic is on the buyer's side, particularly if he is a relatively naive user procuring a turnkey system — hardware and software — and relying solely on the vendor's representations in making his decision. The vendor is the only one fully knowledgeable about all aspects of the intended system and therefore is the only player in any position to make a determination as to throughput performance.

The buyer's only choice is to take the vendor's word and cement it into a contract, thereby trading his system naivete for some solid legal protection.

The vendor must do the same — that is, obtain from MIS an objective definition of the business environment, translate it into an artificial test environment and get MIS to agree that such a test, not the live environment, is the objective definition of performance. In this way, the vendor is not subject to any imprecision or inaccuracy on the part of the user in defining his needs.

Thus, the vendor assumes the responsibility of knowing his product, and the user assumes the responsibility of knowing his business. This is as it should be and forms the basis for a workable response-time guarantee.

How it should work

In the request for proposal, the buyer should state clearly that the vendor will be expected to commit to a specific level of performance as part of the agreement. This puts all bidders on notice that a response-time guarantee is expected, so they are all on equal footing when they propose.

The buyer is obligated to quantify salient features of his intended automated environment in order for the vendor to have enough information to make a reasonable determination as to how its system will perform. For example, Ace might state that its peak burden will consist of six terminals running order entry, three running pick lists, three applying cash and six generating shipping labels.

Superior can then state that its software, running on the HAL 90, can achieve full-transaction average response times on the on-line terminals of two seconds or less 90% of the time, with no transaction exceeding four seconds. This may only be measured in a carefully specified test environment. Live operation has no bearing on the vendor's responsibility.

The buyer is responsible for determining that this test situation is a fair representation of his peak processing burden. If the vendor can demonstrate compliance with these test requirements, the issue is closed.

The actual wording and conditions are more complex than this simplified example, but the point should be clear. Without an objective definition of acceptable throughput, neither party has any clear recourse in the event of a dispute involving failure of the system to perform adequately.

The nature of the vendor's response-time commitment enters into the buying decision. If the vendor backs up the guarantee with a promise to buy additional hardware — at his own expense if necessary — his bid is figured with whatever machine is quoted. If the vendor offers to buy hardware only after the customer has paid a certain amount or offers to sell additional hardware at his cost or to split the difference, the buyer will probably value the bid at a figure higher than the initial quote.

If there is a throughput guarantee but no specified remedies, that is as good as no guarantee at all. The odds are that the issue will be wrestled in court, which essentially kills any chance of coming to a satisfactory and reasonable business solution.

How it really works

How does this work in actual practice? Vendors are extremely reticent to discuss the matter at first and dismiss the need for a guarantee. However, they typically respond positively to the logic underlying the request, especially when they understand that all proposers are being placed in the same circumstance.

Second, this procedure almost always brings up issues that would otherwise never be uncovered. Flaws and "additional considerations" in benchmark citations have a way of appearing, along with a raft of qualifiers as to performance promises. The MIS professional usually takes a sharper pencil to his estimates of system demand and occasionally discovers that a larger machine was probably warranted all along. In some cases, a seemingly closed deal is thwarted as skeletons come out of the closet.

One tactic employed by buyers is to purchase less than the recommended configuration, knowing that the vendor may have built in some cushion. If response time is too slow, the buyer is responsible for upgrading to the recommended level, and the vendor is responsible after that. Again, both sides win.

Gruenfeld is a management consultant in the Los Angeles office of Touche Ross.

Managers

FROM PAGE 84

Costa joined USRN in 1986 as director of data processing. He has also served as director of MIS for Summagraphics Corp. and as MIS director for Staff Builders, Inc. and Boehringer Ingelheim, Inc.

Dale M. Chernich has been appointed assistant hospital director for information systems at the University Hospital of Pennsylvania State University's **Milton S. Hershey Medical Center**.

Chernich's duties include developing long-range information systems plans, evaluating operational and expansion plans and negotiating and controlling contracts pertaining to computer systems.

Chernich was director of client services, customer support and education at Dynamic Control, a division of Baxter Travenol Laboratories, Inc. In addition, he had previously served as director of information systems at Franklin Square Hospital of Baltimore and as a systems engineer for IBM.

Benjamin T. Costa

Bobby W. Legg has been named vice-president for Information Services of the Fruehauf Trailer Operations of **Fruehauf Corp.**

Legg most recently served as director of financial systems. He also had been vice-president and controller of the Hobbs Division after joining Hobbs/Fruehauf in 1969 as controller of the Hobbs Division.

In his new post, Legg will direct the planning and development of Fruehauf Trailer's information systems. Based at Fruehauf's headquarters in Detroit, he will report to the president and chief executive officer of Fruehauf Trailer.

Robert E. Prothero, vice-president of information systems technology for Ameritech, has retired after a 34-year career in telecommunications.

No successor was named for Prothero, 58, who has served as an Ameritech officer since 1985.

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INSIDE

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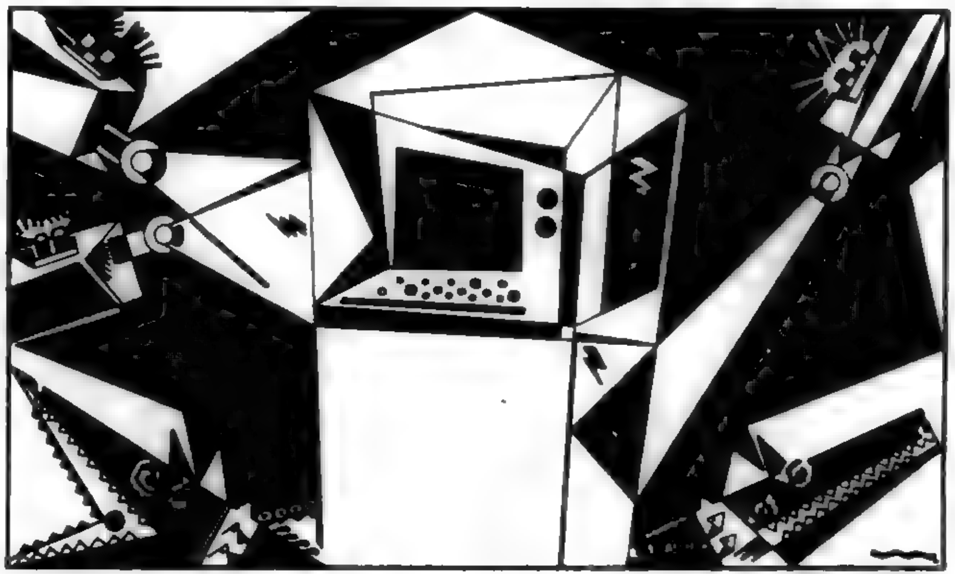
Data that resides on micros is now so valuable that organizations are forced to reevaluate their security policies.

WARDING OFF PC THREATS

BY MARY H. AINSWORTH



MICHAEL McLAUGHLIN

Personal computers have grown into too large and powerful a phenomenon to remain uncontrolled and on the loose. A large part of the allure of PCs, from the very beginning, has been the freedom they permit from outside control. Their low cost and ease of use made them a viable bypass method for departments eager to avoid traditional organizational constraints that governed data processing equipment's acquisition and usage. Furthermore, for a long time, because the information-handling capabilities of these machines was limited, some felt this skirting of security boundaries was harmless.

Now, however, many PCs sitting unguarded on desktops can, and do, process huge volumes of data, and micro-to-mainframe links give users an electronic key that renders the sophisticated lock on the computer room door virtually anachronistic. Given these risks and exposures, many organizations are beginning to realize their mainframe- and minicomputer-oriented data processing controls are out of sync with reality.

Defense contractor Rockwell International Co. in Seal Beach, Calif., has composed what it calls a "recipe for big trouble," which summarizes many of the vulnerabilities that organizations are starting to feel. "Use remote-access distributed data systems to electronically transfer information among seperate locations," Rockwell's recipe says. "Mix in millions of personal computers. Sprinkle with a computer-wise generation."

Consider that the Bureau of Labor Statistics is predicting a quantum leap in the number of employed computer users from the current level of 525,000 to 900,000 by 1990 and it will be easy to see why there is a sense of urgency building around this brew.

Recognizing a problem and acting to correct it are, of course, two completely different matters. Rockwell is addressing the problem of microcomputer security, as are a number of other major organizations. But, according to Carl Jackson, president of the Information Systems Security Association and director of computer security at Ford Aerospace and Communications Corp. in Irvine, Calif., the vast majority is still reluctant to make any sudden moves. "Establishing and maintaining PC policy is such a hard job," Jackson says, "that most organizations don't want to face up to the problem."

Even those furthest ahead in taking action to confront the issue are, for the most part, still in a start-up mode. The Department of Commerce, for example, began wrestling with the threat of microcomputer data loss in their organization last summer and has had an actual control policy in place only since March.

"A security leak in a nonmicro area alerted the department to the vulnerabilities of microcomputers and the need for PC policy," says Reed Phillips, director of the Department of Commerce Office of Information Resources and Management. According to Phillips, that incident served to bring to a head concerns that already existed about information downloaded from the mainframe to the PC and about microcomputers and diskettes that employees took home for

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Ainsworth is a senior associate editor for "Datapro Reports on Information Security" in Delran, N.J.

PC threats

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after-hours department work.

Developing a policy for control of microcomputers was a team effort at the Commerce Department. The committee was chaired by Phillips and included a microcomputer specialist and a computer policy specialist. After a first draft of each policy was completed, the drafts were circulated to the bureaus responsible for implementation and daily administration for their review and comments.

Never-ending effort

The bureaus' involvement was no rubber-stamp exercise, Phillips emphasizes. "After the bureaus returned the first version of the policies, we went through a major rewrite," he says, adding that the same process was repeated with the revised policy. It is important, Phillips says, to involve those who have to live with the policy in its creation. "Otherwise, you may never get it implemented," he says.

> "USERS see PC security as a bureaucratic burden unless companies use a strong awareness program."
>
> CHARLES CRESSON WOOD
> CONSULTANT

It took between six and nine months for the Commerce Department to develop and institute the regulations to govern its microcomputer population. But the effort does not end there. The policies are scheduled to be reassessed early next year by the department's inspector general to ensure that they are still timely and have made the transition from paper to practice.

To make sure its security policy lives and breathes at the user level, the Commerce Department is developing a small nontechnical pamphlet of user guidelines. "Policy should be flexible, viable and frequently updated. If you make policy either too restrictive or too lengthy, it will be ignored," Phillips cautions.

Because protection of DP centers has been the subject of formalized procedures for years, data processing staffs accept security as part of their routine. However, controlling information is a new responsibility for most members of non-DP departments, one they are often inclined to regard as an unnecessary addition to their work load.

"Users see PC security as an additional bureaucratic burden unless companies use a strong awareness program — and firms don't do enough awareness training," says Charles Cresson Wood, a San Francisco-based consultant. Wood sees increased interest PC policy creation, but after policies are written, he finds little compliance checking. "Of course, this is an industry-by-industry thing," he says. "Organizations that are regulated are doing a better job."

Spreading the word

At Rockwell International, where more than 10,000 PCs now reside, developing awareness about security is considered at least as crucial as formal regulations, according to data security officer Harold Tipton. "Written PC policy is essential," Tipton says, "and equally critical is a user awareness program to support the policy."

In fact, an awareness program for top managers involved in the development and implementation of the policy entitled, "Computer Security and the PC Explosion," of which Rockwell's "recipe" excerpt, quoted above, is a small part, was the groundbreaker in an ongoing policy development effort. The program explored security problems associated with micros in order to help managers responsible for developing and implementing policy to determine the measures needed for adequate protection as well as the scope of their own responsibility.

In addition to presenting a detailed series of questions designed to increase understanding of exposure at this level and to sharpen the skills necessary to deal with them, the program posed some direct challenges to managers. "Managers must overcome the feeling that security procedures constrain people, reduce performance and get in the way," the Rockwell group was told.

Concurrent with the preparation of its formal PC policy, which will supplement an already existing policy aimed chiefly at protection of minis and mainframes, Rockwell is working on a PC security video for user training purposes.

Policy drafting, which is the responsibility of the computer security department, has been going on since the beginning of the year. When the writing phase is completed, the results will be reviewed by management in the information systems and engineering departments. Although the process may seem lengthy, Tipton says the incremental change is ultimately more effective. "It is best," he says, "to secure one area at a time. Users resist change, and if you try to secure everything at once, you wind up with a revolt."

Banc One's approach

"Banc One places the responsibility for writing PC security policy within each department,"

Continued on next page

Cards offer smart answer to controlling micro access

BY G. BERTON LATAMORE

This summer, New York Life Insurance Co. of Canada Ltd. in Toronto is auditioning something new in microcomputer access control — a credit card-size device with an embedded computer chip that promises to separate authorized from unauthorized data and shield highly sensitive information.

NANCY ACKERMAN/GAMMA LIAISON

> "YOU WANT to hit a security level somewhere between wide open and a NASA launch site."
>
> DAVID ROGERS
> NEW YORK LIFE'S
> INFORMATION SERVICES DEPARTMENT

The data protection device, the CP8 Micro Card, was provided to New York Life by the Royal Bank of Canada as an adjunct to its new financial management service, Cash Command.

Cash Command is a personal computer-based application that allows Royal Bank's corporate customers to perform a variety of cash management and treasury management analysis functions using real-time account balance information downloaded via modem from the bank's mainframe data bases.

David Rogers, vice-president of New York Life's Information Services Department, says Cash Command is far ahead of any other fund management offering he has seen. The information that Cash Command allows customers to access, however, is also extremely sensitive. With Cash Command, corporate officials at New York Life can draw down the latest information about company accounts and stock portfolios, store it on their PCs and plug the figures into a spreadsheet program for analysis.

Naturally, New York Life is not eager to have users store extracts of that information on their PCs for analysis unless the system can guarantee a reasonable degree of security for the data. Micro Card supplies the necesary level of security without consuming processing power on the user's PC. To use it, card holders insert their cards into small Micro Card readers attached to their PCs and enter their personal identification number (PIN) on the keyboard.

When an authorized PIN is entered, the card checks its program to see what portions of Cash Command the user is authorized to see and what the user is authorized to do, whether to just see the data, manipulate it or add and delete. It then unlocks only the specified functions. Thus, someone with authority to conduct an analysis of the company's present cash status may not be able to look at the corporate stock portfolio.

If an unauthorized person tries to fake the PIN and enters the wrong number three times in a row, the card disables itself permanently and must be replaced.

The card is a product of Dallas-based Micro Card Technologies, Inc., a division of Groupe Bull, the French computer giant that has spent $50 million developing smart-card technology.

The erasable programmable read-only memory chips that make up the heart of smart cards include both their own processing power and up to 64K bytes of random-access memory (RAM). The cards were invented in France in the mid-1970s and have been aggressively developed there with the backing of the French government. In fact, millions of these smart cards are in circulation in France, serving as electronic credit cards and checkbooks, telephone charge and debit cards and security devices.

While word of the technology has spread to other countries and provoked substantial interest, the Royal Bank application is the first commercial use of smart cards as a computer security device outside France.

At the moment, according to Rogers, the only application for the Micro Card at New York Life is Cash Command access control, and only four people in the company — three financial officers and himself — carry the cards. He envisions the day, however, when all corporate employees will carry the cards, and at that point, they will become the standard data and physical access device at New York Life.

With 64K bytes of RAM, the cards can carry a digitized fingerprint or even a retinal scan, as well as the PIN, making them an excellent device for high-security access control. Employees can insert their cards into a terminal in the wall next to a door, tap in the correct PIN on a key pad next to the card slot and put their thumbs onto a fingerprint reader. If the print matches the digitized one, the door opens.

The best thing about the smart card approach, according to Rogers, is that it provides necessary protection without intruding unduly on the activities of legitimate users.

"No one knows for certain who is doing what on office PCs — and you may not want to know," he says. "You want to hit a security level somewhere between wide open and a NASA launch site so that your data is safe, but users are not inhibited from using their PCs to their best advantage. Smart-card [technology] is a way to manage that problem simply and inexpensively. . . . It's the smartest answer I've seen." ●

Latamore is a free-lance writer based in Burlington, Vt.

PC threats

FROM PREVIOUS PAGE

says Robert Payne, statewide PC coordinator and electronic data processing (EDP) auditor at Banc One Corp. in Columbus, Ohio.

To guide the departments in setting policy, the EDP auditing group developed a set of written PC policy standards. Payne was part of the group that developed the standards in 1985. Since then, he says, financial and EDP auditors have participated in monthly and quarterly PC policy training sessions throughout Banc One's statewide locations.

In addition, he says, auditors play a key role in monitoring the departments to see that policy is, in fact, written and implemented. Payne comments, "The auditing group initiated written policy because we wanted to protect downloaded data and keep our customer information confidential."

The Banc One policymakers consisted of EDP auditing group members specializing in programming applications, auditing applications and technical integrity and control. They were led by the supervisor of the EDP audit department.

The group recorded the vulnerabilities of its microcomputers and set out to write policy for the most critical areas first. The committee's highest priorities were to control the acquisition of PCs and the data stored on diskettes.

When the first drafts of each policy were completed, they were routed to staff members for review. A final version of the policy was based on staff comments.

Policy-making is an ongoing process at Banc One. Members of the EDP auditing group meet monthly to fine-tune and add to the policy. Revisions can be proposed at the meeting and reviewed prior to implementation — a process that can take from two to three months.

On the front line

Hughes Aircraft Co. in Long Beach, Calif., recognized the need to develop strong microcomputer security policies in 1983. William Boni, an in-house consultant at Hughes's Information Systems Security Department, helped write Hughes's policies and described this process in a report for "Datapro Reports on Information Security" titled, "Case Study: Controlling 2,000 PCs at Hughes Aircraft Corp." Boni discussed not only the steps taken to write policy but also suggested methods used to implement it.

How did Hughes do it? Corporate policy charged the Information Security Section with developing the EDP security program. The section evaluated threats to PCs and alerted management and vendors to the following security imperatives:

- Protecting company-sensitive data stored or processed on PCs from access by nonemployees and unauthorised employees.
- Preventing theft of proprietary models and data by disgruntled or unscrupulous employees.
- Preventing off-premises access without appropriate controls.

Members of the Information Security Section participated in all the areas in which computer security plans, policies or practices were formulated or implemented. This broad participation had two benefits: Section members became a recognized presence in the departments, and members gained a better first-hand knowledge of the security requirements of the departments.

The head of the Information Security Section was also a member of the EDP director's staff (a high-level reporting position) who had developed strong professional alliances with other managers reporting to the EDP director. Because of the section leader's strong ties to internal management, formal and informal security measures were easily implemented.

When a first draft of the security policy was completed, it was released in a bulletin signed by the director of information resources. This bulletin was sent to all department managers for feedback — and to alert them to the security concerns regarding PCs. The policy was later consolidated in a pamphlet that was included in the security orientation packet for all new employees. The pamphlet sets baseline controls for all employees, since Hughes projects that the majority of its staff will have access to its anticipated installation of 9,000 PCs by 1990.

> "EVERY user of a microcomputer is personally responsible for the protection of the information that the microcomputer stores, processes or transmits."
>
> FROM HUGHES AIRCRAFT CO.'S MICROCOMPUTER SECURITY GUIDELINES

The Information Security Section was also part of a Group PC Standards Committee at Hughes that established PC product configurations and furniture specifications. Affiliation with this committee allowed the section to test and select lock-down devices and to establish other product standards. To promote PC security awareness, the section installed its approved products on every PC in Hughes's Personal Computer Learning Center, where all new PC users are trained.

Other techniques designed to promote security awareness include labeling PCs and diskettes as either classified or unclassified. In addition, a 15-minute PC security awareness program is presented to department managers by the security staff. The program, which emphasizes PC users' personal responsibility to protect data and comply with company policies is also used in briefings for new employees.

Company plans include expanding data groupings beyond "classified" and "unclassified," developing on-staff tiger teams to test the system by attempting to breach it and conducting aggressive auditing procedures to track breaches.

Room for diversity

The four security programs discussed here share a number of characteristics:

- Planned or established policies for the acquisition of microcomputer hardware and software products.
- Designated individuals responsible for ensuring that PC security policy is enforced.
- Prohibited copying of copy-protected software.
- Required off-site storage of backup software and data diskettes.
- Required full documentation of software programs.

The programs also provide policies for power protection, controlling access to the PC and assignment of a PC coordinator responsible for security. Banc One and Rockwell state that all data produced with decision-support software, such as spreadsheets, must be tested and the results validated to ensure that a wrong entry in a cell does not skew the spreadsheet. The Commerce Department and Banc One both require departments to maintain an inventory of microcomputer hardware and software.

Despite these similarities, however, each policy clearly reflects the particular nature of the organization that formed it.

Both Rockwell and Hughes are aerospace companies that rely heavily on government contracts. Banc One is a financial institution that needs to protect customer data, and the Department of Commerce is a government agency that deals with both the public and private sectors. Because these organizations are required by regulation to provide information security, they are on the leading edge of PC policy development.

But what are some of the specific policy concerns at these organizations?

Hughes places heavy security responsibility on the individual user. The company's "Microcomputer Security Guidelines" brochure states that "every user of a microcomputer is personally responsible for the protection of the information that the microcomputer stores, processes or transmits." It also states, "Any employee having knowledge of a violation of the Microcomputer Security Guidelines must report it immediately to management so that corrective action may be initiated."

Banc One's financial concerns are reflected in its policies calling for the use of "due care" for PC processing of basic computer calculations, "great care" for decision-support applications and "extreme care" for applications that generate entries to general-ledger designing, testing, validation and documentation.

The Commerce Department forbids the use of its micros for personal use. Surprisingly, only Commerce — not government contractors Hughes and Rockwell — requires that Tempest-certified equipment is used for processing highly sensitive data. Tempest-certified equipment must meet special shielding standards set by the Department of Defense that ensure electronic emanations cannot be intercepted. Hughes, however, does restrict processing of government data to "systems approved by the appropriate U.S. government agency."

The Department of Commerce enforces two policies that deal with the destruction of

Continued on next page

Law enforcement

Robert Payne's EDP auditing department at Banc One Corp. routinely reviews selected departments to see that they adhere to the company's overall microcomputer security objectives. The questions that Banc One uses to gauge departmental follow-through can be easily adapted for use in other settings. These questions are as follows:

- Are administrative security procedures documented?
- Are administrative procedures for hard-disk and diskette backup documented?
- Are administrative procedures for off-site backup and storage documented?
- Does a written policy state when the user-based system is to be signed on and off and by whom?
- Are there written procedures to control the use of sensitive documents?
- Are there written departmental policies and procedures stating how and what to document for in-house-developed applications?
- Are eating, drinking and smoking prohibited in the immediate computer area?
- Is there a procedure for informing employees that corporate policy forbids the copying of copyrighted software, except for backup purposes?
- Is there a written policy in place regarding the removal of hardware and/or software from bank premises?
- Is there a written policy regarding the reformatting of the hard disk on leased or rented computers when that computer is returned to the lessor?

Steps to secure PCs

Rockwell International Corp.'s awareness program for policymakers suggests the following ways to protect sensitive data on microcomputers:

- Purchase a streaming-tape drive or external hard disk if your personal computers are equipped with internal hard disks. Sensitive data should not be stored on a fixed hard disk.
- Determine the level of backup required for data and programs, separating these resources according to whether they need no backup, secure on-site backup or on-site and off-site backup.
- Train users to make and store backups of programs and data.
- Make sure that the security officer is available to consult with users.
- Require supervisors to audit PC backup activity.
- Assign a custodian for sensitive data sets.
- Store sensitive data on specially colored floppies or designated and marked removable hard disks.
- Store all media containing sensitive information in a cabinet or locked area that is accessed only by the data custodian.
- Place PCs that are used for work with sensitive data in private offices.
- Encourage the use of encryption for sensitive data files.

Starting points

Based on his experience implementing the personal computer policy at Hughes Aircraft Co., William Boni offers suggestions for anyone entrusted with planning for microcomputer security.

Motivate the end user. The distributed processing environment associated with PCs means responsibility for complying with data security practices is now passed on to the end user. Employees will generally comply with company standards when they know why a security program is necessary. Education, awareness and training are critical tools in the PC security program.

Work with the best available. Don't wait for a "silver bullet" to eliminate every PC security problem. Evaluate products in light of your commonsense appreciation of your own operational climate. Given the speed of progress in the security field, product and procedure evaluation will be an ongoing responsibility.

Remember that you cannot have security without reliability. Make sure security products perform as advertised before you purchase them. Also, select products from a reliable vendor; otherwise, when they need support or an upgrade, you may be on your own.

Build a solid base of support. Security staff must enjoy close working relationships with all key players in every major staff function concerned with PCs — DP managers, information center managers, the physical security department and line managers. All have legitimate interests in protecting PCs and the information they process.

Follow up on what you say. Ensure that all products and procedures are understood and consistently employed. Monitor compliance with established standards and report continued violations to appropriate management for action.

PC threats

FROM PREVIOUS PAGE

diskettes: one, those that contain "sensitive unclassified data will be purged of all information by either overwriting or reformatting before release to another office or individual without a need to know"; and, two, "diskettes containing classified data will be degaussed using an approved degausser or will be placed in a burn bag for destruction." Although shredding is not listed as an option for diskette destruction, many shredders do possess this capability.

Banc One is also concerned with the obliteration of data on leased hard disks. Its EDP auditors ensure that departments enforce written policy "regarding the reformatting of the hard disk on leased or rented computers when that computer is returned to the lessor."

Rockwell looks upon personal computers that access the host as a particular vulnerability. Much of the security program focuses on this concern, as well as on diskette labeling and whether diskettes are left in the machine unattended. Proper handling of reports produced on the micro, an often overlooked area, is another concern that Rockwell's program covers.

Banc One, the Department of Commerce, Hughes and Rockwell all used a group approach to write policy. Departments responsible for implementing the policy were either included in the policy-making process or were able to review and change first drafts.

> WRITING PC policy is a political task. It affects people, and people can work for it, work against it or simply ignore it.

Other tips for policy-making include the following:

- Appoint one person in the group to sort through disagreements and make a final decision.
- Conduct a risk analysis of the PCs and protect the most vulnerable areas first.
- Review security policies others have developed for PCs.
- Build an awareness program to support the policy.
- Review the policy regularly and make appropriate changes.

Employees cannot support a policy they know nothing about. Be sure they have their own written copies of the company's security policy. IBM not only provides its employees with written policies, but each year employees are required to read and sign them.

Managers should be well trained in PC security awareness so they can answer questions and set an example for their departments. Videos are popular devices for awareness training, as are brochures, posters and short meetings.

A policy for the people

Writing PC policy is a political task. It affects people, and people can work for it, work against it or simply ignore it. No PC policy will make everyone happy: Voices must be heard, compromises must be made, and work will become a little more tedious.

The Hughes awareness brochure offers the following thought: "The microcomputer has distributed the power of information processing to many users; this means that responsibility for correctly using these devices is also distributed."

It concludes by saying that employees who properly protect information safeguard the company's "ability to compete and prosper in a highly competitive business environment." ●

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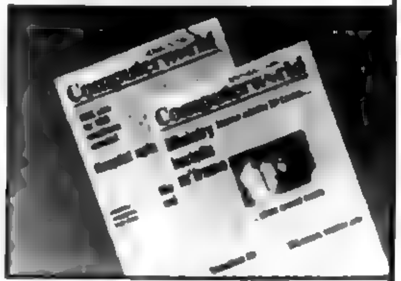

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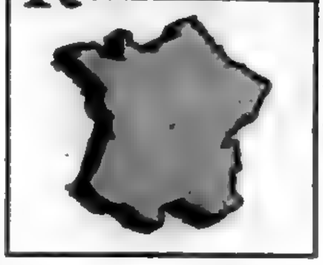

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Recognizing the enemy of corporate data

Computer fraud cost U.S. businesses between $3 billion and $5 billion last year, according to a report prepared by Big Eight accounting firm Ernst & Whinney in Cleveland for the Congressional Commission on Fraudulent Financial Reporting.

The cost of honest errors — deletion, incorrect entry or erroneous alteration of data — is much more difficult to quantify, but most experts agree that this cost is even greater than losses attributable to fraud.

Protecting data from tampering is a complex business, involving more than the installation of a standard security system. "There are no two key rules for making your data safe," says David R. Wilson, national director for information security services at Ernst & Whinney. "People are finding security concerns very hard to address."

One reason the process is so difficult, Wilson says, is that most companies have no idea what they are trying to protect when they install computer security. "Most don't know what they have. They can't possibly know how many personal computers they have. They're lucky if they know where all their mainframes are," he says.

Another difficult call is the assignment of security responsibility. Too often, Wilson observes, the responsibility is placed on MIS.

"Many companies decide, for instance, that MIS owns accounts payable," he says. "But MIS has no way of knowing whether the checks being written today are being made out to the correct people and sent to the proper addresses or are totally fraudulent."

Where risks lurk

When accountability has been established, it is time to evaluate risks. Data can be lost or altered either accidently by legitimate users or purposefully by employees or outsiders.

Direct interference from outside is the least of the major risks, largely because it is easier to get information on corporate strategies by going through a company's garbage bin or by bribing an employee than by tapping into the firm's data base. However, the risk does exist and is bound to increase significantly as companies create sophisticated systems for field personnel and customers and as they work to establish standards for electronic invoicing and bill payment.

Because these systems are designed to be accessed from the outside, the solution to the security issue is not just a matter of taking the system off-line.

A recent survey of corporate officials by Ernst & Whinney confirms that concern about outsider access is growing. "We think," Wilson says, "that the reason for the change is that corporations are using their systems more for competitive advantage rather than strictly for back-office functions."

There are, of course, also internal threats. Disgruntled employees may damage corporate data maliciously. And, because they offer a low-risk high-profit target, computers provide an opportunity for dishonest employees. All it takes to rob a company in many instances is to change the name and address on a check in the accounts payable queue.

Although computer crime grabs headlines, the greatest risk in most companies is attributable to honest errors, according to Robert H. Courtney, president of RCI in Port Ewen, N.Y., and a leading security expert. A company has to expect mistakes, he says. Unfortunately, when someone carelessly deletes or alters a vital piece of information on the main data base, the mistake is seldom trivial.

Growing exposure

The level of exposure to every kind of internal risk has grown exponentially since the start of the PC revolution.

In 1979, only a few technical people in the MIS department had access to data on corporate mainframes and minis. Now, everyone from the president to file clerks know how to log on to the system and change data.

An even more sobering thought is the number of PCs beginning to be linked into local-area networks, for which little protection exists.

Methods exist to ward off almost any type of threat. The question is how much an organization can and should expend on security, especially given that the costs do not consist of only direct expenditures for software and hardware; another cost is reduced efficiency. As security measures block illegitimate users, they inevitably slow down legitimate ones.

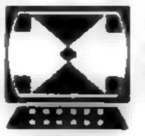
"If the probability that someone will break into your system is small and if the risk of loss if they do is also small, then you don't want to spend a lot on security," Lanagan says. "But if there's a 10% chance of someone breaking in and stealing $1 million, then it's worth spending $100,000 to protect your valuable data — and you can come up with a pretty good protection plan for $100,000."

G. BERTON LATAMORE

PRODUCT FACE-OFF

Encryption packages offer business users a choice

BY HAROLD JOSEPH HIGHLAND



Among the multitude of encryption software packages currently available for Microsoft Corp. MS-DOS- and IBM PC-DOS-based systems, three stand out by virtue of their particular suitability for use in the corporate setting.

Privacyplus from United Software Security, Inc. in Vienna, Va., is a general encryption program that permits a security administrator to decrypt any file. Redwood City, Calif.-based RSA Data Security, Inc.'s Mailsafe can be used where message authentication is of primary importance. Secretdisk from Lattice, Inc. in Glen Ellyn, Ill., provides transparent encryption.

Privacy Plus is a simple, menu-driven encryption program, which, when used with Automated Training Systems' companion program, Masterkey, offers one feature found in no other software and only a few of the more expensive add-on boards.

Masterkey enables a security administrator to decipher any encrypted data file or program without knowing the original encryption key. The administrator develops a configuration file of program options that can be called by Privacyplus. The file also contains the administrator's special master key in encrypted form. Along with this configuration file are separate disks of the encryption program, which are distributed to each user or department. In this way, the administrator has a different key to unlock different files.

Two encryption algorithms are instantly available for the user during any encryption session via a function key. In addition to the Data Encryption Standard (DES), an algorithm developed by the National Bureau of Standards in 1977, a proprietary algorithm runs two to three times faster. In addition, multiple encryption can be used with either algorithm or a mix of both.

The program can be made random-access memory (RAM)-resident. It requires about 57K bytes of RAM and can be called at any time by any of six two-key combinations. This avoids conflict caused by calling combinations of other RAM-resident programs.

Message authentication is the prime feature of RSA's Mailsafe, an encryption package that uses the company's public-key algorithm.

This algorithm uses two keys, which means the sender uses the recipient's public key to encrypt a message, and the recipient uses his own private key to decrypt the message.

IN ADDITION to the Data Encryption Standard, an algorithm developed by the National Bureau of Standards in 1977, a proprietary algorithm runs two to three times faster. Multiple encryption can be used with either algorithm or a mix of both.

The Mailsafe encryption system contains three programs: Install, Keygen and Mailsafe. Install prepares the user's RSA disk with a user-selected password or passphrase consisting of from eight to 80 characters. It then calls Keygen to generate the public key and the password-protected private key.

Mailsafe, the application portion of this encryption package, is menu-directed with numerous Help screens and is used to encrypt and decrypt files for storage and communications.

Message authentication is performed with this program. Using the outgoing mail menu, the sender presses a single-function key that directs the program to generate an RSA Digital Signature for a specific file. The user signature varies from message to message. Also, during the authentication process, the program verifies that the message is complete and adds a message digest of the exact contents of the file.

After the user presses another function key, the message and digital signature are compressed by a special data-compression algorithm and then encrypted using the recipient's public key. ASCII characters are added to this and act to seal the enciphered message in an RSA Digital Envelope.

The recipient of a message that uses the digital signature and digital envelope can decipher the message with his private key. The sender's signature is verified by the recipient using the sender's public key.

Transparent encryption

Secretdisk is a software program that offers the user transparent encryption, which means that no encryption key is entered by the user. The data stored on the disk is always in encrypted form and becomes available only through use of the proper user-selected password.

Secretdisk assigns a logical drive to each confidential disk, improving security by sectioning storage into limited-access areas. For example, three confidential disks can be created on a hard disk in addition to the basic root directory, which is open to all users. The secret disks would be accessed as Drives D, E and F, each with its own password.

During initial installation, the user can select either the DES or a fast proprietary algorithm. Encryption and decryption take place as the data moves from the monitor's screen to the disk or from the disk to the screen.

Even if someone illegally copies the secret disk files, the data will be protected. Because of the logical disk assignment, it is impossible to access the secret disk files unless the microcomputer configuration is duplicated exactly. Even then, the files cannot be read under DEBUG or any of the special utilities because they are encrypted.

The size of any secret disk is specified by the user in a given number of bytes. The number of secret disks on any system is limited by the number of drives addressable by the operating system. One installation program is available to convert an entire floppy into a secret disk. A portion of a floppy disk can be set up as a secret disk by using the hard disk install program.

Two utility programs with this package are available for the user to toggle a secret disk on and off. However, a password must be entered every time a secret disk is turned on. •

Highland is managing director of Compulit, Inc., an Elmont, N.Y.-based firm that tests microcomputer security products and consults on computer security issues. He is the editor of a bimonthly journal, *Computers & Security*, and has more than 40 years of experience in the computer security field.

Deciphering the selection of encryption products

Not all company data needs to be encrypted. Wholesale encryption not only wastes computer and employee time, it also makes sensitive encrypted data more vulnerable to attack by supplying would-be intruders with a better shot at unraveling the code.

Before introducing encryption, therefore, it is essential to classify information and programs according to relative sensitivity, using categories like "company secret," "company confidential" and "company restricted."

Secret data — data that should be seen only by top management — normally constitutes a very small percentage of an organization's total store of electronic information. This type of file should be encrypted when stored on a disk or backup tape and when transmitted from site to site.

Confidential data, which consists of data files and programs restricted to selected employees or departments, can be protected by encryption or password-protected disks with transparent or keyless encryption.

Restricted data, information available to all employees but not the general public, can be adequately secured with data compression programs, which effectively prevent employees from copying disks to take off-site.

> NOTHING is ever totally secure. The cipher machine used by the German military during World War II had 200 quintrillion possible keys, and it was cracked daily by the British intelligence team.

Choosing your security level

There is a plethora of encryption software and hardware products from which to choose. During the past three years, our microcomputer security products laboratory has received close to 100 encryption software packages, encryption boards and specialized replacement read-only memories for testing. Which specific product or products you choose depends on a number of factors, including the following:

- The amount of data that needs to be encrypted.
- The level of security needed by your organization.
- Budget constraints.
- Whether you plan to use the same encryption package for all of your company's sensitive data.

Some companies use the same encryption algorithm for the purpose of storing both confidential and secret data and for all data transmission, believing that the algorithm is completely unbreakable. Early this year, however, *Cryptologia*, a professional journal devoted to the practice of cryptography, published an article by Martin Kochanski in which he broke the encryption technique that was used in five popular personal computer packages, including Superkey from Borland International and N-Code from K Plus L Software.

Many companies turn to the Data Encryption Standard (DES) for ultimate security. The DES was issued in 1977 by the National Bureau of Standards and is available as software or in a chip on a board. The National Security Administration has raised doubts about the security of this algorithm, though, and within the cryptographic community, there is a strong feeling that the DES code has been broken.

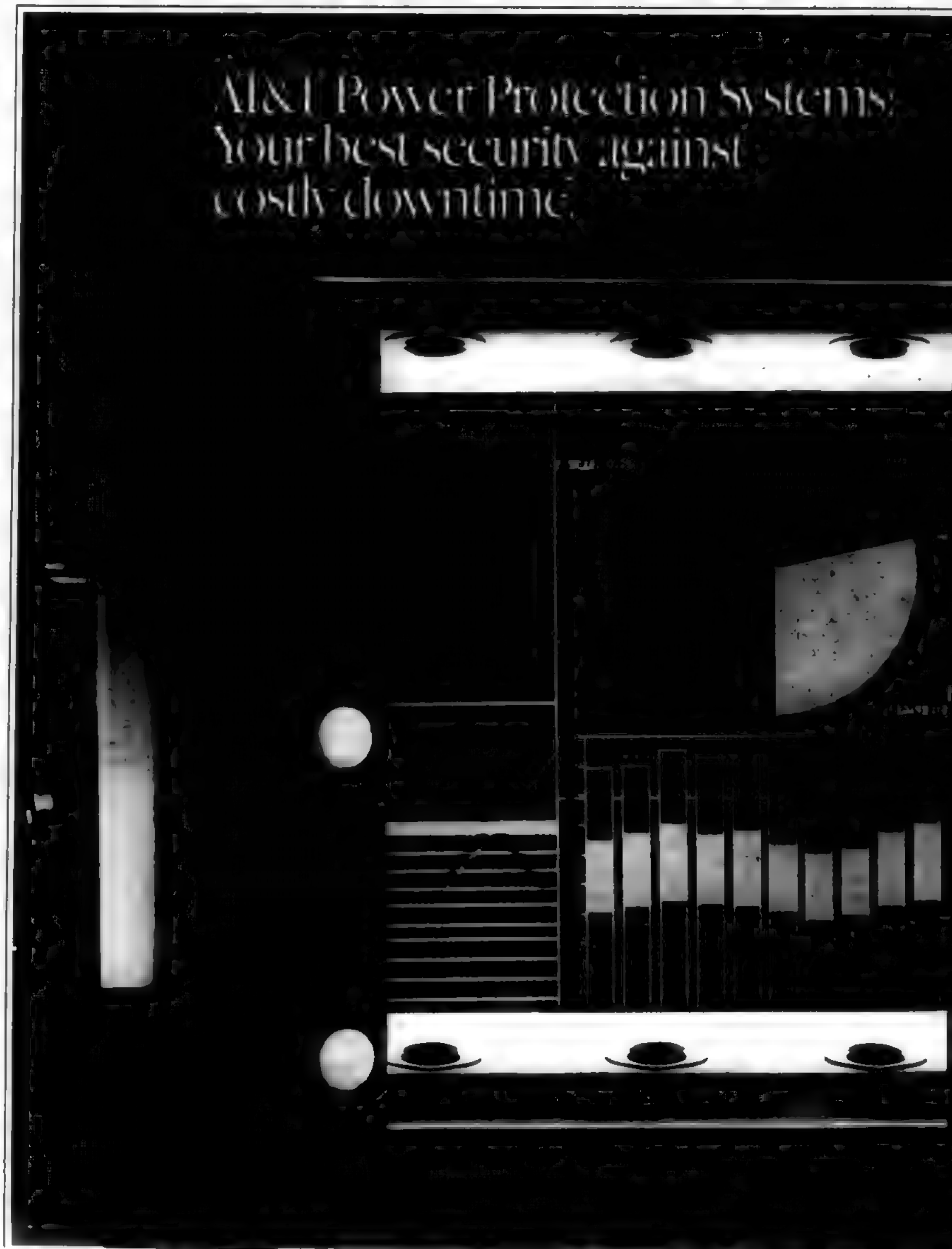
Every algorithm uses a key, a set of characters that are either entered by the user or, in a few cases, generated by the algorithm. The DES has 70 quadrillion possible keys — that is, 70 thousand million million — making it seemingly unbreakable. But nothing is ever totally secure. After all, Enigma, the cipher machine used by the German military during World War II, had 200 quintrillion — or 200 million million million — possible keys, and it was cracked daily by Alan Turing's British intelligence team — without a supercomputer or even an old IBM 650 to assist them.

It is strongly recommended that a different encryption scheme be used for storing secret, as opposed to confidential, data and that still another scheme be used for data transmission.

Living within the budget

The cost per microcomputer to protect data can range from zero, using a public domain package, to several thousand dollars for sophisticated encryption hardware. In many companies, microcomputers handle only unclassified data, and these need not be secured.

Most people assume a high correlation exists between price and quality, but this assumption is incorrect in the encryption products field. Some companies trade on the misconception that cost equals value and set their prices accordingly. Others introduce their products at very low



prices, expecting to double or triple the price later, when demand develops.

Those vendors aiming to sell into government agencies and large corporations often establish high unit prices at the outset so they can offer large volume discounts.

Budget constraints may lead some companies to choose software packages rather than encryption hardware. Software encryption is slower than hardware but can be just as secure, depending on the algorithm.

Financial resources can be stretched by using public-domain or lower priced software for encryption and/or compression of a limited volume of data and by using encryption hardware to meet high-volume needs.

There is an extensive checklist of features that should be considered in evaluating encryption software or hardware. Depending on the company, some of the following features are more important than others:

- Is there a clearly written installation manual or, preferably, a menu-driven program on a disk to help the security administrator install the package?
- Is there a separate user's manual that can be copied for distribution to the staff, or is it necessary to write one in-house?
- Is the encryption program menu-driven for the user? Are there Help screens?
- Does the program provide for multiple encryption algorithms? Some are designed to offer the DES and a proprietary fast encryption algorithm.
- Can the encrypted data be sent without modification over telecommunication lines?
- Does the program verify its encryption? If not, it should not overwrite the original. An in-house procedure will have to be developed to verify the encryption before the original is destroyed.
- If the encrypted file is given a new name by the encryption system, does it overwrite the original or merely delete the file name from the directory?
- Is an audit trail of operations available for the security administrator?
- How many characters does the encryption key require? A program should not permit the use of any key consisting of less than six characters.
- Is there echo-on-screen control so that a passerby cannot read the key?
- Does the program make any provision for encrypted file recovery by the security administrator if the user who originated the key becomes suddenly unavailable?
- If access control is offered, how easily can it be defeated by the average user?

The evaluation process

After a review of manufacturers' literature and the completion of a checklist of desired features, several products should be secured for testing.

All products should be tested under identical conditions that reflect the most typical microcomputer configuration used.

The time required to install the hardware or software package should be noted during a series of timing tests for each encryption product. The time required to encrypt and decrypt 5K-, 10K- and 50K-byte ASCII text files should be determined, and, if there are software programs that have been written in-house, two typical programs should be timed both in source and executable code.

If graphics are used extensively, some of these programs should also be time-tested as well.

SOME boards and packages will function well on one machine but then falter when transferred to an identically configured machine from another manufacturer.

Timing tests should be run with the test data on both floppy and hard disks. If the microcomputer configuration has a random-access memory (RAM) disk, test that as well. Encryption of 10K-byte ASCII text files generally requires about 30% to 40% less time on a hard disk than on a floppy. Timing tests using a RAM disk show about a 50% time savings over a floppy.

Watch for variables

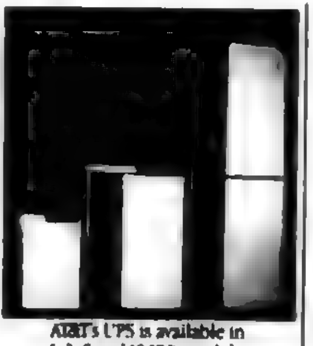
After the basic data has been obtained on a typical machine, select two or three of the most likely encryption choices, and test several of the files and programs on other machine makes and configurations. It has been our experience that some boards and packages will function well on one machine but falter when transferred to an identically configured machine from another manufacturer.

Machinery is not the only variable that can affect performance. We have found encryption software and hardware are also affected by different versions of the same operating system, differences between the same versions of IBM's PC-DOS and Microsoft Corp.'s MS-DOS and different makes of memory expansion boards.

Proper evaluation is a lengthy procedure. If a company uses one brand of microcomputers and similar configurations throughout its organization, it will take about six to eight hours to conduct a single product test.

If there is a considerable mix of machine makes and configurations, however, it may require a company up to three or four days to conduct a complete evaluation of a single product.

HAROLD JOSEPH HIGHLAND



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Avoiding sins of transmission: Ethics for the corporate network

BY RON SCHNEIDERMAN

Ethics. It's a subject very much in the news today. And the news isn't good.

We hear about ethical deterioration in politics (the Iran-Contra affair), religion (Jim Bakker's PTL Club) and business (Wall Street's insider trading). And now, ethical drift is something that has to be considered in connection with microcomputing and microcomputer networks.

The most common security problems today have little to do with hackers, terrorists or even organized crime. The more likely threats, according to security specialists and several recent studies, are posed by internal fraud and sabotage committed by disgruntled employees — someone, for example, who may have been passed over for a promotion or someone who didn't get the office by the window.

A recent study by International Resource Development, Inc., a Norwalk, Conn., market research organization, indicates that while corporate data processing managers at large companies used to be concerned about security breaches originating outside the company, they now realize that the greatest threat may be from their own employees. "In talking with top DP managers," the study says, "it repeatedly emerges that the disgruntled or dishonest employee is viewed as 'Enemy No. 1.' "

The federal government's own statistics indicate that only about 5% of its data security problems are caused by hackers. The government's main problem is abuse and misuse by its own employees.

Wire pirates

The trend toward networked computers increases opportunities for mischief and moral lapses. Some 220,000 local-area networks (LAN) will be installed this year worldwide, according to analysts at International Data Corp., a Framingham, Mass.-based market research firm. Those figures are up from 52,000 in 1984.

But workers may be using networks in ways that their companies never intended. And when it comes to sharing information on a network, issues of property rights and entitlement arise that blur the rules and sow seeds of mistrust.

"Networking, more than anything else, has caused the end of the old expectation that we're all friends," says Stephen Walker, president of Trusted Information Systems, Inc., a consulting firm active in commercial and government security work.

A team of faculty members at the Stevens Institute of Technology in Hoboken, N.J., recognized the problem while conducting a study for the National Science Foundation in Washington, D.C. The project, called Ethical Implications of Computer Networking in Science and Government, found that the "need to know" has become so strong among members of the scientific community that many authors of scientific papers distribute "preprints" of their research results before their papers are published. The project predicted that networking will facilitate this trend.

This practice is bound to raise a number of ethical issues revolving around ownership of data, according to I. Richard Lapidus, a physics professor at Stevens Institute and study team member.

"In a networked environment, where investigators may be required to make their raw data available to other scientists," he says, "disputes about ownership will become commonplace, and a set of rules will have to be developed to resolve them."

> "NETWORKING, more than anything else, has caused the end of the old expectation that we're all friends."
>
> STEPHEN WALKER
> TRUSTED INFORMATION SYSTEMS, INC.

In fact, the potential for abuse in computer networking, particularly where plagiarism is concerned, was addressed (albeit briefly) in a federal government report, "Intellectual Property Rights in an Age of Electronics and Information," published last year.

The report points out that, since computer networks allow on-line creation and collaboration in a haphazard and informal fashion, each contributor may be anonymous and his contributions, unrecorded. Under these circumstances, the authors ask, who has a right to claim ownership of a work if it becomes commercially valuable? What is to prevent business and scientific or engineering professionals, or others in the workplace, from using information from someone else's report or memorandum for their own gain?

Battening down the LAN

The National Computer Security Center (NCSC) in Fort George G. Meade, Md., has worked out a set of guidelines for securing computer networks, to be published in August. Known internally as the "brown book" and based on interpretations of the NCSC's Trusted Computer Systems Evaluation Criteria, or "orange book," these guidelines are in demand. Agency officials have received several queries from large corporations, mainly insurance companies and banks, expressing interest in adapting them for their own use. Among the book's contents are sections covering integrity of and denial of access to LANs.

Several Fortune 500 companies have also expressed interest in a secure LAN developed by Verdix Corp. in Chantilly, Va., for the NCSC. Verdix has already installed at least two of the networks at defense contractors' facilities.

Gaurang Shah, Verdix's director of marketing, is not surprised by the interest. "You can't have the R&D department on the same network with accounting and payroll," he says. "That's the way it works in many places, and it doesn't make sense. There are too many opportunities for abuse."

Unlike the government, the commercial world normally does not classify its information, and that, according to Shah, is a big mistake. "Top management should be allowed access to just about any of the company's computer data, but that's not true of others in the company," he says.

In the user's hands

Who is responsible for ensuring that traditional ethical values are applied to network users? Currently, "it's an MIS responsibility," says Don Monoco, a managing partner at Chicago's Arthur Andersen & Co., an accounting and management consulting firm, and head of the company's Advanced Systems Group.

"But I don't think it's being addressed adequately today," he says. "MIS has to be concerned with who has access to files, but ultimately it rests with the users. It's their system and their information, and they should exercise the proper level of control." Ideally, he says, that will come with time.

Monoco identifies two key issues and says both should be addressed. "Are the software and hardware solutions adequate to provide the level of controls the application demands? And are the users disciplined enough to take advantage of those solutions and know what is secure and what isn't?" he asks.

Perhaps the best example of how murky issues of ownership and control of data can become in shared systems is provided by current events. Lt. Col. Oliver North and his associates thought they had purged their own messages from IBM's Professional Office System (Profs), an intraoffice electronic mail system used by the White House. But congressional investigators found all the Profs notes in a backup file and are using them against North and others in their investigation of the Iran-Contra affair. It's to the political pundits to decide if that's ethical. •

Schneiderman is a free-lance writer based in Bedminster, N.J.

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Making disaster recovery for the micro painless

BY BELDON MENKUS

The widespread introduction of microcomputers has created a host of new disaster exposures and recovery problems, most of which are not addressed in existing disaster recovery plans. The typical data processing disaster recovery plan reflects 20-year-old assumptions and is designed only to restore the critical activities carried out in a single-site mainframe data processing facility.

Not all data processing activities undertaken with microcomputers are essential to business operations. A microcomputer used to manage sales or inventory activities in a branch office of a national organization is probably engaged in an essential computing activity. However, a microcomputer used primarily for text processing, electronic mail and remote data base content reference is not likely to be engaged in computing activities whose prompt restoration after a disaster are essential to the organization's recovery.

Insofar as microcomputers are used to carry out essential activities, they are also key elements in the overall disaster recovery process. Even if, for instance, the central data processing site survives a disaster, loss of either telecommunications capabilities or microcomputers at critical locations may reduce the organization's ability to restore essential data processing functions in a timely manner.

In addition, microcomputers may not be consistently configured. The software used may have been modified or even written from scratch by individual end users. And the infinite varieties of this software, along with the files used with it, may not even be backed up on any regular basis. Loss of the original software and files in this environment will mean that everything is lost.

Three-way street

The same risk assessment methods used in preparing a single-site data processing disaster recovery plan should be applied to an organization's microcomputer environment. Normally, there are three microcomputer-related disaster vulnerabilities for which recovery provisions must be made. These involve loss of the hardware itself, software that is unique to the company and data files whose contents are not duplicated elsewhere.

Since microcomputers typically are purchased and not leased, replacements for damaged or destroyed hardware will probably have to be bought from nearby retailer stocks. In situations in which a number of machines must be replaced, it may be necessary to draw upon the stocks of numerous retailers or of one or more distributors, which may result in intolerable delays in restoring essential data handling activities.

The hardware replacement process will be expedited if a single type of microcomputer is used consistently throughout the organization and if limits are placed upon the variety of enhancement and expansion boards used.

Microcomputer software that has been modified locally or obtained without documentation from electronic bulletin boards may prove to be almost impossible to replace in a timely manner. Of course, unduplicated files may be impossible to restore in any fashion. Again, as with microcomputer hardware, requiring the use of readily available commercial software products will help reduce the restoration problem. And modification of these application packages should be discouraged. Finally, regular — at least daily — backing up of unique microcomputer file contents should be required, especially when high-capacity hard disks are in use.

Improving the odds

Several things can be done to ensure that essential microcomputer activities are able to survive a disaster.

First, educate those using microcomputers about the need to conform to the controls described here. Second, arrange to have the organization's internal auditors verify microcomputer user compliance with disaster recovery plan requirements as part of their routine examinations. Third, include microcomputers and their users in the organization's periodic testing of the overall data processing disaster recovery plan.

The rapid growth in reliance upon microcomputers makes it essential that they just as rapidly be made an integral part of every organization's data processing disaster recovery plan. It will be relatively painless to ensure that they are covered by that plan. ●

Menkus is an independent information systems development and computer security consultant based in Middleville, N.J. He has been involved in data processing disaster recovery planning for more than 25 years and is the author of *Getting Started in Data Processing Disaster Recovery*, published by the Institute for Management Improvement.

VENDOR VIEWPOINT

Modems and the protection of dial-up communications data

BY FRANCIS BACON

Although network management is the first requisite for all network security, it is even more true for dial-up than for dedicated networks.

Until recently, the phrase "dial-up network" was a contradiction in terms. Traditionally, networks have been thought of as a centrally managed collection of established links that connect several or even many senders and receivers on a more or less permanent basis.

The term "dial-up," on the other hand, conjures up pictures of ad hoc connections between pairs of modems. Modems are connected temporarily by one modem dialing the phone number of another. The modems are then disconnected when their hosts have nothing more to communicate. There is no "network" per se, only independent modem connections using public telephone circuits. Any modem can simply call any other modem in the world that understands its protocol and whose host has been programmed to respond to the caller.

All this is changing with more intelligent modems. It is now entirely possible to impart network-like qualities to temporary connections that utilize the public telephone system. The key difference between the new modems and their predecessors is that they can be programmed to communicate only with certain other modems or classes of modems. In addition, this programming can be changed dynamically from a central point.

In other words, a company can define established, and even exclusive, relationships among various nodes without keeping the links continuously active.

Those relationships can be defined by various link attributes such as data speed, security level, the presence or absence of data compression and who is allowed to talk to whom. Further, these attributes can be controlled and set dynamically from a central host without remote operator intervention.

Of course, public telephone lines are just that — public — which makes them easy targets for information thieves. Many of the security problems inherent in dial-up lines can be solved, however, by making those lines part of a managed network.

The most basic threat to dial-up communications originates from the fact that the only thing standing between a computer and anyone with a telephone is a pair of modems. Historically, the first line of defense against someone calling into a computer and getting information is password protection on the host itself. This is the method of protection with which everyone who dials into a host is most familiar. A second threat is a tap on the telephone line.

Once dialogue occurs between a remote user and a host, it is possible to simply monitor the dialogue using a tap and a third modem. There is nothing to stop someone using a phone tap from monitoring transmitted data or from simply stealing the password needed to gain independent access.

> MANY of the security problems inherent in dial-up lines can be solved by making those lines part of a managed network.

Managed modems — those with built-in management features — can stand up to both of these threats by providing password and callback protection before a connection is even made to the host. Since a remote user must know two passwords — the modem's and the host's — and be located at a predefined telephone number before access is permitted, security is significantly enhanced, while a drain is removed from CPU resources.

In regard to line taps, the managed modems allow for a number of defenses, including data encryption and data compression.

Data encryption means the bit patterns representing the characters are rearranged in an unpredictable way before going out on the line and then are put back together in the proper sequence at the other end. Data compression, which reduces the number of bits needed to represent characters (in order to increase effective line speed) accomplishes very good data encoding as a by-product of compression. In fact, compressed data that is also encrypted is doubly hard to read by unauthorized line intruders. To do so, an intruder must have both the encryption code — set at random and known only to the hardware — and the same modem type as that used by the victim.

Hidden passwords are modem-level passwords that can be defined remotely from a central site with no involvement by those at the modem's location. When a dial connection is established, the modems exchange predefined hidden passwords. Only modems with approved passwords are allowed to communicate with the host. Access is denied at the point of entry to the central-site modem pool rather than at the exit.

Security is management

It is one thing to implement a specific security option in a single modem or pair of modems. It is another to implement a number of options or combinations of options across hundreds of modems in a planned fashion.

Questions like, "Who will talk to whom?" and "At what level of security?" are ones that companies must ask themselves before installing a dial-up network. The actual implementation, however, is very straightforward.

Managed modems are, of course, required. Network configuration is usually performed through a personal computer using high-level commands that directy address intelligence within the modems. Network parameters, including security, are defined from a single site, which has a single unified perspective of the entire network.

What management of a dial-up network really means is defining how modems will respond to other modems that attempt connection. These relationships give users not only the impression but the reality of a network. A big part of these modem relationships is security.

Many companies have delayed implementation of a security system because of historically high costs for security equipment to be used with modems. With the advent of managed modems, complete dial network security can now be installed for the cost of the modem alone.

So what is the relationship between dial-up network management and security? The answer is fundamental: Management makes security possible. ●

Bacon is chairman of Telcor Systems Corp., a maker of data compression modems and network management and security products.

Microcomputer security software

COMPANY	PRODUCT	OPERATING SYSTEM(S) REQUIRED	RANDOM-ACCESS MEMORY SIZE REQUIRED	DISK STORAGE REQUIRED	COPY-PROTECTED	NUMBER OF ENCRYPTION/ DECRYPTION ROUTINES	MENU-DRIVEN	DATA COMPRESSION SEPARATE OR BUILT-IN	OVERWRITES ORIGINAL TEXT	PRODUCES PRINTABLE ENCRYPTED FILES	MAXIMUM NUMBER OF KEY CHARACTERS	OFFERS USER-SELECTED KEYS	OFFERS ON-SCREEN ECHO OF KEY	INCLUDES AUDIT-TRAIL FACILITY	WORKS ON LOCAL-AREA NETWORK	PERMITS MICRO-TO-MAINFRAME TRANSFER	TIME AND DATE STAMPING	PRICE
A-O Electronics, Inc. [illegible] 491-0946	[illegible] 100	Any PC-DOS 2.0 and higher	0	Any	NA	1	Yes	NA	Yes	Yes	8	Yes, choice	Yes	Yes	Yes	Yes	No	[illegible]
	[illegible] 80	PC-DOS, MS-DOS 2.0 and higher	0	Any	NA	1	Yes	NA	Yes	Yes	16	Yes, choice	Yes	No	Yes	Yes	No	[illegible]
Advanced Computer Security Concepts (703) 354-0985	Cryptogard	PC-DOS 2.0 and higher	2K bytes	6K bytes	NA	1	No	NA	Yes	No	—	No	No	No	No	Yes	Yes, purchase option	Contact vendor
[illegible] & Co. [illegible]	Cylock	MS-DOS 2.0 and higher	64K, 128K, 256K bytes	[illegible] bytes	No	2	Yes	Built-in	Yes	Yes	8	Yes	No	Yes	Yes	No	Yes	[illegible]
American Computer Securities (a division of Sendex, Inc.) (219) 232-2770	Easylock	MS-DOS 2.0 and higher	68K bytes	47K bytes	No	1	Yes	Built-in	Yes, purchase option	Yes	8	Yes	No	No	Yes	No	No	[illegible]
American Computer Security Industries [illegible]	[illegible]	PC-DOS 2.1, 3.1, 3.2 and compatibles	[illegible] bytes	—	Yes	—	Yes	—	Yes	—	—	—	—	Yes	Yes	Yes	—	From [illegible]
Analytics Communications Systems, Inc. (703) 471-0892	The Personal Computer Security Module	MS-DOS 2.1 and higher	—	File-dependent	Yes	NA	Yes	NA	Yes	Yes	64	No	No	Yes	Yes	Yes	Yes	$1,125
[illegible], Inc. [illegible]	[illegible] Encryption	PC-DOS 2.1 and higher	[illegible] bytes	[illegible] bytes	No	2	No	NA	Yes	No	8	Yes	No	No	Yes	Yes	Yes	From [illegible]
Basic Data Systems, Inc. (301) 279-2791	Crypto	PC-DOS 2.1 and compatibles	512K bytes	—	Yes	—	Yes	—	Yes	Yes	—	Yes	—	—	Yes	—	—	$25 (per single user), $500 (for agency or entire bank)
	Crypto MS-DOS filter	MS-DOS 2.0 and higher	20K bytes	20K bytes	No	1	No	NA	Yes, choice	Yes, purchase option	256	Yes	Yes	No	Yes	Yes	No	$25
[illegible] Associates, Inc. [illegible]	[illegible] Tool Kit	MS-DOS, PC-DOS 2.0 and higher	[illegible] bytes	0	No	2	No	Built-in	Yes	No	16	Yes	No	No	No	No	No	[illegible]
Borland International (408) 438-8400	Superkey: Productivity Booster	MS-DOS, PC-DOS 2.0 and higher	128K bytes	44K bytes	No	2	Yes	NA	Yes	Yes	12	Yes	Yes, asterisk only	NA	Yes	No	Yes	$100
[illegible] Software Associates, Inc. [illegible]	Lock-Up	MS-DOS 2.0 and higher	[illegible] bytes	64 bytes more than normal program	Yes	1	Yes	—	Yes	Yes	[illegible]	Yes	No	No	Yes	No	No	[illegible]
Digital Pathways, Inc. (415) 964-0707	Access Key Management	PC-DOS 2.1 and higher	256K bytes	256K bytes	No	16	No	NA	No	Yes	64	Yes	No	Yes	Yes	Yes	Yes	$3,025
[illegible] [illegible]	[illegible]	All current MS-DOS; Unix System V, Release 2 and higher	[illegible] bytes	[illegible] bytes	No	2	Yes, choice	Separate	No	Yes	[illegible]	Yes	Yes, purchase option	No	Yes	No	Yes	From [illegible]
Enigma Logic, Inc. (415) 827-5707	PC-Safe (Dynamic Password Access Control)	PC-DOS, MS-DOS 2.0 and higher	64K bytes	Any	No	65,000	Yes	NA	Yes	No	32	Yes	Yes	Yes	Yes	Yes	Yes	$275 or $625
	PC-Safe (Fixed)	PC-DOS, MS-DOS 2.0 and higher	64K bytes	Any	No	65,000	Yes	NA	Yes	No	32	Yes	Yes	Yes	Yes	Yes	Yes	$99
[illegible] Systems Corp. [illegible]	[illegible] PC Security Package	PC-DOS, MS-DOS 2.0 and higher	[illegible] bytes	[illegible] bytes	No	1	Yes	NA	Yes	No	[illegible]	No	No	Yes	No	No	No	[illegible]
Flinder Software Laboratories (716) 693-0584	Maglock	PC-DOS, MS-DOS 2.0 and higher	Less than 64K bytes	20 bytes per file secured	No	1	Yes	NA	Yes	No	8	Yes	No	Yes	Yes	No	Yes	$89
[illegible] Engineering, Inc. [illegible]	Crypt Library [illegible]	PC-DOS 2.0 and higher	64K bytes	0	No	—	—	—	Yes, purchase option	No	8 or 16	Yes	Yes, purchase option	Yes, purchase option	Yes, purchase option	Yes, purchase option	Yes, purchase option	[illegible]
Inset Systems, Inc. (800) 828-8088	Xpack	PC-DOS, MS-DOS 2.0 and higher	38K to 40K bytes	File-dependent	No	8**	Yes	Built-in	Yes, purchase option	Yes	8	Yes	Yes	No	Yes	Yes	Yes	$49.95
	Inset	PC-DOS, MS-DOS 2.0 and higher	115K, 128K bytes	File-dependent	No	1	Yes	Built-in	No	Yes	8	Yes	For screen encryption only	No	Yes	No	Yes	$99
[illegible] Systems Ltd. [illegible]	[illegible]	MS-DOS 2.0 and higher	Any	Any	No	3	Yes	NA	Yes	Yes	8	Yes	Yes, choice	Yes	Yes	Yes	Yes	[illegible]
Jones Futurex, Inc. (916) 635-3972	Autocrypt	PC-DOS 2.0 and higher	64K bytes	0	No	1	Yes	Built-in	Yes	No	12	No	No	No	Yes	Yes	No	$95
Lattice, Inc. [illegible]	[illegible]	MS-DOS 2.0 and higher	128K bytes	360K bytes	No	2	No	Built-in	NA	Yes	16	Yes	Yes, purchase option	No	Yes	Yes	No	[illegible]
Linear Systems, Ltd. (204) 783-2228	The Data Cage	PC-DOS 3.0 or higher	256K bytes	360K bytes floppy	No	1	Yes	Separate	No	No	Unltd.	Yes	Yes	No	Yes	Yes	Yes	$374

The companies included in this chart responded to a recent telephone survey conducted by *Computerworld*. Further product information is available from vendors. Research assistance provided by Harold Joseph Highland of Compulit, Inc.

COMPANY	PRODUCT	OPERATING SYSTEM(S) REQUIRED	RANDOM-ACCESS MEMORY SIZE REQUIRED	DISK STORAGE REQUIRED	COPY-PROTECTED	NUMBER OF ENCRYPTION/ DECRYPTION ROUTINES	MENU-DRIVEN	DATA COMPRESSION SEPARATE OR BUILT-IN	OVERWRITES ORIGINAL TEXT	PRODUCES PRINTABLE ENCRYPTED FILES	MAXIMUM NUMBER OF KEY CHARACTERS	OFFERS USER-SELECTED KEYS	OFFERS ON-SCREEN ECHO OF KEY	INCLUDES AUDIT-TRAIL FACILITY	WORKS ON LOCAL-AREA NETWORK	PERMITS MICRO-TO-MAINFRAME TRANSFER	TIME AND DATE STAMPING	PRICE
MCTel, Inc. [illegible]	P/C Privacy	All MS-DOS and PC-DOS, CP/M, OS/2, Macintosh, Apple DOS	16K bytes	16K bytes	No	2	Yes	Separate	Yes	Yes	Unltd.	Yes, purchase option	No	Yes, purchase option	Yes	Yes	Yes	$140
MPPI, Ltd. (312) 996-6401	Cryptlock	All PC-DOS, MS-DOS	8.5K bytes	8.5K bytes	No	1	Yes	Built-in	Yes	No	8	Yes	Yes	No	Yes	No	No	$50
Mycroft Labs, Inc. [illegible]	Crypto-Mite with Message Authentication Code	All MS-DOS, PC-DOS	[illegible] bytes	[illegible] bytes	No	2	Yes	Separate	No	Yes	8 or 16	Yes	Yes	No	Yes	Yes	Yes	[illegible]
Obsidian Computer Systems (415) 839-0101	Super Encryptor II	All MS-DOS	128K bytes	Less than 20K bytes	Yes	2	Yes	Built-in	Yes	Yes	Unltd.	Yes	Yes	No	Yes	Yes	No	$100
	Personal Courier	All MS-DOS	128K bytes	Less than 20K bytes	Yes	2	Yes	Built-in	No	Yes	Unltd.	Yes	Yes	No	Yes	Yes	No	$75
	Corporate Courier	All MS-DOS	128K bytes	Less than 20K bytes	Yes	2	Yes	Built-in	Yes	Yes	Unltd.	Yes	Yes	No	Yes	Yes	No	$125
Prime Factors, Inc. [illegible]	[illegible]	All MS-DOS, PC-DOS	128K bytes	71K bytes	No	1	Yes	Separate	No	Yes	80	Yes	Yes, purchase option	No	Yes	Yes	Yes, purchase option	Contact vendor
	Descrypt/[illegible] 8088, Z-80, 6502 microprocessor families	Operating system-independent	1K to 4K bytes	NA	No	1	No	Separate	Yes, purchase option	Yes, purchase option	16	Yes	No	No	Yes	Yes	Yes, purchase option	Contact vendor
	Descrypt/C for any C Compiler	Operating system-independent	1K to 4K bytes	NA	No	1	No	Separate	Yes, purchase option	Yes, purchase option	16	Yes	No	No	Yes	Yes	Yes, purchase option	Contact vendor
Qualtec Data Products, Inc. (408) 496-6184	File-Guard	MS-DOS 2.0 and higher	32K bytes	Yes, purchase option	No	1	Yes	Built-in	No	Yes	11	Yes	No	No	Yes	Yes	No	$99
RSA Data Security, Inc. [illegible]	Mailsafe (RSA Digital Signature)	MS-DOS 2.0 and higher	[illegible] bytes	[illegible] bytes	No	1	Yes	Built-in	Yes	Yes	[illegible]	Yes	No	No	Yes	Yes	Yes	$250
Secure Systems Technology, Inc. (800) 647-5580	Confidante	All MS-DOS, PC-DOS	12K bytes	30K bytes	No	1	Yes	NA	Yes	No	64	Yes	Yes, purchase option	No	Yes	Yes	Yes	$99
[illegible] [illegible]	[illegible]	MS-DOS, PC-DOS 2.0 and higher	Less than 96K bytes	Application-dependent	No	1 standard, 1 optional	Yes	Yes, purchase option	Yes	Hardware-dependent	26	Yes	Yes, choice	Yes	Yes	No	No	[illegible]
Sentry Systems, Inc. (816) 471-7472	Stoplock IV	MS-DOS, PC-DOS 3.2 and higher	NA	10M bytes	NA	3	Yes	—	Yes	No	16	Yes	Yes	Yes	Yes	Yes	Yes	$695
[illegible], Inc. [illegible]	[illegible]	All PC-DOS, MS-DOS	[illegible] bytes	12K bytes	No	2	Yes	NA	Yes	Yes	18	No	Yes	Yes	No	Yes	Yes	[illegible]
Star Gate Technologies, Inc. (800) STARGATE	DEM-1000	PC-DOS, MS-DOS 2.1 and higher	5K to 10K bytes	0	No	1	Yes	NA	No	Yes	56	Yes	No	Yes, limited	Yes	Yes	Yes	$200
[illegible], Inc. [illegible]	[illegible]	MS-DOS, PC-DOS 2.0 and higher	0, 2K to 180K bytes	[illegible] bytes	No	11	Yes	NA	Yes, purchase option	No	110	Yes	Yes, purchase option	Yes	Yes	Yes	Yes	[illegible]
	[illegible]	MS-DOS, PC-DOS 2.0 and higher, [illegible]	0	[illegible] bytes	No	1,611+	Yes	NA	Yes, purchase option	Yes, purchase option	164	Yes	Yes, purchase option	Yes	Yes	Yes	Yes	[illegible]
Tact Technology, Inc. (215) 569-1300	Disksentry	PC-DOS, MS-DOS 2.0 and higher	128K bytes	128K bytes	No	2	Yes	Built-in	Yes	Yes	8 to 100	Yes	Yes	No	—	Yes	Yes	Contact vendor
[illegible], Inc. [illegible]	[illegible] System 301	MS-DOS, PC-DOS 2.1 and higher, Xenix	0, [illegible] bytes	[illegible] bytes per user	Yes	2	Yes	Built-in	Yes, choice	Yes	NA	Yes, choice	Yes	Yes	Yes	No	Yes	Contact vendor
	[illegible] System	MS-DOS, PC-DOS 2.1 and higher, Xenix	0, [illegible] bytes	[illegible] bytes per user	Yes	2	Yes	Built-in	Yes, choice	Yes	NA	Yes, choice	Yes	Yes	Yes	No	Yes	Contact vendor
Trigram Systems (412) 422-8976	Datasafe	All PC-DOS, MS-DOS except 1.0	64K bytes	64K bytes	No	1	Yes	NA	Yes	No	59 ASCII or 56-bit hex key	Yes	Yes	No	Yes	No	No	$99
United Software Security, Inc. [illegible]	[illegible]	PC-DOS 1.0 or 2.0 and higher	[illegible] bytes	[illegible] bytes	No	2	Yes	NA	Yes	Yes	[illegible]	Yes	Yes	No	Yes	Yes	No	Contact vendor
Winterhalter, Inc. (313) 662-2002	Secure	MS-DOS, PC-DOS 2.0 and higher	128K bytes	300K bytes	No	1	Yes	NA	Yes	No	115	Yes	No	Yes	No	Yes	No	$119.95

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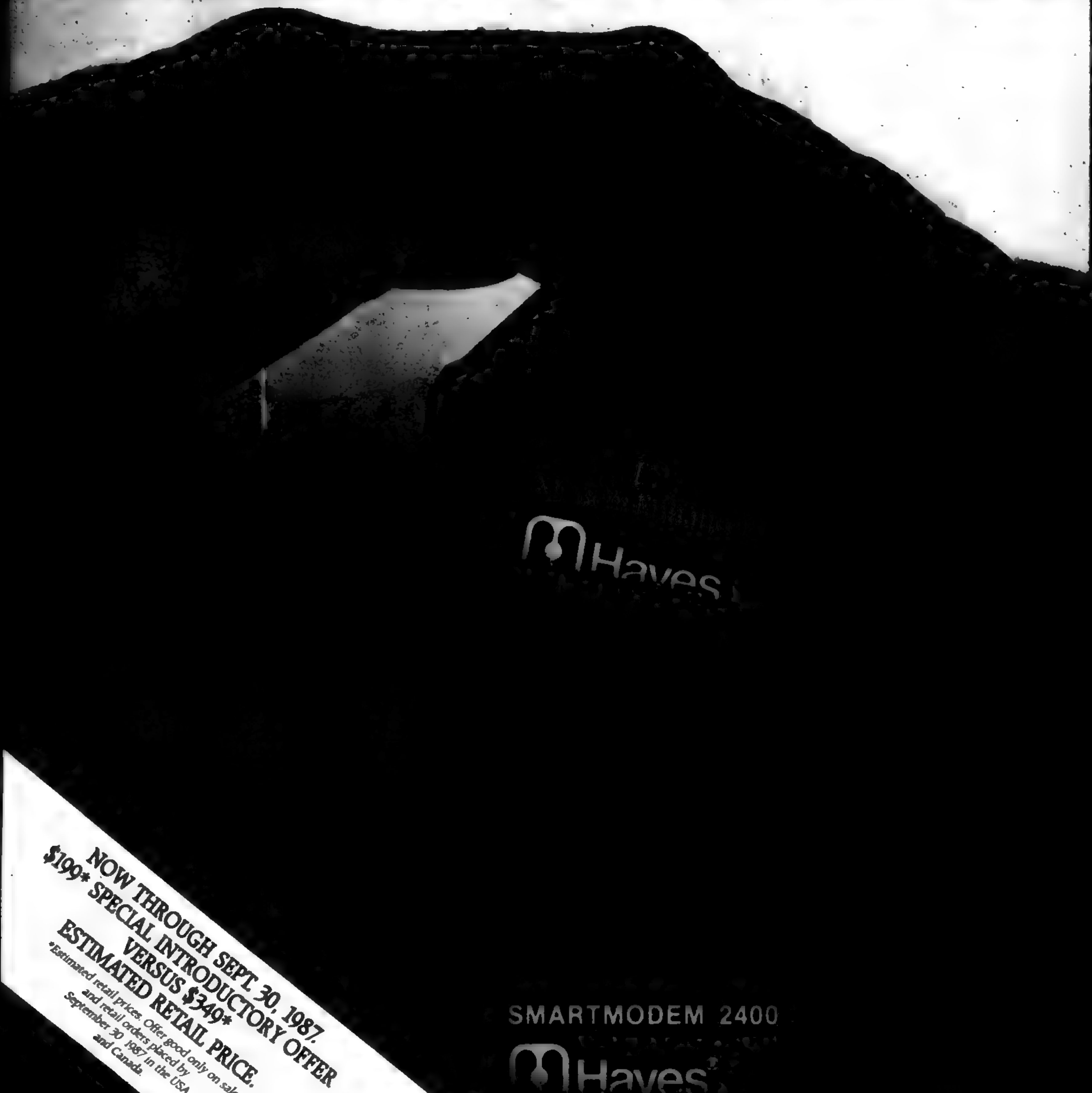

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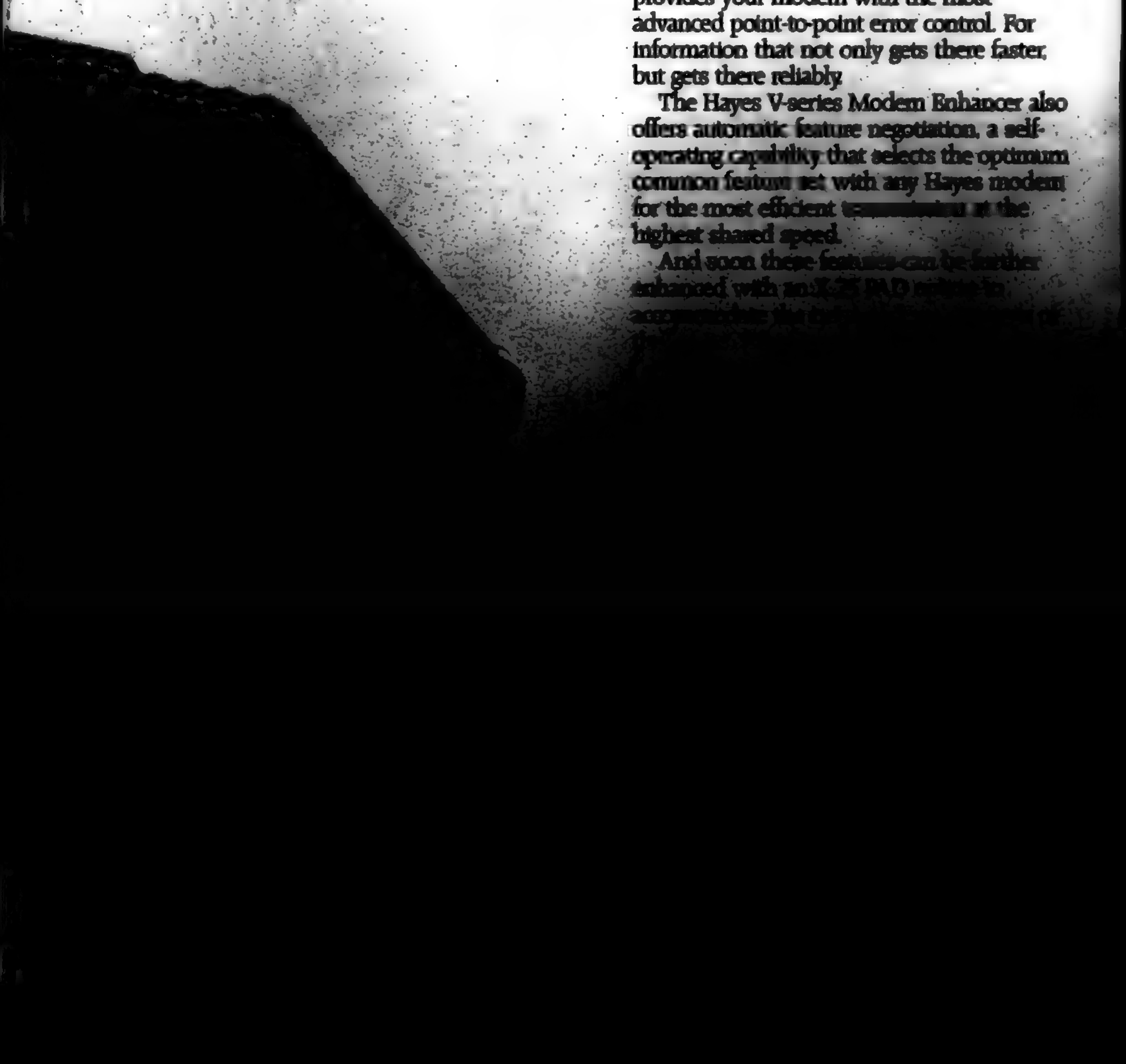

CALENDAR

JULY 19-25

AM/FM International Conference X. Snowmass, Colo., July 20-23 — Contact: Barbara Emery, Automated Mapping/Facilities Management International, Suite 820, 8775 E. Orchard Road, Englewood, Colo. 80111.

The Federal Desktop Publishing Conference and Product Showcase. Washington, D.C., July 20-23 — Contact: FDPC coordinator, 3825-I S. George Mason Drive, Falls Church, Va. 22041.

The Desktop Publishing Conference. Arlington, Va., July 21-22 — Contact: The JLS Group, Inc., 7485 Demille Court, Annandale, Va. 22003.

National Fincom: Financial and Computer Automation Conference. New York, July 22-23 — Contact: Jim Mion, H. A. Bruno, Inc., 333 Sylvan Ave., Englewood Cliffs, N.J. 07632.

Microtrends '87. New York, July 22-24 — Contact: International Communications Industries Association, 3150 Spring St., Fairfax, Va. 22031.

JULY 26-AUG. 1

Computer Associates International, Inc. Annual User Conference. Orlando, Fla., July 26-31 — Contact: Barbara Peacock, Computer Associates International, 711 Stewart Ave., Garden City, N.Y. 11530.

1987 Summer Computer Simulation Conference. Montreal, July 27-30 — Contact: The Society for Computer Simulation, P.O. Box 17900, San Diego, Calif. 92117.

Siggraph '87 — The Fourteenth Annual Conference on Computer Graphics and Interactive Techniques. Anaheim, Calif., July 27-31 — Contact: Conference Management, Smith Bucklin and Associates, Inc., Suite 600, 111 E. Wacker Drive, Chicago, Ill. 60601.

AUG. 2-8

Recognition Technologies Users Association Annual Forum: Remittance and Document Processing. San Francisco, Aug. 2-5 — Contact: Recognition Technologies Users Association, P.O. Box 2016, Manchester Center, Vt. 05255.

25th Annual Conference of the Urban and Regional Information Systems Association. Fort Lauderdale, Fla., Aug. 2-6 — Contact: URISA, 319 C St. S.E., Washington, D.C. 20003.

Resource Access Control Facility Users Conference. Anaheim, Calif., Aug. 3-7 — Contact: Vanguard Integrity Professionals, Suite 109, 1720 E. Garry St., Santa Ana, Calif. 92705.

Desktop Productivity Conference. Boston, Aug. 5-7 — Contact: The Seybold Group, Inc., Suite 100, 100 Homeland Court, San Jose, Calif. 95112.

Extending the Human Mind: Computers in Education. Eugene, Ore., Aug. 6-9 — Contact: University of Oregon Continuation Center, 1553 Moss St., Eugene, Ore. 97403.

AUG. 9-15

Spocade III CAD/CAM Conference. Coeur d'Alene, Idaho, Aug. 9-11 — Contact: Spocad,

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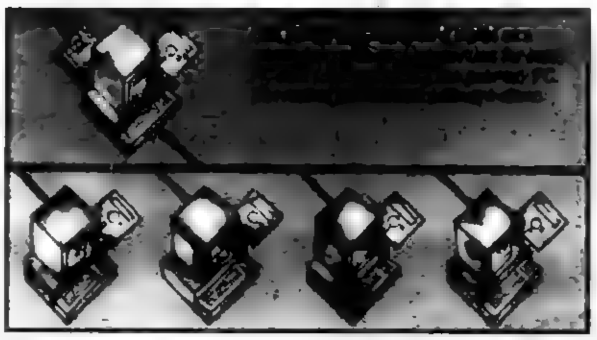

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Very High Performance Engineering Workstations. Bedford, Mass., Aug. 9-11 — Contact: Institute for Graphic Communication, 375 Commonwealth Ave., Boston, Mass. 02115.

International Computers in Engineering Conference and Exhibition. New York, Aug. 9-13 — Contact: Meetings Department, American Society of Mechanical Engineers, 345 E. 74th St., New York, N.Y. 10017.

2nd Annual Summer Camp for the Information Professional. Bedford, N.H., Aug. 9-14 — Contact: Arnoudse & Ouellette Associates, Inc., #66, 40 S. River Road, Bedford, N.H. 03102.

Computer Art & Design Conference. Chicago, Aug. 10-14. Contact: National Computer Graphics Association, Suite 200, 2722 Merrilee Drive, Fairfax, Va. 22031.

RDB Frontiers '87. Boston, Aug. 10-14 — Contact: The Relational Institute, Suite 106, 6489 Camden Ave., San Jose, Calif. 95120.

Macworld Expo/Boston. Boston, Aug. 11-13 — Contact: World Expositions, Mitch Hall Associates, P.O. Box 860, Westwood, Mass. 02090.

Third Annual Access Technology 20/20 Users' Group Meeting. Boston, Aug. 12-14 — Contact: Access Technology, Inc., 6 Pleasant St., Natick, Mass. 01760.

National Computer Graphics Association's Industry Rountable. San Diego, Aug. 13 — Contact: Barbara Iazzetti, NCGA, Suite 200, 2722 Merrilee Drive, Fairfax, Va. 22031.

AUG. 16-22

The Tenth Annual McCormack & Dodge User Conference. Chicago, Aug. 16-20 — Contact: M&D, 1225 Worcester Road, Natick, Mass. 01760.

National Computer Graphics Association CAD/CAM '87 Conference and Exposition. Boston, Aug. 17-20 — Contact: NCGA, Suite 200, 2722 Merrilee Drive, Fairfax, Va. 22031.

1987 International Conference on Parallel Processing. St. Charles, Ill., Aug. 17-21 — Contact: Pheasant Run, P.O. Box 64, St. Charles, Ill. 60174.

AUG. 23-29

Share 69. Chicago, Aug. 23-28 — Contact: Share, Inc., 111 E. Wacker Drive, Chicago, Ill. 60601.

Tex Users Group's Annual Conference. Seattle, Aug. 24-26 — Contact: Tex Users Group, c/o American Mathematical Society, P.O. Box 9506, Providence, R.I. 02940.

The Omni User Second Annual Technical Conference (on IBM's System/34, 36 and 38). Chicago, Aug. 25 — Contact: The Omni User, P.O. Box A 3031, Chicago, Ill. 60690.

Voice Recognition Applications in Manufacturing. Chicago, Aug. 25-26 — Contact: Nancy A. Loerch, Society of Manufacturing Engineers, One SME Drive, P.O. Box 930, Dearborn, Mich. 48121.

First Conference on Speech Technology in Healthcare. San Francisco, Aug. 26-27 — Contact: Registrar, Institute for Medical Record Economics, 121 Mount Vernon St., Boston, Mass. 02108.

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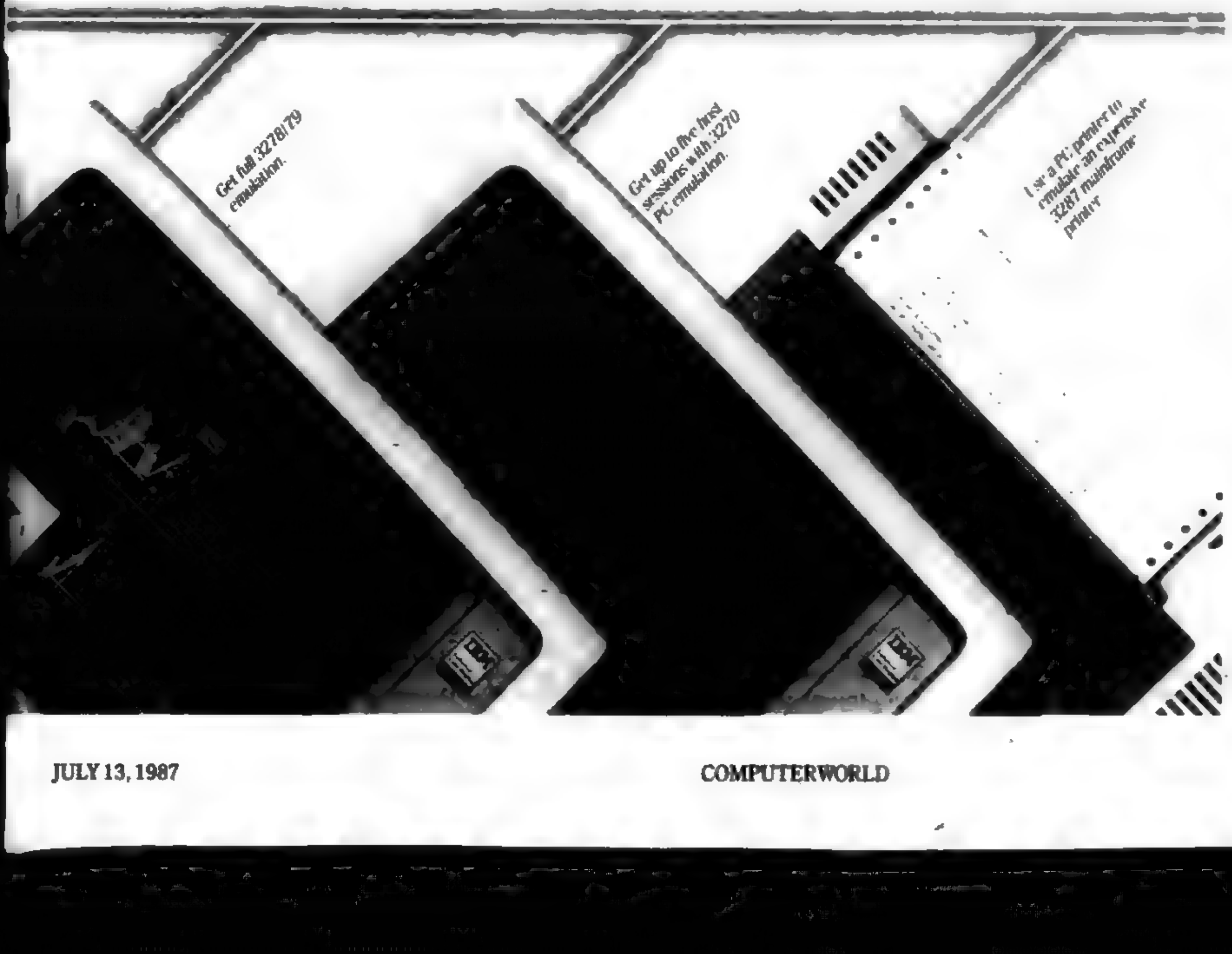
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Phoenix	11/4
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Portland	10/6
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Tampa	10/7
Washington, D.C.	8/7, 9/9, 10/7, 11/5, 12/2
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Toronto	8/19, 11/5, 12/2
Vancouver	10/8
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Users' bonds

FROM PAGE 83

come, as MIS tries to maintain control over users and users continue to strive for greater independence.

In the beginning, the high priests of MIS largely controlled corporate computing on the basis of their exclusive command of the technology and the highly centralized nature of early systems.

But this state contained within it some of the seeds of its own decline — chiefly, the development of massive backlogs and an inability, or unwillingness, on the parts of many MIS professionals to understand the needs of end users.

Bigger they are . . .

With the personal computer revolution, users could seize the means of processing for many of their individual needs. Centralized control gave way, depending on the situation, to anything from power sharing between MIS and users to a form of anarchy, with users doing their own things.

This swing of the pendulum ran up against its own constraints, however. Many senior managers realized that they were blowing a significant share of their investments in PCs. Sometimes, the spending was almost totally squandered because the machines simply weren't being used — or were being used for nonproductive purposes like games of *Leather Goddesses of Phobos*.

In other cases, PCs have been put to highly productive use, but their potential hasn't always been reached, due to a lack of standardization, connectivity and integration with corporate systems.

Thus, generally in the past three years, the forces of centralized control have reasserted themselves, establishing standard hardware and software, regulating purchases, installing local networks and forging links — highly controlled links, these forces hope — to corporate data.

Looking ahead for the most part now, this reassertion of control again offers the potential for a reversal. For as the networked PCs gain greater capabilities through developments such as more truly distributed processing and data bases, end users can exert even more influence.

> SOMETIMES PC spending was almost totally squandered because the machines were being used for purposes like games of *Leather Goddesses of Phobos.*

Live bias-free or die

New Hampshire Governor John Sununu, a former technical consultant, suggested the trend when he recently told *Computerworld*, "I'd rather go to the raw, unadulterated data" to avoid bias that creeps in when others summarize it and pass it on.

One can also see in this development the basis for a return swing as increasingly sophisticated corporate networks give MIS organizations more control over the use of the PCs that are tied to it. While top management will most often make the primary responsibility of MIS organizations accommodating the needs of end users, in the interest of efficiency it will also encourage MIS to maintain tight control of the network.

MIS may be responsible for backing up all PCs, regulating their access to the network and off-loading processing and storage to them.

Power to the people

It's important to note that this natural process is going somewhere or, perhaps more accurately, is being taken somewhere. Increasingly, top management is ensuring that users ultimately control information processing because they are the organization's producers.

Steps that senior management is taking to do this include spinning off much of the role of MIS from the corporate staff to line units and appointing former users to head MIS. Bank of Boston Corp., for example, has distributed MIS operations to five divisions in conjunction with a companywide decentralization and has hired a top information systems executive whose experience is in general management rather than information technology.

This drive by management to ensure users' control of information technology has its own natural, driving force — capitalism's guiding principle of survival of the fittest.

Ludlum is *Computerworld*'s senior editor, management.

Theses win $10,000

WASHINGTON, D.C. — The International Center for Information Technologies recently awarded three $10,000 prizes in its competition for doctoral dissertations on information systems and technologies.

The winners were: Patricia J. Guinan, an assistant professor at Boston University, for an Indiana University thesis, "Specialist-Generalist Communication Competence: A Field Experiment Investigating the Communication Behavior of Information Systems Development"; David Rung of MCI Communications Corp., for an Oxford University thesis, "Using Telecommunications for Competitive Advantage"; and Veda Storey of the University of Rochester in New York for a University of British Columbia thesis, "An Expert View Creation System for Data Base Design."

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INDUSTRY INSIGHT

Jean S. Bozman

Will AT&T hang it up?

The heat is on. Pressure is building inside AT&T's Basking Ridge, N.J., fortress for the telecommunications giant to let go of its four-year dream of becoming a computer vendor.

Sales of AT&T's Model 3B line of minicomputers and Ing. C. Olivetti & Co.-made personal computers are way off, company insiders and industry analysts agree. Not that the 3B family ever made an impact in corporate America — they were installed at a few showcases like Trailways, Inc. in Dallas and at AT&T's own auditor, Coopers & Lybrand in New York. Other than that, the minicomputers made only modest gains as Unix-based office systems.

Olivetti's answers to the IBM Personal Computer proved more popular, but end-user sales through AT&T's sales division also sagged during the last year.

AT&T's Data Systems Division's sales are now so low, sources say, that even modest sales targets set for this year have not been met. Vittorio Cassoni, the Olivetti manager tapped last year to become senior vice-president of the Data Systems Division, is faced with a dilemma. He has a plan to make the division profitable but is running out of time.

The Gartner Group, Inc. in Stamford, Conn., estimates 1986 losses of $700 million to $1 billion at the Data Systems Division. This year's losses will probably top $500 million, Gartner Group analysts said last week. Even for a $34 billion company, those losses are too great to bear.

Spin-off possible?

"They're in a holding action," one analyst said, "and we expect a spin-off of the computer business within the next 12 months." The end may come as soon as this fall, some insiders say.

Lending credence to the immediacy of the problem was a se-

Continued on page 101

Contel-Comsat merger dashed

Telecom firm pursues VSAT market, will buy Equatorial Communications

BY JAMES A. MARTIN
CW STAFF

ATLANTA — After officially terminating a $2.47 billion merger with Communications Satellite Corp. (Comsat), Contel Corp. announced plans last week to acquire Equatorial Communications Co., a satellite communications vendor, as well as two Comsat subsidiaries.

The acquisitions should strengthen Contel's presence in satellite data and voice communications, particularly in very small-aperture terminal (VSAT) services. According to analysts, Contel is seeking to be a broad-based communications supplier, and these acquisitions will help move the company in that direction.

As expected, Contel's merger plans with Comsat were terminated last week. Instead of proceeding with the merger, Contel will buy the Comsat International Communications, Inc. unit and Comsat's VSAT business for $38 million.

Under the merger agreement with Equatorial, Contel will pay $60 million for the company's outstanding shares, 24% of which are currently owned by Martin Marietta Corp.

Under a three-year noncompete agreement and a 10-year joint marketing agreement, Contel has agreed to pay Martin Marietta an additional $12 million to refrain from competing in Equatorial's market. Contel also agreed to purchase some $45 million worth of services from the merged company.

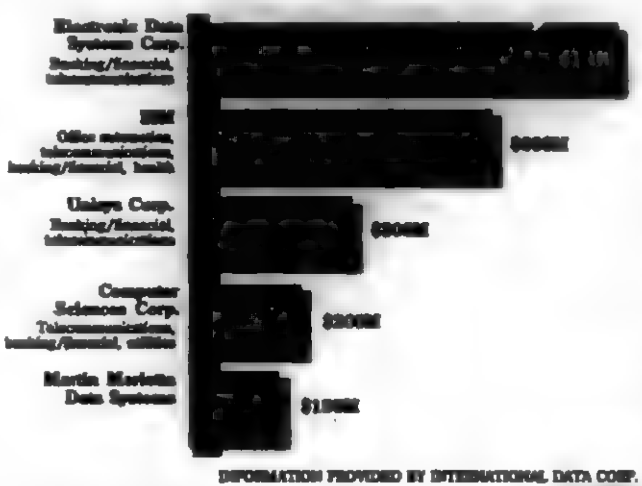
Equatorial, based in Mountain View, Calif., provides satellite data networks for broadcasting and terminal-to-host interactive transaction network applications. The company is

Continued on page 101

Data View

Leading systems integrators

Selected vendors' estimated revenues from systems integration for market and application areas including manufacturing and government, 1986



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CW CHART

3Com sales hit new high

LAN maker reports $31.6M for quarter

BY PATRICIA KEEFE
CW STAFF

SANTA CLARA, Calif. — 3Com Corp. recently reported record sales of $31.6 million for its fourth quarter ended May 31, a 64% increase over the $19.3 million in sales recorded in the same quarter of fiscal 1986.

The fourth quarter marked the seventh consecutive quarter of sales growth and fourth consecutive quarter of increasing orders for 3Com.

For the full year, sales were

Continued on page 100

European dumping alleged

BY MARIE-MARTINE BUCKENS
IDG NEWS SERVICE

BRUSSELS — The executive commission of the 12-nation European Community (EC) said last week that it has launched a new probe into alleged dumping of dynamic random-access memory (RAM) chips in the European market by Japanese firms.

The latest investigation concerns exports from Fujitsu Ltd., Hitachi Ltd., Mitsubishi Electric Corp., NEC Corp., Toshiba Corp. and Texas Instruments, Inc.'s Japanese subsidiary. The EC announced in April that trade inspectors are already investigating imports of Japanese 64K- and 256K-byte erasable programmable read-only memory chips that are allegedly being sold below cost in Europe.

The new antidumping investigation follows a formal complaint lodged by the European Electronic Component Manufacturers Association, which accounts for all European dynamic RAM production.

Inside

- Corvus Systems lays off 25% of its employees and closes its domestic regional sales office. Page 96.
- France's top two service firms agree to form a strategic alliance. Page 100.

Board maker set to buy Tallgrass

BY ALAN J. RYAN
CW STAFF

TUSTIN, Calif. — CMS Enhancements, Inc., a manufacturer of expansion boards and storage systems for personal computers, announced last week that it has signed a letter of intent to acquire slumping Tallgrass Technologies Corp. in Overland Park, Kan., for an undisclosed amount. Analysts estimated the sale price will be somewhere between $10 million and $17 million.

Tallgrass is a designer and manufacturer of tape backup systems for IBM Personal Computers and compatibles.

Rumors about troubles at Tallgrass surfaced recently when company cofounder David M. Allen, who was chairman and director of research and development, and Emmett W. Johnson, president and chief executive officer, resigned on June 11.

One source said they were asked to leave as a result of the company's weakened market performance [CW, June 22].

"Tallgrass underwent tremendous success and then some downturns over the last few years because of the market they're in," said Lee Eliser, president of Peripheral Strategies, Inc., a data storage consulting and market research firm in Santa Barbara, Calif.

'Attractive acquisition'

But Tallgrass "still has a reasonably good dealer base that would make quite an attractive acquisition for anyone," Eliser added.

Tallgrass's facilities will allow CMS to increase its profits by manufacturing more products itself, rather than buying peripherals from other companies and adding enhancements, said Phil Devin, a senior industry analyst at Dataquest, Inc. in San Jose, Calif.

Devin added that CMS recently opened a new factory facility in Singapore, which brings high-volume, low-cost overseas manufacturing to the company.

The acquisition is subject to the preparation of a definitive agreement and approval of the two boards of directors, according to a prepared announcement.

According to a CMS spokesman, the privately held company was incorporated in 1983 and was later acquired by publicly held Electro Funds Corp. The deal was basically a reverse acquisition, he said, which allowed CMS to become publicly held without going through the usual process.

For its fiscal year ended June 30, 1986, CMS recorded revenue of $41.2 million and earnings of $1 million, or 2 cents per share.

Devin estimated that Tallgrass's current annual revenue will be approximately $20 million.

For its first nine months of fiscal 1987, ended March 31, CMS posted sales of $68.5 million and earnings of $1.4 million, or 3 cents per share. According to a company spokesman, the low profit margin is "not untypical of the industry we are in." CMS employs approximately 140 people.

Corvus cutbacks seen as last-ditch survival move

BY ADAM STONE
CW STAFF

SAN JOSE, Calif. — In what some observers have called a last-ditch effort to keep afloat, Corvus Systems, Inc. recently laid off 25% of its employees, closed all its domestic regional sales offices and announced its intention to abandon direct sales of its IBM-compatible microcomputers.

Still alive, though ailing, the company said it will redirect emphasis toward its local-area network (LAN) products, such as PC/NOS.

Corvus said its new domestic strategy also will depend heavily on distributor and value-added reseller channels for the sale of those products.

Corvus's IBM-compatible personal computer line accounted for about 20% of the company's total sales last year, but that number has been steadily declining, and the profit margin on PCs is low.

Corvus said it expects to show a loss for the fourth quarter, ended June 30, but would not disclose the amount, pending a final audit.

For the first three quarters of fiscal 1987, Corvus reported sales of $42 million and a loss of $9 million.

Questionable future?

After eight straight losing quarters, some industry analysts have expressed serious doubts about the troubled company's future. "They're going down the tubes," said Doug Gold, a senior analyst at International Data Corp. (IDC) in Framingham, Mass.

"My guess would be it's probably one of their last gasps, if not actually their last gasp," Gold said of the recent cuts.

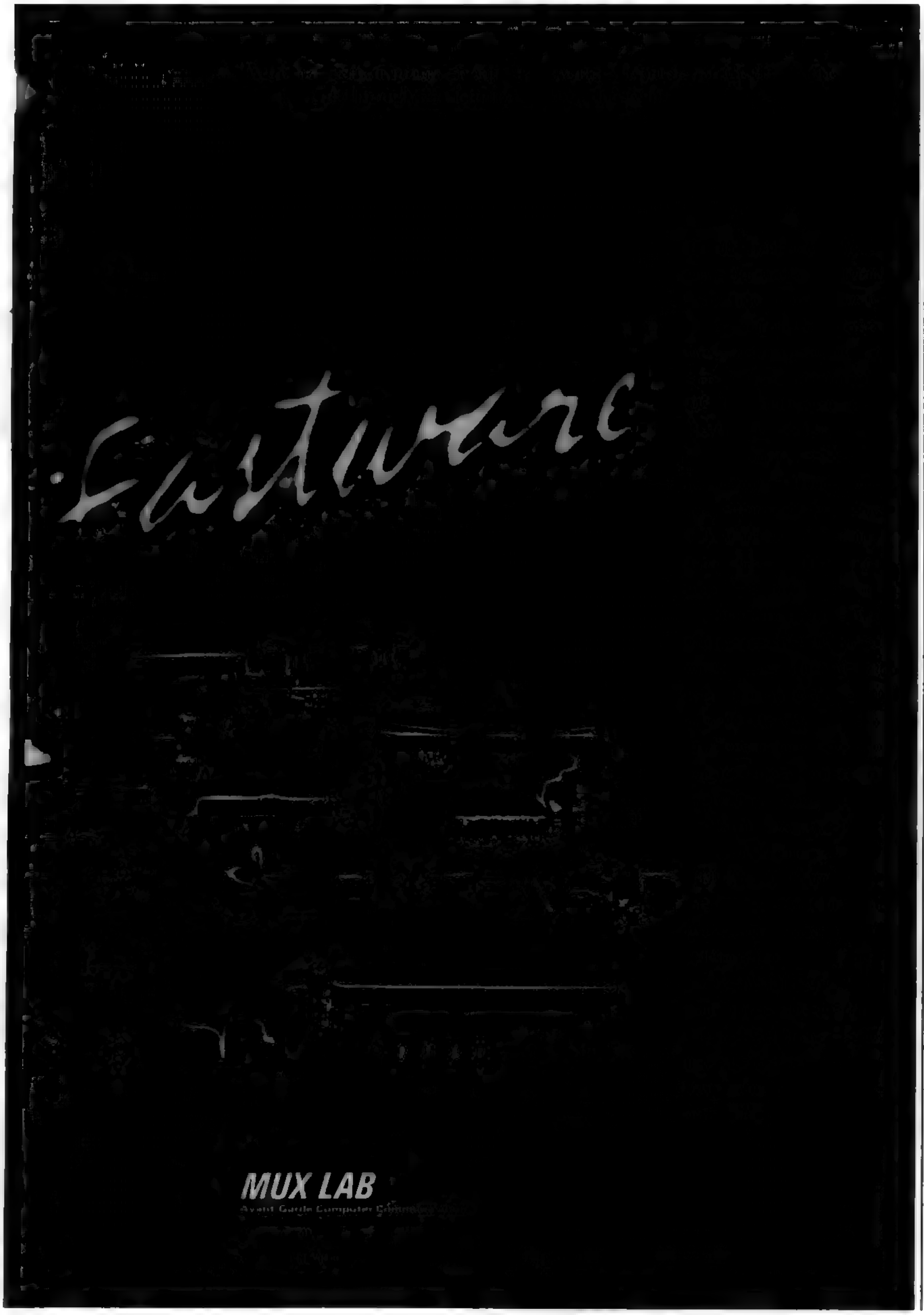
> "THEY HAVE to be pretty close to the bottom of the barrel."
>
> BOB CLARKE
> THE SEYBOLD GROUP, INC.

Recent IDC estimates have indicated that Corvus will ship a mere 0.6% of all IBM-compatible PC LANs in the U.S. this year. "They've slipped out of the group of viable companies shipping a lot of product," Gold said.

Bob Clarke, a former Corvus employee who is currently vice-president of consulting at The Seybold Group, Inc. in Santa Clara, Calif., characterized the recent cuts as "a pretty drastic move. . . . They have to be pretty close to the bottom of the barrel."

Gary Breeding, a Corvus spokesman, estimated that of the 46 people laid off in the most recent round of cutbacks, about 25% held sales and marketing positions. Clarke suggested that the number lies closer to 50% or 60%. "When you lay off the majority of your sales organization, you'd better have another plan," Clarke said. "I don't know what that plan is."

To further complicate Corvus's financial woes, a court ruling came down recently on the alleged default of payment on a $5 million bank loan by KSI Disk Products, a disk component maker of which Corvus owns 50%. The court ruled that KSI's creditor, Union Bank in Los Angeles, may obtain a writ of attachment against Corvus's unsecured assets. Corvus has said it intends to contest the award.



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Another reverse for AT&T-Philips venture

BY AMIEL KORNEL
IDG NEWS SERVICE

PARIS — AT&T recently suffered another setback in its efforts to penetrate Europe's public telecommunications equipment markets. AT&T- Philips Telecommunications BV (APT), its Dutch-based joint venture with Philips N.V. in the Netherlands, lost a bid for a $1.4 billion order from Belgium's national telecommunications authority.

The five-year contract calls for numerical switching and transmission equipment to modernize the country's telecommunications network.

Belgium's Regie des Telephones et Telegraphes said the deal would go to local subsidiaries of French and West German groups: Bell Telephone Manufacturing Co. N.V., the ex-ITT affiliate acquired this year by Cie. General d'Electricite (CGE); and Atea, bought last year by Siemens AG from U.S.-based GTE Corp.

The contract award was the second major setback for APT in three months. In April, APT's hopes of entering the French market were dashed when the government sold nationalized Cie. General des Constructions Telephonique (another ex-ITT affiliate) to a consortium led by Sweden's L. M. Ericsson.

APT has also seen its efforts to enter British and West German markets stymied by persistent pleas for support from Europe's telecommunications industry.

APT officials disclosed in April that they expected the firm, created in 1983, to reach the break-even point in the next fiscal year. But more than three years after its creation, APT has little to show for its efforts.

Meanwhile, the acquisition of the civil telecommunications business of Spain's Marconi Espana SA could turn into a mixed blessing, analysts warn, because of the troubled financial situation at the ailing Spanish firm.

The Spanish deal calls for APT to take control of the civil telecommunications business of Marconi, one of two ITT affiliates acquired by Dutch-based Alcatel N.V., the CGE-controlled telecommunications group created earlier this year.

The Spanish public telecommunications network, with 9.7 million access lines installed by 1985, is the fifth largest in Europe, according to Arthur D. Little, Inc., a Cambridge, Mass.-based market research firm.

But observers warn that Marconi's financial health is far from assured. They note that Spain's state-controlled telecommunications authority, Telefonica, is a sleeping partner in the other Spanish Alcatel affiliate, owning 25% of the firm's capital.

Court OKs NEC petition

BY JAMES A. MARTIN
CW STAFF

MOUNTAIN VIEW, Calif. — NEC Electronics, Inc. has convinced the 9th U.S. Circuit Court of Appeals to consider disqualifying the judge presiding over the NEC-Intel Corp. patent infringement lawsuit.

NEC's petition in the 3-year-old lawsuit resulted from a disclosure by Judge William Ingram that he indirectly owns some $80 worth of Intel common stock through an investment club. NEC filed a motion in November 1986 to disqualify Ingram from presiding over the lawsuit as a result of that disclosure.

NEC said it was delighted with the Court of Appeals' decision to review its plea. Intel officials did not comment.

A Court of Appeals decision to remove Ingram from the case could have "tremendous significance," according to Mel Thomsen, a semiconductor analyst with Dataquest, Inc. in San Jose, Calif. "If that happens, then the earlier ruling by Ingram might not stand, and the case would have to start all over again," Thomsen said.

Regardless of its outcome, the appeals court hearing on Ingram's status will certainly delay the eventual ruling on the merits of the landmark copyright infringement case. Proceedings in the lawsuit will not continue until the matter is resolved.

NEC filed suit in December 1984, seeking a judgment that microcode was not protected under U.S. copyright laws and that the microcode in its V series of microprocessors did not infringe on Intel's copyrights for its 8088 and 8086 chip codes.

Ingram's September 1986 ruling that microcode is copyright-protected was hailed as an industry milestone. Whether or not NEC violated Intel's copyright has yet to be decided in the case, and NEC said it does not want Ingram to continue as judge because of his financial interest, albeit small, in Intel.

Last March, a federal judge denied NEC's motion to disqualify Ingram on the grounds that his financial disclosure "did not establish conscious awareness of the connection between his interest in Intel and the present litigation." NEC appealed that ruling to the appeals court.

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MERGERS & ACQUISITIONS

Intelogic Trace, Inc. has agreed to acquire the assets of **Texas Troubleshooters** and other Texas maintenance service contracts from **DP Enterprises, Inc.**, headquartered in Seattle.

Texas Troubleshooters is a Houston-based IBM System/34 and 36 service provider with customers located primarily in Houston, San Antonio and Austin, Texas. In addition to Texas Troubleshooters, DP Enterprises sold all of its maintenance service contract business in Texas to Intelogic Trace.

Cincinnati Bell, Inc. has taken the final step to acquire **Auxton Computer Enterprises, Inc.** in Maitland, Fla.

Auxton provides data processing consulting services, proprietary applications software packages and information processing services to the telecommunications industry. Auxton will operate as a subsidiary of **Cincinnati Bell Information Systems, Inc.**, which is a subsidiary of Cincinnati Bell.

Convergent Technologies, Inc. in San Jose, Calif., and **Bidtek, Inc.** in Portland, Ore., have reached an agreement in principle for Convergent's acquisition of Bidtek, a supplier of a computer-based estimating system for construction firms.

Upon completion of the acquisition, Bidtek will become a part of the Convergent Business Systems subsidiary and should strengthen Convergent's position as a provider of turnkey systems and services to the construction industry.

Neti Technologies, Inc. announced the sale, for more than $4 million, of essentially all the assets and liabilities of its **Huron Leasing, Inc.** subsidiary to a group of investors headed by a former Huron Leasing executive.

Huron Leasing, which sells, leases and services computer hardware, including microcomputers, minicomputers and peripheral equipment, was acquired by Neti Technologies in 1985 for 405,000 shares of the latter's common stock.

French service firms combine

BY JENNY DE MONTAIGNE
[illegible]

PARIS — Cap Gemini Sogeti SA (CGS) of France, Europe's premier independent software and services company, reportedly has agreed to buy a 36% stake in the Cisi Group, France's No. 2 services firm.

CGS recently signed an agreement with CEA-Industries, the state-controlled firm that owns all Cisi stock, for an undisclosed sum. Observers estimated the deal was worth about $33.3 million.

The alliance of France's two biggest software and services companies should enable both to compete more aggressively for international contracts, value-added networks and facilities-management projects, observers noted.

CGS boasts annual revenue of $483 million and has 6,800 employees, while Cisi has revenue of $255 million and supports a 3,000-member work force.

Observers noted that Cisi has been looking for a financial partner within the industry, while CGS has been eager to accelerate revenue growth and strengthen its international image.

3Com sales

CONTINUED FROM PAGE 95

$110.4 million, 72% above the $64 million earned in fiscal 1986.

3Com attributed the strong sales and orders to its 3System concept, open architecture and recently introduced 3Station diskless workstation.

Flat growth ahead?

However, some analysts are predicting flat growth in revenue for the local-area network maker for at least the current quarter. 3Com may experience a lull in demand during the next three months as its distribution channels evaluate its current software, 3+, vs. its recently announced, but not yet available, 3+Open software, said Alice Bradie, a senior technology analyst with Hambrecht & Quist, Inc.

3Com also faces the risk that users may put off buying 3Com software until 3+Open ships.

But while Bradie predicted that 3Com will realize roughly $31 million in revenue in its first fiscal quarter, she said she expects that for fiscal 1988, 3Com will produce a revenue gain of 31.5%.

Income up 50%

3Com's net income for the fourth quarter was reported at $3.2 million, or 20 cents per share, a 50% rise from $2.1 million, or 15 cents per share, reported in the same period last year.

For the fourth quarter, the company also reported record orders of $30.4 million, a 63% increase over the $18.6 million in orders in the fourth quarter of 1986.

For the year, net income of $11.1 million, or 76 cents per share, was up 67% from the $6.7 million, or 48 cents per share, reported last year.

Orders for fiscal 1987 totaled $111 million, which represented a 68% increase over 1986 orders.

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AT&T hang up?

CONTINUED FROM PAGE 95

ries of secret meetings held last month in Italy, near Olivetti's headquarters, and in Basking Ridge, sources said. The reported topic: how to dispose of the Data Systems Division.

Those close to AT&T are unsure whether AT&T will elect to spin off the division or hold it in partnership with Olivetti. They are sure of one thing, though: the bleeding must be stopped.

"There's still a market for the AT&T products," says the director of one Midwestern value-added reseller of AT&T systems. "But the pressure is on within the company for fiscal responsibility."

What AT&T wants — and always wanted — from its computer division, insiders say, is to have its hands on state-of-the-art, very large-scale integration (VLSI) technology. That technology is critical to its switching systems. The Model 3B architecture was derived from AT&T's own switches, and Model 3B20s typically handle 800-number telephone calls.

So, even if end users never fall in love with the Model 3Bs, AT&T cannot afford to jettison them entirely.

A spin-off, analysts say, would continue AT&T's ability to incorporate new breakthroughs in VLSI technology in private-branch exchange switches.

"They need to control their own computer technology," says David Taylor, program director of Office Information Systems at the Gartner Group, "but they don't have to be a computer vendor."

Taylor made no predictions about when, or whether, AT&T would spin off its computer systems group. But he added that Olivetti might like to be able to integrate AT&T's Unix-running 3B series within its own product line in Europe, where Unix-based systems are in high demand.

Will not surrender child

Two weeks ago, when published reports refueled speculation on the spin-off stories, AT&T issued a statement. The company said that it would never think of placing the child of its deregulation up for adoption.

"Computers are an integral part of AT&T's data networking strategy, and the fact is that the results for the first half of the year in our Data Systems Division are on target," the statement said in part.

Bill Patchett, director of product marketing for AT&T's Data Systems Division, broadcasted a similar view in response to media inquiries. "Everything's the way it was," he said, "and we are absolutely going to be announcing new products in the fall."

To informed onlookers, however, it appears that the corporation doth protest too much.

Bosman is *Computerworld's* Midwest correspondent.

Contel-Comsat

CONTINUED FROM PAGE 95

said to be a leading supplier of VSAT services, used in linking point-of-sale terminals, data processing terminals or microcomputers to a host via satellite.

Equatorial's financial results, however, have been awash in red ink. The firm lost $67.7 million in 1986 and reported a loss of $3.3 million in the first 1987 quarter, ended March 29. First-quarter revenue dropped 37% from year-earlier levels to $11.9 million.

Last April, Atlanta-based Contel announced plans to withdraw from the overall Comsat merger as a result of pending Federal Communications Commission actions against Comsat. Several months after the Comsat-Contel merger announcement, the FCC ordered Comsat to refund $62 million to customers because Comsat had earned more after-tax profits than were allowed by FCC regulation.

Comsat is the U.S. representative to an international consortium of countries that provides worldwide telecommunications services via satellite and thus must answer to the FCC.

> "CONTEL wants to be a one-stop shop, and although they have a lot of pieces in place already, they're short in long-haul transmission and fiber optics, as well as in having an international presence."
>
> JEFFREY HELD
> NETWORK STRATEGIES, INC.

The termination of the merger was mutually agreed on and expected.

The resolution to the merger saga was "the best the two could do under the circumstances without totally scuttling the deal," said Jeffrey Held, director of systems integration for Network Strategies, Inc., a communications consulting firm in Fairfax, Va.

"Contel wants to be a one-stop shop, and although they have a lot of pieces in place already, they're short in long-haul transmission and fiber optics, as well as in having an international presence," Held added. Contel spokesman Kenneth Bomar said the acquisition of Comsat's international business unit will strengthen Contel's overseas presence.

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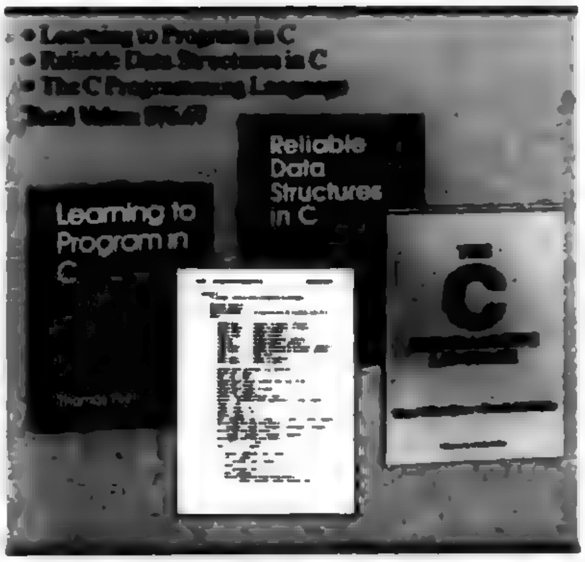

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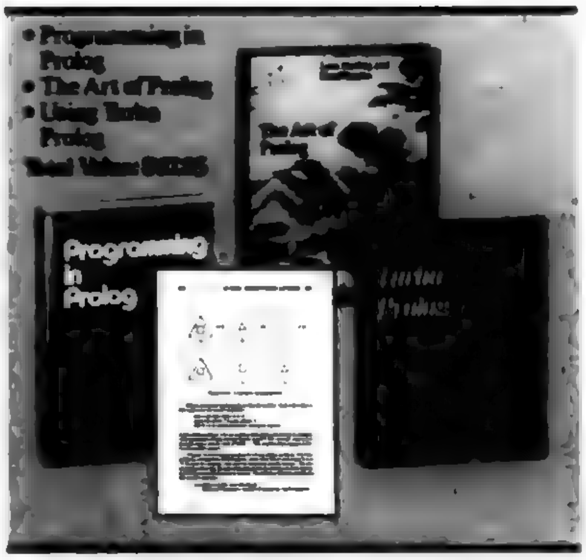

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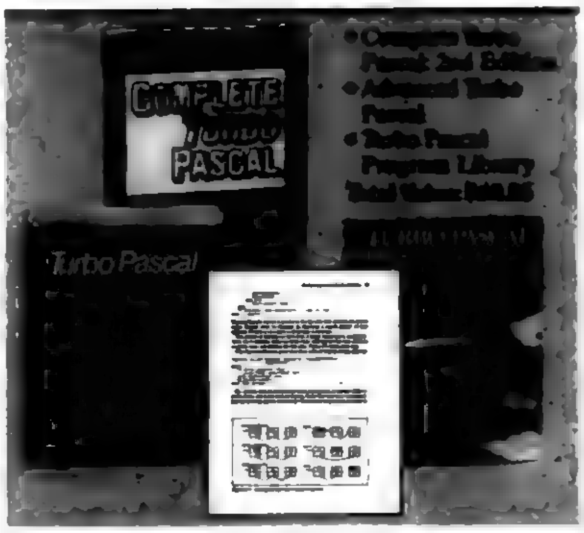

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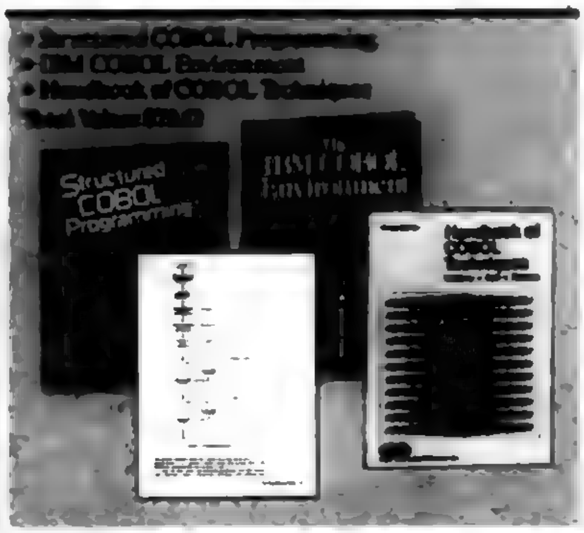

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EMPLOYMENT TODAY

Knowing enough to walk away

Avoid disastrous career moves by recognizing telltale signs of danger

BY MICHAEL BALL
SPECIAL TO CW

Sometimes, MIS professionals can easily determine when to say no to a job offer. If they see 10 people trying to work at one terminal or watch the sheriff repossessing the company's furniture while they are waiting for the interview, they know to walk back out the door.

But often the clues are so subtle that professionals — from beginning programmers to veteran managers — miss key warnings. If they do not pay attention, if they do not ask the right questions of the right people, or if they simply ignore the signs, job hunters can easily walk right into career danger and disappointment.

Professionals interested in advancing their careers or starting new ones often find it difficult to remain objective when evaluating possible employers. But a small amount of skepticism can help candidates avoid disaster.

First impressions

"You can learn a lot in the lobby," says Steve McMahan, managing director of Source EDP in Boston. "If everybody's up and happy and enjoying themselves, it is a great sign. If they're not, and the managers treat the people like dirt, you don't want to be there."

Similarly, another recruiter says he finds considerable import in the initial reception. "First impressions are vital," says Lee Walkinshaw, who heads Computer People, Inc.'s Los Angeles office. "If there is a messy reception area or the person who comes to see you is late or badly dressed, you should think badly of the company."

During the first interview, MIS professionals must be alert. What may sound like general information can really constitute the first signs of trouble.

"It's the absolute kiss of death if somebody starts complaining about their employees being lazy or incompetent," McMahan says. "If they do, run like hell as soon as they start telling you everybody else in the shop is a turkey."

As the interview proceeds, a candidate can sense the extent of the work load. "If a company is always way behind schedule and the staff regularly works 60- and 70-hour weeks, forget it," McMahan says. Such conditions indicate understaffing and, in some cases, poor management.

What interviewers do not say is often just as important as the way they describe the company, says Jack Erdlin, president of Management Dimensions, Inc. in Wellesley, Mass. Candidates should be wary if the employer does not offer a tour of the facility or an opportunity to meet potential co-workers. "You have to wonder what the employer is hiding if you don't get to walk through and talk to the other people," Erdlin says. "You can learn a lot from how you are received in the department."

> "IT'S the absolute kiss of death if somebody starts complaining about their employees being lazy or incompetent. If they do, run like hell as soon as they start telling you everybody else in the shop is a turkey."
>
> STEVE MCMAHAN
> SOURCE EDP

Often, warning signs are mixed with positive messages. Candidates can discover the true nature of the job by asking properly timed questions. Yet many MIS professionals often come away from first interviews complaining, "I didn't get enough information to make a decision," Erdlin says.

"People have bad days, interviewers and job seekers alike," he says. "If someone doesn't interview you, you have to interview yourself." Rather than sitting back awaiting questions, candidates should offer details about their background.

Question the interviewer

Likewise, professionals will face a time in the interview when they must ask the tough questions about the position. Such questions should be asked during the second interview or at the end of the first. "Be sure the company is interested in you before you ask," Erdlin says.

At the appropriate time, candidates should ask the following:

- Is the position new, or was the opening caused by someone leaving?
- If it is not new, what happened to the person who held the position, and why did he leave?
- If the position is new, why was no one promoted from within to fill the opening?

Such questions can lead to a discussion of the company's advancement policy and whether it offers an outplacement service.

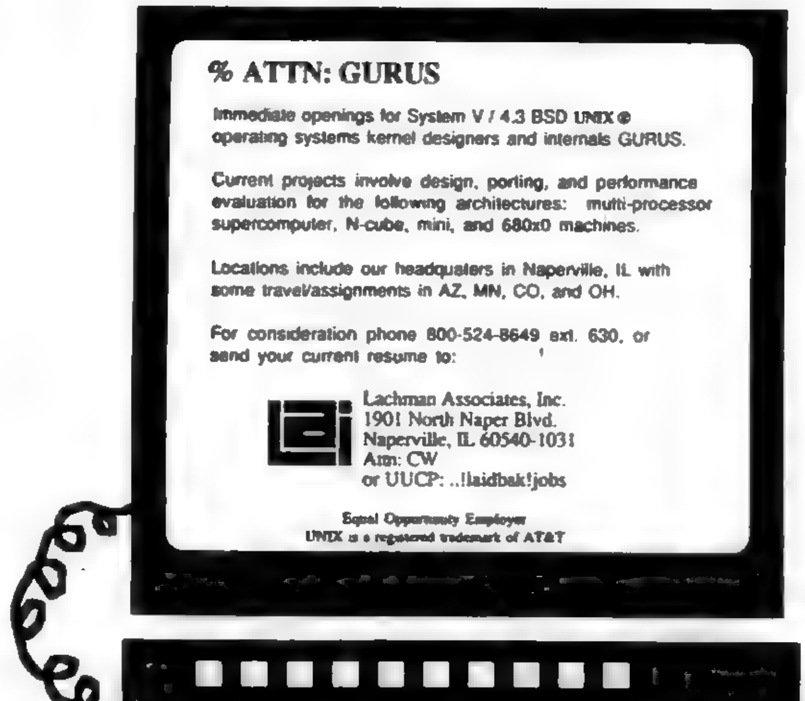
While many of the warning signs apply to most situations, one professional's concerns may be another's lures. A few years ago, when McMahan left IBM, he interviewed for a position with a company whose data processing staff was composed of ex-Honeywell, Inc. employees. "I knew there would be antipathy in the long run and didn't take the job."

Candidates should define their own set of warning signs, Erdlin says. "If you're used to a private office and you look at a company where there are cubicles or open bays, it might not be the best choice for you," he says.

Armed with mental lists of warning signs, MIS professionals should put companies to a final test by questioning potential co-workers. "Talk with the employees for a while," Erdlin says. "They will open up if you ask them simply what they like and dislike, ask what the boss's strengths and weaknesses are, or better, just ask about the guy's style."

After such questions are answered, the candidate should go back to the interviewer to discover more telling and less obvious information. "Ask about the review period," Erdlin says. "Do you get a real performance appraisal, and does it mean a raise? If they say you're supposed to get one every year, but it is only every 18 months and doesn't mean anything, watch out."

Ball is a free-lance writer based in Boston.



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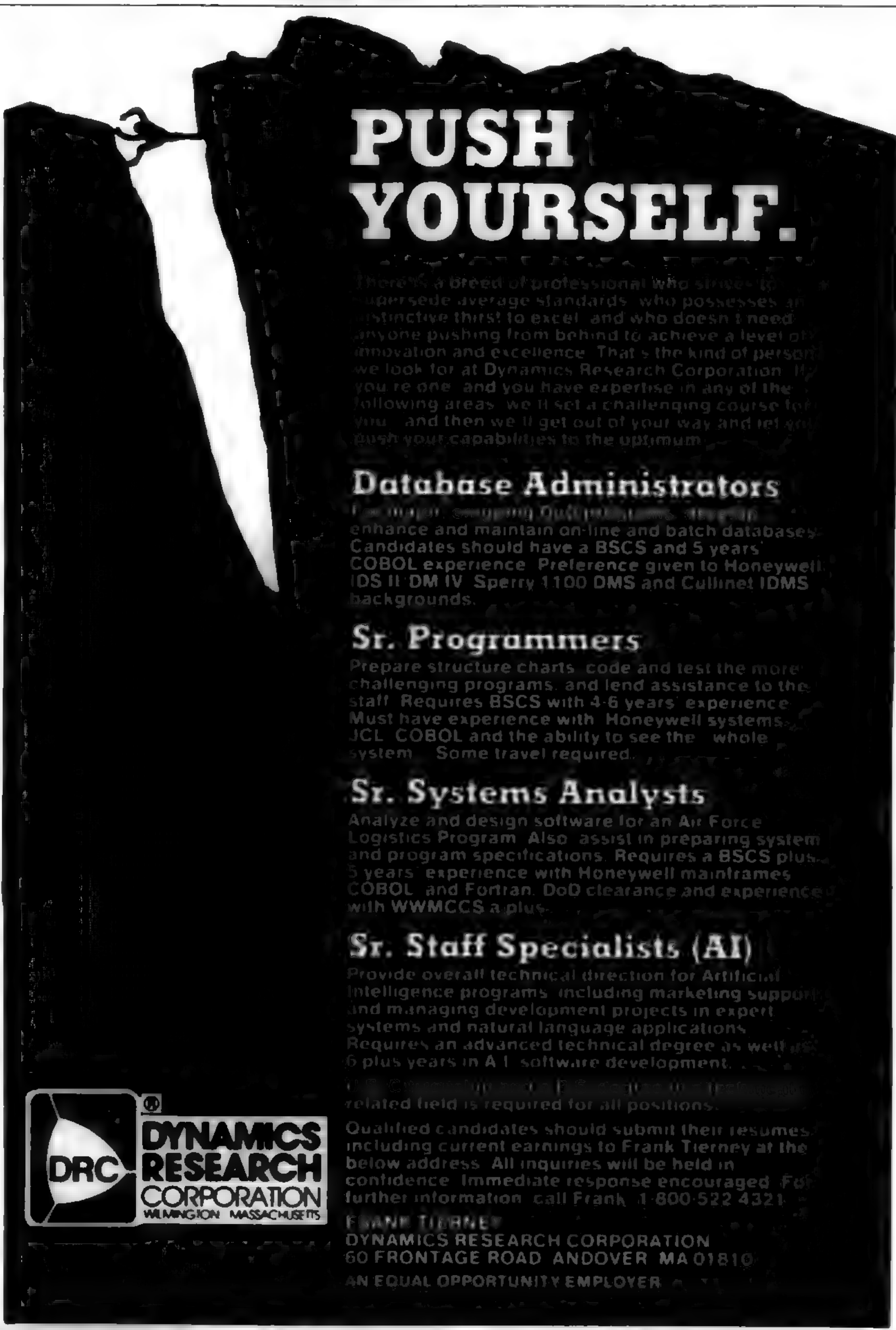

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Experience: Minimum 5 years related IBM experience

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SNA Systems Programmer

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Experience: Minimum 5 years related IBM-SNA experience

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Experience: Minimum 5 years related IBM-CICS experience

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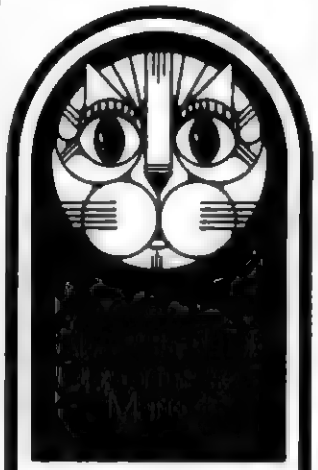

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Duties: the Director of Data Processing is responsible for the direction and administration of the department to include all aspects of operations, systems and applications. Develops departmental plans and objectives, supervises and manages personnel, coordinates the purchase, installation and maintenance of system hardware and software, directs the analysis and upgrades of existing systems, long-range planning, and budget preparation, responsible for hiring, training, development and evaluation of department staff, assists with contract management and evaluation, manages a $3.1 million annual budget, prepares comprehensive reports for the City Manager, performs related duties as required.

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Completion of supplemental qualifications questionnaire is required. City application and supplemental questionnaire forms must be received by 5:00 August 7th, 1987. City of Alexandria, VA, City Hall, Personnel Office, Room 2500, 301 King Street, Alexandria, VA 22314 (703) 838-4422

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Our TPF/ACP Applications Group currently has a need for an experienced programming professional. This position requires 2 or more years experience in the design, coding, and implementation of TPF/ACP applications, using IBM Assembler language. Send resumes to the attention of **Joan Benjamin.**

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Riyad Bank DP environment is an SNA environment with a host MVS/XAO/S and relational data-base; with late 1980's distributed processing and data-base network at the microprocessor level.

This Development Manager will be responsible for

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Selection of standard Banking Software System and managing the development of the interfaces to Riyad Bank Program Software.

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Pre-requisites of this position are:

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Minimum of 5 years banking Software experience.
Minimum of 10 years of management supervisory experience.

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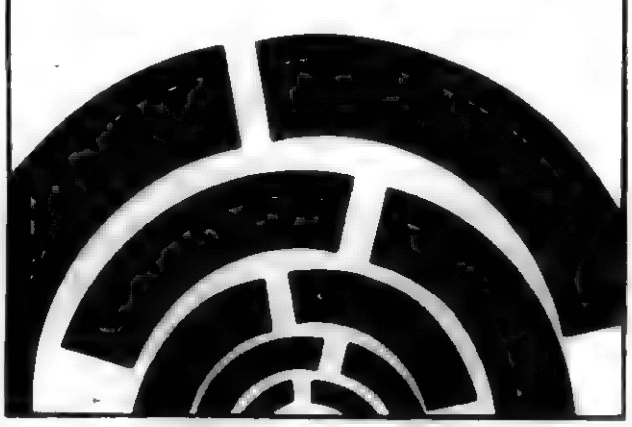

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EOE

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Systems Engineer: Analyzes clients' data processing requirements to determine electronic data system that will provide system capabilities for projects or workloads, prepares proposal for system design to accomplish such requirements utilizing all engineering and electronic processing principles and equipment; confers with company's managerial personnel as necessary to obtain all data needed for the preparation of such systems, follow through on recommended and planned lay-out; performs all necessary engineering services to complete the electronic data processing program, makes necessary modification and suggestions relating to peripheral equipment as needed. 40 hours per week with 5 hours of overtime per week. 8:00 A.M. to 6:00 P.M. $14.55 per hour with overtime paid at the rate of $21.82 per hour. Must have MS in Computer Science and four months experience in the offered position or four months experience as Computer Science Research Assistant. Must have had a course in computer design, integrated circuits, software engineering, information, organization and retrieval. Send resume to: Illinois Department of Employment Security, 401 South State Street-3 South, Chicago, IL 60605, Attn: Marie Niewman, Reference No. 7050-N. An employer paid ad.

DISNEY

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The Programmer Analyst positions will be filled by individuals with experience in a UNISYS 1100 environment and a knowledge of DMS 1100, TIP, SDP, and DPS.

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Education and qualifications include: substantial experience as a successful computer user of a multi-user computing facility required; evidence of a genuine interest in helping people solve problems required; ability to work with diverse individuals in a tactful, productive manner required; 4-year college degree required (computer related preferred); experience as a computer user in an academic environment preferred; knowledge of CDC (NOS), Harris (VOS), or UNIX operating systems a plus; working knowledge of 2 or more of the following languages a plus: FORTRAN, RPGII, Pascal, COBOL, C, Ada, LISP; familiarity with any of the following packages a plus: SPSS, SAS, HEC1, IMSL, ORACLE, EMACS, Network Mail, WordPerfect, dBase III+, R:Base 5000, PC Net.

A letter of application and resume should be sent to: Sally Jarmow, Search Committee Chair, UNS Computing Center, 4505 Maryland Parkway, Las Vegas, NV 89154. Include the names and addresses of at least three professional references.

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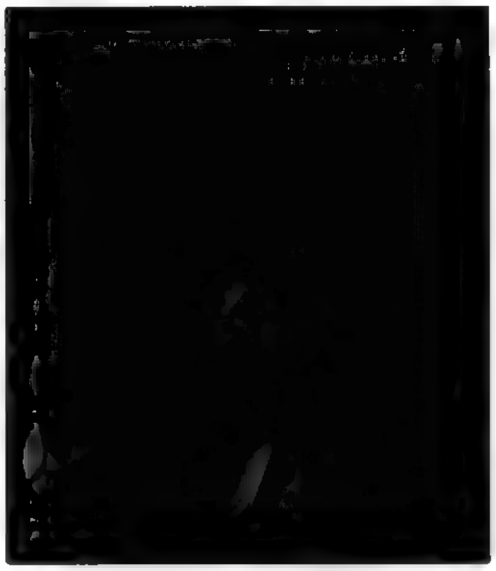

Marc Blessing
Director
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A division of Management Recruiters International with 172 offices in the U.S., CompuSearch markets itself as the nation's largest recruitment agency devoted exclusively to MIS/DP placement. But it was not always that way, according to Marc Blessing, Director of CompuSearch.

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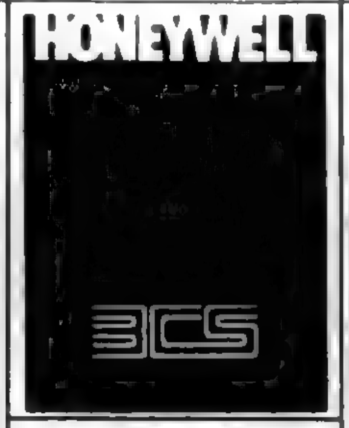

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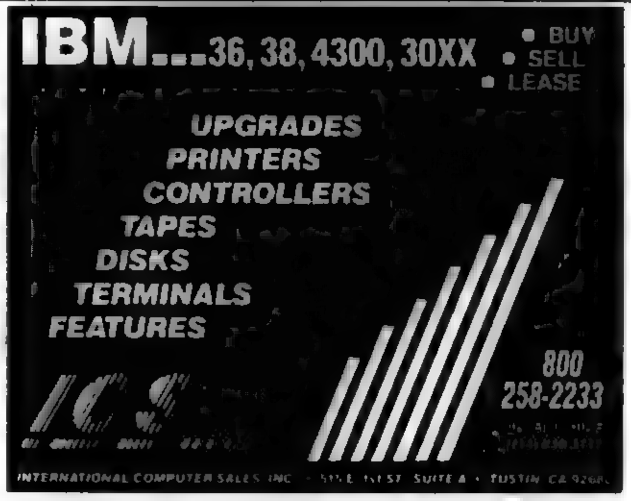

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Sealed Bids will be received by the Housing Authority at the Office of the Systems & Computer Services Dept (Rm 1221), 250 Broadway NY, NY 10007.

Bids will be publicly opened and read at the time and place stated UNTIL 11 am Friday, July 24, 1987. Bid ccm002 to be opened at 11:15 AM.

Housing Authority will receive sealed bids for the purchase of the computer equipment listed below. Bids must be submitted on the forms provided by The Authority in the bid documents.

Only Manufacturer will be considered "Responsible Bidders."

BID #ccm001: 1 CENTRAL PROCESSING UNIT FOR DISTRICT OFFICE USE

BID #ccm002: 10 CENTRAL PROCESSING UNITS FOR PROJECT USE

Bid documents may be obtained from Stanley Ferdinand, Assistant Director Systems & Computer Services Department (Rm 1208) NYC Housing Authority, 250 Broadway, New York, NY 10007

NEW YORK CITY HOUSING AUTHORITY REQUEST FOR PROPOSAL

The Housing Authority requests proposals from companies to provide persons with computer skills to carry out specific tasks for the Authority.

Copies of the RFP will be made available beginning Wednesday July 8, 1987 in the offices of the Systems & Computer Services Dept, Rm 1207, 250 Broadway NY NY 10007. Responses must be returned not later than the close of business (4:30 PM) on Friday, July 24, 1987. Bids must be submitted on the forms supplied in the RFP package.

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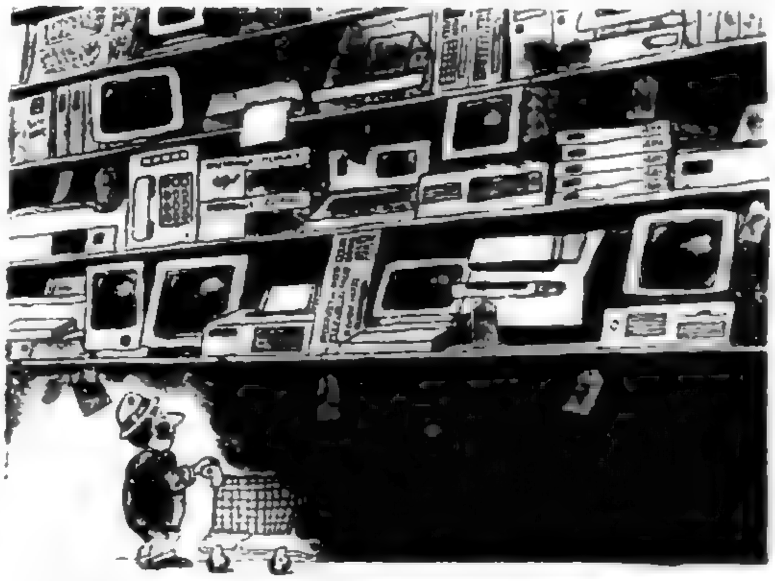

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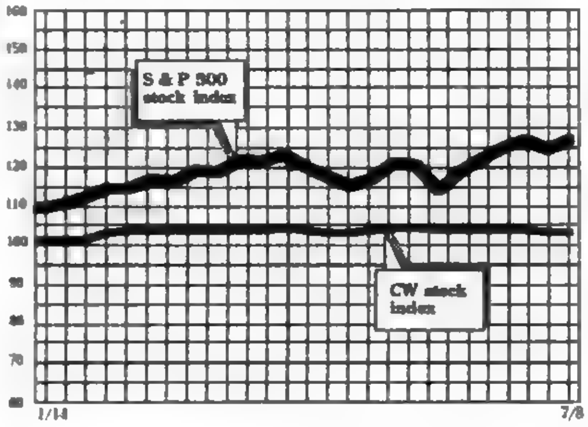

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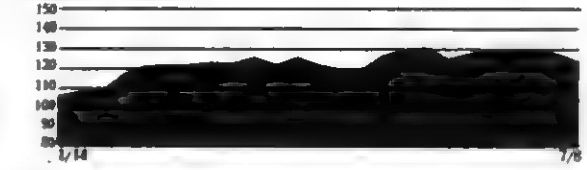
Communications

Computer Systems



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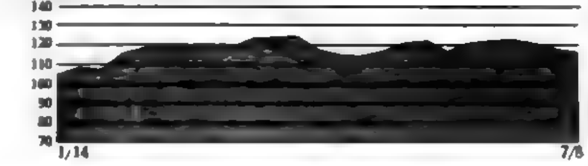
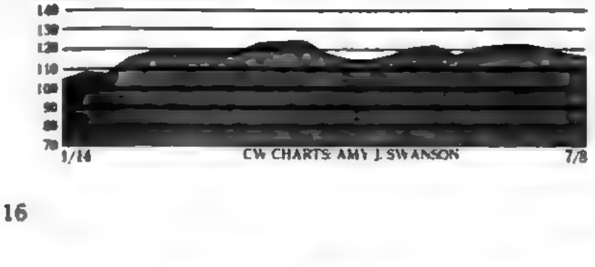


Leasing Companies



CW CHARTS: AMY J. SWANSON

Computerworld Stock Trading Summary

CLOSING PRICES WEDNESDAY, JULY 8, 1987

Communications and Network Services

EXCH		52-WEEK RANGE (1)		PRICE CLOSE JULY 8 1987	PRICE WEEK NET CHNGE	PRICE WEEK PCT CHNGE
N	AMERICAN INFO TECHS CORP	101	77	86.50	-1.6	-1.9
Q	ANDREW CORP	19	14	15.75	+0.3	+1.6
Q	ARTEL COMM CORP	5	2	3.00	+0.0	+0.0
N	AT&T	30	22	29.25	+0.9	+3.1
Q	AVANT GARDE COMP INC	7	3	3.50	-0.1	-3.4
Q	AVANTEK INC	19	13	14.50	1.3	-7.9
N	AYDIN CORP	38	18	32.75	-1.5	-4.4
N	BELL ATLANTIC CORP	77	62	67.75	-0.5	-0.7
N	BELLSOUTH CORP	46	35	39.25	-1.5	3.7
Q	BRIDGE COMMUNICATION	27	11	21.88	-0.4	1.7
Q	COMPRESSION LABS INC	13	4	4.38	-0.1	-2.8
Q	COMPUTER NETWORK TECH	8	4	4.19	+0.2	+4.7
Q	CONTEL CORP	35	27	32.88	+0.5	+1.5
Q	DATA SWITCH CORP	9	5	6.88	+0.1	+1.9
Q	DIGITAL COMM ASSOC	49	17	34.50	+0.8	+2.2
Q	DYNATECH CORP	44	27	30.75	-0.3	-0.8
Q	EQUATORIAL COMM CO	7	2	3.63	+0.5	+16.0
Q	GANDALF TECHNOLOGIES	11	5	8.25	+0.1	+1.5
Q	GENERAL DATACOMM INDS	14	8	8.75	-0.9	-9.1
N	GTE CORP	43	34	38.25	-0.3	-0.6
Q	INFOTRON SYS CORP	15	7	9.75	-0.3	-2.5
N	ITT CORP	66	47	60.38	+2.4	+4.1
N	M A COM INC	17	12	14.00	+0.3	+1.8
Q	MCI COMMUNICATIONS CORP	10	5	7.38	+0.0	+0.0
Q	MICOM SYS INC	18	10	11.38	-1.4	-10.8
Q	NETWORK SYS CORP	19	9	9.75	+0.0	+0.0
N	NORTHERN TELECOM LTD	24	13	23.25	+2.3	+10.7
Q	NOVELL INC	27	9	19.75	+0.3	+1.3
N	NYNEX CORP	73	59	67.88	-1.5	-2.2
N	PACIFIC TELESIS GROUP	31	23	25.88	-0.6	-2.4
N	PARADYNE CORP	8	4	6.75	-0.1	-1.8
A	PENRIL CORP	6	4	4.88	+0.3	+5.4
N	PLESSEY PLC	41	24	36.50	-0.5	-1.4
N	SCIENTIFIC ATLANTA INC	20	9	19.38	-0.1	-0.6
N	SOUTHWESTERN BELL CORP	41	33	37.75	-1.1	-2.9
Q	3 COM CORP	24	9	17.50	-1.0	-5.4
N	TIMEPLEX INC	41	14	29.50	-1.0	-3.3
Q	UNGERMANN BASS INC	16	7	12.25	-0.1	-1.0
N	U S WEST INC	62	45	52.25	-0.9	-1.6

Computer Systems

EXCH		52-WEEK RANGE (1)		PRICE CLOSE JULY 8 1987	PRICE WEEK NET CHNGE	PRICE WEEK PCT CHNGE
Q	ALLIANT COMPUTER SYS	37	16	22.00	-6.0	-21.4
Q	ALPHA MICROSYSTEMS	7	3	4.50	+0.0	+0.0
Q	ALTOS COMPUTER SYS	17	10	12.50	-0.1	-1.0
A	AMDAHL CORP	42	16	36.50	+1.3	+3.5
Q	APOLLO COMPUTER INC	25	9	18.13	-1.1	-5.8
Q	APPLE COMPUTER INC	43	15	37.25	-2.8	-6.9
N	BOLT BERANEK & NEWMAN	60	37	39.00	-4.6	-10.6
Q	BRITTON LEE INC	6	3	3.13	-0.1	-3.8
N	COMPAQ COMPUTER CORP	51	12	44.75	1.9	-4.0
Q	COMPUTER AUTOMATION INC	17	2	12.75	-1.3	-8.9
A	COMPUTER CONSOLES INC	12	7	8.88	-0.6	-6.6
Q	CONCURRENT COMP CORP	19	11	17.25	+0.3	+1.5
N	CONTROL DATA CORP DEL	35	20	28.13	-0.3	-0.9
Q	CONVERGENT TECH	12	4	7.13	+0.1	+1.8
Q	CONVEX COMPUTER CORP	22	8	13.88	-1.8	-11.2
N	CRAY RESH INC	136	68	99.13	-2.5	-2.5
Q	DAISY SYS CORP	13	8	8.00	+0.1	+1.6
N	DATA GEN CORP	39	25	30.13	-1.8	-5.5
N	DATAPOINT CORP	9	4	7.00	+0.5	+7.7
N	DIGITAL EQUIP CORP	175	82	161.13	-3.5	-2.1
N	FLOATING POINT SYS INC	38	8	10.38	+0.8	+7.8
N	GOULD INC	22	15	20.00	+0.3	+1.3
N	HARRIS CORP DEL	43	27	34.25	-2.5	-6.8
N	HEWLETT PACKARD CO	67	38	60.50	+0.4	+0.6
N	HONEYWELL INC	85	58	80.50	-0.5	-0.6
N	IBM	169	116	166.75	+2.8	+1.7
Q	INFORMATION INTL INC	17	13	13.75	-0.3	-1.8
Q	IPL SYS INC	3	2	2.75	-0.1	-4.3
Q	MASS COMPUTER CORP	10	5	8.38	+0.3	+3.1
Q	MATSUSHITA ELEC INDL LTD	159	77	142.75	-9.3	-6.1
Q	MEGADATA CORP	7	2	5.50	-0.3	-4.3
Q	MENTOR GRAPHICS CORP	34	11	25.75	-3.8	-12.7
N	NBI INC	13	8	12.75	+0.6	+5.2
N	NCR CORP	80	42	73.00	-1.1	1.5
N	PRIME COMPUTER INC	30	16	25.75	-0.3	-1.0
Q	PYRAMID TECHNOLOGY	12	4	9.00	-0.3	2.7
Q	STRATUS COMPUTER	41	18	31.75	-2.5	-7.3
Q	SUN MICROSYSTEM INC	46	11	36.88	-5.3	-12.5
Q	SYMBOLICS INC	8	4	3.88	-0.3	-6.1
N	TANDEM COMPUTERS INC	38	14	29.13	-2.9	-9.0
N	TANDY CORP	58	31	41.00	-1.8	-4.1
N	ULTIMATE CORP	29	13	25.75	-0.9	-3.3
N	UNISYS CORP	128	64	123.50	+0.1	+0.1
A	WANG LABS INC	19	11	15.63	-0.3	-1.6

Software & DP Services

EXCH		52-WEEK RANGE (1)		PRICE CLOSE JULY 8 1987	PRICE WEEK NET CHNGE	PRICE WEEK PCT CHNGE
Q	ADVANCED COMP TECH	6	3	4.00	+0.0	+0.0
N	ADVANCED SYS INC	25	12	23.75	-0.9	-3.6
N	AGS COMPUTERS INC	22	8	16.25	-1.0	-5.8
Q	AMERICAN MGMT SYS INC	19	7	15.50	-1.9	-10.8
Q	AMERICAN SOFTWARE INC	22	7	15.00	+0.5	+3.4
N	ANACOMP INC	9	3	8.25	-0.3	-2.9
Q	ANALYSTS INTL CORP	11	4	8.75	-0.4	-4.1
Q	ASHTON TATE	30	10	24.75	+0.0	+0.0
Q	ASK COMPUTER SYS INC	17	9	12.50	+0.1	+1.0
Q	AUTODESK INC	285	8	21.00	-4.0	-16.0
N	AUTO DATA PROCESSING	51	29	47.38	-0.1	-0.3
Q	BOOLE & BABBAGE INC	11	4	10.75	-0.3	+2.4
N	COMPUTER ASSOC INTL INC	29	10	23.50	-1.3	-5.1
Q	COMPUTER HORIZONS CORP	15	10	12.63	-0.1	-1.0
N	COMPUTER SCIENCES CORP	61	30	56.13	-1.3	-2.2
N	COMPUTER TASK GROUP INC	18	11	12.50	-0.6	-4.8
Q	COMSHARE INC	28	11	25.75	+0.0	+0.0
N	CULLINET SOFTWARE INC	13	6	11.63	+0.0	+0.0
Q	CYCARE SYS INC	14	7	8.63	-0.4	-4.2
Q	DUQUESNE SYS INC	33	12	20.00	1.8	-8.0
Q	ENDATA INC	12	5	10.88	+0.5	+4.8
N	GENERAL MTRS (CLS E)	46	24	40.88	+2.0	+5.1
Q	HOGAN SYS INC	17	9	13.38	+0.3	+1.9
Q	INFORMIX CORP	23	7	17.25	-1.6	-8.6
Q	INTELLICORP INC	11	4	7.25	+0.0	+0.0
Q	KEANE INC	15	5	8.00	-1.0	11.1
Q	LOTUS DEV CORP	37	9	29.25	+0.5	+1.7
Q	MANAGEMENT SCI AMER	21	11	12.13	+0.3	+2.1
Q	MICRO PRO INTL CORP	8	2	5.88	+0.0	+0.0
Q	MICROSOFT CORP	128	26	93.25	-9.3	-9.0
Q	NATIONAL DATA CORP	27	16	23.00	+1.8	+8.2
Q	ON LINE SOFTWARE INTL INC	20	6	16.38	-0.5	-3.0
Q	ORACLE SYS CORP	30	7	21.63	-0.5	-2.3
N	PANSOPHIC SYS INC	23	12	18.88	-0.9	-4.4
Q	POLICY MGMT SYS CORP	30	15	25.00	+0.5	+2.0
Q	PROGRAMMING & SYS INC	13	8	10.25	+0.0	+0.0
Q	REYNOLDS & REYNOLDS CO	42	27	33.00	+0.5	+1.5
Q	SEI CORP	18	8	17.50	+0.5	+2.9
Q	SHARED MED SYS CORP	53	23	27.75	+0.6	+2.3
Q	SOFTWARE AG SYSTEMS INC	20	10	13.38	-0.1	-0.9
Q	SOFTWARE PUBG CORP	17	5	8.75	+0.0	+0.0
A	STERLING SOFTWARE INC	19	9	10.75	-0.1	-1.1
Q	SUNGARD DATA SYS INC	21	10	18.00	-0.3	-1.4
Q	SYSTEMATICS INC	30	14	24.25	-1.5	-5.8
N	UCCEL CORP	45	18	38.00	-1.8	-4.3
N	URS CORP	21	13	17.50	+0.1	+0.7
Q	VM SOFTWARE INC	45	16	22.25	-0.8	-3.3

Semiconductors

EXCH		52-WEEK RANGE (1)		PRICE CLOSE JULY 8 1987	PRICE WEEK NET CHNGE	PRICE WEEK PCT CHNGE
N	ADV MICRO DEVICES INC	25	13	18.13	-0.6	-3.3
N	ANALOG DEVICES INC	24	14	19.63	+0.4	+1.9
Q	ANALOGIC CORP	13	10	10.88	+0.1	+1.2
Q	INTEL CORP	48	16	43.63	-1.9	-4.1
Q	LSI LOGIC CORP	17	8	9.88	-0.5	-4.8
Q	MONOLITHIC MEMORIES INC	19	10	15.25	-0.8	-4.7
N	MOTOROLA INC	64	34	53.13	-0.4	-0.7
N	NATL SEMICONDUCTOR	17	8	12.75	+0.0	+0.0
N	TEXAS INSTRS INC	68	34	59.75	-0.4	-0.6
A	WESTERN DIGITAL CORP	33	11	24.25	-0.8	-3.0

Peripherals

EXCH		52-WEEK RANGE (1)		PRICE CLOSE JULY 8 1987	PRICE WEEK NET CHNGE	PRICE WEEK PCT CHNGE
N	AM INTL INC	9	5	7.50	+0.1	+1.7
Q	AST RESH INC	23	11	14.75	+0.8	+5.4
Q	AUTO TROL TECH CORP	9	3	5.88	-0.1	2.1
Q	BANCTEC INC	16	6	13.13	+1.0	+8.2
Q	CIPHER DATA PRODS INC	18	9	9.63	1.4	-12.5
A	COGNITRONICS CORP	5	2	4.25	+0.0	+0.0
N	COMPUGRAPHIC CORP	24	16	23.75	+0.3	+1.1
N	COMPUTERVISION CORP	23	10	15.00	+0.0	+0.0
N	CONRAC CORP	30	12	27.25	+0.0	+0.0
A	DATAPRODUCTS CORP	16	10	11.13	+0.0	+0.0
A	DATARAM CORP	10	7	7.13	-0.1	-1.7
N	DECISION INDS CORP	12	7	10.00	+0.3	+2.6
N	EASTMAN KODAK CO	89	52	87.25	+1.6	+1.9
Q	E M C CORP MASS	34	11	28.50	+0.0	+0.0
Q	EMULEX CORP	10	6	7.50	+0.1	+1.7
Q	EVANS & SUTHERLAND	40	20	33.00	+0.5	+1.5
Q	ICOT CORP	13	5	6.38	-0.4	-5.8
Q	INTERLEAF INC	20	8	16.00	+0.3	+1.6
Q	IOMEGA CORP	12	2	3.50	-0.4	-9.7
Q	LEE DATA CORP	10	5	5.38	-0.1	-2.3
Q	MASSTOR SYS CORP	5	2	4.63	+0.4	+8.8
Q	MAXTOR CORP	34	10	16.88	-2.4	-12.3
Q	MICROPOLIS CORP	44	14	35.00	-0.9	-2.4
Q	MINISCRIBE CORP	18	5	15.13	-1.3	-7.6
N	MINNESOTA MNG & MFG CO	73	50	69.88	+0.0	+0.0
A	MSI DATA CORP	18	10	17.13	-0.4	-2.1
Q	PRIAM CORP	6	2	4.50	-0.1	-2.7
Q	PRINTRONIX INC	14	10	12.50	+0.5	+4.2
N	QMS INC	18	11	15.88	-0.5	-3.1
Q	QUANTUM CORP	35	15	16.38	+0.1	+0.8
Q	RAMTEK CORP	6	4	5.00	-0.1	-1.2
N	RECOGNITION EQUIP INC	27	10	19.88	+0.1	+0.6
Q	REXON INC	14	5	9.38	-0.1	-1.3
Q	SCAN TRON CORP	17	11	12.25	+0.5	+4.3
Q	SEAGATE TECHNOLOGY	46	10	29.50	-3.9	-11.6
N	STORAGE TECH CORP	5	2	3.38	-0.3	-8.9
Q	TANDON CORP	7	2	4.75	-0.4	-7.3
A	TEC INC	7	3	5.13	+0.0	+0.0
N	TEKTRONIX INC	43	27	39.38	+0.8	+1.9
Q	TELEVIDEO SYS INC	3	2	2.63	+0.1	+5.0
N	TELEX CORP	102	52	71.75	+0.3	+0.3
Q	WYSE TECH	35	13	25.50	-2.6	-9.3
N	XEROX CORP	81	49	76.50	-0.1	-0.2
Q	XIDEX CORP	20	11	11.38	-0.1	-1.1

Leasing Companies

EXCH		52-WEEK RANGE (1)		PRICE CLOSE JULY 8 1987	PRICE WEEK NET CHNGE	PRICE WEEK PCT CHNGE
N	COMDISCO INC	33	15	28.75	-1.4	-4.6
N	CONTINENTAL INFO SYS	14	7	11.88	+0.0	+0.0
Q	PHOENIX AMERN INC	8	3	4.75	+0.5	+11.8
Q	SELECTERM INC	7	5	5.50	+0.3	+4.8
N	U S LEASING INTL	53	38	52.00	+0.0	+0.0

EXCH: N = NEW YORK, A = AMERICAN, Q = NATIONAL
O = OVER-THE-COUNTER, S = SPLIT

O-T-C PRICES ARE BID PRICES AS OF 3 P.M. OR LAST BID
(1) TO NEAREST DOLLAR

Tough times

High-tech slide hits small firms hardest; IBM bucks trend

The times are tough for high-tech stocks in general, but smaller companies are being hit the hardest. Some Wall Street gurus are saying that the trend will continue for several more months and that, in effect, the problems creating losses for a few companies have spawned the overall slide.

During the first four days of trading last week, Alliant Computer Corp. dropped from 29¼ to 22½. Sun Microsystems, Inc.'s stock, despite a major announcement, fell 5⅛ points to 37½. Convex Computer Corp. and Apollo Computer, Inc. dropped 2 points to 13½ and 17, respectively. Larger firms feeling the effects of the slide were Compaq Computer Corp., which dropped 1½ points to 44¾, and Digital Equipment Corp., which was down 5⅜ points to 161⅛ on Thursday.

Digital Communications Associates, Inc., whose stock has fallen steadily in recent weeks, was up one-half of a point to 35¼ after reporting strong year-end results.

Firms bucking the losing trend last week included IBM, which was up 2 points to 166¼, and On-Line Software, Inc., which reported a sharp increase and closed at 17¾ on Thursday.

ALAN J. RYAN

Borland

FROM PAGE 1

threat now. It actually makes me less concerned, because Borland is not known in major corporations for high-quality applications," Esber said.

Borland made one previous effort to put a dent in Ashton-Tate's market share when it acquired Reflex — a data base with built-in statistical, analytical and graphics functions — and repriced it from $495 to $99. However, with Reflex, Borland "never did any significant damage to Ashton-Tate," said William Shattuck, a software analyst with Montgomery Securities.

Borland President Philippe Kahn, who called Dbase "old technology," said his firm intends "to make Paradox the standard corporate multiuser data base."

But in addition to Ashton-Tate, Borland will face competition from Lotus, Microsoft Corp., IBM and a host of mini and mainframe software vendors bringing packages down to personal computers.

"Ashton-Tate is the standard now, but with OS/2, you'll have Oracle Corp., Lotus, Microrim, Inc., maybe Microsoft, as well as file managers from Symantec and Software Publishing Corp. Now there's Borland-Ansa. It's really going to be a battleground," said Aaron Goldberg, a vice-president at International Data Corp.

"I don't think there is room for a third standard," said Bruce Johnston, an analyst with First Boston Corp. "The only place where it could be a concern is if it was priced at $99. That would be the only place they could mess up Ashton-Tate."

Developers key

The key strength of the Borland-Ansa combination may lie in its developers. With Adam Bosworth, a Reflex developer, and Richard Schwartz and Rob Shostak, both Paradox authors, Borland has "one of the best collections of data base talents in the industry," said Adam Green, a Lexington, Mass.-based Dbase consultant. "Data bases are where Lotus and Microsoft have never gone before. I would stack Bosworth, Shostak and Schwartz against those companies."

For the near term, however, the battle is largely with Ashton-Tate. Analysts generally agreed that the acquisition strengthens Paradox, but they disagreed on whether Ashton-Tate will be affected.

Paradox users contacted last week said they were pleased with the acquisition. Some users said they believe Ansa's sales have suffered from the firm's small size. "Some people have expressed concern that Ansa is a start-up company. With Borland's resources behind it, it makes Paradox more attractive," said Steve Owens, national microcomputer coordinator for Price Waterhouse in Chicago.

For user Greg Salcedo, the biggest plus is the addition of Ben Rosen, a venture capitalist who helped launch Ansa, to Borland's board of directors. "The Rosen connection made a difference to our senior management when choosing Paradox," said Salcedo, manager of research and development for the financial division of American Savings & Loan Associates in Stockton, Calif.

Expect enhancements

Users said they are also looking forward to expected product enhancements, particulary the addition of Reflex as a front end to Paradox and the inclusion of conventional programming languages — especially C — as development tools. "A lot of users have asked if it is possible to write routines outside of [Ansa's] PAL. That interface really isn't there yet," Owens said.

"If we had an easier way to interface C, you could, for example, create spreadsheet functions that link to the data base, and it would be dynamite," Salcedo said.

Under terms of the transaction, which is expected to be completed next month pending shareholder approval, Ansa shareholders will receive a 13.5% interest in Borland. Borland is now valued at approximately $280 million.

Bells' enhanced service plans stall

BY ELISABETH HORWITT
CW STAFF

The Federal Communications Commission's Comparably Efficient Interconnection (CEI) plan, designed to pave the way for enhanced service offerings from the regional Bell holding companies, may involve too many regulatory potholes to fulfill its function before it becomes obsolete early next year, recent events have indicated.

Last week, Pacific Telesis Group became the second regional holding company to file an enhanced telecommunications service offering under CEI, proposing a voice-mail service that would allow users to access voice mailboxes from Touch-Tone telephones.

This week, Bell Atlantic Corp. will find out whether the Department of Justice has withdrawn its objections to the company's own CEI plan, which was filed last March. Bell Atlantic's proposed service would provide facilities for the voice equivalent of a bulletin board, company spokeswoman Patricia Riley said, in which users would access the same voice message by dialing a given number.

The FCC proposed CEI as a way to allow the Bell operating companies to get into enhanced-service markets while ensuring that they could not use their monopoly of the local telephone network to squeeze out competitors. With each enhanced service tariff, the regional carriers must file a CEI plan showing how they will ensure that a competitor will get the same access to their telecommunications facilities as they provide to their own enhanced services.

CEI is being used as a stopgap until next February, when the Bell operating companies must file the more comprehensive Open Network Architecture (ONA) plans for providing basic service elements to enhanced services providers.

No rush so far

So far, however, there has been no rush on the part of the operating companies to jump on the CEI bandwagon — although Bell South Corp. is rumored to be readying a CEI plan of its own. "We stuck our head out and the rest of the Bell companies have been sitting on the fence, waiting to see how it turns out," Bell Atlantic's Riley said. If so, the other firms may feel discouraged; Bell Atlantic has spent four months trying to get its filing past the regulatory Cerberus represented by the FCC, the Justice Department and enhanced service providers that have offered comments on its proposal.

"We had to get approval from both sides," Riley said. "The FCC says, 'It's an enhanced service so you have to file a CEI plan'; the Department of Justice says, 'It's an information service, which is forbidden under the Modified Final Judgment — so you need a waiver from us.' "

Pacific Bell said it has taken a lesson from Bell Atlantic's experiences. "Their filing was fairly short; ours is a very detailed service," said the company's director of marketing, Heidi Harris.

The next step will be to issue the CEI plan for public comment, followed by a period for the regional carrier to reply to public comments.

Pacific Bell said it hopes to get a waiver from the Department of Justice by September or October and FCC approval within four months. "You would think [the two regulatory bodies] would have an incentive to approve CEI plans, since they put CEI out to allow us to provide enhanced services before ONA is implemented," Harris said.

Consolidate to conquer latest supplier tack

BY CLINTON WILDER
CW STAFF

Two companies that in 1985 each heralded themselves as the next potential Lotus Development Corp. moved last week to solidify their positions as second-tier suppliers of microcomputer software to the corporate marketplace, while a third is trying to raise cash with a low-priced public offering.

Ansa Software's buy-out by Borland International, Symantec Corp.'s acquisition of Living Videotext, Inc. and Javelin Software Corp.'s initial public offering all demonstrated the vendors' needs for strategic partners and solid financial resources in a maturing and consolidating marketplace.

The three different business directions mapped by the firms provided further evidence that start-up firms can no longer ride a single product, such as Lotus's 1-2-3 or Ashton-Tate's Dbase series, to the top of the industry.

Strengthens position

But through acquisitions and partnerships, firms like Ansa and Symantec can strengthen their positions as smaller, but established, vendors of multiple microcomputer products to the MIS community.

Ansa, for example, said it will combine its well-regarded Paradox data base technology with Borland's aggressive marketing, which pioneered the concept of business software priced below $100 (see story page 1).

"The announcements show how difficult it is for new companies to challenge the market leaders," said William Shattuck, software analyst for Montgomery Securities in San Francisco. "I'm not saying they can't succeed, but even companies with great, exciting products find they just can't get on dealer shelves. It's hard to compete on the basis of a frontal attack with the established leaders."

'The Fat Five'

"You can't count on being a single-product company to be in the top tiers," said Aaron Goldberg, a vice-president at International Data Corp. (IDC) in Framingham, Mass. "But through acquisitions, the Big Three may become the Fat Five."

Cupertino, Calif.-based Symantec, with its second major acquisition in five months, staked its first significant claim to the Apple Computer, Inc. Macintosh software market. Mountain View, Calif.-based Living Videotext's key product is More, a presentation graphics package for the Mac.

Symantec, best known for Q&A, its IBM Personal Computer file management software, may incorporate Macintosh features in future Microsoft Corp. MS-DOS or MS OS/2 products, analysts said. "The next generation of PCs is going to look a lot like the Mac," said Jeffrey Tarter, editor of "Softletter," an industry newsletter in Cambridge, Mass. "An amazing number of Mac features, like pull-down windows, are finding their way into PC programs."

Avoided assault

Earlier this year, Symantec acquired Breakthrough Software Corp., developer of Time Line, a project management program for the IBM PC [CW, Feb. 2]. "Symantec may have the best chance to be a viable software publisher, because they have avoided a frontal assault on a market leader and grown by acquisition," Shattuck said.

> "I'M NOT saying they can't succeed, but even companies with great, exciting products find they just can't get on dealer shelves."
>
> WILLIAM SHATTUCK
> MONTGOMERY SECURITIES

Living Videotext will retain its name and its president, Dave Winer, and will run as an independent division of Symantec.

Winer joins Symantec Chairman Vern Raburn and President Gordon Eubanks to forge a highly talented management team, IDC's Goldberg said.

"The biggest limitation for most companies in this business is the lack of good people running them," Goldberg said. "Both Symantec and Borland have brought a lot of good people together."

Javelin's initial public offering, intended to raise between $4.9 million and $6.5 million, was quietly announced July 2 and is being underwritten by James J. Duane & Co., a regional investment firm based in New York.

Most analysts said they believe the $6- to $8-per-share offering is essentially a fund-raising move. The Cambridge-based start-up has failed to find a winning market strategy for its financial analysis software.

"They're barely large enough at this point to be going public," Shattuck said. "They've been banging their heads against the wall going against Lotus."

IBM expert program afforded product status

BY CHARLES BABCOCK
CW STAFF

RYE BROOK, N.Y. — IBM recently upgraded its expert system development product from an introductory program offering to a full-fledged product capable of accessing the firm's relational data base management systems.

The enhancements to Expert System Environment (ESE), announced a year ago for IBM's MVS operating system, were made close to next week's American Association for Artificial Intelligence conference in Seattle.

"IBM promised last year it would do something in AI, and now they can say they have. They have switched the status of their product," said Harvey Newquist, editor of "AI Trends," a Scottsdale, Ariz.-based newsletter.

Three-pronged system

ESE consists of three components: an expert system shell, using either forward or backward chaining; rules-based reasoning, called the Expert System Development Environment; and a framework for providing the end-user dialogue with the system, called the Expert System Consultation Environment.

Newquist said he does not know how widely used ESE has become during its status as a program offering but said that even as a product, IBM uses it as an incentive to demonstrate interest in an emerging technology and keep customers from going to Cullinet Software, Inc. or Aion Corp., which offer their own expert system development packages.

ESE, set to be available in October, will cost $42,500, or a monthly license fee of $2,360. The Consultation Environment alone will cost $7,500, or a monthly license charge of $415. As an IBM Solutionpac, it is priced at $57,500, including training and consulting services.

IBM is also offering a mainframe version of Common LISP Application Environment, priced at $10,000 or a monthly license charge of $500, and Common LISP Development Environment, priced at $22,000 or $1,100 a month.

The products are scheduled to be available in March 1988.

Ashton-Tate

FROM PAGE 1

color graphics, an Intel 80286-based machine and at least 512K bytes of RAM.

Ashton-Tate's low-end strategy "fills a significant niche in the market," said Craig Cline, associate editor of the "Seybold Report on Desktop Publishing," a newsletter based in Malibu, Calif. "Up till now, you had a choice: either simple word processing or moving up to [Aldus's] Pagemaker, which requires a high level of expertise," Cline said.

Ashton-Tate also opted to compete in the IBM Personal Computer and compatible market, which analysts view as having higher growth in desktop publishing than Apple Computer, Inc.'s Macintosh.

While Byline reportedly was designed for desktop publishing novices, it has drawn criticism from some observers as being too difficult to use.

"It will get eaten alive," said one analyst briefed by Ashton-Tate. The analyst, who asked not to be identified, said Byline does not stack up against most vendors' full-featured desktop publishing packages.

A key concern is the product's lack of what-you-see-is-what-you-get capability, which allows a user to preview onscreen exactly what will appear in printed output. Byline also uses pull-down menus rather than the familiar icons employed on most publishing packages.

However, the product reportedly contains at least one key feature that should appeal to a large base of PC users. Byline can import files from a variety of programs, including Apple's Macpaint and Macwrite; Ashton-Tate's Dbase and Multimate; Lotus Development Corp.'s 1-2-3; and most popular IBM PC-based graphics programs.

Byline is based on technology Ashton-Tate acquired from Skisoft, Inc., a Lexington, Mass.-based software development firm.

Although Skisoft President Ken Skier declined to reveal specifics, he confirmed that the package would run on the installed base of IBM PCs and compatibles, including 8088-based machines.

According to Skier, Byline is aimed at users whose desktop publishing needs do not justify an investment in new hardware. "If you are preparing a spreadsheet with Lotus and would like your stuff to be much more beautiful, you don't need a 386 with an Adobe Systems, Inc. Postscript printer," he said.

CORRECTIONS

The Copal U.S.A., Inc. Write Hand series of dot matrix printers [Spotlight, June 22] is priced from $349 to $1,145.

A U.S. Department of Justice official last week stressed that the department has not reached any preliminary conclusion regarding the proposed merger between Computer Associates International, Inc. and Uccel Corp. He said the department is considering verbal testimonies from competitors and customers as a matter of routine procedure [CW, June 29].

Xenix 386 is distributed by Santa Cruz Operation; Microport Systems, Inc. distributes Unix 386 [CW, July 6].

INSIDE LINES

The good, the bad and the not-so-ugly. The bad news is IBM representatives' reaffirmation for high-end System/38 customers that the first deliveries they will see of the successor to the System/36 and 38 — code-named Silverlake — will be in late 1988. When they asked if they should wait for Silverlake or a new high-end System/38, the users were recently told to buy more System/38 Model 700s. Better news was that the high-end Silverlake model will provide twice the power of a Model 700. The good news for other IBM customers is that 36 and low-end 38 users may see Silverlake models in their performance range months before the high-end models arrive. In related moves, IBM will reportedly move RPG III under its System Applications Architecture within a year and enhance the System/38's CPF operating system with an SQL-type function allowing update access to multiple data bases as if they were one data base.

President has to sign off. Several months ago, a London resident received an International Computer Program (ICP) plaque recognizing that his software company's product had achieved $5 million in sales the year it was introduced. Both the company, Consoft, and the product, DBXV, were fabricated by Guy Kewney, a British free-lance writer, who wanted to make the point that anyone willing to fill out two pages of forms could get an ICP award. The awards, which have been given out for 16 years, recognize software products that achieve $1 million in sales their first year and, at regular revenue levels, up to $250 million in succeeding years. ICP officials acknowledge they are dependent on the word of applicants and that they require the signature of the president and chief executive officer of a company along with either the firm's accountant or chief financial officer. Kewney said the only call he received asked him if he would like to advertise in an ICP publication.

The enterprise. Microsoft and Excelan are discussing a strategic alliance centered around Excelan's Transport Control Protocol/Internet Protocol expertise. Products from 3Com Corp., Microsoft's partner in LAN Manager development, use a competing protocol, Xerox's Network Systems. Discussions between Microsoft and Excelan are progressing nicely, according to Excelan Vice-President Subash Bal. If all goes well, look for an announcement soon.

Second channel. Another report wafting across the country concerns the upcoming — and next major — announcement from Compaq. Sources say the announcement, scheduled to take place by summer's end, concerns Compaq's multiuser strategy — either Unix- or networking-based. Meanwhile, back at the ranch, Compaq is hard at work on a Micro Channel project, making it appear that Compaq doth protest too much.

Clear to the operatives. Apple's recently formed software subsidiary last week was named "Claris," a contraction of clarity and distinctiveness, according to subsidiary President William V. Campbell, who tapped Metaphor Computer Systems co-founder Yogen Dalal as vice-president of product development.

No fall guy. Microsoft Chairman Bill Gates revealed that a version of the Presentation Manager will ship to developers this year. Speculation that OS/2, and the Presentation Manager in particular, were slipping completion dates recently prompted IBM Engineering Systems Division chieftain Bill Lowe to pronounce the Presentation Manager as being possibly ahead of schedule, although he would not say what that schedule was.

The first shipment. July is nearly half gone, and 9370 Models 20 and 60 have not yet begun volume shipments, according to an IBM spokesman. But the mid-range processors are still slated to move off the loading docks and onto trucks bound for customers before the month is out, the spokesman said. One software developer who has been working with the machines suggested IBM could be making some last-minute changes to DOS VSE/SP 3.1 and CICS 1.7, both new versions that are to be shipped with the long-anticipated boxes.

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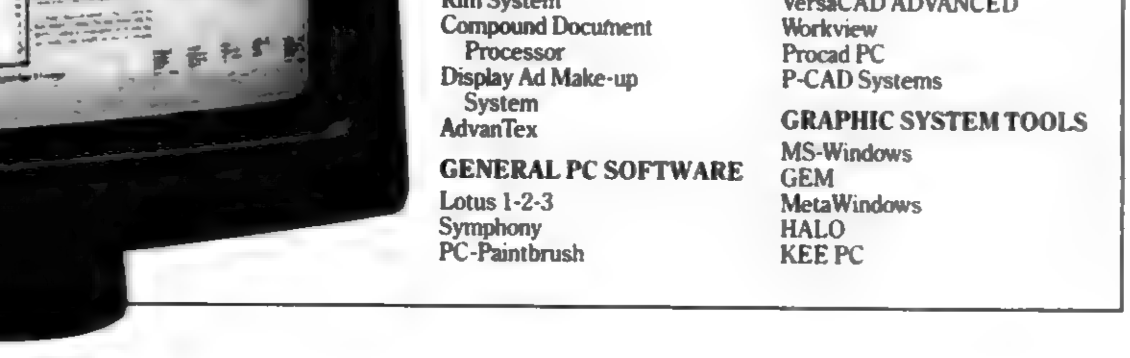

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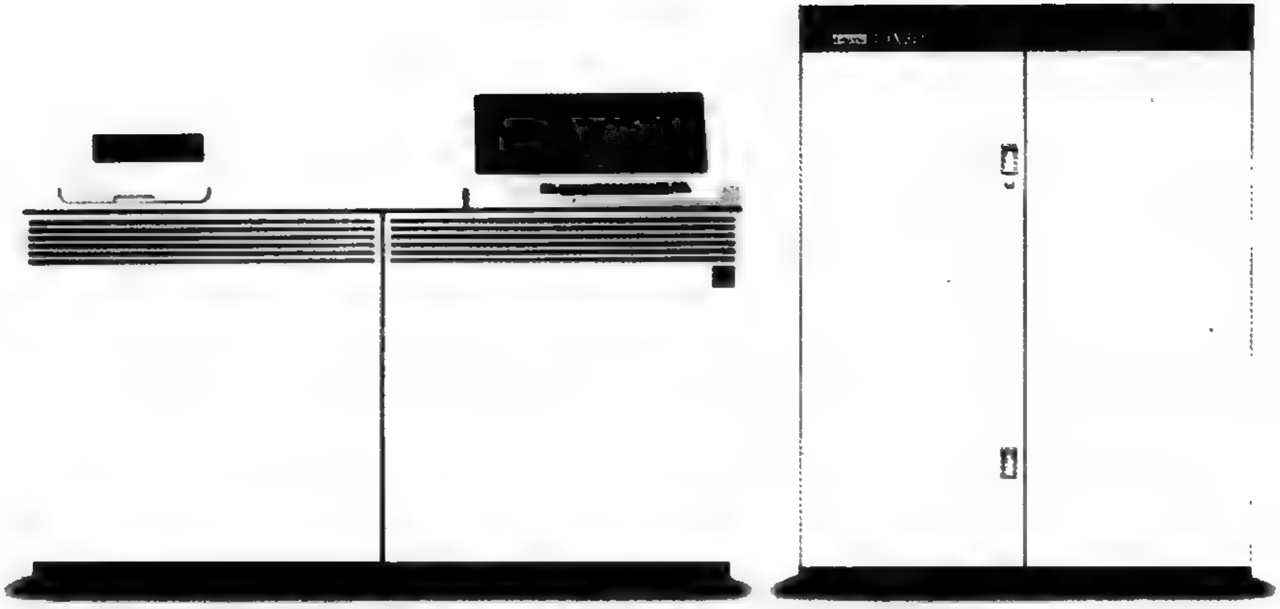

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COMPUTERWORLD

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NAS rolls out its line of midrange processors aimed at the high end of the 4381 series and the low end of the 3090 series. Page 6.

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Prime ups ante in its challenge to DEC's Microvax II. Page 12.

The executive credited with Hogan Systems' startling recovery abruptly resigns. Page 73.

OS/2 kit a hit with MIS pros

BY DOUGLAS BARNEY
CW STAFF

More than half of the 2,000-plus MS OS/2 Developers Toolkits shipped so far by Microsoft Corp. have been snapped up by corporate developers, many of whom say they plan to develop a new generation of personal computer applications with ties to minicomputers and mainframes.

In interviews with *Computerworld*, corporate developers said MS OS/2 will allow applications on a mainframe and minicomputer level to be moved to microcomputers.

"They are talking about the same thing we have had on mainframes for 20 years," said Charlie McLoughlin, manager of software support for auditing at Touche Ross & Co. in New York.

The finished operating system is set to be available early next year. According to Microsoft Chairman Bill Gates, corporations have expressed much more interest in developing for MS OS/2 than they ever did for his firm's MS-DOS.

For one user, MS OS/2 is not just interesting but crucial. "We are running out of gas in 640K because of networks," said Ali Semsarzadeh, senior computer systems officer in charge of future strategy directions for the International Monetary Fund in Washington, D.C. "Our communications cards require 80K to 150K [bytes] and prevent some of our applications from running. That has put our networking in jeopardy."

Semsarzadeh is looking forward to increased internal development under MS OS/2, in particular taking advantage of its large memory and multitasking

Continued on page 6

IBM hastens 9370 deliveries

BY ROSEMARY HAMILTON
and STANLEY GIBSON
CW STAFF

In a major push for its new line of 9370 processors, IBM is accelerating some delivery schedules by up to six months and detailing future enhancements that will extend the 9370s into the mainframe realm.

At an analysts' briefing in Dallas last week in which IBM atypically discussed a range of competitive benchmarks, the company said its 9370 Models 20 and 60 will begin general availability shipments today, according to John McCarthy, an analyst with Forrester Research, Inc. in Cambridge, Mass.

When contacted by *Computerworld*, IBM would neither confirm nor deny the shipping date.

However, IBM had previously said that general availability would begin in July.

Six months early

In addition, IBM has informed several customers that they can take delivery of the new line of 9370 processors six months earlier than they were originally told by the company.

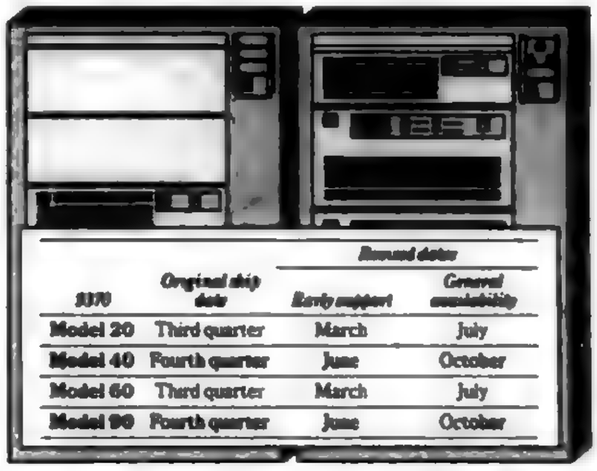
Gerald Giuliani, manager of MIS at Komline-Sanderson Engineering Corp., said he has a 9370 on order for the spring of 1988 but that IBM "wanted to push it up to December."

Another user who was first told to expect the machine in mid-1988 was recently advised that he can take delivery in December.

A software developer report-

Continued on page 93

Pouring out the iron
IBM set to establish installed base of all 9370 models well before the end of the year



9370	Original ship date	Revised dates	
		Early support	General availability
Model 20	Third quarter	March	July
Model 40	Fourth quarter	June	October
Model 60	Third quarter	March	July
Model 90	Fourth quarter	June	October

CW CHART: MITCHELL J. HAYES

ANSI Fortran revamp rankles giants

BY CHARLES BABCOCK
CW STAFF

A revision of Fortran that recently stirred up the opposition of a powerful set of Fortran compiler developers and users is being advanced by a technical committee of the American National Standards Institute.

IBM, Digital Equipment Corp., Unisys Corp. and Boeing Computer Services Co. representatives were among the nine X3J3 Committee members voting in Philadelphia recently against what is likely to be Fortran 87 or Fortran 88, currently designated Fortran 8X.

Several of the features added to Fortran 8X make it too unwieldy, opponents say, while other needed features were left out. If these complaints strike a responsive chord in the user community during the public review process, negative comments on the ANSI standard could force it back to the X3J3 Committee for further modification.

IBM, DEC and Unisys all produce Fortran compilers for their processors, while Boeing Computer Services provides Fortran business and engineering applications to many customers, including its Seattle aerospace parent, Boeing Co.

"Boeing as a whole makes massive use of Fortran. We have a very strong interest in the new standard," said X3J3 Committee member Ivor R. Philips, the Boeing Computer Services official who voted against the new standard. He said the company was still debating how to explain its opposition.

"We're in for a certain

Continued on page 8

U.S. firms lobby for Toshiba

Vendors urge Congress to withhold sanctions

BY MITCH BETTS
CW STAFF

WASHINGTON, D.C. — Computer industry lobbyists last week urged Congress to shield the industry from any import ban or other trade sanctions imposed against Japan's Toshiba Corp., which is under fire for a subsidiary's sale of military technology to the Soviet Union.

Representatives of the Computer and Business Equipment Manufacturers Association, the Computer & Communications Industry Association and Apple Computer, Inc. said U.S. computer manufacturers depend on Toshiba-made semiconductors and other components and that those companies are worried about foreign retaliation in response to U.S. sanctions.

The comments were made at a hearing held by the House Ways and Means Committee, which is considering legislation similar to the two-year import ban passed by the Senate June 30 [CW, July 6]. A week later, the Department of Commerce suspended Toshiba's blanket li-

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JERROLD L. WAGENER
AMOCO CORP.

On the attempt to set an ANSI standard for Fortran 8X. See story page 1.

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Service rivals cut prices

TRW, Amdahl reductions counter IBM's CSA

BY STANLEY GIBSON
and ALAN ALPER
CW STAFF

Joining the growing number of maintenance providers that are cutting their prices in response to IBM's Corporate Service Amendment (CSA), TRW, Inc.'s Customer Service Division and Amdahl Corp. will soon lower their prices.

Computerworld last week was informed that in mid-August, TRW's Customer Service Division, which maintains IBM's and other manufacturers' gear, will decrease its maintenance charges by as much as 20% on IBM equipment under a plan called Service Plus.

TRW, which specializes in servicing networks and small systems, previously offered prices that were 20% to 25% lower than IBM's regular prices, according to Donald Goodspeed, president of Computer Maintenance Consultant, Ltd. in White Plains, N.Y.

Goes the extra mile

Effective Aug. 15, TRW will reportedly offer 24-hour, seven-day-a-week service at no extra charge, a move that mirrors IBM's CSA. In addition, TRW said it will guarantee its maintenance charges for two years and, unlike IBM, will not penalize customers who decide to cancel.

In March, IBM revised its CSA to offer 24-hour, seven-day-a-week service to customers under the plan at no extra charge. First introduced last fall, CSA discounts on network service can be as much as 33% lower than regular IBM maintenance prices.

However, the revised CSA does have some sticking points. Customers must take a test showing that they are in control of day-to-day operations and troubleshooting in order to qualify for the program. And while prices are guaranteed to remain within limits for fixed periods of time, customers can be assessed additional charges for withdrawing from the program.

Concierge service

Under Service Plus, TRW will guarantee response times, the company said. The division said it is also providing customers with a "concierge" who is assigned to coordinate services and troubleshoot problems when they occur.

"We're looking to give customers a high level of service with no strings attached," said Paul Snyder, TRW Customer Service Division's recently appointed vice-president and general manager. "We don't require customers to do things the way IBM does."

For several weeks, Amdahl has been notifying its customers that it will lower maintenance charges by between 11% and 23%, a company spokesman acknowledged. The spokesman declined, however, to offer a list of the different discounts offered on various pieces of equipment.

However, one customer said he was notified that maintenance charges are being reduced on Amdahl 580 and 5890 processors by up to 23%.

In addition, he said he was told that Amdahl will reduce the rates for 24-hour, seven-day-a-week maintenance for its 6380 and electronic direct access storage products by approximately 17%.

Amdahl's changes are effective Aug. 1 and will be automatically reflected in customer bills, the company said. Customers with multiple systems are still eligible to receive additional discounts under the Amdahl Multiple System Maintenance Discount Plan, according to the vendor.

"We are in a competitive world, and our pricing has to be competitive vis-a-vis competitors'," such as IBM's CSA, the Amdahl spokesman said.

Impact seen in prices

"The impact [of the CSA] is highly competitive pricing and exclusion of others," said Bob Djurdjevic, president of Annex Research, Inc. in Phoenix.

Djurdjevic said maintenance rates of IBM plug-compatible vendors such as Amdahl have always been higher than IBM's own rates.

An IBM 3090 Model 600E, for example, carries a monthly maintenance charge from IBM of approximately $14,000, but a comparable Amdahl processor costs $19,700 per month for Amdahl to service, Djurdjevic said.

A spokesman for AT&T, a large Amdahl customer, said his company has been advised by Amdahl of the change. Amdahl does not maintain all of AT&T's Amdahl equipment, however, and the spokesman said it is too early to tell whether Amdahl will be given a larger slice of the maintenance pie.

Both Sorbus, Inc. and Control Data Corp.'s Engineering Servicies Division have begun offering plans to compete with the terms and conditions of CSA and offer substantial discounts [CW, June 1].

In addition, Sorbus recently acquired Pacific Computer Corp., a Milpitas, Calif., company that specializes in maintenance of Amdahl equipment. Also, Intelogic Trace, Inc. recently announced a discount program (see story page 51).

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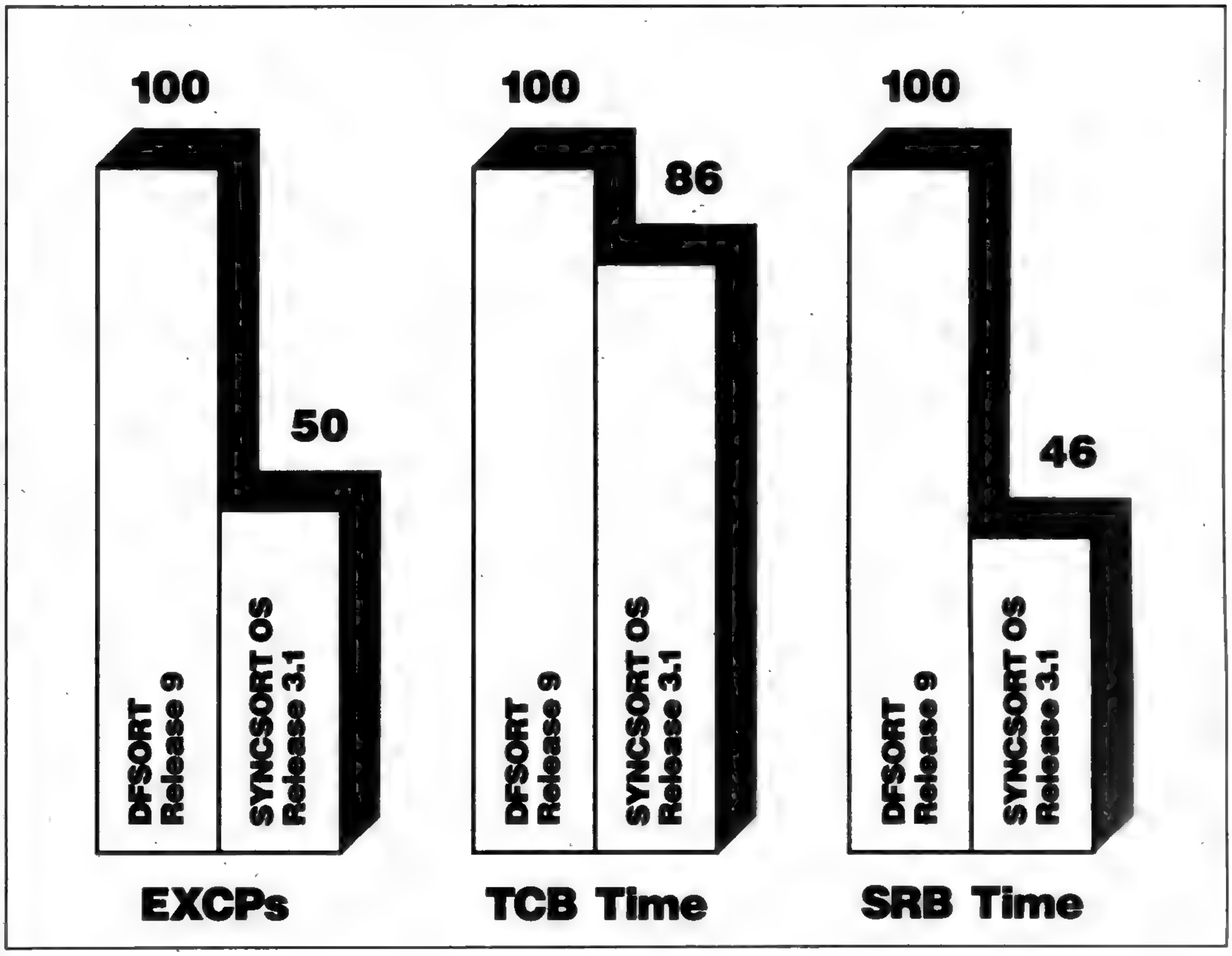

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Profits still down at IBM

Income falls almost 10% despite high demand for PS/2, early shipments

BY CLINTON WILDER
CW STAFF

ARMONK, N.Y. — Still climbing slowly out of a two-year business trough that has outlasted the industry slump, IBM last week reported its fifth straight quarter of earnings below year-earlier levels.

Although a last-minute wave of financial analysts' enthusiasm raised market expectations that IBM's results failed to meet, most analysts said they saw few fundamental surprises in the 9.8% drop in net income.

"The quarterly results were something of a nonevent," said Stephen Smith, a computer hardware analyst at Paine Webber, Inc. "Orders were a bit better than in the first quarter, but a lot of that came at the low end of the product line. It was, as expected, a transition quarter."

Profits fell to $1.18 billion, or $1.95 per share, from $1.3 billion, or $2.12 per share, in the second quarter of 1986. IBM eked out a revenue gain of 4.3% from $12.27 billion to $12.8 billion.

In a prepared statement, IBM Chairman John F. Akers noted that IBM began early shipments of 3090E mainframes and 9370 minicomputers in the quarter, and he said that Personal System/2 demand was strong. But Drexel Burnham Lambert, Inc. mainframe analyst Peter Labe said those products have not yet had much financial impact.

"Those will all be second-half volumes," Labe said. "In fact, for IBM to pull out 4% revenue growth with nothing new to sell is really not bad."

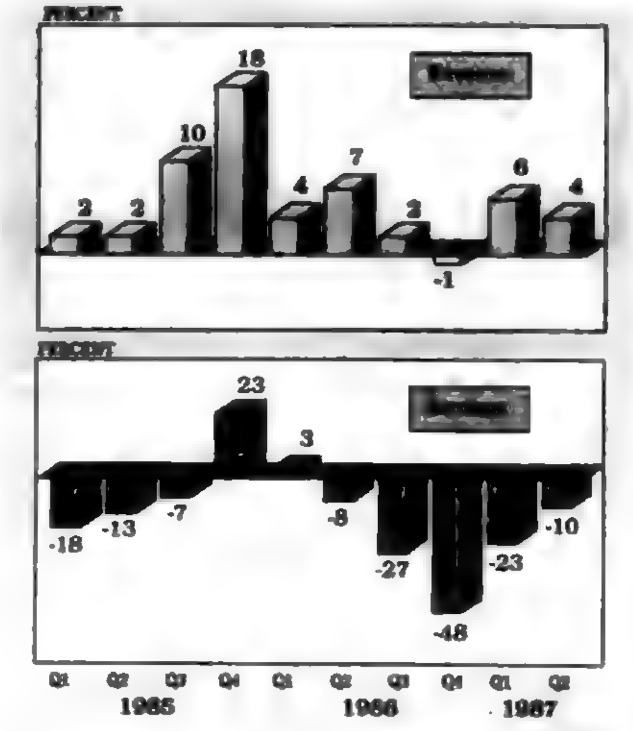
Could restore earnings

On the strength of those new products and a reduced cost structure, however, IBM is still expected to restore earnings growth in the third and fourth quarters and into 1988.

"The ingredients for recovery are there," Labe said. "For the next four quarters, the debate is not whether profits will grow, but by how much."

Not out of the woods yet

IBM's percentage gain and decline in revenue and earnings in comparison to year-earlier quarters



CW CHART

But regardless of a lower cost structure, analysts noted that competitive pricing across the hardware product line will continue pressure on profit margins and probably prevent the margins from ever reaching their levels of 1984, IBM's last strong growth year.

In the mid-range, for example, IBM has had to price the 9370 aggressively in an attempt to win market share away from Digital Equipment Corp. "That's the price you have to pay to stem the competition," said Bob Djurdjevic, president of Annex Research, Inc. in Phoenix.

In the third quarter, high-end 3090E sales volumes should begin to pick up. Paine Webber's June survey of IBM mainframe buying intentions for the year found that 24% of surveyed corporate users intend to buy this year, compared with the 16% who responded positively in March.

In addition, IBM's unprecedented work force and expense reduction plan of the past 18 months is expected to begin lowering the firm's break-even point. The company said 13,000 employees, or 1,000 more than previously announced, took advantage of the early retirement incentive program that ended June 30.

Labe estimated that IBM will save an average of $60,000 annually for each departing employee and that it will slash overall expenses by $1 billion.

IBM's revenue from maintenance services grew only 5.6% in the second quarter to $1.93 billion. The growth rate is expected to erode further in the third quarter, the first full quarter of deep maintenance price cuts under IBM's Corporate Service Amendment, which took effect June 1.

"That's an area where IBM and others have been aggressive, and it's showing," Paine Webber's Smith said. But most watchers said they expect growth to be restored in the long run as IBM expands its installed base of hardware to be serviced.

Rise in software revenue

IBM's most encouraging financial news was in software, in which revenue — primarily from mainframe operating system licenses — grew 23% in the second quarter to $1.53 billion.

IBM's software revenue represented 12% of total sales, up from 10% one year earlier. Djurdjevic predicted that IBM's gross margins on operating system licenses, already higher than 70%, could rise to more than 80% by next year.

"It's all blue sky, all upside on software," Djurdjevic said. "IBM's MVS and VM are the one area where they still can call all the shots. If that were ever to change, IBM's entire strategy would come tumbling down like a house of cards."

IBM's second-quarter results benefited significantly from the weak U.S. dollar. The company said foreign currency differentials raised its profits by $115 million and its revenue by $840 million.

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Symantec unveils Q&A writing tool

BY DOUGLAS BARNEY
CW STAFF

CUPERTINO, Calif. — In an effort to leverage the success of its Q&A, an integrated file manager and word processor, Symantec Corp. last week announced Q&A Write, a word processing package priced at $199.

Q&A Write is aimed at middle managers who are interested in creating documents but do not need a complex and expensive word processing package, according to Rod Turner, Symantec executive vice-president. "Middle managers don't want to become experts in using their PC," Turner said.

The product is scheduled to ship this month.

According to Turner, Q&A Write will directly compete against Professional Write, a popular package from Software Publishing Corp. Q&A Write is not expected, however, to compete with high-end products such as Ashton-Tate's Multimate Advantage II, Wordperfect Corp.'s Wordperfect and Microsoft Corp.'s Word.

Q&A Write is an enhanced version of the word processing module within Q&A and includes support of most popular laser printers, font control and enhanced data import and export capabilities. Users can run Lotus Development Corp.'s 1-2-3 or other popular applications from the Q&A menu. The package reportedly can import complete 1-2-3 work sheets into documents.

For corporate users needing to share documents with host systems, Symantec said it will offer, for $29, an IBM Document Content Architecture utility that provides document import and export capabilities for 15 popular word processing packages.

The product, however, lacks many of the features available on higher priced word processing packages, such as built-in dynamic outlining and footnotes. Outlining capabilities may eventually be offered by using technology from Living Videotext, Inc., which was recently acquired by Symantec.

CORRECTIONS

Swanson Analysis Systems, Inc.'s Ansys can be used by customers as a benchmark [CW, June 8], but the product primarily functions as a finite-element analysis program.

Merge 386 was incorrectly referred to as an operating system in which Unix runs as a task under Microsoft Corp.'s MS-DOS [CW, July 6]. MS-DOS runs as a task under Unix.

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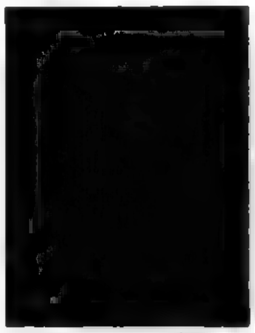

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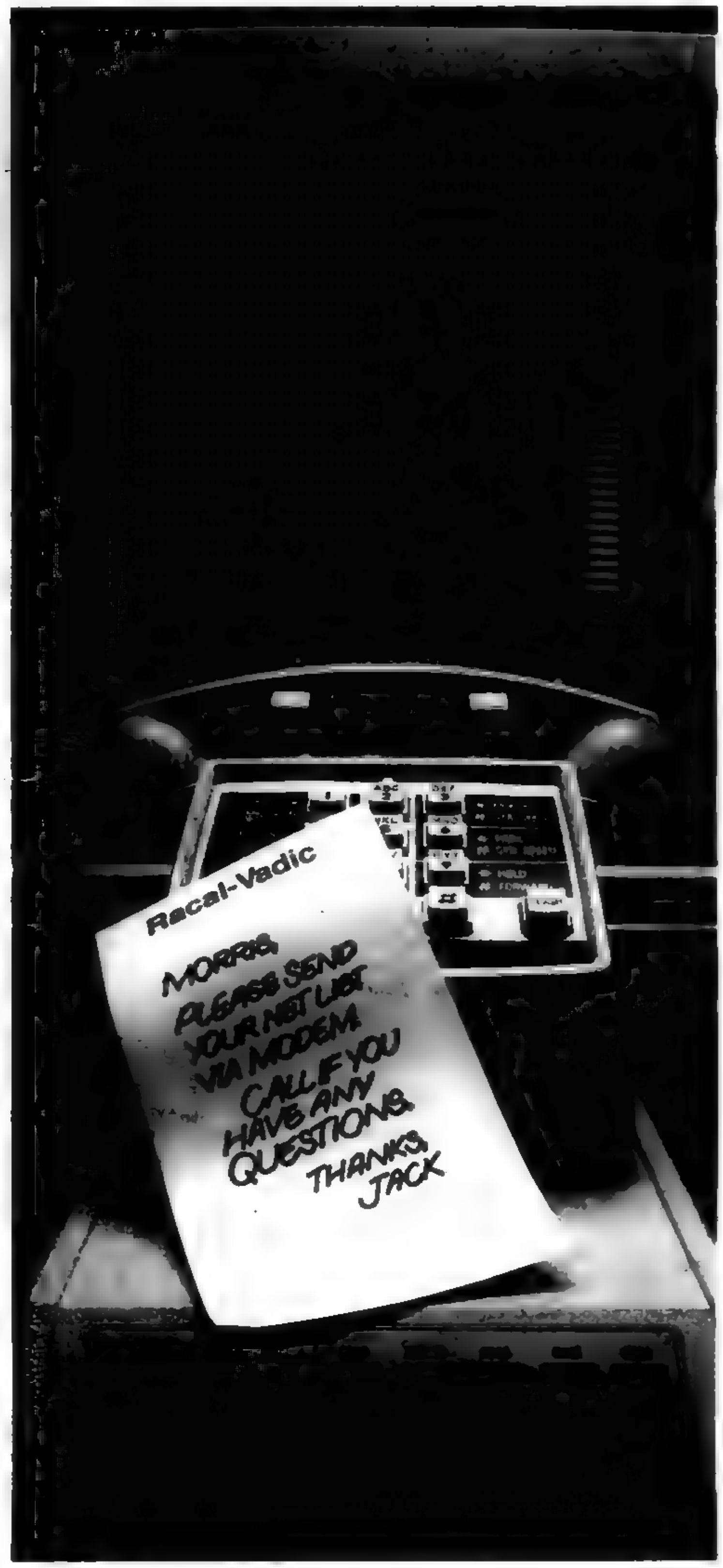

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NAS intros counter IBM in processor fray

BY JEFFRY BEELER
CW STAFF

MOUNTAIN VIEW, Calif. — As expected, National Advanced Systems Corp. (NAS) last week countered IBM's recent move to plug the price/performance gap between mid-range and large-scale processor lines.

Announcement of the four AS/VL intermediate systems comes hard on the heels of the debut of IBM's third generation of 4381 machines, including the 4381 Models 23 and 24 and introduction of the entry-level 3090 Model 120E. In extending the 4381 upward and 3090 downward, IBM bridged the intimidating price gulf that had long divided its medium- and large-scale CPU lines, according to Rick Martin, a research analyst with New York brokerage house Sanford C. Bernstein & Co.

For more than 20 years, "very few users could ever afford to jump the gap," which typically ranged from $1 million to $2 million, Martin said. When they exhausted the capacity of their existing machines, "it was a lot less expensive simply to buy a second mid-size system instead of a bigger machine."

IBM's intent in filling the price gap between its processor families is to induce 4300 series users who might otherwise have balked at migrating to the 3090 to take the plunge, he said.

But in positioning a range of systems where none previously existed, the industry giant has also intensified the competitive pressure on NAS, which has countered the challenge by upgrading the semiconductor technology in its intermediate CPUs.

With the AS/VL, the company has adopted a "layered technology" approach in which each systems module uses a different kind of circuitry, according to Dave Profio, NAS's manager of domestic marketing.

Similar design

The design concept resembles the one underlying the plug-compatible vendor's top-of-the-line AS/XL mainframes. For example, with the three AS/VLs' uniprocessor models and lone dyadic machine, NAS uses 2,000- and 5,000-gate emitter-coupled logic chips, which operate at 200 to 250 picosec.

In the I/O processor, NAS uses 24,000- and 40,000-gate CMOS components while incorporating 4K- and 64K-bit bipolar CMOS technology in the associated cache buffers and dynamic working storage. The AS/VL also reportedly marks the first use in a mid-range system of 1M-bit CMOS memory chips.

Together, the various categories of circuitry "allow NAS to price its systems even more aggressively than the 3090 Model 120," said First Boston Corp. Vice-President Steve Milunovich. "Technology will definitely give the AS/VL a price/performance boost over IBM."

The AS/VL series offers a 15% to 20% advantage in price/performance over its IBM counterparts, Profio said. The largest of the three uniprocessors, the AS/VL 60, provides 3.5 to 4.2 times more throughput than the firm's existing AS/6660 CPU and outperforms the AS/VL 40 and AS/VL 50 by 40% to 55% and 25% to 35%, respectively. The dyadic AS/VL 80 offers 70% to 90% more computing power than the AS/VL 60, according to NAS.

By implementing much of the processor family in dense CMOS, NAS minimized the machines' parts counts and reduced their footprints to 16.1 sq ft, Profio said.

The CMOS chips' heat dissipation also reportedly allows the AS/VL to provide increased processing power while using the air-cooling scheme utilized in earlier NAS systems.

By contrast, IBM uses air cooling in the 4300 and relies on water cooling in the larger 3090 family, which requires costly plumbing additions when a user migrates from the 4381 to the 3090.

Upgrade hesitation

Because such facilities changes are costly, many 4381 customers will hesitate to upgrade to the 3090 even with the recent closing of IBM's price gap, according to 4381 user Phil Grammatica, DP director for the City of Anaheim, Calif.

In the wake of its AS/VL introduction, NAS's Japanese hardware supplier, Hitachi Ltd., ceased production of the NAS AS/6600 family. In addition, the firm said it will continue to make small quantities of the AS/8000 for a limited time.

All three of the field-upgradable AS/VL uniprocessors support a minimum of eight channels and 8M bytes of memory and expand to 32M bytes and 128 channels. Delivery is set to begin this quarter.

The AS/VL 80 also holds eight to 32 channels but has twice the main memory capacity of the other three models.

Shipments of the dyadic complex will reportedly start during the fourth quarter.

Base configuration prices are $638,000 for the AS/VL 40, $891,000 for the AS/VL 50, $1.3 million for the AS/VL 60 and $2.1 million for the AS/VL 80.

Dueling mainframes

New NAS mainframes positioned for price and performance challenges to IBM systems

	National Advanced Systems				IBM		
	AS/VL 40	AS/VL 50	AS/VL 60	AS/VL 80	4381 Model 24	3090 Model 120E	3090 Model [illegible]
MIPS*	5	7.5	10	17	7.8	7.5	15.6
Memory (in bytes)	32M to 128M	[illegible] 128M	[illegible] 128M	[illegible] 256M	16M to 64M	32M	32M to 64M
Price	$638,000	$891,000	$1.3M	$2.1M	[illegible]	[illegible]	$2.6M

* Million instructions per second

CW CHART

OS/2 kit

FROM PAGE 1

to enhance the workstations of IMF economists. "Our related development is related to hooking PCs into larger systems," he said.

The IMF currently uses Microsoft Windows to provide a consistent interface for two different data bases, one on a Hewlett-Packard Co. minicomputer and the other on a Digital Equipment Corp. VAX. The IMF's sister organization, the World Bank, also uses a Windows interface to access a host data base.

OS/2 with the Presentation Manager interface will allow the IMF to have communications running in the background, remove the memory crunch and allow users to be constantly connected to more than one host computer, without interfering with PC applications, Semsarzadeh said. All these applications can be addressed through the same interface, he added.

Touche Ross's McLoughlin said all in-house applications written in his department will eventually be converted to OS/2. But some may be difficult to convert. Most of McLoughlin's applications are written in Basic, which is not currently supported in the OS/2 tool kit.

A key part of the migration to OS/2 is the compatibility box, which allows many exisiting MS-DOS applications to run but without taking advantage of additional memory. "Our stuff will run in the compatibility box," McLoughlin said. With the compatibility box, users can install OS/2 and retain the investment in existing applications.

Minis look like micros

A user at Westinghouse Electric Corp. has similar plans. "They will be able to be logged onto an IBM 3090 and a Data General Corp. mini and do local work," said Robert D. Wood Jr., associate systems analyst in the marketing services division at Westinghouse. In addition, Wood says he expects his department to put minicomputer-style applications on micros running OS/2. "It is getting tough to distinguish between the minis and the micros," Wood noted.

Charles Weir, a systems analyst at Reuters, Ltd. in the UK, said he is also impressed with OS/2's capabilities. "OS/2 is the way things are going. It gives us extra memory and faster task switching," Weir said.

Reuters developed a currency trading system that runs under Windows and replaces multiple terminals that traders formerly used. The company will eventually move that system to the Presentation Manager, according to Weir. Reuters has decided against Unix for its trading system. "The Unix graphics interface is suspect," Weir said.

Analysts contacted last week disagreed on corporate interest in OS/2 development. "The new IBM Personal System/2 design is a real computer design with a real operating system in the eyes of MIS. Companies are realizing they have a huge investment in PCs, and there is a lot of pressure from upper management to better utilize that investment, including in DP-type applications," said John McCarthy, research manager for "Forrester's Professional Automation Report" in Cambridge, Mass. "We are seeing the systemization of PCs."

But Marty Gruhn, vice-president of The Sierra Group in Tempe, Ariz., disagreed. "There is a lot of inertia in the old MS-DOS. A lot of users are not convinced of what OS/2 will do," Gruhn said. "Buying a $3,000 tool kit is not a major strategic investment for these companies."

Turbo gets toolboxes

SCOTTS VALLEY, Calif. — Borland International announced plans last week to introduce three Turbo Basic toolboxes for data base, editor and telecommunications development.

The developers' tools, which are slated to be available in the third quarter, include source code that can be incorporated into users' applications, according to the company.

The Turbo Basic Database Toolbox includes three sets of routines for data base programming: access, sort and screen display and entry.

It uses long integers for record numbers, permitting data bases of more than two billion records, Borland claimed.

The Database Toolbox also includes a Turbo Basic version of the Quicksort program and supports virtual memory management for an expanded sorting space.

Data can be imported from three types of files: Borland's Reflex, ASCII and Ashton-Tate's Dbase II and III Plus.

The Turbo Basic Editor Toolbox comes with First-Ed, a multiwindow, multifile editor that is control-character driven, and Microstar, which is similar to First-Ed but has pull-down menus. Both editors are random-access memory based.

Supports windows

The Editor Toolbox supports multiple windows, multitasking and DOS functions like copy/delete file or change directory, Borland said.

The Turbo Basic Telecom Toolbox is said to provide the routines required to build a complete communications program.

It includes an asynchronous communications tutorial and routines for controlling ports and screen handling.

The package features two example programs: Smallcom, a simple program with basic modem control, and Turbo Telecom, a complex program with command line and script processing, Digital Equipment Corp. VT100 terminal emulation, Xmodem file transfer and a phone book data base.

The toolboxes are available for IBM Personal Computers and compatibles.

Borland said each toolbox will sell for $99.95.

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Information centers growing up

Survival depends on ability to better integrate center into corporation

BY ROSEMARY HAMILTON
CW STAFF

NEW ORLEANS — The information center fad is over. Now, many of these facilities are being forced to prove their worth, managers and consultants said last week.

"Three years ago, lots of people thought they better have an information center because they thought, 'The competition has one,' or, 'The guy I play golf with has one,' " said Larry Des Jardines, manager of user services at United Student Aid Funds, Inc. "But now we're getting looked at."

Many consultants at the Information Center Conference and Exposition, held here last week, suggested future survival depends on the information center's ability to market itself to the corporation. Some information center managers, however, said the key is for their departments to move away from their original — and very broad — mission of bringing computing to the masses and to zero in on a specific, high-visibility project that is sure to catch management's attention.

Of the 450 information centers recently surveyed by Crwth Computer Coursewares, 32% reported that a chief obstacle is the ability to justify resources. When this survey was conducted two years ago, this question was not included because it was not an issue, a Crwth spokeswoman said. But when she surveyed 100 information center managers this year to help establish the questions for the 1987 questionnaire, "they made the suggestion that we include this issue," she said.

'A real hot issue'

At McCormick & Co., a specialty foods manufacturer in Baltimore, the end-user services organization was launched at a time of corporate crisis, said Tom Artes, system application manager. A number of projects were behind schedule, and "maintenance was a real hot issue," he said.

The systems and project management group was formed to operate separately from MIS and to involve users in resolving these problems, he added.

One such project was an order-processing system that had been languishing for four years, according to Artes. His group was able to turn it around within a few months, he said. From there, additional projects, such as fourth-generation language use among end users, have been tackled.

'Redundant'

"Management got responsiveness, so our budget has been there," Artes said. Recently, a productivity consulting group was hired to evaluate McCormick's information systems requirements. "They said we were redundant. But management did not agree," Artes added.

The information center department at Storage Technology Corp. took a similar approach. Ron Carroll, manager of the DP information center, said the firm's management recently saw the immediate results of an inventory-reporting system that was put together by Carroll and members of the information center.

The microcomputer-based system is being installed nationwide, and, as a result of this automation, Carroll said, each city that comes on-line shows an average initial savings of $60,000 for the first month.

"Those types of systems got us enough visibility for management to say that we are a strategic part of the business," Carroll said.

Carroll also agreed with the marketing techniques and plans discussed by consultants and managers at many of the Information Center Conference's seminars. In addition to the special projects strategy, Carroll said that his department publishes newsletters on their achievements while also hosting luncheons and giving awards to information center employees.

Unclear responsibilities

Not all information centers have taken the approach of tackling key projects and, as a result, their responsibilities are unclear to management.

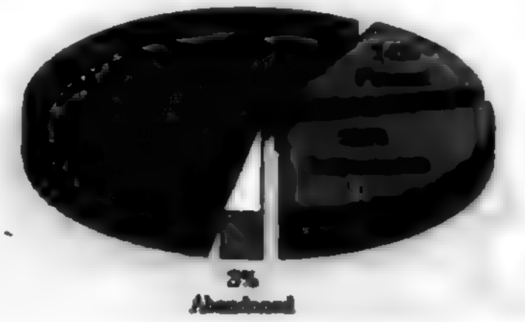
When Des Jardines was hired by the United Student Aid Funds two years ago, he said, he *was* the information center. Consequently, he was strapped with the job of selecting hardware and software, installing it and bringing users up to speed with the systems. Eventually, Des Jardines brought on four analysts to work in his department.

"Some managers really don't have a good sense of what we're doing," he said. "Often we help someone else accomplish something, and they get the primary recognition. What we do is more intangible — you can't put productivity figures to it."

However, Des Jardines said that since 1985 his immediate boss has developed a clear understanding of his department. "We're not called on more than other departments to justify our budget, but the manager is now asking me more questions," he said.

Information center chargeback

1987 survey of 450 information centers shows majority do not have chargeback systems



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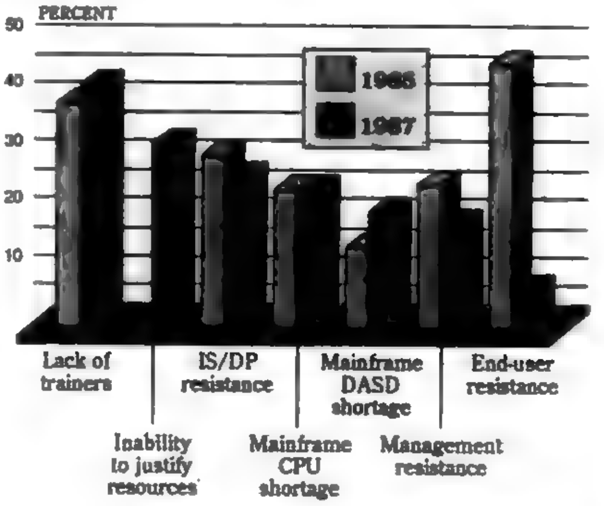
CW CHART

Information center obstacles

Survey of 450 information centers in 1987 indicates end-user and management resistance are on the wane



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Revamp

FROM PAGE 1

amount of controversy now. I'm bracing myself," said X3J3 Committee Chairwoman Jeanne C. Adams.

She called the proposed changes in Fortran, which include the addition of array processing and derived data types, necessary modernizations of the language.

The X3J3 Committee also proposes to do away with what it calls duplicative or obsolete features of the language over an unspecified time period. That extended time frame has stirred little opposition, said X3J3 Vice-Chairman Jerrold L. Wagener of Amoco Corp.

IBM could not be reached for comment at press time, but Adams said the IBM representative's opposition was based in part on a desire to keep Fortran compact enough to run efficiently on a personal computer. The array processing features are a sizable addition to Fortran, she said.

Negative vote

Boeing Computer Services' representative cast a negative vote because the company was looking for additional features in Fortran, such as bit data types and pointers, Wagener said.

Boeing Computer Services' Philips said his company was not ready to announce its stance in opposition to Fortran 8X. But each committee member voting against the proposed standard must put his reasons on the record, Adams said.

Unisys representative Larry Rolison charged that the committee strayed into designing a new language rather than standardizing features common to the best existing Fortran compilers. "We thought they added too much to the language," he said.

The opposition, while influential, "is equally split between those who say we've got too much in the new standard and those who say we've got too little," Wagener noted. As a result, the X3J3 Committee "is in a tricky situation. To satisfy one of the groups will make the other one unhappy."

The situation reminds some observers of the dilemma faced by another ANSI technical committee when it attempted to get the new Cobol 85 standard accepted. Powerful opposition emerged during the public review process, challenging modernizations that would have required the conversion of the huge library of existing Cobol applications. Compatibility does not appear to be an issue in the debate over Fortran 8X.

Positive outcome

The X3J3 Committee's proposed standard is undergoing a 30-day letter ballot consideration by parent X3 Committee members, the positive outcome of which will allow the standard to be submitted for four months of public review and comment. The opposition to Cobol 85 emerged during its public review period.

An X3 advisory committee has already forwarded both negative comments and proposed changes to the parent group. ANSI's Standards Planning and Requirements Committee, which checks procedural matters, took the step as a way of making certain that opponents get their point of view represented to all parties.

"The negative comments are going to have an effect," said Wagener, an advocate of the new standard. But, he said, a solid two-thirds majority of the X3J3 Committee held together in spite of the disagreements.

The proposed changes, according to committee observers, include the following:

- Provide array operations or process sets of data simultaneously. This feature is already offered by several vendors of Fortran compilers.
- Provide an abstract means of specifying the representation of numbers, leaving it to the compiler to determine whether numbers should be stored as single- or double-precision figures. Commercially available compilers do not provide this feature.
- Provide derived data types, whereby a data type for employee numbers, for example, could prevent an attempt to add employee identification numbers together, even if an application mistakenly called for such a result. This feature is another that is not currently available on Fortran compilers.
- Provide modular definitions, which allow a programmer to link the common elements of subroutines or other objects.
- Provide for the removal of obsolete, or so called "depreciated," features of the language at an unspecified future date. The deletions would occur with the full revision of Fortran that is set to follow the currently debated one.

Micom melds voice, data on 56K bit/sec. lines

BY ELISABETH HORWITT
CW STAFF

SIMI VALLEY, Calif. — A combination voice digitizer and digital multiplexer that Micom Systems, Inc. is expected to announce today reportedly provides voice and data integration over 56K bit/sec. dedicated circuits as an alternative for sites that cannot cost-justify a 1.5M bit/sec. T1 line.

The Oneliner, by transmitting multiple data and voice transmissions over the same 56K bit/sec. dedicated digital line, brings voice and data integration to midrange companies — Micom's target customers — that "often cannot afford T1 lines except as backbone networks," said Micom product manager Greg Iverson. "If you are doing more than 1½ hours of telephone calls between two sites, you save money by using a leased line, so many companies have one leased line linked to the private branch exchange [PBX] and another for data."

Most interface equipment that provides voice and data integration supports 1.5M bit/sec. T1 rates, according to Iverson, and many corporate sites do not have the voice or data traffic to justify installation of such equipment.

Voice conversion

Oneliner incorporates Micom's new Advanced Packetized Voice technology, which converts voice signals into digital packets, permitting "high-quality voice" to be sent at rates of 9.6K or 14.4K bit/sec., Micom said. As a result, the multiplexer can support as many as four voice channels, or a combination of voice and high-speed data transmissions, over a single dedicated 56K bit/sec. link, according to Iverson.

Industry experts questioned the market for 56K bit/sec. voice and data transmission. "I don't think many companies would bother to install 56K bit/sec. for voice and data when it only takes six 56K bit/sec. channels to cost-justify installing a T1 link," said Richard Kuehn, president of Cleveland consulting firm RAK Associates, Inc.

"A 56K bit/sec. Dataphone Digital Service [DDS] line is damned expensive," agreed William Rahe, a vice-president of the enterprise networking strategies group at the Gartner Group, Inc. in Stamford, Conn. However, Oneliner would be useful to a "data center that is using up most of a DDS line but wanted to slip in some voice bandwidth," or for companies that provide long-distance satellite connections, Rahe noted. "GTE [Spacenet Corp.] just announced a 56K bit/sec. full-duplex VSAT [very small-aperture terminal] that only costs $1,700 a month." Additionally, he said, the product could be used over satellite or transatlantic cable-based links between the U.S. and Europe.

Other products, or combinations of products, can reportedly provide 56K bit/sec. voice and data integration — although Micom seeks to differentiate its own product in terms of voice quality. Republic Telcom Systems Corp. in Boulder, Colo., reportedly offers a multiplexer and voice digitizer that supports six to eight voice channels or a combination of voice and data. In March, Timeplex, Inc. in Woodcliff Lake, N.J., began reselling this system under the name Link Packetized Voice Server-8.

General Data Comm Industries, Inc. also reportedly has a voice digitizer that sends 16K bit/sec. voice channels over a digital multiplexer.

Pricing for the Oneliner Wideband Synchronous Time Division Multiplexer starts at $4,635. It can be equipped with an MT VM2 full-duplex voice digitizer module, priced at $2,940, and an integral 56K bit/sec. data service unit per channel service unit, priced at $1,250.

Ex-Intelsat head guilty of fraud

BY MITCH BETTS
CW STAFF

WASHINGTON, D.C. — Richard R. Colino, the former head of the International Telecommunications Satellite Organization (Intelsat), last week pleaded guilty to participating in a $4.8 million scheme to defraud the satellite consortium.

The complex scheme involved efforts by Colino and associates to obtain kickbacks from contracts for the financing and construction of Intelsat's new headquarters building here, according to court documents.

Colino, who was fired by Intelsat in December 1986 following a financial audit, faces a maximum sentence of 10 years in jail and a $250,000 fine after pleading guilty to one count of interstate transportation of money obtained by fraud. Sentencing is scheduled for Sept. 11 in U.S. District Court here.

Intelsat is a 114-nation cooperative that operates a global satellite system for telephone, video and data communications services. Colino, 51, was known for trying to turn the consortium into an aggressive competitor to meet the challenge of rival carriers using fiber-optic cables.

Just published:

IMS for the COBOL Programmer

Part 2: Data Communications and Message Format Service

This NEW book takes the pain out of learning how to handle IMS data communications (DC) processing. Although IMS DC is a complex subject, this book takes you through it step-by-step so it's manageable and even easy to understand

(You use IMS DC on an MVS system for interactive applications that let terminal users access and update IMS data bases. There's another function of IMS—IMS data base, or DB, processing—that lets you access IMS data bases in batch. *IMS for the COBOL Programmer, Part 1* covers IMS DB (called DL/I on DOS/VSE systems), which you need to know about before you can tackle IMS DC)

Here's what you'll learn

IMS, Part 2 focuses on 2 main topics First, it teaches you all about the COBOL programming considerations for DC programs. That includes:

- why you have to code message processing programs, or MPPs, the way you do (DC programs are typically called MPPs because they handle messages sent from and to user terminals)
- what the COBOL elements are for MPPs
- how to send output to a terminal other than the one where the input was entered
- how to develop a conversational application that lets you save data from one execution of an MPP to the next
- how to develop a batch message processing (BMP) program that can do batch updates on IMS data bases while the same data bases are being used by other programs
- how to use Batch Terminal Simulator (BTS) to test DC applications using IMS resources, but without affecting the production IMS environment

The second main topic of *IMS, Part 2* is Message Format Service (MFS) MFS acts as an interface between the format of messages as they appear at a terminal and the I/O formats in your programs So you'll learn how to.

- create and understand MFS *format sets* that specify the formats of terminal and program I/O
- control cursor position and field attributes on a screen so you can make data entry easier for a terminal operator
- handle PF key functions through MFS
- develop applications that use more than one screen format
- use physical and logical paging to break messages down into smaller components for display, processing, or both

And more! In short, with MFS you'll learn to create formatted screens that are easy for operators to use And you'll learn what tasks you can handle through MFS instead of having to code for them in your DC programs

117 examples make complicated things easier to understand

IMS, Part 2 is chock-full of illustrations that make it easier for you to master IMS DC You get schematic drawings that show how DC works and syntax summaries of MFS commands But most important, you get the screen layouts, MFS format sets, structure charts, and COBOL code for 8 business programs. Use these as models for your own programs, and you'll save yourself hours of design, coding, and debugging

Who this book is for

If you're a professional programmmer-analyst, you owe it to yourself to learn about IMS DB and DC Obviously, that's a must if you're developing IMS applications But even if you're not, you should still understand IMS to make yourself more flexible on your current job ..or more marketable for another job

If you've tried to learn IMS DC from other sources, the experience probably frustrated you. That's because IMS DC is just plain difficult Although IBM's IMS manuals might seem like your best bet to start, they're designed for reference, not training So they don't help you focus on what's really important and practical And other so called "training" materials aren't much help, either But *IMS, Part 2* is different It teaches you the essential and useful points, and does it from your perspective application programming

If you're a manager, a trainer, or a DBA, I urge you to test this book on at least some of your programmers It's the easiest and cheapest way to beef up your IMS training program because it doesn't take any of your time all you have to do is pass the books out to your programmers I guarantee they'll be developing better IMS DC applications in just a few days, or you can return the books and forget the bill (see my complete guarantee below)

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NCR Comten doubles 5620's power

Enters price/performance battle with IBM 3720, upgrades throughput, line support

BY ELISABETH HORWITT
CW STAFF

ST. PAUL, Minn. — Firing the latest salvo in a price/performance battle with IBM's 3720, NCR Comten last week announced an upgraded version of its 5620 communications processor.

The 5620XP model delivers between 2.2 and 3.7 times as much throughput power and supports twice the number of lines as the vendor's older model at a comparable price, according to NCR Comten.

Like the 5620, the 5620XP was designed to meet the communications needs of "remote sites in large, complex networks that may need to connect a variety of IBM and non-IBM terminals with a [Systems Network Architecture] backbone or non-IBM hosts," said David Anderson, NCR Comten's manager of marketing and planning.

The 5620 and 5620XP are "positioned against IBM's 3720 [communications processor], but the 3720 came after the 5620," Anderson said. A 5620XP equipped with additional communications subsystems supports 64 communications lines using asynchronous, bisynchronous or CCITT X.25 protocols. The implementation of two NCR Comten Integrated Protocol Converters allows up to 64 asynchronous devices to be attached to 32 of the lines, so that the device supports 96 channels in all, the vendor said.

"NCR Comten is trying to beat IBM to the 3720 punch," said John Carosella, an analyst at Fairfax, Va., consulting firm Network Strategies, Inc. "With the spread of [IBM] 9370s and distributed processing, users are going to need network concentrators." An NCR Comten or IBM communications processor can accept incoming lines from multiple IBM hosts and multiplex them over a single leased line connection to a remote host, providing significant savings over multiple leased lines, Carosella said.

IBM's 3720 was introduced in May 1986. Models 1 and 2 support up to 28 lines; the 3721 expansion unit increases support to 60 lines. Models 11 and 12 support up to 16 lines and two IBM Token-Ring connections; 48 lines plus two Token-Ring connections with the expansion unit.

NCR Comten was unable to provide any benchmark figures comparing the 5620XP with the 3720 in terms of power.

An NCR Comten 5620XP, supporting up to 32 lines, is available now for about the same price as a comparable 5620 model, the vendor said. The base 5620XP model costs $16,000, with fully configured systems ranging up to $111,482.

An expansion feature that allows the 5620XP to support up to 64 lines will reportedly be available in the fourth quarter for $11,000.

Maintenance fees for the 5620XP are reportedly between 25% and 50% lower than previous NCR Comten 5620 fees.

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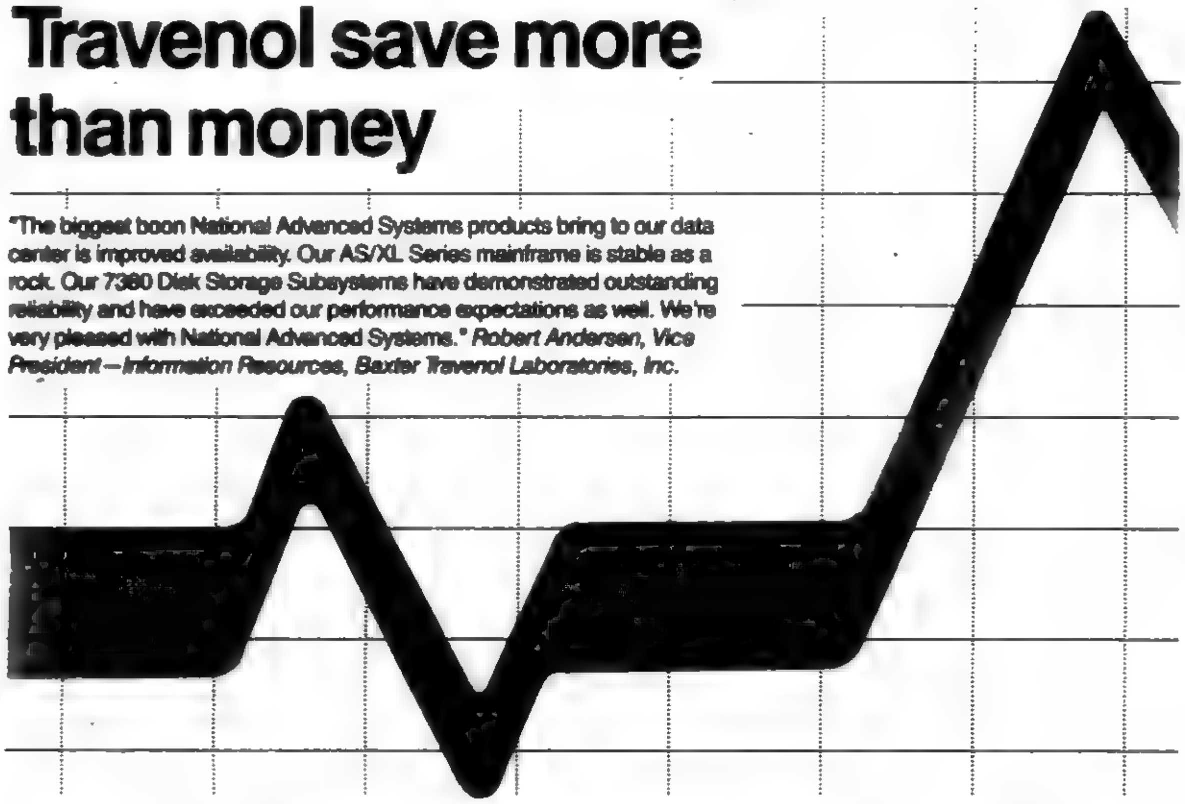

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Speedy 386 Unix debuts

BY DAVID BRIGHT
CW STAFF

SAN JOSE, Calif. — Convergent Technologies, Inc. last week introduced an Intel Corp. 80386-based multiuser Unix system and personal computer server that the firm claims is the fastest such machine on the market.

Convergent's offering, to be sold initially to OEMs and then to value-added resellers, will compete against 80386-based multiuser machines recently introduced by Altos Computer Systems, Prime Computer, Inc. and Texas Instruments, Inc.

Called the Server PC, the system is built around a 20-MHz microprocessor and is said to support as many as 64 PCs, 32 character-oriented terminals or a mixture of the two. The system can use Locus Computing Corp.'s Merge 386 software environment to simultaneously run Convergent's implementation of AT&T's Unix System V Release 3.0 and Microsoft Corp.'s MS-DOS.

According to marketing manager Henry Robinson, Convergent used sophisticated design features like a 64K-byte write-back cache memory with zero-wait states to build a very high-performing machine. The system uses a small computer systems interface (SCSI) disk drive controller to speed disk drive operation.

The Server PC is said to be compatible with the IBM Personal Computer AT. The box contains five 16-bit slots for PC AT add-in boards, three 8-bit PC-compatible slots and two 32-bit slots. Two of the 8-bit slots can also function as 32-bit slots.

A base configuration with 4M bytes of memory, an 80M-byte hard disk drive, an AT-compatible floppy disk drive and room for three additional SCSI peripherals is priced at $7,500.

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	Nashville	Aug 6
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CANADIAN SEMINARS

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Prime deskside set to challenge DEC

Potent 50 series system aims to give Microvax II run for money in price/performance arena

BY DAVID BRIGHT
CW STAFF

NATICK, Mass. — Hoping to strengthen its competitive position against Digital Equipment Corp.'s Microvax II line, Prime Computer, Inc. is scheduled today to announce its most powerful 50 Series deskside system.

Prime officials claimed that the addition of the new departmental 2455 system provides better price/performance and a better incremental growth path than DEC's Microvax II systems.

However, analysts termed Prime's argument "a little bit forced," because the Microvax's power can be increased through clustering and because DEC has a software advantage. In addition, DEC is believed to have in the works a Microvax III that would leapfrog the performance of the 2455, although it is unclear when that system would be announced.

While all of DEC's Microvax II machines run at 0.9 million instructions per second (MIPS), according to analysts' estimates, Prime's three deskside systems range in performance from 0.85 to 1.6 MIPS. To obtain more performance, DEC customers must either link Microvaxes in networks such as Vaxclusters or jump to a much larger VAX 8250, which operates at 1.3 MIPS. The Microvax cannot be upgraded to an 8250.

> "WHAT WE can do that DEC can't do . . . is increase productivity by upgrading users to a more powerful machine while staying in this office-installable kind of environment."
>
> MARY SCOTT
> PRIME COMPUTER, INC.

"What we can do that DEC can't do to the same degree is increase productivity by upgrading users to a more powerful machine while staying in this office-installable kind of environment," said Mary Scott, Prime's product manager. "Clustering isn't right for everybody."

Different philosophy

But analyst Richard Mikita of International Data Corp., a Framingham, Mass.-based market research firm, said that in many cases, increasing performance through clustering can be just as practical as Prime's single-processor method.

"It's just a different philosophy," he said. "The DEC approach would be to provide those small increments of capability in multiple places, not to take a central processor and upgrade it in small increments." Therefore, he added, Prime's "steep-step argument is a little bit forced."

In order to better compete against the Microvax II, Prime needs to concentrate not so much on price/performance as on providing more applications that solve users' problems, stated Kimball Brown, who tracks the systems market for Dataquest, Inc., a San Jose, Calif.-based market research firm. With products like its All-in-1 office environment, which is built around the company's VMS operating system, DEC has an advantage over Prime, he said. "You can't fight VMS with price/performance," he added.

The 50 Series machines all use proprietary processors and the company's Primos operating system, although in late April, Prime modified its traditional proprietary strategy somewhat by introducing a Unix-based multiuser system built around the Intel Corp. 80386 microprocessor. Mikita said that the 2455 announcement should reassure customers that Prime is still investing in its bread-and-butter 50 Series.

Like the entry-level 2350 and 2450 systems, the 2455 is said to be totally compatible with Prime's entire line of superminicomputers through the high-end dual-processor 23.6-MIPS 6550 machine. The 2455 uses a new CPU to boost performance by 23% over its 2450 sister machine. Internal cabinet changes leave room for three 258M-byte hard disk drives, compared with two that were previously accommodated. The combination of the new processor and the revised cabinet brings maximum memory from 8M to 12M bytes. A 64K-byte cache memory with a 98% hit rate reportedly makes memory access more efficient.

A base configuration with 4M bytes of memory, a 258M-byte hard disk drive, a 60M-byte cartridge tape backup drive, four asynchronous communications ports, a system console and a Primos license lists for $62,810.

Prime said the systems will be available immediately.

According to one analyst, a preconfigured DEC system would cost approximately $36,000.

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Product brainstorming marks AI conference

From software to systems, knowledge-based intros portray healthy growth in field

BY ALAN J. RYAN
CW STAFF

SEATTLE — Artificial intelligence developers attending last week's sixth annual conference of the American Association for Artificial Intelligence (AAAI) here had several products to choose from to enhance their job functions.

AAAI-87, which drew nearly 5,400 users, developers and others interested in AI, is held to further scientific and technological progress in the AI field.

Product highlights included Mountain View, Calif.-based Intellicorp's demonstration of its Knowledge Engineering Environment/C Integration Toolkit software, which it began shipping last week.

The software integrates programs written in C with knowledge-based applications developed using Intellicorp's LISP-based Knowledge Engineering Environment (KEE) system. The tool kit enables developers to move among C, KEE and LISP as necessary, depending on which programming language is most appropriate, the company said.

Intellicorp also demonstrated a delivery version of its KEE system running on Intel Corp. 80386-based personal computers. The KEE system reportedly allows individuals without substantial AI experience to develop their own knowledge-based systems. It runs on workstations from Digital Equipment Corp., Sun Microsystems, Inc., Symbolics, Inc., Texas Instruments, Inc. and Xerox Corp.

Commercial market tools

Teknowledge, Inc. announced plans to roll out a family of products designed specifically for developers of expert systems in mainstream commercial markets. The family includes the Copernicus Development Facility, the Copernicus Delivery Facility, the Copernicus Database Integration Facility, the Copernicus Cobol Integration Facility and Teksolutions Applications Packs. The rollout is likely to take place in the fall, with the introduction of the Copernicus core products and many of the family's optional features for DEC VAX, Apollo and Sun systems, the company said.

Gensym Corp. in Cambridge, Mass., demonstrated its real-time expert system for process control and related applications. Called G2, the system reportedly manages data in real-time environments and allows dynamic knowledge and rules to be represented. Prices for the product start around $36,000, depending on options and support.

DEC displayed the recently enhanced version of its VAX LISP software, its version of the widely used LISP AI programming language.

VAX LISP Version 2.2 is said to allow users to integrate AI techniques with existing systems. DEC offers an entry-level VAX system with an AI development language for less than $7,000. The same VAX system with a graphics-oriented AI development environment sells for less than $15,000.

Symbolics unleashes product load

As expected, LISP-based workstation maker Symbolics announced a series of hardware and software products at AAAI-87. The new products included the Cloe software package, which the firm said allows applications to be developed on Symbolics systems and delivered on 80386-based personal computers.

Symbolics also announced an 80386-based plug-in board designed by Norwood, Mass.-based Phoenix Technologies Ltd. for Symbolics 3600 systems. The board is said to allow users to run applications under the Unix and Microsoft Corp. MS-DOS operating systems on the Symbolics 3600 series under the control of Genera, the standard Symbolics software system.

The Symbolics SNA 3270 software interface package, which allows Symbolics systems to connect directly to IBM Systems Network Architecture-based networks, was also announced at the show.

Symbolics said all of its new products are slated to ship by the end of this year or early 1988.

For companies breaking into the AI field, and for those seeking added potential in AI, Texas Instruments introduced three consulting options available through its Knowledge Engineering Services group. They are the Technology Application Assessment, the Application Prototype and AI Project Reviews.

The Technology Application Assessment was designed for companies that are beginning to explore AI or that want to develop a staff of knowledge engineers, TI said.

The Application Prototype reportedly provides customers with a system prototype that illustrates solutions to problems in a subset of a chosen application area.

AI Project Reviews offers a set of four-week, on-site meetings in which a senior TI knowledge engineer critiques the development process for the customer's knowledge-based system, according to TI.

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Computer Associates cooks up data base add-in

BY DOUGLAS BARNEY
CW STAFF

SAN JOSE, Calif. — In hopes of boosting the position of its Supercalc 4 integrated spreadsheet, Computer Associates International, Inc. said it will offer a data base add-in product by early next year.

But even sooner — later this year — Computer Associates is expected to develop a version of the add-in for archrival and market leader Lotus Development Corp.'s 1-2-3.

Computer Associates commissioned the project after realizing that the data base component of 1-2-3 is the second most used data base, right behind Ashton-Tate's Dbase III. "Many spreadsheet users use it for a data base, but the data base capability of Lotus [1-2-3] or Supercalc is not that strong," said Abraham Poznanski, president of Computer Associates' microcomputer products division.

The products are currently under development by Eric Michelman, the original designer of Reflex, an analytical data base now owned by Borland International. The add-ins will run from within the spreadsheet environment and will be invoked through function keys or submenus, Michelman said.

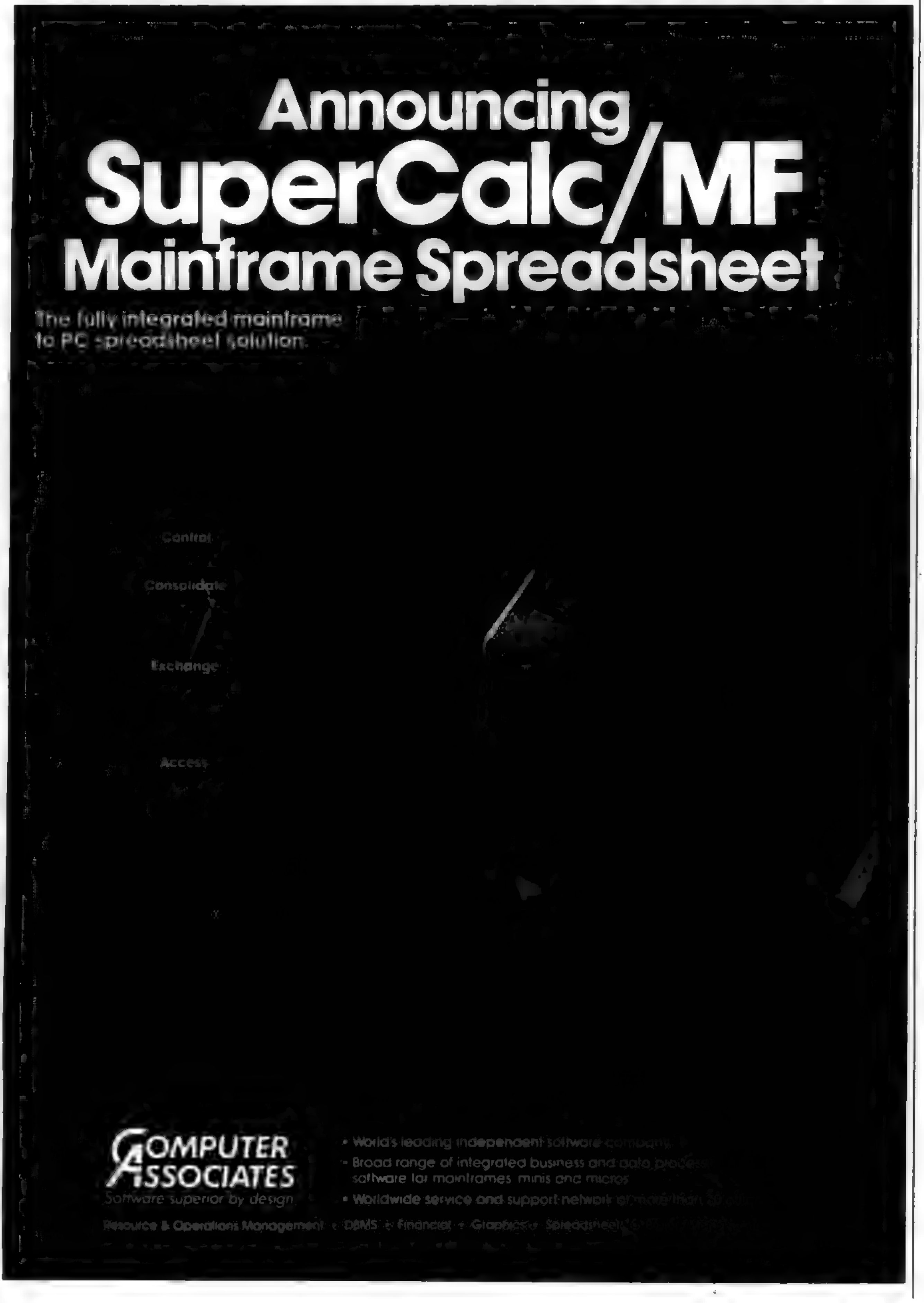
Both Michelman and Poznanski declined to release details of the products, including whether they are at all relational or if they are simply file managers. Both men, however, described the add-ins as focusing on analysis and reporting capabilities. The products will use the interface of the spreadsheets they support. Pricing is not yet available.

Similar approaches

Computer Associates' approach to the spreadsheet market is highly similar to that of Lotus. Both firms offer a broad line of products that work with the core spreadsheet product. Lotus offers a natural language interface, desktop accessories, a report writer and prepackaged data. Computer Associates offers spreadsheet auditing, a cell-notation product and a utility for printing large spreadsheets sideways.

The approaches differ radically, however, when it comes to site licensing, networking and copy protection. While Lotus has announced intentions to release a network version of 1-2-3, the firm is far behind schedule. Lotus's software is copy protected, and no site licenses involving onsite duplication are available.

On the other hand, Computer Associates has aggressively sold unlimited site licenses. The company's product is not copy protected and is available for local-area networks.



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AT&T profits surge by 41%

NEW YORK — Although sales of its computers and telecommunications hardware continued to be sluggish, AT&T reported last week that strong revenue from long-distance services propelled the firm to a 41% surge in profits in the second quarter ended June 30.

AT&T also began to see benefits from its work force reductions of 1986. The firm said its expenses in the quarter declined 4.6% from year-earlier levels to $7.28 billion.

AT&T reported earnings of $596 million, or 55 cents per share, up from $422 million, or 37 cents per share, in the second quarter of 1986. Revenue was flat at $8.4 billion, compared with $8.42 billion last year.

The telecommunications giant said sales of office telephone systems, switches and computers rose just 1.5% to $2.5 billion. Services revenue increased 5.2% to $4.98 billion, and revenue from rentals fell 25% to $931 million.

CLINTON WILDER

AT&T holds out carrot to SDN resisters

Dial-up access option makes service more affordable for sites without dedicated line connection

BY ELISABETH HORWITT
CW STAFF

WASHINGTON, D.C. — In an effort to beef up user demand for its Software Defined Network (SDN) service, AT&T announced a dial-up access option that makes the offering cost-effective for user sites that cannot justify a dedicated line connection.

SDN is geared toward large corporations with at least 20 sites that place 40% of their calls within the company, and it provides many private-network features over a dial-up network, said Glenn Starr, AT&T's product manager for SDN services.

While calls travel over AT&T's public-switched network, each calling location within a given SDN user community has a unique directory number that is housed in an AT&T data base. The data base, which is unique to each SDN community, permits the AT&T system to provide call screening, user-defined routing and accounting for later billing purposes. A uniform dialing plan allows all users within an SDN community to call each other using a seven-digit number. The service is less expensive than private-line connections for sites that communicate less than 200 hours a month, Starr said.

Pricing in ballpark

SDN also provides price breaks comparable to WATS or AT&T's Megacom over ordinary long-distance dial-up lines, Starr noted. Recently, AT&T introduced a remote calling feature that lets people on the road dial into the SDN network and take advantage of SDN pricing via a special calling card number.

Previously, a location could only become part of an SDN community through a dedicated link to the nearest AT&T office. The new tariff proposed by AT&T would allow locations to use the dial-up network to access the SDN network. In addition to a regular telephone number, the caller must dial in an identification number that tells the local carrier to route the call to a particular SDN trunk group on the AT&T switch.

The proposed tariff "is a logical extension of SDN that demonstrates AT&T's good faith that it isn't trying to get customers to bypass the local telephone companies," said Peter Bernstein, a senior research analyst at the New York consulting firm Probe Research, Inc. "It will squeeze MCI Communications Corp. and U.S. Sprint Communications Co. just like everything else AT&T does, by making it easier for customers to access SDN."

The new SDN offering reportedly replaces a "standard switched-access" version of SDN that called for a dedicated line connection between the customer and the local carrier's central office and required the divested Bell operating companies to install special features on their switches.

Customers not interested

The AT&T filing reportedly said that the tariff could not be cost-justified because of an absence of customers. One reason for the service's lack of success is local carriers' refusal to support service at their central offices.

The tariff is scheduled to take effect Aug. 27, given Federal Communications Commission approval, AT&T said. As part of the same filing, AT&T established rates for dial-up SDN that are "slightly higher than their Pro America II rates," Starr said. AT&T also filed for a 6% reduction in SDN calls that originate over switched-access lines and are completed over special-access lines, or vice versa, and an 8% price cut for calls that are originated and completed over special-access lines.

MCI announced earlier this year a similar dial-up access feature for its V-net software-defined network service.

Both carriers' dial-up options are scheduled to be available in the same third-quarter time frame. MCI said it plans to file in August for V-net rate cuts geared to keep the service competitive with AT&T's SDN, according to MCI's director of network services, Steven Johnson. Sprint was unavailable for comment.

DEC offers doubled-up Microvax II

BY DAVID BRIGHT
CW STAFF

MAYNARD, Mass. — Digital Equipment Corp. recently announced a hardware-redundant computer system that consists of dual Microvax II systems and special software that runs under DEC's VMS operating system.

DEC said it is positioning the Microprocessor Implementation of a Reliable Architecture, or MIRA, system for dedicated control applications that require highly available communications with terminals, sensors and other computers. Targeted applications, which the company expects OEMs and value-added resellers to address, include message switching and manufacturing operations.

According to a spokesman, the system is not intended to compete with offerings from established fault-tolerant computer vendors like Stratus Computer, Inc. and Tandem Computers, Inc. "We don't see it as direct competition with anything," he said. "It's for people with a certain amount of criticality in their operations."

Operations are conducted on one of the Microvaxs, which functions as a master system, while the second machine serves as a standby. If the master system malfunctions, control of any attached devices will be switched to the standby unit.

Prices start at $66,820. Late summer availability is planned.

Gate links 3Com E-mail, IBM hosts

BY DAVID BRIGHT
CW STAFF

SANTA CLARA, Calif. — 3Com Corp. and Soft-Switch, Inc. last week announced a software gateway that transfers electronic mail between 3Com local-area networks and IBM mainframes.

A week earlier, 3Com rival Novell, Inc. had introduced an electronic mail connection linking its networks with electronic mail systems on computers from Digital Equipment Corp. and other companies as well as on IBM mainframes.

3Com communications products manager Peter Koolish said the key difference between the two methods is that Novell uses proprietary protocols, while 3Com uses IBM's Systems Network Architecture Distributed Services (SNADS) standard.

SNADS migration

"It's true that today, you can only connect directly from [3Com's] 3+ to the IBM Distributed Office Support System, but as time goes on, you're going to see more and more people moving to SNADS," Koolish said.

The product, which resides on an IBM Personal Computer AT or compatible system, forms a direct link between 3Com's 3+Mail system and Soft-Switch's SNADS Gateway/MVS or IBM's Disoss on an IBM host computer running IBM's MVS operating system.

Through these mail-server connections, users of the 3Com system have the ability to exchange messages with other SNADS-based systems, including the IBM System/36 and 38, the 5520 and the 8100.

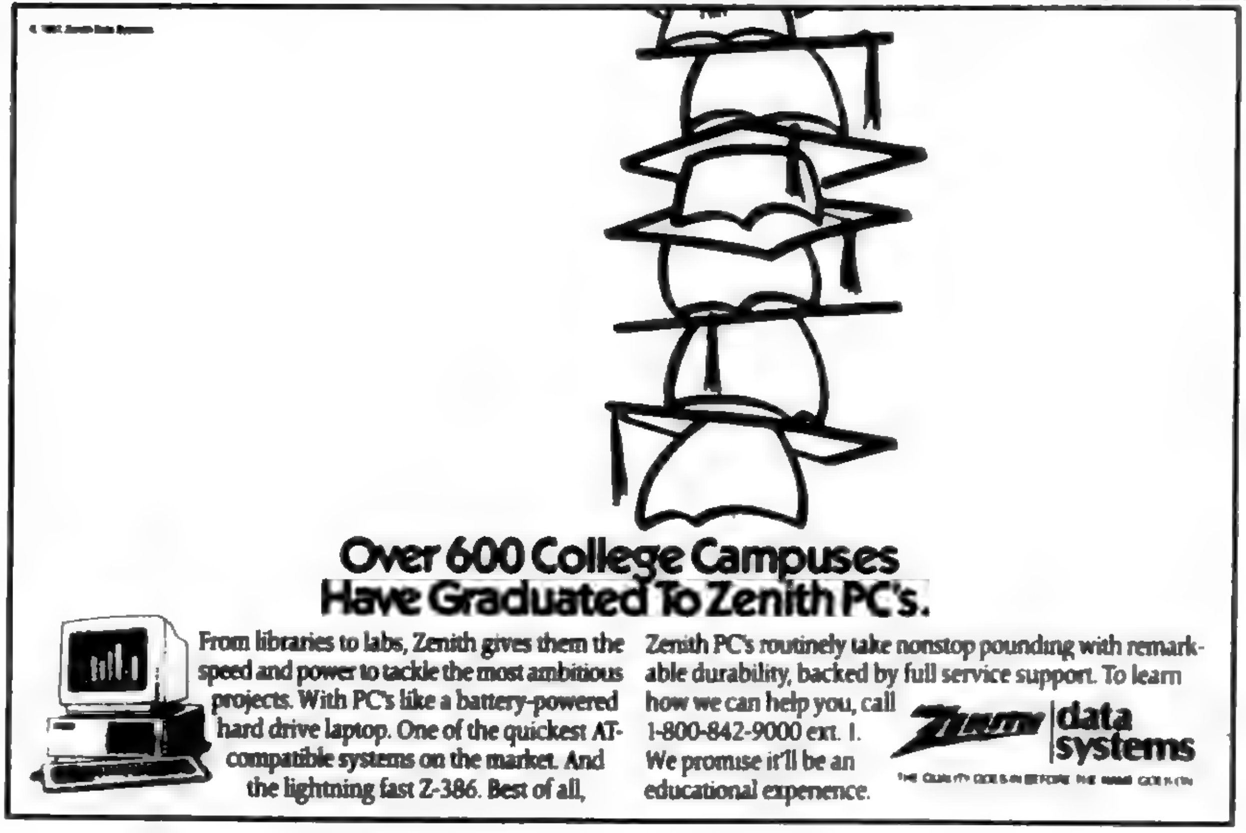
Efficiency the goal

Other Soft-Switch products can be used to route electronic mail through the IBM host to systems from DEC and Wang Laboratories, Inc.

However, using that method would not be as efficient as using a direct link, according to Michael Zisman, Soft-Switch's chairman.

Gateway licenses are priced between $3,000 and $5,000, depending on volume.

Availability is planned for late summer.



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Airlines in dogfight over reservation system

BY DAVID A. LUDLUM
CW STAFF

Already sharpened as a result of recent mergers, the competition among airline reservation systems should climb to intercontinental proportions this week.

On Tuesday, a group of major European airlines is expected to make an announcement about bringing a U.S. partner into its efforts to build a sophisticated European reservation system, according to a spokesman for American Airlines.

The four European carriers — Lufthansa German Airlines, Air France, Iberia Air Lines of Spain and Scandinavian Airlines System — reportedly have been negotiating with American and Texas Air Corp. regarding participation in Amadeus, the European reservation system they say they plan to build.

Pressure on the Amadeus group to choose a U.S. partner escalated recently when a group of three other European airlines with rival plans to develop a reservation system announced that United Airlines would join its project. Incentives for the U.S. airlines include the prospects of replicating in Europe the considerable profits of U.S. reservation businesses, enhancing the capabilities of their U.S. systems and strengthening various joint marketing agreements with the European carriers through closer cooperation.

"It's basically to make some money," said Rob Doughty, a spokesman for United.

American's parent company, AMR Corp., operates the Sabre reservation system, which leads the U.S. market in travel agencies served. Sabre currently has about a 36% share of that market. The Apollo system operated by United's parent, Allegis Corp., is No. 2, with about a 25% share of the market.

System One, serving Texas Air's Continental Airlines and Eastern Airlines, has a share of about 11% but has been gaining modestly since Texas Air bought Eastern last fall, according to Wall Street estimates.

Equity retention an issue

The Amadeus negotiations revolve, in part, around the issue of whether a U.S. carrier would share in ownership of the system. "I suspect the decision will not depend solely on the quality of the software. Retention of equity in the venture could be a major source of contention," said Michael Friedman, a consultant with the New York firm Selig, Helliesen & Eichner, Inc., which conducted a study on construction of a European reservation system for the Association of European Airlines (AEA).

American has put a multipart, menu-like proposal on the table and "will participate at whatever level makes them comfortable," said Joe Stroop, a spokesman for the airline. "If they want us to take a piece of the pie, we will do that. If they want us to be a software vendor, we will do that."

American sees reservation systems not only as the arms of an airline but also as successful businesses in and of themselves, Stroop said. "We are in the business of selling computer services and support. I think that's the Christmas tree, and everything else is going to be ornaments," he said.

Texas Air spokeswoman Eva Archer Smith declined comment on the specifics of the negotiations. "We are not discussing the fine details of the contract at all," she said.

This spring, in response to the expansion of Sabre and Apollo in Europe, the AEA commissioned the study on the feasibility of a joint European reservation system. While the results suggested construction of a single network, the two rival plans emerged.

The Amadeus partners are expected to invest $300 million, with IBM getting $140 million for use of its hardware. The system is scheduled to be in operation by mid-1989 and to break even financially by 1993.

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MRP scofflaws under DOD gun

BY MITCH BETTS
CW STAFF

WASHINGTON, D.C. — The Department of Defense's (DOD) deputy inspector general last week urged a tougher crackdown on defense contractors whom he said allow their manufacturing resource planning (MRP) systems to overcharge the government in an elaborate "inventory game."

The testimony by Derek J. Vander Schaaf at a congressional hearing was the latest development in an ongoing controversy over DOD audits indicating that the MRP systems implemented by many defense contractors do not comply with the Pentagon's cost accounting and contracting regulations [CW, May 11].

MRP systems, which regulate the flow of parts and assign costs in manufacturing plants, frequently make numerous inventory transfers in order to improve production efficiency.

Consequently, many MRP systems do not peg each part and its cost to a single contract, which is routinely required under defense contracts.

At a previous hearing, the Aerospace Industries Association argued that Pentagon regulations are flawed and "out of sync" with modern manufacturing systems [CW, May 25].

The deputy inspector general, however, said Pentagon audits have uncovered cases of excess inventories, floating inventories not assigned to any contract and transfers of parts between government and commercial contracts.

Officials admit errors

At one contractor site, Vander Schaaf said, the auditors noted that about 1.9 million material transfers were made between government and commercial contracts during an 18-month period. Contractor officials acknowledged that for at least two years, their MRP system had not properly allocated the costs of parts to the contracts for which they were purchased, he said.

"Materials make up an estimated 50% to 75% of the costs associated with defense weapons systems at the point of final assembly. With billions of dollars at stake, there is a tremendous incentive for contractors to practice what I call the 'inventory game,' " Vander Schaaf testified. He said the chief executives of defense contractors should be required to sign a document certifying — under penalty of law — that their MRP systems comply with Pentagon regulations. Companies that fail to certify their systems could be the targets of audits and could be penalized with reduced progress payments, he said, in order to put pressure on them to make their MRP systems comply with Pentagon regulations.

Vander Schaaf complained that his recommendation for certification was rejected by Pentagon management as premature while the Defense Contract Audit Agency conducts its investigation. However, he said the inspector general's office will be conducting its own year-long investigation of the problem.

Meanwhile, key members of Congress said they will push for the creation of a special task force to resolve the dispute.

Mac tools get revamp

Compatibility with Appleshare emphasized

CUPERTINO, Calif. — Apple Computer, Inc. last week announced new versions of its Macdraw, Macwrite, Macproject and Macterminal software that bring those packages into compatibility with the Appleshare file server.

Each program now takes advantage of the features of Apple's Macintosh II and Macintosh SE personal computers, the company said.

Macdraw Version 1.9.5, which sells for $195, is said to be compatible with all versions of the Macintosh. It loads 20% to 75% faster than the older version of Macdraw and includes a zoom box in the title bar, a cancel button in the printing dialog box and additional command keys, Apple said.

Additionally, Macdraw is said to support up to 54 fonts and to offer what-you-see-is-what-you-get technique text.

Version 4.6 of Macwrite is compatible with Macintosh II, Macintosh SE and full-page monitors. It now supports arrow keys and uses a scaled Apple Laserwriter ruler, according to the vendor. It sells for $125.

Macproject Version 1.2, which is compatible with all Macintosh systems with at least 512K bytes of memory, supports color when used with the Macintosh II, the company said. Its price is $195.

The Macdraw, Macwrite and Macproject programs will become the property of Claris Corp., Apple's application software subsidiary, according to Kyle Mashima, manager of Apple's software product management.

Version 2.2 of Macterminal is said to be compatible with the Apple Keyboard and Apple Extended Keyboard and updates the operation of the Enter key in IBM 3278 mode. It sells for $125 and should be used with the universal system and finder on the Macintosh Plus, Mac SE and Mac II, according to the company.

Macdraw, Macproject and Macterminal are available now; Macwrite reportedly will be available next month.

Ridge broadens low-end reach, supports System V

BY JAMES CONNOLLY
CW STAFF

SANTA CLARA, Calif. — Ridge Computers last week announced AT&T Unix System V, Release 2 support for a new entry-level superminicomputer, which the company expects will expand its user base from technical computing into commercial applications such as software development and data base management.

The Ridge 32 Turbo/RX runs Ridge's RX/V, which is the System V implementation previously available on the company's high-end 3200 Model 95 superminicomputer. The 32 Turbo/RX effectively replaces the previous low-end Ridge 32/100 and Ridge 32/300. Those machines ran Ridge's Unix-like ROS operating system and remain available but are not being actively marketed, according to Ridge Vice-President of Marketing Larry Lunetta.

In addition to the System V support, the 32-user 32 Turbo/RX features 16K bytes of cache storage, compared with 256 bytes on the 32/100 and 32/300.

"Technical computing has been the traditional environment for Ridge, but we expect to move into new areas because we are seeing more use of System V for things like time-sharing, software development and data base," Lunetta said.

Aims at Tower, Power

The 32 Turbo/RX uses the same reduced instruction set computer technology as the 32/100 and 32/300 and is rated by the vendor at 2.3 million instructions per second (MIPS). Lunetta said the MIPS rating is based on comparisons between the speed at which applications run on the Ridge machine and on a 1-MIPS Digital Equipment Corp. VAX-11/780. Lunetta positioned the system against Unix-based systems such as the NCR Corp. Tower series and the Computer Consoles, Inc. Power 6/32 series.

The 32 Turbo/RX is available with 4M to 32M bytes of memory, eight to 32 RS-232 ports, a 60M-byte cartridge tape drive and a 150M or 300M-byte hard disk drive. It has a base price of $31,900.

Ridge also said it recently has shipped the 3200 Model 95, announced in December.

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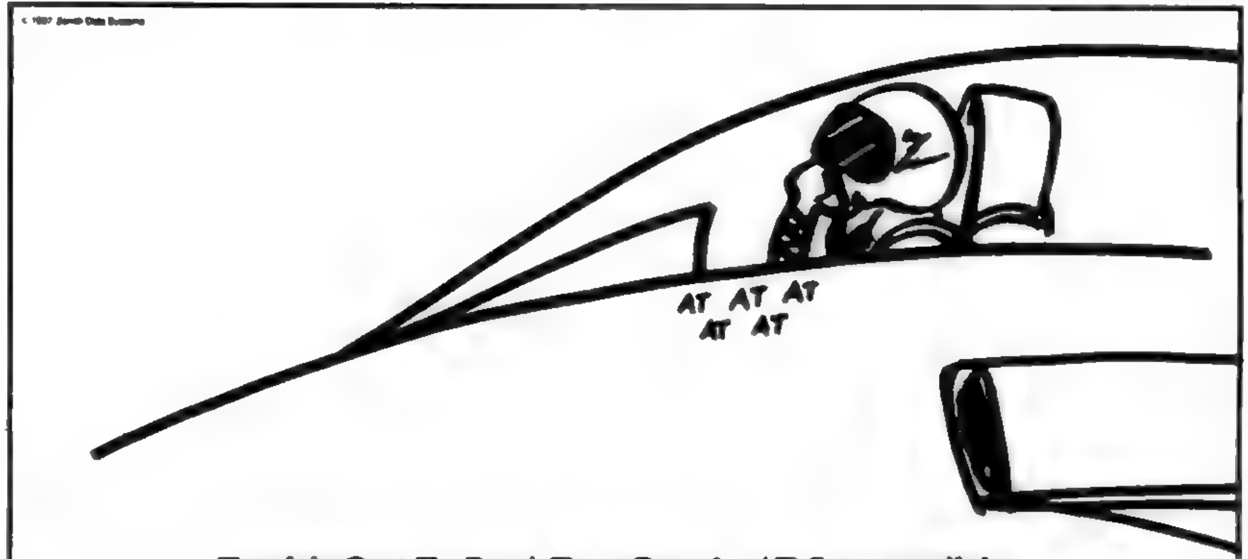

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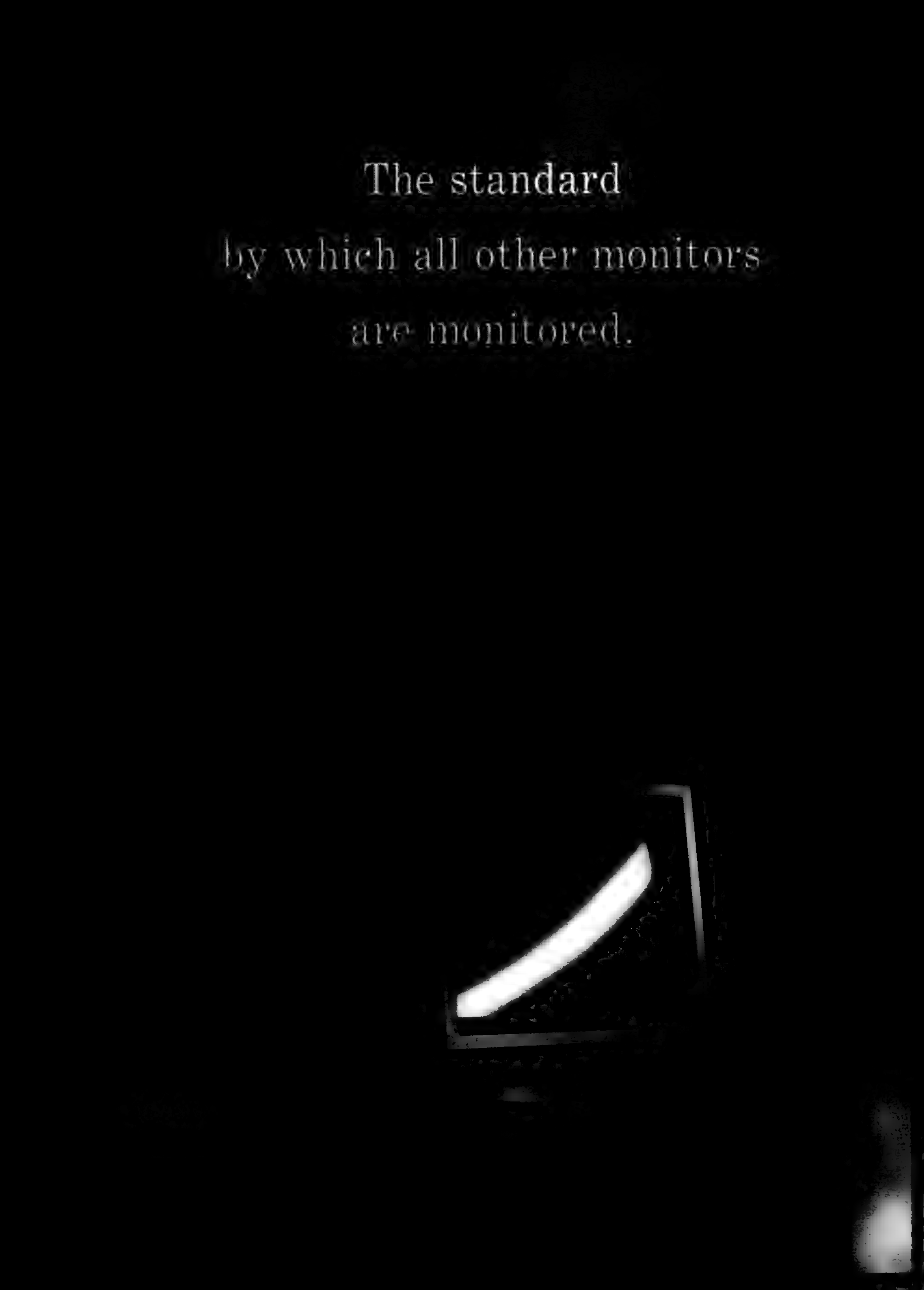
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EDITORIAL

Merger mania

Item: "Borland to buy Ansa"
Item: "Competition thriving despite lessor buy-outs"
Item: "Merger giant swallows Uccel"
Item: "Fox Research scooped up by DCA"
Item: "Sale of D&B's Nomad2 imminent"

There's nothing unusual about merger and acquisition activity in business — except that the headlines above all came from *Computerworld* in the last two months alone. And, as the headlines indicate, the urge to merge and acquire cuts a broad swath across the entire industry, from large systems software to networking to leasing.

For companies like Broadview Associates, high-tech matchmakers specializing in software companies, business has been great. But for customers trying to cement purchase decisions and forge lasting ties with vendors, the frenetic pace of merger activity is producing big headaches.

Simply put, there's no way of telling what the impact of a merger is going to be on a range of issues, such as support for existing products, upgrades to those products and pricing of product lines, especially when a merger vests a company with a large market share in a particular line.

This is not to suggest that the impact of mergers and acquisitions is inherently negative. The biggest merger in the industry, the Burroughs Corp.-Sperry Corp. pact, has resulted in a $10 billion colossus that has shaved millions of dollars in administrative overhead — savings that can be passed directly or indirectly to customers. Similarly, IBM's purchase of Rolm Corp. has generally resulted in a more clearly defined direction for Rolm's product lines.

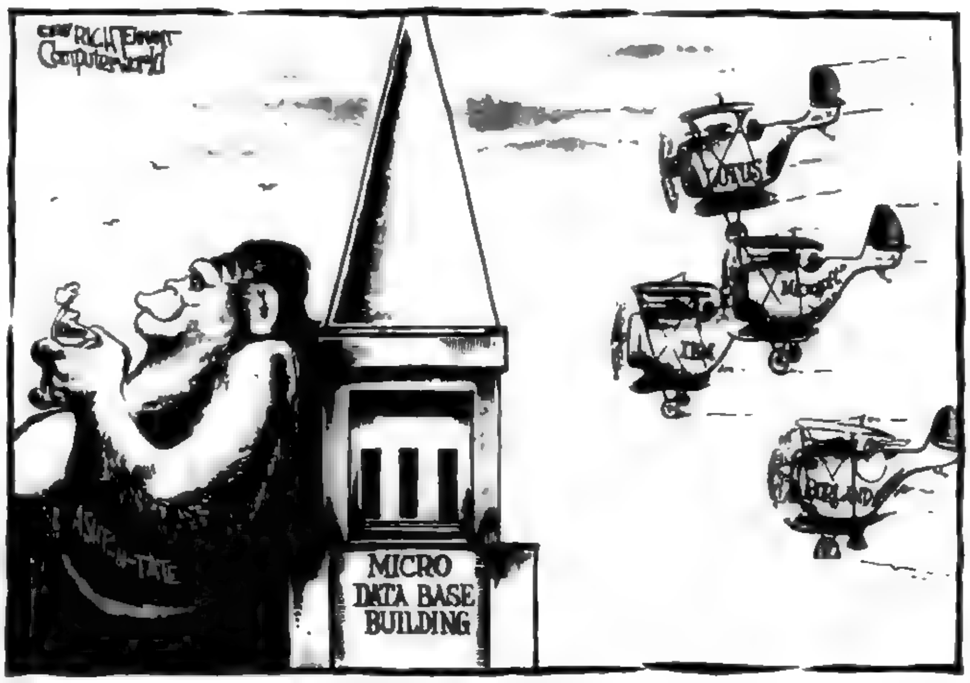
In the case of the recent $500 million purchase of Uccel Corp. by Computer Associates International, Inc., many questions have been raised about continued support by Computer Associates of Uccel's software.

The point to note is that Uccel users are actively involved in airing their concerns directly to Computer Associates and working with that company to spot potential problems. This strategy, vigorously pursued, is a trump card, because the vendor ultimately needs the continued support of the customer base a lot more than the collective customer base needs any one vendor.

Honeywell, Inc. users, for example, have extracted notable verbal commitments from Honeywell Bull, Inc. for continued support and enhancement of key product lines.

That the pace of merger activity will continue is almost assured by the dynamics of the computer marketplace today. For vendors, diversifying product lines is imperative to survival, and buying an existing player is easier and quicker than starting your own team in niche markets. And the stock market of the past two years has generated record stock prices, making outright purchases with company shares easier than ever.

But in the fiercely competitive computer markets, users have tremendous clout, especially in a merger situation. Use it.



LETTERS TO THE EDITOR

Innovation hits

I agree with much of what was said about innovation in the industry in "Innovation: Credit only where it's due" [CW, June 15]. However, I would like to point out a marked resemblance between the user interface of Apple Computer, Inc.'s Macintosh operating system and certain Xerox Corp. software.

I feel the Mac is an excellent machine, and its appearance has changed the market significantly, but it too has benefited from the sharing of ideas that is an important part of the industry.

IBM's Personal System/2 Micro Channel architecture is an elegant method of improving throughput without just going to faster clock speeds. I think this is a true innovation, but even if it is not, I would like to see IBM get credit for bringing it to the market, just as I would like Apple to get credit for its excellent development and marketing work.

Gary L. Katsanis
Rochester, N.Y.

Active participants

We were distressed to read the article about the development of a surgical information system at Rush Presbyterian-St. Luke's Medical Center [CW, June 1].

The various parties to the process of developing the system have participated fully from the project's inception. Years ago, we at Rush-Presbyterian endorsed the concept of decentralized systems development within the context of the larger computing and information systems environment. Integration of systems to the appropriate degree has been a key objective in systems development for a considerable time. We have learned that the collaboration of our MIS group, which most recently has come to include administration of our AT&T Information Systems Network, is essential to systems integration, regardless of whether systems development occurs centrally within MIS or in the decentralized mode. The only real variable is the extent of involvement of the MIS group, not whether or not the MIS group is involved.

It is true that we have allowed decentralized computing over the years when noninstitutional funding has been used to support the respective efforts. In these cases, however, the developers of the systems concluded that they could function adequately for their limited purposes in a free-standing mode.

We have worked hard and effectively to ensure that our 8,000 employees, many of whom are potential systems developers, understand the benefits of systems integration and the potential dysfunction associated with computing "in a vacuum." We regret the disunity portrayed in the article. We remain committed to integration of our surgical information system into the larger information systems environment at Rush-Presbyterian.

Gordon B. Bass
Associate Vice-President and
Associate Administrator
Surgical Sciences & Services
Walter Menning
Assistant Vice-President
Associate Administrator
Date Processing
Rush Presbyterian-St. Luke's
Medical Center
Chicago

This week in history

July 18, 1977
Thousands of travelers in New York City are stranded after dozens of airline and hotel reservations systems go down when a lightning bolt knocks out a consolidated Edison substation and shuts off power at more than 3,300 computer centers serving more than 2.7 million customers.

July 19, 1982
The Federal Bureau of Investigation, reacting to allegations that Hitachi Ltd. and another Japanese company tried to steal IBM trade secrets, rejects a contract bid involving Hitachi-manufactured mainframes in favor of IBM's higher priced machines.

What bugginess?

I have a bone to pick regarding the headline "Users: 386 operating system buggy" [CW, June 22].

The article basically presents the following facts: The Software Link, Inc. shipped its first release of PC-MOS/386; 2,500 orders were filled in the first four weeks of shipping; and buyers of the first release will get a free upgrade. It also pointed out four well-received aspects of the product, two specific incompatibilities and the fact that we forgot to tell users about a special command required to use the Compaq Computer Corp. tape backup unit.

I did *not* see anything in the article to substantiate the idea of "bugginess." That is not to say

Continued on page 22

A portrait of the artist as a PC

Contemplating the future of desktop publishing as its software swells

JOHN KIRKLEY

Aesthetic anarchy.

That's what will happen when everybody becomes their own art director, and we are inundated by tidal waves of memos, letters, pamphlets, reports, monographs and books prepared on the desktop publishing systems that are spreading through American business like the Andromeda Strain.

Armed with a seemingly infinite number of typefaces and able to reproduce pictures, charts, old woodcuts, contemporary clip art — in short, images culled from everything from *The Book of Kells* to the Sunday comics — workers in corporate America may go on a binge of typographic elaboration and decoration that will make the Baroque period pale by comparison. And they may do so unencumbered by considerations of taste or even the most basic sense of design.

BILL RUSSELL

One might argue that desktop publishing systems are not that widespread. A personal computer, some sophisticated software and a laser printer make up a capital expense that is not to be sneezed at. And yet, if well established technological trends continue, system prices will continue to plummet and capabilities increase.

It is also a good bet that desktop publishing will begin to lose its individuality in a few years as greater graphics capabilities are built into inexpensive software packages aimed at the general office information systems market. Adding to this merging of the technologies is the capability of IBM's PS/2 machines with their high speed, wide bandwidth and internal data buses capable of handling true compound documents.

Some industry observers see corporate desktop publishing going through the same cycle as did the PC: initial widespread bootlegging as users seek to bypass cumbersome service departments, followed by alarmed reaction from top management and a call for control.

Maybe so. But the barn door is already open and Aldus Corp., Adobe Systems, Inc. and others are fueling the fires of user-generated publishing.

Now at this point you may wonder if I'm not indulging in some sort of aesthetic snobbery. Eyeglasses in hand, scented handkerchief to the nostrils, we watch in horror as the unwashed masses invade what was once the sacred realm of a highly trained brotherhood of graphic artists.

Could be. Perhaps what is really happening is that there is about to be a modern-day publishing Renaissance characterized by an elevated sense of style and a sensitivity to the enhanced communications possible when form and content are melded into one. Perhaps the general level of artistic expectation will rise to where not only the workplace, but our entire environment, will be permeated by an impatience with the crass and the ugly. There could be a universal demand for the creative, the subtle, the artistic — an acknowledgement and extension of the Bauhaus ideal that the design of everyday objects reflects the highest aesthetic merging of form and function.

Sounds great. But what is more likely is a hodgepodge of graphic experimentalism spewing out of myriads of desktop systems; attempts to squeeze five columns of type into an 8½-in. wide sheet of paper; using six different type fonts in one memo; overwhelming the written message with an excess of pictorial decoration.

Aldus, the Seattle company that helped accelerate the desktop revolution when it introduced Pagemaker in 1985, has taken a step toward bringing good basic design concepts to the average user. When you buy its package, you get a little book called *The Aldus Guide to Basic Design*, written by Roger C. Parker, a professional graphics designer. He attempts to distill, in some 60-odd pages, the fundamentals of page layout, the grid system, use of headlines, graphic images, borders, rules and even such niceties as kerning and dealing with widows and orphans. It's a good little book, a foretaste of what's to come.

Corporations are not very keen on anarchy of any kind. They thrive on regularity, convention and standardization. "I don't like surprises," is a management staple response. When it comes to graphics, managers often spend great quantities of money to create a distinctive corporate look that extends from the annual report to the logo on the back of the company's bowling shirts.

Those concerned with matters of corporate image — corporate executives and the corporate communications folk — will first be appalled and then spurred into action when they realize that all manner of correspondence is being issued in the company's name by a work force equipped with both desktop publishing systems and their own wildly individualistic sense of what constitutes good graphic design.

What will they do? Issue standards, of course, much like the restrictions now imposed by management regarding the acquisition and use of PC hardware and software within a company. Very simply, if you're an IBM shop, you don't buy from Apple Computer, Inc. If you're a stylistically conservative Helvetica and Times Roman typeface kind of corporation, you will not tolerate demented excursions into Balloon Bold or Weiss Italic by your employees.

And so, after a period of ferment, desktop publishing will be folded into office systems, and there will be corporate handbooks dictating which typefaces will be used under what circum-

Continued on page 22

Kirkley, a former editor of *Datamation* magazine, is an industry consultant currently acting as editorial adviser to Patricia Seybold's Office Systems Group. He is based in South Nyack, N.Y.

Modern marketing's love affair with AI

A catchall term promotes "gee-whiz" products

HARVEY NEWQUIST

Welcome to the world of artifical intelligence exploitation.

People often ask me why I chose a field like artifical intelligence to write about. After all, most people think AI stands for artificial insemination, which makes for a lot more office jokes than artificial intelligence does.

Well, first of all, I don't have any kids to ask me probing questions about the disk drive industry, and I don't have a regular barber to help me better understand the semiconductor industry. I just think AI happens to be a fairly intriguing, fairly new technology that is finding its way into a variety of practical business applications. And there are a lot of companies doing some incredible things with it: American Express Co., Citicorp, Travelers Insurance Co., Procter & Gamble Co. and Ford Motor Co. to name a few.

Unfortunately, there are other companies doing some less than great things with AI — which brings us to the subject of AI hype.

One of the things that continually amazes me is how many groups use the AI tag to promote their products simply because they feel that it's enough of a "gee-whiz" term to get people to buy something. Let's run through some examples.

A very large diskette company (which shall remain nameless, but they make excellent tapes and diskettes) has been running a full-page ad in personal computing magazines that shows a pair of robots (a la C-3PO of "Star Wars") operating on a third robot. One robot is hunched over the patient; his name is obviously Igor. The other is holding aloft a diskette surrounded by various electrical sparks and pyrotechnics in a scene right out of "The Bride of Frankenstein." The headline reads, "Give the gift of intelligence. Free." The ad goes on to say that specially marked boxes of this company's diskettes contain *free* AI software, a $200 value. Got that? $200 worth of artificial intelligence for free.

First of all, that "specially marked box" stuff belongs on the cereal shelves of supermarkets, where you can get away with promises of big things inside the box because the average user is a 4-year old.

Second, I can just see some young, enthusiastic engineer running into the executive lunchroom with a new package of these diskettes yelling "Boss, look! Now our company can use real artificial intellience with only a $20 investment! Isn't that great?"

You might laugh at this scene, but don't think it won't happen.

Consider another example. A relatively new startup company has invented an electronically interactive weight-training machine, which is sort of like "Robbie the Robot Meets Nautilus." Based on information it stored in previous workouts and just how frequently you use the system, the machine keeps track of your progress during a workout. But get this: The company claims that the system uses artificial intelligence to perform these functions.

AI and the ego

Imagine what artifical intelligence could do to a person's ego at a health club. Incorporate some expert system technology, a litte voice synthesis and recognition, and voila! You get the following scene:

"Hello, Dana. Long time, no see. Probably too busy to exercise that far-from-perfect body of yours, right? Well, not to worry. My knowledge base says you've paid your membership in full until 1988, so we have your money anyway. OK, come sit over here on the leg-lift chair." Sufficiently humiliated, Dana lowers himself onto the artificially intelligent seat.

"Good God, Dana! What have you been doing for the last three weeks, four days, nine hours, and 52 minutes? Are Twinkies the only food in your diet? You've gained 1.2 kilograms! Have you no pride, no discipline? You must have blown your last paycheck on discount chocolates. Well, no matter, we'll take care of you. Let's start with 300 leg lifts. One, two . . ."

Yet the winner in the AI hype club, surprisingly, is IBM. During a series of TV advertisements last year, IBM demonstrated the wonders of its voice recognition system by having a woman dictate into her computer the words, "Mrs. Wright, write home right now."

Guess what? The video screen printed up each word immediately and correctly — spelling, grammar, punctuation, ev-

Continued on page 22

Newquist writes and consults on artifical intelligence and other advanced high-technology topics from his office in Scottsdale, Ariz.

Love affair

FROM PAGE 21

erything. And guess what else? The voice system isn't available to the public. IBM doesn't even sell it, because it's not a product. It's still in the research stage, and there are no plans to market it in the near future. And don't believe the machine responds as fast to the spoken word in real life as it did in the TV ad.

To be fair, using AI to generate consumer interest isn't limited to business products; it has even extended beyond prime-time TV ads to prime-time television shows. Who could get away with using AI to gain ratings points? The answer is the perfect combination of computer technology and cynical hucksterism: Max Headroom.

In one of the early episodes, Max confronted the computer named A7 that controls and manipulates at will the personnel files of the world's citizens. How can a computer do such horrible things? Because it is an "artificial intelligence computer," Max learns. But on TV, as in real life, higher reasoning triumphs and A7 ultimately falls victim to artificial emotion.

Many of the successful vendors of AI-based products have taken to referring to their products by the specific area of technology, such as expert systems, natural language, machine vision and so on instead of using the term artificial intelligence. AI has come to be a catchall name for all those technologies that attempt to emulate some area of human behavior, but that doesn't mean it's the most appropriate name.

Bugginess

FROM PAGE 20

that bugs do not exist — we know of some specific bugs and incompatibilities, and nobody in this business would expect differently from any product, much less an operating system (hence the free upgrade). In fact, we have shipped more than 3,000 PC-MOS/386 packages to date, and only 14 customers have taken advantage of our 30-day money-back guarantee. Feedback has been overwhelmingly enthusiastic.

I know that CW is a fine product, even if there is an occasional glitch. Your readers should know the same about PC-MOS/386.

Rod Roark
Director of Research and Development
The Software Link, Inc.
Atlanta

Questions data

I read the article about Datapro Research Corp.'s survey of minicomputer user satisfaction [CW, June 22] with interest. If IBM's System/38 does deliver the highest satisfaction rating in the survey, that is critical to our firm, which specializes in software for that system. We do not question that the System/38 can deliver that satisfaction, but we do question the validity of the data on which the survey is based.

If one looked at the data, he might assume that Hewlett-Packard Co.'s HP 3000 users were the most numerous in the field, followed by Wang Laboratories, Inc. VS users and NCR Corp. 900 ITX users. This would be concluded because 37.7% of the respondents were HP users, 22.2% were Wang and 15% were NCR users.

Imagine the surprise to learn that the survey represented different sample sizes from each group. Based on Computer Intelligence data in January, the survey responses covered 8.4% of all NCR users, 3.8% of Wang VS users and 3.8% of Unisys Corp. B 1900 users. The responses also covered 0.6% of System/38 users, 1.4% of Digital Equipment Corp. VAX II users and 0.1% of IBM System/36 users.

There are many reasons for changing sampling rates in a survey. Such variability of sample sizes means that you cannot make any statistically valid inferences about differences in overall satisfaction levels between users of various vendors' hardware.

There is a redeeming lesson, though. Scanning the data, one would notice the range of overall satisfaction scores was pretty high. From that, one might conclude that minicomputer users were a fairly content lot and that what matters is not the hardware vendor but rather the suitability of the software to the task at hand.

Mark Lieberman
Vice-President of Marketing
Friedman and Associates, Inc.
Deerfield, Ill.

Portrait

FROM PAGE 21

stances and how graphics are to be included on the printed page. How flexible these guidelines will be will depend on the individual corporate culture.

So another revolution will have been quashed. Art directors will ply their trade in peace once more. Convention and stability will be the order of the day.

But just as the corporate arbiters of taste sigh in relief, somewhere out there, inexpensive video communications devices are being designed.

Think of it: every worker a video director, a producer . . . yes, even a star.

Ahead of time

John R. Vacca's article, "AI diagnoses MVS ailments" [CW, June 8], destroyed its credibility in the first sentence: "Twenty years ago, operators of IBM's MVS operating system provided both problem-handling expertise and control over the normal allocation of computing resources."

In 1967, MVS was not even imagined. IBM still regarded virtual storage as a blue-sky technique, not one appropriate to its mainstream product line. IBM was still struggling to get OS/360 to work reliably and had no inclination to fund a massive rewrite.

The only paging software that IBM released in the 1960s was in support of the 360/67. CP/67 was originally a pair of research projects on a modified 360/40; this is the system that evolved into VMF/370 and into MV/SP and VM/XA and had nothing to do with the development of MVS. Time Sharing System (TSS/360) was a sophisticated system that, in many ways, was superior to MVS (especially with the TSS/370 RPQs) but again was not an ancestor to MVS.

During the 1960s, IBM was considering the development of Low End OS (LEOS) and had decided that it did not have the resources to develop both LEOS and OS/VS. So not only was MVS not around 20 years ago, but there was not even a commitment to develop it.

Seymour J. Metz
Annandale, Va.

Filling wish list

I found the roundtable on Cobol code restructuring [CW, June 29] one of the more insightful summaries on the state of the art in this arena to date.

Among the issues — or wishes — raised were the need to understand the code, deal with other types of code and dialects, be able to run on different machines, bridge to other tools, such as code generators and fourth-generation languages, and document the code and support the maintenance programmer as he maintains the code.

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Richard J. Welke, Ph.D.
President and Chief Executive Officer
Meta Systems Reverse Engineering
Ann Arbor, Mich.

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SOFT TALK

William Inmon

A better DSS benchmark

Many measures of the performance of decision-support software (DSS) rate the number of transactions per second, but the nature of DSS processing is not oriented toward transactions. I would like to propose a measure that is more relevant, one that considers the number of active end users.

The decision-support world is one that is typified by long reports, ad hoc analysis, unscheduled and unstructured processing and so forth. The very nature of the decision-support world is one of unpredictable processing. End-user computing is often synonymous with decision-support processing, where the long-term directions of the enterprise are being considered. Transactions are not the norm for most decision-support processing. Certainly transactions can be run in a DSS world, but they are second-class citizens compared with the more normal processing that occurs.

This "more normal" processing typically includes:

- Reports — summaries of activities, events and so on.
- Merges — "relational joins" of data bases in order to create meaningful Cartesian products.
- Extracts — analysis of subsets of data.

Continued on page 26

Users praise frame technology

Say method saves money, increases flexibility in Cobol programming

BY CHARLES BABCOCK
CW STAFF

Users of a development method called "frame technology" say it gives them an inventory of reusable Cobol parts from which they can construct applications in a speedy, assembly line-like fashion.

Sold under the trade name Computer Automated Programming (CAP), the development method involves both modules of reusable code and a skeleton control process for calling these modules and linking them together.

CAP is a product from Toronto-based toolmaker Netron, Inc. and has been available since 1983. It is said to be able to produce mainframe Cobol source code from a system that works on either an IBM mainframe or Personal Computer, a Digital Equipment Corp. VAX or a Wang Laboratories, Inc. VS minicomputer.

Gains acceptance

CAP's acceptance in the marketplace has been slow, but two prominent users say it has become an accepted development method in their shops.

"We see a potential 50% savings [in the cost of application development]. We can generate 80% to 90% of an application from standard frames," says Bernard Renois, head of the corporate segments department of information management for The Hartford Insurance Group.

The developer of the technology, Paul G. Bassett, vice-president of research at Netron, says CAP's main benefit is its flexibility in the hands of programmers. But users report that they like the amount of code they can generate without resorting to custom programming.

"Eighty percent to 85% of the time, we can go with just those frames," says Dale R. Novotniak, supervisor of systems and programming at Koppers Co. in Pittsburgh.

How CAP works

A Netron customer receives 30 modules of code and a development process that invokes the modules from a strict hierarchy. At the bottom of the hierarchy is a set of generic frames containing code that can be used with many applications to control such things as screen formats, I/O controls or the reading of information from a field, according to Bassett.

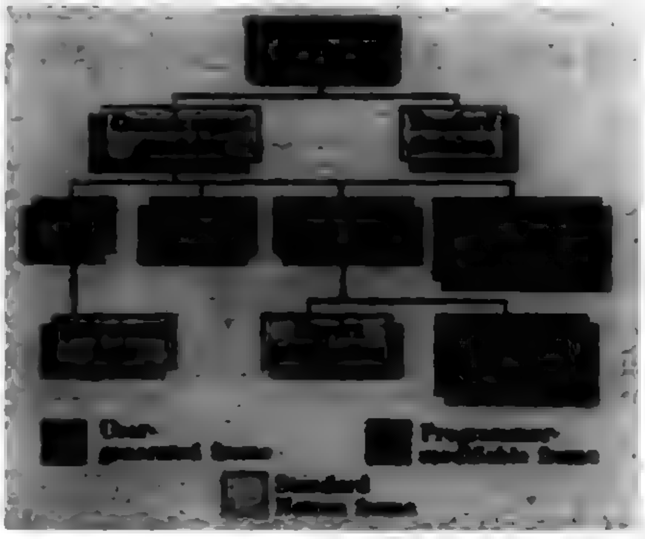
At the top of the hierarchy sits the specification frame, which contains the custom parts of the application written by a staff programmer.

Included in that frame is a method of calling lower level frames for parts of the application, Bassett explains.

In between the specification frame and lower level frames are

Continued on page 24

Netron frame hierarchy



INFORMATION PROVIDED BY NETRON, INC.

Graphics for MVS

Computer Associates offers reporting option

GARDEN CITY, N.Y. — Computer Associates International, Inc. is offering graphics reporting with its IBM MVS operating system utilities as a direct spinoff of its acquisition late last year of Integrated Software Systems Corp.

The $5,550 Graphics Reporting Option was designed to work with CA-Unicenter, the vendor's package of operating system utilities allowing greater automated control of the data processing center.

The Graphics Reporting Option also was designed to work with the CA-Top Secret security product, CA-Jars job accounting product, CA-Dynam/TLMS tape library manager, CA-Dispatch report printing and distribution product and CA-Scheduler production scheduling system.

System operators can use the graphics reporting option to depict what they deem to be critical information in bar charts, pie charts or plot graphs, said Michael Guido, president of Computer Associates' Systems Products Division.

Inside

- BEI's Combat helps create computer-based training courseware. Page 27.
- Golden Key turns Unix systems into turnkey systems. Page 27.

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Frames

FROM PAGE 23

mid-level frames that assert various degrees of control over the application.

Some of the frames can be modified by a staff programmer to fit a particular application, although the CAP library version will remain untouched.

"A mid-level frame might understand how to process a transaction, grabbing information from a screen and throwing it out to another frame for error checking," Bassett says.

Each frame contains what might be described as a subroutine or module of reusable code, but it actually differs from both of these.

Unlike a subroutine, a frame can be used with many applications.

"A frame is like a generalized engine for many cars. A frame looks for similarities across many subroutines, then you tailor it for the use you want," Renois says.

Unlike a module of reusable code, a frame is not static. It can contain several variations of a procedure, with some higher frame in the hierarchy tapping the correct variation for the application, Bassett says.

Because the staff-written code in an application is contained in the specification frame, maintenance effort is focused there. Typically, the specification frame contains 10% to 20% of the application, users say. "We have reduced the area of maintenance by a considerable margin," Renois says.

CAP has procedures and command statements that require two to three months of training, according to Koppers' Novotniak says. The frames contain variable names that refer to the next frame to be invoked. "I would use MAINT ST1 to call a standard subroutine," Novotniak notes, adding that the reference can be altered by inserting the name of another frame in its place.

Break points can also be inserted into a frame to allow for the addition of data or other custom programming procedures, he says.

Add frames cautiously

Customers may add their own frames to the set that Netron provides, but both users say such additions should be made with restraint.

"Some people here have math degrees and have thought up things to put in frames," Novotniak says, but only generalized, error-free code should be allowed to become a frame.

Paul G. Bassett

"We say additions should be things that are unique to The Hartford," Renois adds.

Big plans for training

Since February, Renois' shop has trained 20 of its 1,100 programmers and analysts to use CAP in pilot projects. It plans to have up to 100 of its staff members trained by the end of the year, Renois says. The company has used frame technology to move an application from a VAX to a VS, and the effort "took half the amount of time we thought it would," he says.

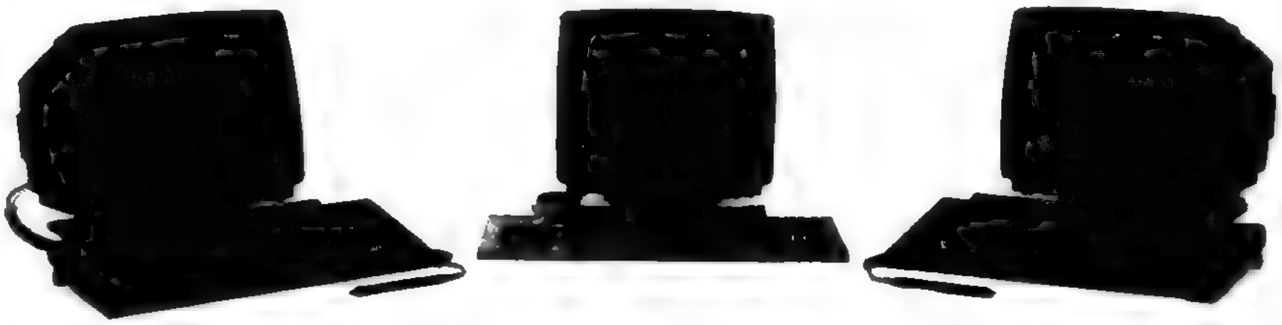
Novotniak's shop has trained 30 programmers in CAP during 1½ years, and he says it plans to train half of its Cobol staff. Koppers is using it to develop general ledger, payroll, accounts payable, inventory and sales and orders applications that are tailored to each of 13 plants.

"At our Georgia plant, we put up an invoice system — a simple system with 100 programs — in five days. We worked 16 hours a day, but we were able to go live with it a month later," Novotniak says.

The CAP approach can be used for CICS applications because specific frames invoke command-level instructions, Bassett says.

On June 16th, IBM announced several NEW COAX A terminal products.

Beehive was already shipping theirs!



191D - A 3191D terminal product with three screen sizes.
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DSS

CONTINUED FROM PAGE 23

- Trend monitoring — tracking of summarized data time.

The majority of the activity that occurs in the decision-support environment characteristically involves bulk data processing. As a consequence, the transaction processing rates that can be achieved in a decision-support processing environment do not provide a meaningful benchmark.

Instead, I would recommend "active end users per million instructions per second (MIPS)" as a meaningful benchmark criterion for DSS software.

An active end user is an end user that is logged on or otherwise actively processing decision-support activity. The end user may be doing a wide variety of tasks, such as specifying work to be done, analyzing results or actively causing the processor to do heavy execution. A MIPS increment is, of course, the standard hardware measure of power. Dividing the active end users by the MIPS rate minimizes the disparity of one end user community operating on an IBM 4381, and another end user community operating on an IBM 3090 Model 200.

While, under controlled circumstances, the active end users per MIPS for a hardware or software configuration may prove to be a useful figure, there are many inequities under uncontrolled circumstances.

'Normalize' work loads

For example, one of the big disparities in the decision-support environment is in the work load being processed. One set of users is doing analysis on data bases that contain, on the average, one million records. Another set of users is doing analysis on data bases that contain, on the average, 10,000 records. Even if the algorithms used are identical, the resources consumed in the two environments will not be. Total and average data base sizes then are one variable that must be "normalized" from one environment to the next in order for active end users per MIPS to be meaningful.

Another variable that must be normalized is the nature of the work being done by the end user. One set of end users is doing heavy data base processing — sorting and merging several tables together. Another set of users is accessing small subsets of data selectively from a data base and doing individual analysis based on those subsets. Even if the size of the bases of data are the same, the first set of users will use far more resources than the second. The processing between the different groups of data needs to be normalized before active end users per MIPS becomes meaningful.

> RELYING ON one of the standard benchmarks for comparison may produce very biased (and, to the interested organization, incorrect) results.

Still another factor that must be normalized is the nature of the processing that is occurring. One group of users is doing massive update processing, which requires a fair degree of internal control of data to maintain integrity. Another group of analysts is doing pure access and calculation only — where no update integrity control is required. All other factors being equal, the first group of analysts will require many more resources than the second.

It is clear, then, that there are many variables that must be taken into account if active end users per MIPS is to be a meaningful figure.

One approach to normalize the work load is to create a standard work load that can be run in a number of environments. There have been some benchmarks for the DSS environment that lay the foundation for a standard work load. These benchmarks are definitely a step in the right direction. But, strictly speaking, the benchmarks are only valid for environments that mirror the benchmark.

In other words, if an organization is interested in DSS performance and has a work load that is not represented by one of the standard benchmarks, then relying on one of the standard benchmarks for comparison may produce very biased (and, to the interested organization, incorrect) results.

Inmon is a senior principal with American Management Systems in Lakewood, Colo., and an author on the subject of data base design.

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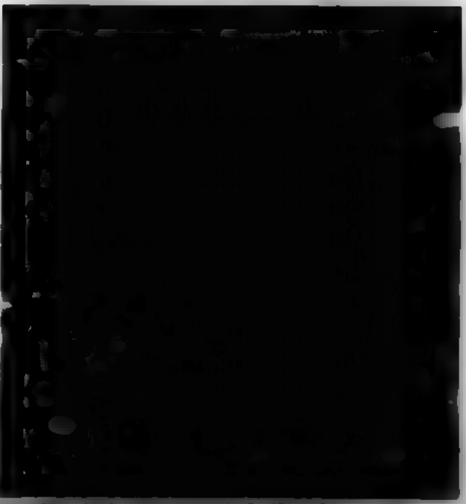

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NEW PRODUCTS

Systems software

A Wang Laboratories, Inc. VS computer series-based integrated authoring system designed for creating computer-based training courseware has been announced by **BEI Corp.**

Combat features response analysis; case insensitivity; wild card, punctuation and blank character stripping; conditional judgment; frame-logic GOTOs and external branching; automatic and author-initiated student response recording and scoring with management reporting; and two levels of bookmarking.

Software pricing is tiered and follows Wang's A, B and C CPU classifications. A class B license costs $11,000.

BEI, 2921 Eastlake Ave. E., Seattle, Wash. 98102.

A VSAM catalog information and reporting system for IBM and compatible mainframes has been introduced by **Goal Systems International, Inc.**

Mastercat/VSE is said to allow users to view all VSAM catalog information on-line and create customized batch reports that list only the catalog information selected by the user. Mastercat/VSE's on-line facility provides VSAM catalog data in packets, eliminating the need to search through Listcat reports for information. The batch-reporting function lists all VSAM information about all clusters in all catalogs, with only three control cards.

Mastercat/VSE is available for $3,920 under a permanent license or $98 per month under a three-year renewable license.

Goal Systems, 5455 North High St., Columbus, Ohio 43214.

Applications packages

Shop Floor Control, a module designed to control the flow of work on the factory floor by keeping track of materials, operations, labor and tools, has been added to **MCBA, Inc.**'s line of Digital Equipment Corp. VAX Cobol software.

The 18-module accounting, distribution and manufacturing system, which runs on all VAX computers under DEC's VMS, makes up a closed-loop Manufacturing Source Planning system.

Functions of the Shop Floor Control module include fully customized shop orders; creation of shop orders by copying associated Bills of Material and Routings; set-up of repeat orders through Base Order and Order Copy facilities and reports such as status and exception.

The Shop Floor Control module costs from $4,500 to $9,000.

MCBA, 425 W. Broadway, Glendale, Calif. 91204.

Utilities

A turnkey login package for Unix, called **Golden Key**, has been released by **Goldbar Computer Systems.**

Golden Key is said to allow users to set up a Unix system to perform as a turnkey system. Login and password, according to the vendor, become a function of the application software. The menu-driven software also monitors certain areas of the system such as file sizes and disk fragmentation to relieve the need for system administration.

Golden Key knows when the terminal is turned on, sets up I/O control, handles all need functions and executes the application assigned to that terminal.

Golden Key is priced from $99 for one- to four-user systems to $419 for more than 20 user systems.

Goldbar Systems, P.O. Box 2686, 3326 Transit Ave., Sioux City, Iowa 51106.

Development tools

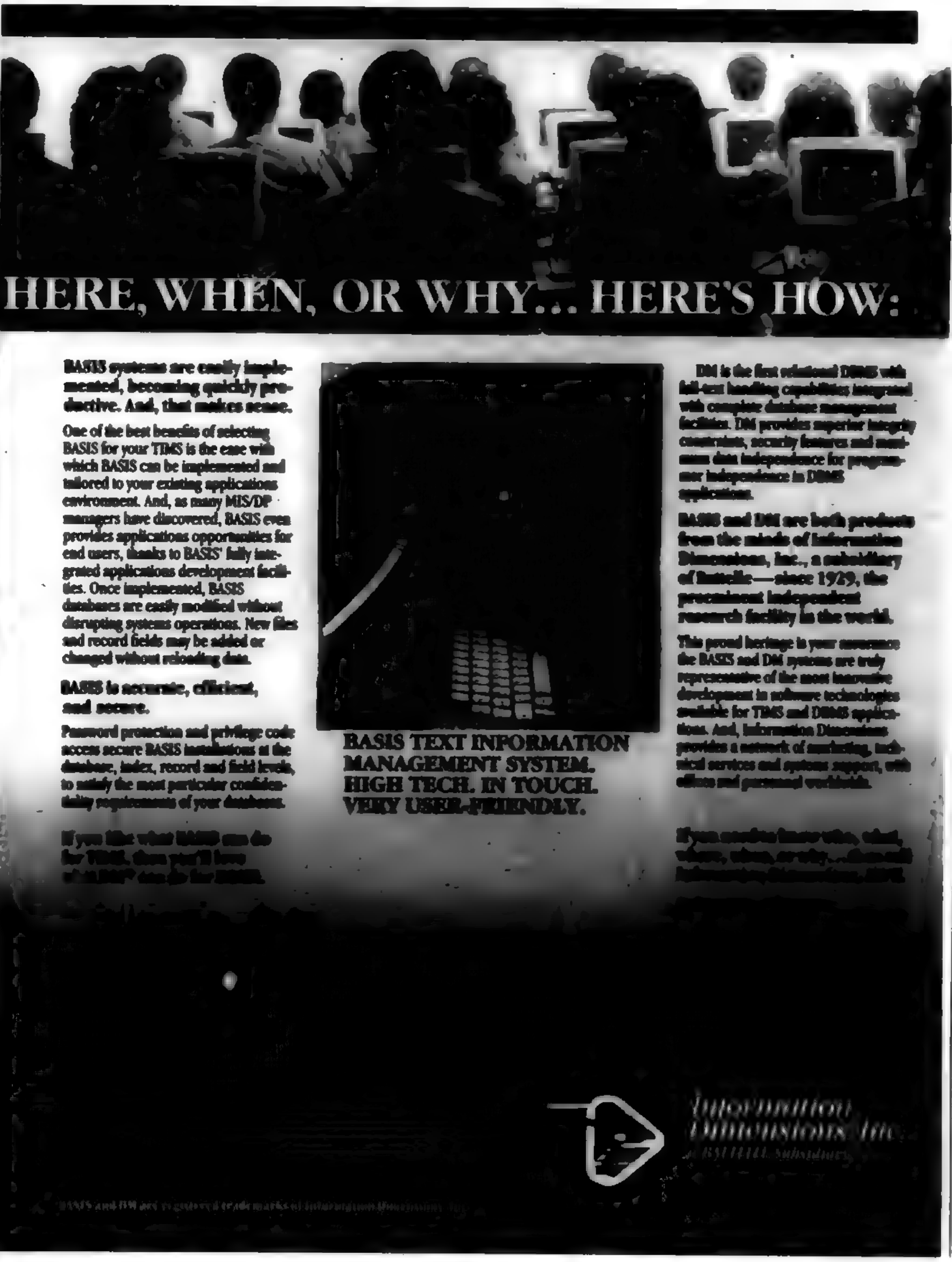
Cform, an application development environment said to work on microcomputers, minicomputers and mainframes with most operating systems supporting a C language compiler, has been announced by **Comsure Computer Services, Inc.**

Cform is said to use a set of visual forms-oriented applications tools. Aspects of the application are defined by creating forms and answering questions in dialog boxes. Data bases are inferred from forms and do not have to be predefined.

Other features include a data dictionary, in which all data elements are centralized, and the ability to cross-reference data from one form with data from any other form. Also, a programmer may write in C at any level in the development process.

A Cform starter license costs $295. A license including a runtime module costs $595, and a developer license, including C language libraries, costs $995.

Comsure Computer Services, P.O. Box 235, Chatham, N.J. 07928.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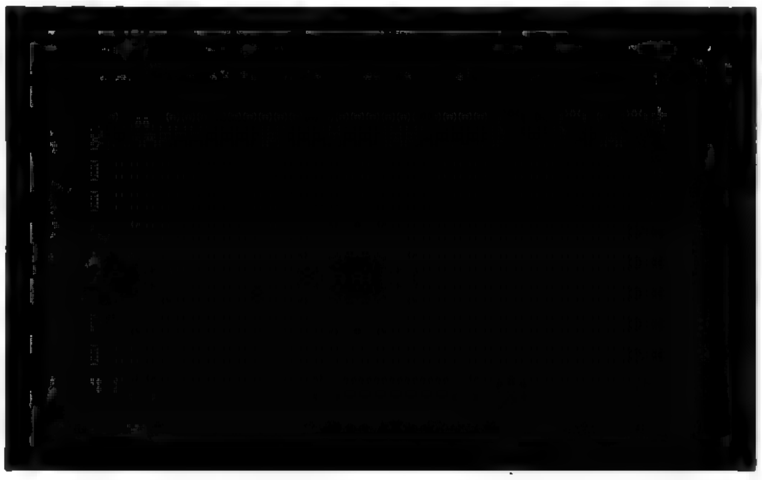

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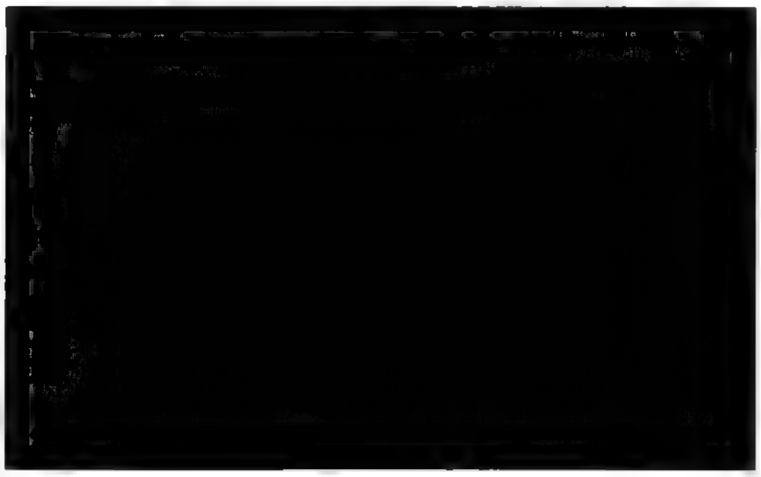

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MICROCOMPUTING

SMALL TALK

William Zachmann

Using ports in PC storm

Not every user has too many peripherals for too few serial ports on an IBM Personal Computer or compatible. But for those who do, a handy solution is provided by the Crosspoint AB+.

The product, from Eugene, Ore.-based Crosspoint Systems, Inc., is a software-controllable switch that allows a user to connect up to seven serial peripherals to a single serial port or up to six serial peripherals to two serial ports.

With the Crosspoint AB+, a user can, for example, connect a modem, a plotter, a serial mouse, a direct serial connection and a Lotus Development Corp. Signal board — all to the same personal computer — with little effort. With two serial ports on the system, two devices can be used at the same time.

Best of all, the Crosspoint AB+ easily switches any device onto any serial port with simple commands that can be issued from batch files. Switching to your modem or terminal port when starting up a communica-

Continued on page 32

PS/2 stalls New York PC plans

Big Apple MIS execs wary of Micro Channel's potential pitfalls

BY ALAN ALPER
CW STAFF

NEW YORK — Uncertainty regarding the potential benefits and pitfalls of IBM's Personal System/2 family is causing some MIS managers here to delay their purchase decisions. They said recently they are putting off such decisions until they are sure of the strategic rationale for adopting the new technology.

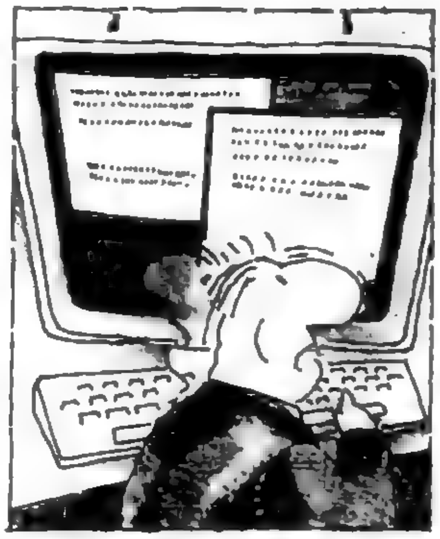
This was one of many interesting findings of a survey of Manhattan-area MIS executives' purchasing plans conducted by Calif.-based Computerland Corp.'s White Plains, N.Y., store during a seminar on the PS/2 sponsored by Information Management Perspective, Inc., a New Brunswick, N.J., consulting firm. The 28 respondents to the questionnaire composed a cross-section of the Fortune 1,000 and included firms such as J. C. Penney Co., Bankers Trust Co. and Metropolitan Life Insurance Co.

Approximately 68% of the MIS executives surveyed said their business units plan to purchase IBM-made microcomputers over the next 12 to 18 months. Five percent said they intend to buy Compaq Computer Corp. micros, while 27% said they anticipate bringing in systems made by NCR Corp., Toshiba Corp. of Tokyo and Grid Systems Corp.

Continued on page 30

OS/2 UPDATE

Multitasking for the masses



PETER PERRY

BY EDDY GOLDBERG
SPECIAL TO CW

The future of IBM's recently announced Personal System/2 and Microsoft Corp.'s MS OS/2 operating system as the next standards for personal computers is pretty much assured, judging from reactions since the unveilings on April 2. But for the next year or two, this spring's blockbuster announcements will have very little effect on the daily life of the corporate PC user. In fact, one might ask, "Who needs these things, anyway?"

The answer, of course, is MIS and microcomputer managers who want to bring multitasking — at long last — to their installed base of Intel Corp. 80286-based, IBM Personal Computer AT-class PCs without re-

Continued on page 33

Hercules to bulk up IBM's VGA

BY ALAN J. RYAN
CW STAFF

In a release slated for this fall, Hercules Computer Technology, Inc. reportedly will offer a graphics board that the company recently said will enhance the Video Graphics Array (VGA) of IBM's Personal System/2, which is also fully compatible with other Hercules graphics modes, including Ramfont, the firm's popular graphics mode that is geared toward text-oriented applications.

The Hercules PS/2 Card, designed to work with the PS/2 Models 50, 60 and 80, will not interfere with the graphics included on the motherboard of those units, according to Bruce Cummings, Hercules' executive vice-president.

"It will be the only video card that plugs into the PS/2 and brings the PS/2 into compatibility with the PCs that are out there," Cummings said.

The board is said to enhance

Continued on page 35

Inside

- VM Personal Computing brings mainframe features to integrated PC, MS-DOS environment. Page 25.
- Intel claims speed, flexibility improvements for 82786 graphics chip. Page 32.

Afraid to modify your old mainframe applications? Unlock their potential with VS COBOL Workbench.

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Intel smoothes 82786 development path

BY JAMES A. MARTIN
CW STAFF

SANTA CLARA, Calif. — Intel Corp. has announced four enhancements to its 82786 graphics coprocessor that reportedly improve the speed, adaptability and design flexibility for programmers developing applications for the chip.

The 82786 coprocessor features two independent processors on one microchip for the manipulation of graphics and text and for executing multiple hardware windows, Intel said. The new features include a Version Register, which reportedly will enable the chip to identify itself to software, ensuring that the software is aware of the chip's enhanced capabilities.

In addition, the enhancements are said to minimize the random-access memory requirements and design time for programmers and allow a single-bit monochrome image to be partially overlayed on top of a one-, two-, four- or eight-bit graphics image.

Vendors' input in design

"We developed these features from input from software vendors, who told us that adding these features would make it easier for them to write their software," said Mark Olson, manager of Intel's graphics product line.

Microsoft Corp.'s Windows, Xerox Corp.'s Ventura Publisher and other graphics-oriented systems running under Windows support the 82786 graphics coprocessor, Olson said. Intel has received commitments from "just about everyone who writes drivers for the chip" to take advantage of the new features in their future software releases, he added.

The 82786, available now, costs $67.50 per unit in quantities of 10,000 and $85 per unit in quantities of 1,000.

Separately, Olson said Intel was currently developing add-in cards to enhance the Video Graphics Array (VGA) technology built in to most of the IBM Personal System/2 series.

"We're glad IBM put VGA on the motherboard, because we no longer have to put an Enhanced Graphics Adapter chip on an enhancement card," Olson said. The VGA chip is compatible with the EGA chip. Graphics boards for IBM's older Personal Computer series required an EGA chip, since it did not exist on the PC motherboards.

Olson said there will be a strong need for graphics resolution beyond the 640- by 480- by 16-pixel resolution offered by VGA but would not elaborate on when Intel plans to release a product.

PC plans

CONTINUED FROM PAGE 29

About one-third of those who plan to buy IBM microcomputers said they are unsure whether to purchase current-generation Personal Computers or forge ahead with the PS/2.

MIS executives are still weighing the advantages of the Micro Channel bus architecture — including potential expansion capabilities, the ease of use of IBM's OS/2 operating system and issues involving the retraining of end users, according to a sampling of responses from the audience.

'A strategic decision'

"Purchasing the PS/2 is a strategic decision," noted Matt Fitzsimmons, proprietor of the White Plains Computerland. "In the past, most PC equipment was extremely forgiving. If you had a problem, you could always add more memory or another disk drive.

"With the PS/2, you have to think things out more carefully," he continued. "Eventually, third parties will come up with new solutions. But as it stands now, if you make the wrong decision, it will be hard to live with."

Twenty-five percent of those surveyed said they intend to buy the PS/2 Model 60. The Model 50 was called the second most desirable unit; 23% of the respondents said they anticipate buying one or more.

Not surprisingly, the Model 30, which many observers have dubbed "the orphan," was said to be in the purchase plans of only 1% of the audience. The Model 80 is the machine of choice of 8% of the respondents. Fourteen percent of those surveyed said they intend to purchase PC ATs, while only 1% said they will buy PCs or XTs.

Of the 5% who said they plan to buy Compaq micros, only 17% said they intend to purchase the Deskpro 386. Almost two-thirds of Compaq customers said they expect to buy additional portables.

Regarding networking plans, 18 of the firms in attendance said they have a solid strategy. Six firms said they anticipate using IBM's Token-Ring, while three said they are leaning toward networks from Novell, Inc. Eight firms reported that they have not yet decided which local-area network (LAN) hardware adapter to use. Nine firms said they plan to use Novell Netware software, while two said they expect to go with IBM's LAN and seven remain undecided.

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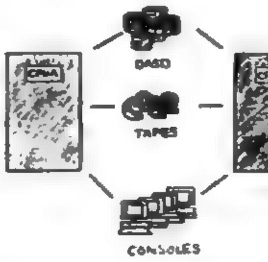

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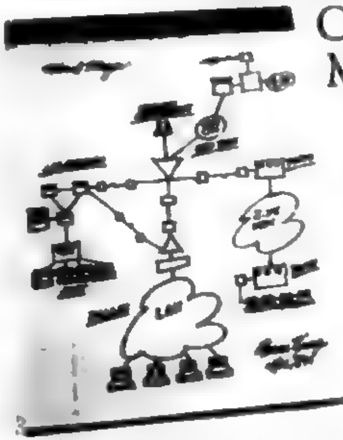

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Vericomp rescues PS/2 users, provides EMS

BY DOUGLAS BARNEY
CW STAFF

SCOTTS VALLEY, Calif. — Early users of the IBM Personal System/2 family have been forced to sacrifice the ability to use the Lotus/Intel/Microsoft Expanded Memory Specification (EMS) mode of many popular software packages.

But Limbo, a product from Vericomp that was announced last week, allows PS/2 access to the EMS capabilities of packages such as Lotus Development Corp.'s 1-2-3 and enables the use of memory beyond 640K bytes, according to the vendor. The $49 product is available immediately, the company said.

Limbo is said to incorporate EMS driver technology licensed from Borland International. San Diego-based Vericomp is the first OEM for the Borland technology.

The Vericomp product runs on the PS/2 Models 50 and 60 and takes advantage of IBM's Memory Expansion Option Board, a non-EMS board based on Intel Corp.'s 80286 chip.

"Limbo turns it [the Memory Expansion Option Board] into an EMS board," said Bill Gordon, president of Vericomp.

According to Spencer Leyton, vice-president of business development at Borland, EMS technology provides a way for users to address extra memory without waiting for OS/2, the next-generation operating system jointly developed by IBM and Microsoft Corp.

Although Borland will not sell its EMS driver as a retail product, the company will make it available to interested corporations on a negotiated basis, Leyton said.

"A lot of people are buying PS/2s which have EMS software, and [they] want to accommodate those large 1-2-3 spreadsheets," Leyton said. "It is an opportunity for corporations to justify the purchase of new hardware technology and have a bridge to new operating systems."

PC storm

CONTINUED FROM PAGE 29

tions program is as easily done as switching to a plotter when starting your graphics program.

Even initial setup is quite straightforward. In fact, it is a lot easier than it appears from a first read of the Crosspoint AB+ manual. The documentation provides a work sheet to write down exactly what you are going to connect and what its characteristics are. (I never bothered with all that.) Once you get the idea of the thing, it is remarkably easy to set up, and adding or removing devices from the system is just as easy.

The setup

Basically, you attach the supplied adapters to the 25-pin RS-232 connectors on the system's serial ports and on the peripherals you are going to use. Eight of these are supplied with the Crosspoint AB+. The two female adapters are used for the serial ports, and the remaining six male adapters go on the devices.

The adapters have RJ12 telephone-style modular sockets on them. Through these, you simply connect the serial ports and the peripherals to the Crosspoint AB+ using telephone-style modular cables, which are also included with the unit. There is no need for the bulky, shielded RS-232 cables normally used for serial peripheral connections.

The only other step in the physical setup is to run your parallel printer cable to the Crosspoint AB+. A ribbon cable runs from the AB+ to the printer, or parallel, port on the personal computer. This can be a little confusing, even though it is easy to do.

Since the AB+ simply switches devices on the serial port and does not switch the parallel printer port, it isn't very clear why the parallel printer gets into the act at all. In fact, when I first looked at the AB+ switch, it wasn't even clear to me whether it served as a serial port switch or parallel port switch or both. It took a little head-scratching to get it straight. In reality, however, it is not at all complicated.

The Crosspoint AB+ uses the parallel port as a means of controlling the switch. Passing the parallel printer line through the AB+ does not affect the normal operation of the printer in any way. The function of the AB+ is simply to switch devices on and off the serial port. Of course, printers with a serial interface can be attached through the AB+.

Software setup is also quite easy. A single program, ABPLUS.COM, is used both for initial setup and ongoing operation. A Switch Setup window is used to specify what is plugged into the eight RJ12 sockets on the AB+. Devices may be specified in terms of a specific bit/sec. rate, parity and number of data and start bits. Alternatively, as in the case of variable-speed modems, devices may be defined as "adaptive," for which detail parameters are not specified. An Application Setup window is then used to assign application names to particular connections made through the switch.

Priced at $399.95, including the switch itself, adapters, cables, software, power supply and documentation, the AB+ is a tremendously useful device.

Zachmann is vice-president of research at International Data Corp.

DATELINE: NEW YORK

Executive confesses to computer collaboration using In-Synch!

John Merson, noted microcomputer industry executive, has confessed to using IN-SYNCH for the purpose of computer collaboration. This is the first public statement in what appears to be the rapid proliferation of IN-SYNCH-based co-computing throughout industry and government.

Collaborating the Easy Way

In an exclusive interview, Merson recounted his actions, from his first co-computing session to his full-blown use of IN-SYNCH. "It started innocently enough," Merson said. "My partner, who was working in our branch office, needed help drafting a proposal for a prospective new client. With IN-SYNCH, we were able to work together, in real-time, on a WordPerfect document as well as a 1-2-3 spreadsheet. We even developed an AutoCAD drawing and threw in some ChartMaster graphs to spice up the proposal. IN-SYNCH made co-computing easy and quick—just as if we were sitting side-by-side. No fax machines. No overnight mail. No special networking. Just our modems and the regular phone lines."

Collaborators Get Carried Away

According to Merson, the computer collaboration didn't stop there. "I guess I got carried away," admitted Merson, "but it was amazing what we could do with IN-SYNCH." Apparently, Merson and his partner next used IN-SYNCH to prepare a slide presentation, using screens selected from the proposal they had developed. These sequenced "slides", including text, drawings, graphs and spreadsheet data, were then shown PC-to-PC (again using IN-SYNCH) to their prospective client. "The prospect had IN-SYNCH on his PC too," continued Merson, "so we dialed him up and delivered our sales pitch online. He loved it! Said it was just the kind of state-of-the-art stuff he needs in today's fast-paced business world. We beat out the competition and got the job."

Collaborating and Proud of It

Merson showed little remorse. "You'd do the same thing if you saw IN-SYNCH. This co-computing is going to catch on like crazy. The possibilities are too hot to ignore. You can co-run all the popular PC software packages. You can transmit and annotate "snapshots" of screen displays. Develop, save and present "slide shows." And IN-SYNCH keeps "minutes" so you've got a complete audit trail of everything you've done. Managers, engineers, programmers, sales people—they're all going to be co-computing with IN-SYNCH. I just did it first. And I'll certainly do it again. And again!"

Poll Shows Collaboration Spreading

Results of an unofficial poll taken by this reporter show Merson's prediction to be proving true. An inside source at MCI stated, "We use IN-SYNCH all the time to analyze important revenue data. It eliminates the need to express diskettes between headquarters and remote branches." And according to a highly-placed source at Rockwell International, "We're using IN-SYNCH for software development as well as for the training of new PC program users." In perhaps the most stunning admission, the president of Engineering Computer Services, Inc. said, "We're using IN-SYNCH with AutoCAD to help designers and clients review architectural drawings, thereby expediting schedules and cutting costs."

Cheers for Collaborators

According to a spokesman for AVTC, producer of IN-SYNCH, the company will not press charges against Merson. "We knew when we released IN-SYNCH that it was the first and only product to bring teleconferencing to the desktop of every PC user. With an innovative product, you've got to expect innovative uses. Off the record, well, frankly we're delighted and we'd just like to say: keep on collaborating!"

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Multitasking

FROM PAGE 29

sorting to Unix or Microsoft Xenix-based alternatives already on the market. And later, when the software and applications arrive to harness the power of Intel 80386-based PCs, there will also be the productivity and cost benefits to be gained by bringing multiuser capabilities down to the PC level.

The critical question for MIS and microcomputer managers concerns how to get from here to there with a minimum of pain. They need to protect their installed base — an estimated $75 billion invested in the current Intel chip/MS-DOS standard in approximately eight million to 10 million PCs and 15,000 to 20,000 Microsoft MS-DOS-based PC software applications — without sacrificing the training and experience of their end users.

Further complicating the picture, Microsoft — which not only has the upper hand but also seems to be gaining a choke-hold on the PC software market — jointly announced with AT&T in February that it also will offer another standard operating system for the 386: the official, AT&T-approved version of Unix for 386 machines, scheduled to be available in early 1988. Maybe.

As things stand today, if corporate computer managers want multitasking for their PC users, they have five basic choices:

- Play it safe and wait for MS OS/2 and applications to appear.
- Cautiously buy the new PS/2 systems from IBM as they arrive and be a willing pioneer by switching early to MS OS/2.
- Use existing networks or install new ones to link personal computers.
- Use a Unix or Xenix platform to run current DOS applications as tasks running under the non-IBM operating system.

The preceding solutions are relatively inexpensive and exist today for 286 and 386 machines.

- Buy IBM's announced 3270 Workstation Program, which is scheduled for a summer release. It promises multitasking with mainframe access by emulating IBM 3270 terminals through the company's Token-Ring network without an IBM 3278 or 3279 adapter. It will work on existing PCs and *most* of the PS/2 series.

However, MIS and PC managers need to ask several fundamental questions before embarking on the uncertain and complicated road to multitasking. Are the implied gains worth the growing pains? Yes, if you think about the advantages that multitasking can bring to the right work environments.

Are end users really knocking down MIS's door asking for multitasking? On the whole, no. The reason: The average corporate user is not familiar with the advantages of multitasking and, therefore, doesn't know to ask for it.

What the market offers

Beyond IBM and Microsoft, the current spate of microcomputing activity being reported in the press is generated primarily by software developers and PC clone makers. They are scrambling to chart a new course on the still-undefined PC seas, which were thrown into turmoil by the IBM-Microsoft tidal wave. In their haste to formulate public positions, these vendors are creating many secondary waves of their own as they struggle to survive and stake their claim on future market share.

> "WE'RE just stepping back and waiting a little while for some of these things to get a little bit clearer."
>
> JOHN PAJAK
> MASSACHUSETTS MUTUAL LIFE INSURANCE CO.

From the corporate PC buyer's point of view, the only clear outcome from the recent flood of information is confusion, with its usual marketplace result: watching and waiting. Without a doubt, it's all very interesting for MIS and micro managers to keep score as the contending vendors engage in their own brand of Wrestlemania, but corporate buyers are waiting to see who's left in the ring when the bodies stop flying.

At the Massachusetts Mutual Life Insurance Co. in Springfield, an attitude of active neutrality prevails. "We're just stepping back and waiting a little while for some of these things to get a little bit clearer," says Executive Vice-President John Pajak. "That has to be the strategic direction we take at this point. I wouldn't say that we're in a holding [position], in the sense that we're standing by and doing nothing; we're in an evaluation and assessing position right now."

George DiNardo, executive vice-president and chief of the Information Management and Research Department at Mellon Bank NA in Pittsburgh, sums up buyer frustration. "Are you going to make a major commitment to anything, including IBM, when you have all this competition going on? No. [The user has] a box that does what he needs. Why would I buy another? I'm just going to let the projectiles fly from one enemy camp to the other one and watch them go back and forth," he says.

It appears, then, that the new IBM and Microsoft products are bound to be important, but not yet — at least in terms of corporate buying activity. In fact, there really isn't much to buy right now. According to Microsoft's delivery schedule, it will be quite a while before applications utilizing the new capabilities of MS OS/2 are in the hands of the end user. The following is Microsoft's most recent delivery schedule:

May 1987: The MS OS/2 Software Development Kit shipped to software developers with a beta-test release version of the MS OS/2 system kernel, development languages and tools, plus specifications for the Presentation Manager and MS OS/2 LAN Manager.

August 1987: The MS OS/2 Presentation Manager ships to developers as an update to the development kit.

December 1987: The MS OS/2 kernel ships to OEMs; phased release begins. Meeting this target date depends on developers' feedback after the release of the kit. If history is a teacher, this date will slip.

Fourth-quarter 1987: The MS OS/2 LAN Manager is released to developers — as updates to the MS OS/2 Software Development Kit — and OEMs. Another piece to integrate.

First-quarter 1988: The MS OS/2 kernel is shipped to end users. This, as Microsoft product literature attests, is only anticipated.

Date uncertain: The delivery date for the extended version of OS/2 will not even be announced until the fourth quarter of this year. That is six to eight months before the folks at Microsoft and IBM are even willing to predict a delivery date.

So what is the bottom line? It will be mid-1988 or beyond before applications utilizing the multitasking capabilities of MS OS/2 appear in users' hands. More complex applications, incorporating the Presentation Manager and LAN Manager, could be as far away as early 1989.

> THE DELIVERY DATE for the extended version of OS/2 will not even be announced until the fourth quarter of this year. That's six to eight months before the folks at Microsoft and IBM are willing to predict a delivery date.

Early buyers of IBM's PC ATs now considering the PS/2 line would do well to recall the implied promises for a multitasking MS-DOS when the first ATs were unveiled. Remember MS-DOS 5.0, also known as Advanced DOS? Those early buyers are still waiting. So why should they buy PS/2 systems now? Granted, the 286-based AT-class machines offer users greater speed, but are the price/performance gains of the PS/2 series worth the risk of early purchase?

At The Travelers Corp. in Hartford, Conn., Senior Vice-President Joseph Brophy looks out onto a sea of 20,000 PC users. He says he, too, is frustrated with how long it will take for MS OS/2 to arrive in a useful form but that he looks forward to its eventual arrival.

"We wish it were here today, because we could apply it, but we have to wait. We think it has a lot of promise for multitasking," Brophy says.

Brophy, who cites many personal uses for multitasking, says he is "glad they made the announcement, and the sooner we get it, the better."

Nevertheless, what to do with the millions of PCs already in use is a thorny issue, Brophy acknowledges. "In terms of upgrading and protecting investments, that's a difficult question. It depends on where people are. People on the IBM PC XT and basic PC have a problem, because there is some incompatibility there. If you're on the AT — and we've been buying only ATs in the last year or so — you do have some upward compatibility," he says.

> "ARE YOU going to make a major commitment to anything, including IBM, when you have all this competition going on? No."
>
> GEORGE DINARDO
> MELLON BANK NA

At Mellon Bank, DiNardo put in his company's first order in early May — for one PS/2 box. He says he ordered it "just to have something to play [with] and see what it does and see what the implications on the current and the new operating system are."

Nevertheless, DiNardo acknowledges a future importance of PS/2 and OS/2 and says that what is important to him now is to get ready for their arrival. "Listen, it enhances all of our capabilities, and when it happens, we'll do it," he says.

In order to give his 700 PC users a chance to trade in their old computers for the new IBM systems, following IBM's April announcement, DiNardo opened up a used computer store at the bank. Contrary to his expectations, the response was underwhelming. "Everybody could have sent down their old boxes," he explains. "And I figured, 'Oh boy, there's gonna be a mad crescendo of movement to the new boxes,' right? In one month, I have not gotten one application for a turn-in. I did not get one box turned in. That's out of 700."

His explanation is that the current generation of PCs and applications already does the jobs his users require. "People are getting disinterested," he says. He also mentions the complications of going beyond the single-user box, including networking, mainframe access and how other PC users can access each other's data bases.

Another difficult choice for MIS and micro managers is deciding which applications should run under the current versions of MS-DOS and which should be rewritten to take advantage of the greater capabilities of MS OS/2. According to Microsoft, "MS OS/2 can run most existing applications designed for MS-DOS." Which applications will not run, and in what ways, is still an open question.

"There's really a whole new architecture evolving in how you use computing in a knowledge work environment," The Travelers' Brophy says.

"The old time-sharing, where the host controls everything, is finally going to give way to an environment where the personal computer on your desk — or mainframe on your desk — really is the controlling node that controls all the resources. But you've got to understand that. We're struggling to understand how to do it. You evolve into it," Brophy says.

Goldberg is a free-lance writer based in Amherst, Mass.

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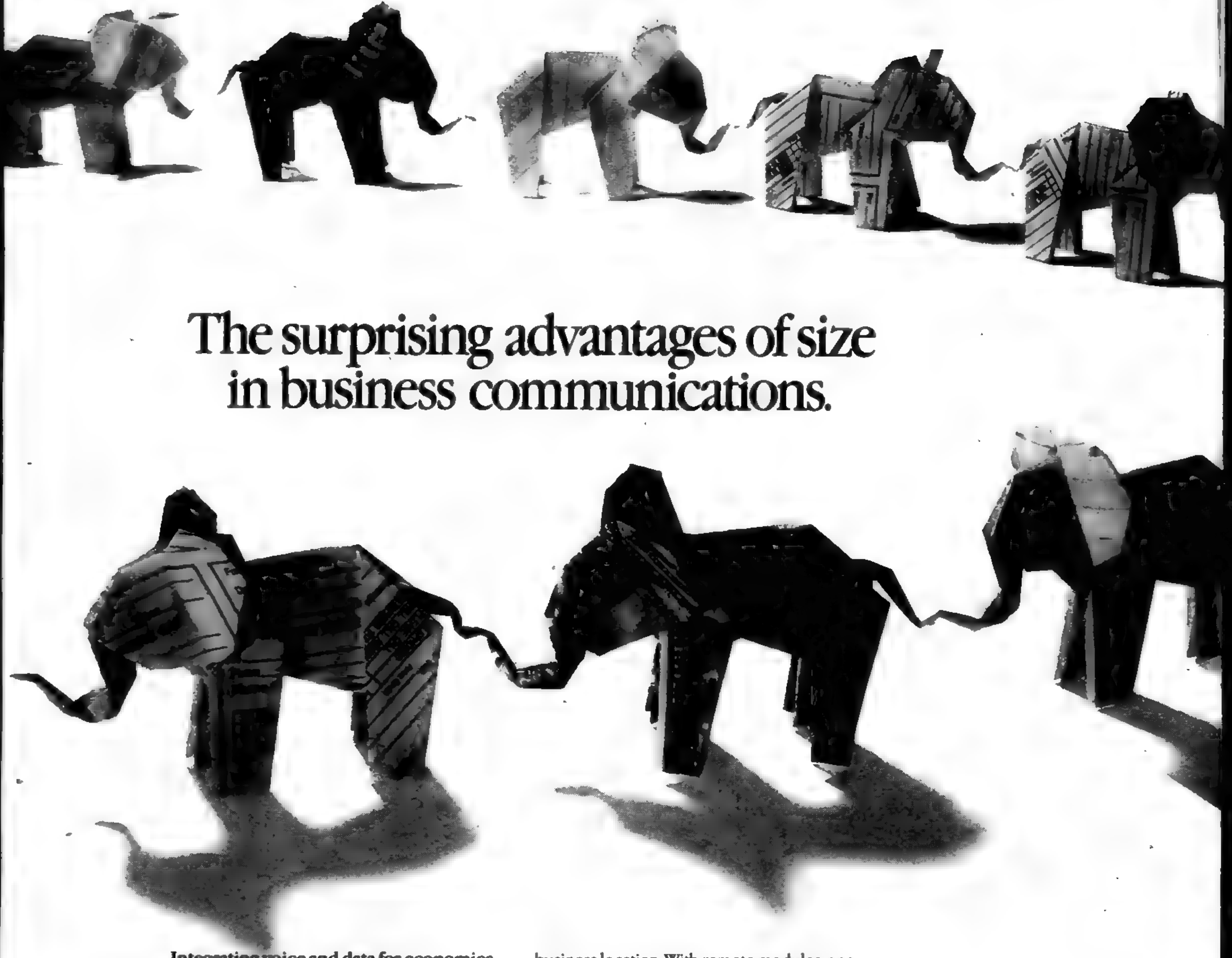

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Tool brings CPU strengths to batch language

BY JAMES A. MARTIN
CW STAFF

DANBURY, Conn. — VM Personal Computing, Inc. recently announced an IBM Personal Computer software development tool package that reportedly brings mainframe capabilities such as script language, editor and screen manager into an integrated IBM PC- and Microsoft Corp. MS-DOS batch-language environment.

The package, Beyond Bat, is based on the vendor's script language, which VM Personal Computing said also serves as the cornerstone of the company's Relay communications software packages. "We found some Relay customers were using its script language to automate procedures not related to communications," President Robert Millstein said. "That gave us the idea to make a product using the same script language that would take up less memory, would cost less and be better integrated with the operating system."

Beyond Bat is said to allow developers to create or combine existing applications using features not available in the DOS batch language. "The product offers developers a group of tools they were used to in the mainframe world, such as a panel manager, editor and script language — things that haven't been convenient or integrated before on the microcomputer level," Millstein said. Possible applications also include designing data entry systems.

The product retails for $99 and is available now.

Hercules

FROM PAGE 29

Lotus Development Corp.'s 1-2-3 Release 2 and Symphony Version 1.1 as well as Microsoft Corp.'s Word using software drivers developed by Hercules.

In a recent interview, Cummings outlined three opportunities for graphics for the PS/2 family. One, he said, is developing an Enhanced Graphics Adapter (EGA) card with 640- by 480-pixel resolution for "personal computer classics." He said this "me-too" approach works by activating the 640- by 480-pixel mode already present on existing EGA chips.

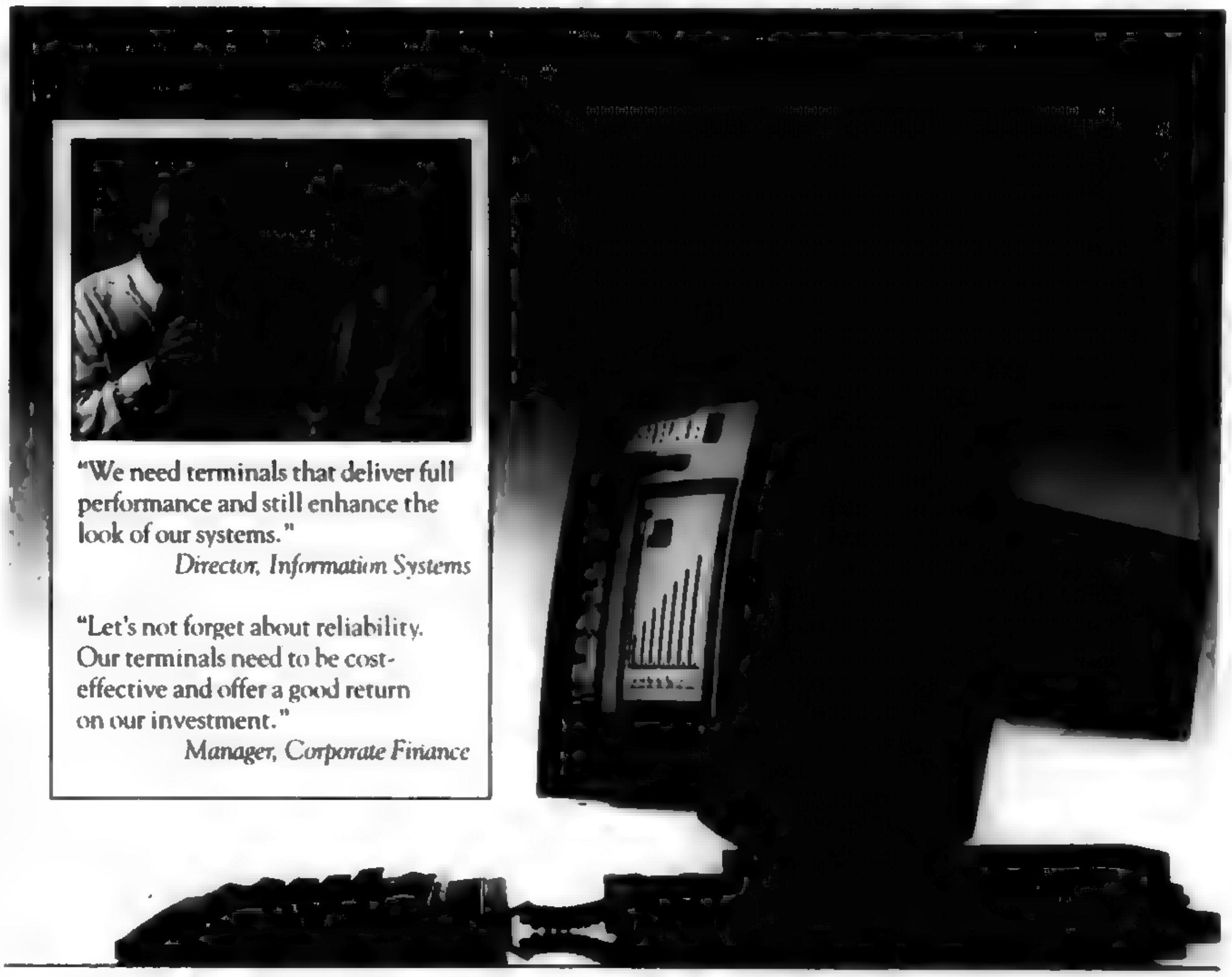
Cummings predicted that "me-too" graphics cards will be designed by many board makers, including Hercules. "We'll have a board, and so will every other company. That's called assigning a junior engineer to an exercise," he said.

The second opportunity, Cummings said, is creating a card that will emulate the PS/2's VGA for "PC classics," which involves plugging a card into a personal computer to bring it into compatibility with the PS/2. To do this, he said, the manufacturer would have to clone the full range of graphics and text capabilities on the PS/2 motherboard. Emulation would be questionable, he claimed, and with a $595 version already announced by IBM, there is not much need for this product.

Cummings said his company is not pursuing option No. 2 yet. "Emulating the PS/2's VGA for PC classics is a bad idea for us," he said. "We can't do anything better in that area — at least not yet — so we say, 'Buy IBM.' "

The third option Cummings outlined is the VGA enhancement and compatibility with existing "PC classic" standards, the Hercules PS/2. The card, he said, would improve spreadsheets and word processors and would offer higher resolution graphics for more software.

"Our first inclination after the introduction of the PS/2 was, 'Stay with what's out there — IBM Personal Computer ATs, XTs and clones.' However, some of our corporate customers are going for the PS/2s and have asked us if we will make a card for them. We're moving it up on our production schedule," Cummings said.



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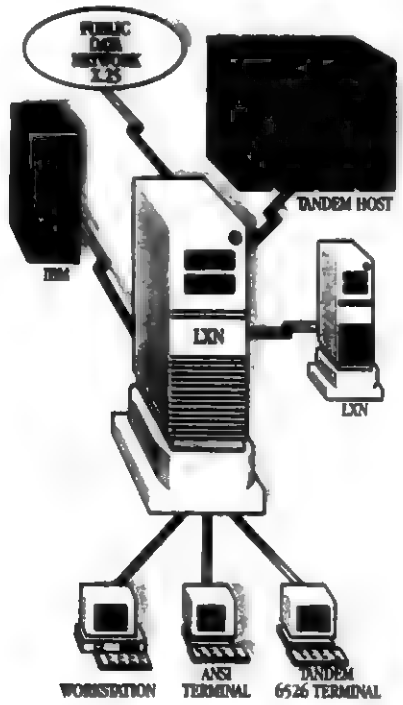
The LXN system integrates easily into the Tandem transaction processing network. You can access both Tandem host applications and UNIX applications, as well as other hosts through SNA or X.25. You can connect PCs to LXN through Ethernet LANs, then LXN to other systems. A MS-DOS file server provides availability benefits of LXN to PC users.



HIGH AVAILABILITY.

Tandem is the first to bring OLTP features to UNIX in this price range. The system can support two mirrored disks. If one fails, the other takes over. In case of power failure, an uninterruptible power supply will run the entire system for up to five minutes. It will also send everything in memory to disk. When power is restored, auto restart resumes where you left off, maintaining data integrity.

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NEW PRODUCTS

Systems

Sapphire, a system said to allow IBM Personal Computers and compatibles to capture and store ASCII streamed data while operating under emulation as an IBM System/34, 36 or 38 workstation, has been announced by **Dynamic Communication, Inc.**

According to the vendor, the Sapphire workstation receives, archives and transfers incoming ASCII file records to an EBCDIC host file. Incoming data may be passed to the PC's asynchronous communications port via an external modem or an RS-232C cable.

Sapphire is said to enable the user to perform certain IBM PC-DOS-based functions. Including software, emulation card, asynchronous communications board and serial clock and emulator transfer utility, Sapphire costs from $2,000. Remote polling-site versions begin at $995.

Dynamic Communication, Suite 700, 711 Leyden St., Denver, Colo. 80220.

Software applications packages

A financial analysis software product that combines spreadsheet, modeling and data base functions has been introduced by **Javelin Software Corp.**

Javelin Plus performs budgeting, forecasting, consolidating and reporting functions as well as data handling functions. Users can enter text or dates anywhere they can enter a number. Dates can be used in formulas as well, the vendor said. Data base functions allow the user to select or sort records in a list as part of a model. The software is also said to offer cross-tabulation functions.

Javelin Plus is priced at $249.95.

Javelin Software, Building 200, One Kendall Sq., Cambridge, Mass. 02139.

Software utilities

Software said to add to Lotus Development Corp.'s 1-2-3 and Symphony work sheets, allowing users to find optimal values for defined variables, has been introduced by **Enfin Software Corp.**

Optimal Solutions is the second module of Enfin's Decision Support Solution series. Features include a full-screen form window for problem setup and viewing of results; a built-in display and "what-if" shell for scenario building; display and calculation of shadow prices, reduced costs and slack values in a form window; allowance for variables to be real numbers or of type zero/one; a vector product key to minimize entry of long formulas; the ability to call Optimal Solutions from Lotus macros; an indexed Help screen; and a Lotus-style user interface.

Optimal Solutions costs $99.95.

Enfin, Suite 106-A, 6920 Miramar Road, San Diego, Calif. 92121.

Printers/Plotters/Peripherals

The PC Publisher Kit, software said to provide users of Hewlett-Packard Co.'s Laserjet and compatible printers with desktop publishing features, has been announced by **Imagen Corp.**

The PC Publisher Kit is based on Imagen's document description language. It uses raster-image processor technology and provides such features as full-page graphics and font scaling capabilities. It works with IBM Personal Computer XTs, ATs and compatibles and comes with a base set of 18 typefaces.

The PC Publisher Kit is priced at $1,895.

Imagen, P.O. Box 58101, 2650 San Tomas Expwy., Santa Clara, Calif. 95052.

Board-level devices

Univision Technologies, Inc. has announced the **UDC-800 series** image display controller.

The 2,048- by 1,536-pixel by 8-bit controller is a single IBM Personal Computer AT-compatible card. The UDC-800 series is said to support 60Hz noninterlaced monitors. It features 3M bytes of dual-ported memory, up to 512K bytes of display-list memory and video random-access memory.

Basic commands include line, polygon, arc, circle, fast-bit block copies and text. It comes with initialization and diagnostics software and supports Microsoft Corp. Windows.

The UDC-800 image display controller costs $6,995.

Univision Technologies, 12 Cambridge St., Burlington, Mass. 01803.

Interaction Systems, Inc. has announced the **Model 4003** Touch Controller board for IBM Personal Computers.

The plug-in touch controller board is said to add capacitive touch-input capability to the PC. The user is able to input and access data via touch when the 4003 board is inserted into an IBM bus slot, a standard Interaction Systems touch screen is attached to the monitor and the touch screen is connected to the controller via a single cable. The Model 4003 features standard scaled resolution of 256 by 256 pixels, skew compensation and write default.

The Model 4003 is priced from $295.

Interaction Systems, 130 Lincoln St., Brighton, Mass. 02135.

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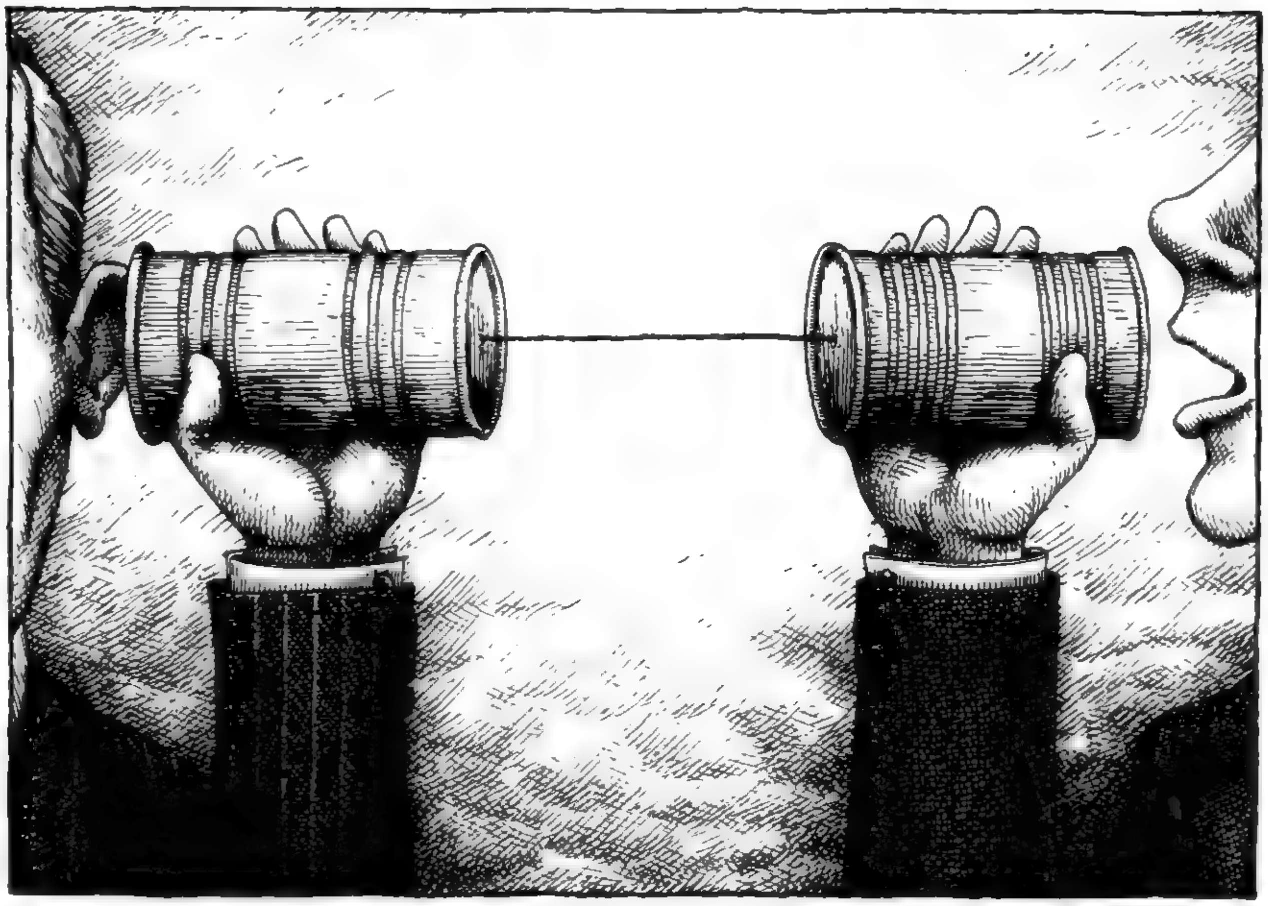

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NETWORKING

DATA STREAM

Elisabeth Horwitt

Why fear baby Bells?

Maybe it's a holdover from predivestiture days when Ma Bell and her seven kids were omnipotent and omnipresent, but I am having a lot of trouble understanding why everyone assumes that once U.S District Judge Harold Greene lets them loose, the regional Bell holding companies will run amok in every business sector from financial services to pay telephones.

Granted, there is truth in the complaints that have arisen from competitors whose turf is being actively threatened by the Bells. For example, in March, Bell Atlantic Corp. filed for a tariff to sell storage facilities for services that play the same message to everyone who calls a given number. Not only do Bell Atlantic's operating companies have built-in credibility in such a market, but the holding company submitted a two-tiered pricing structure in which its own enhanced service would charge customers lower telephone rates. A little pressure from competitors made Bell Atlantic back down.

Another example of a company with a right to gripe is MCI Communications Corp., which sees Nynex Corp. as a threat to its current thrust into the international telecommunications market. Nynex first purchased

Continued on page 46

3Com fills out software plans

Users will get windowing, corporatewide links; product blitz set for '88

BY PATRICIA KEEFE
CW STAFF

SANTA CLARA, Calif. — A recently released paper detailing 3Com Corp.'s software direction for the next three years and beyond focuses heavily on plans to tie 3Com users into corporatewide systems.

Users can expect to see 3Com expand its current work group-oriented product offerings to include connectivity to IBM's Systems Network Architecture, Digital Equipment Corp.'s Decnet, Unix and the Transmission Control Protocol/Internet Protocol, as well as advanced network management and the ability to run multiple protocols on 3Com's intelligent adapters, according to the paper.

Some of these products are slated to be announced as part of a 10-product blitz planned for next year.

In 1988, 3Com said it plans to tackle a number of areas by integrating Microsoft Corp.'s OS/2 LAN Manager into 3Com's 3+ network operating system. The merged product reportedly will be called 3+Open.

3+Open will continue to support both protected-mode IBM Netbios support and IEEE 802.2 to protect existing applications development and existing 3+ networks, 3Com said.

3+Open will also provide the server and station sides with minicomputer-like functions, such as interprocess communications, multitasking, distributed computing and event auditing.

Other projects slated for 1988, according to 3Com, include the following:

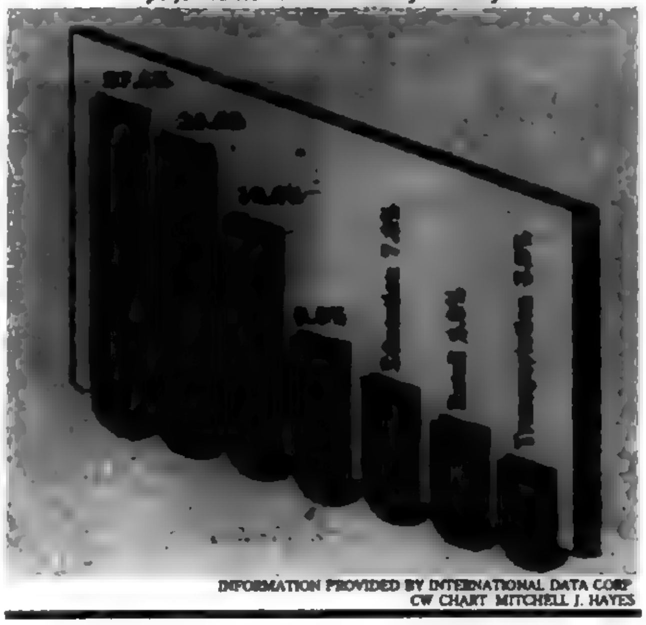
- 3+Windows. A fully graphics-featured window interface will eliminate the need for users to know command-line directions.
- Network management. 3Com will focus on monitoring, controlling and administering the network using graphics displays, test tools, advanced messaging and other tools.
- Mainframe access. 3Com will use applications built on the Data Link Control/Logical Link Control interfaces provided with with 3+ and will offer gateways,

Continued on page 48

Data View

Network management

Companies planning to buy network management and performance measurement by industry



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CW CHART MITCHELL J. HAYES

Prudential takes to sky

Satellite network replaces leased lines

BY DAVID BRIGHT
CW STAFF

NEW YORK — Prudential-Bache Securities, Inc. hopes to obtain faster, cheaper and more reliable data communications by converting from a terrestrial leased-line network to a satellite-based system, company officials recently said.

Tridom Corp. in Atlanta will implement a network of its own Clearlink very small-aperture terminals (VSAT) — small satellite dishes that operate over the Ku-band frequency. The Clearlink nodes, which are slated to be installed at more than 300

Continued on page 48

Pronet-10 beefed up, price cut

BY PATRICIA KEEFE
CW STAFF

WESTBORO, Mass. — Proteon, Inc. last week enhanced its Pronet-10 10M bit/sec. token-ring network with network management software and an IBM Micro Channel interface and also announced some price cuts.

The Tokenview-10 advanced network management software features performance analysis, configuration management and network troubleshooting from a single, centrally located station. Proteon offers the same management services for its Pronet-4, a 4M bit/sec. token-ring network.

Proteon said it will introduce Tokenview-10, which is not offered on the Micro Channel interface, in three phases.

Phase 1, set to be available in September, will reportedly include network configuration, data collection and statistical analysis functions to assist network administrators in isolating potential problems on the network. Phase 2, to be available in December and upgradable from Phase 1, is said to add automated fault-identification and isolation.

With the introduction of Phase 3 in the first quarter of 1988, Tokenview-10 will handle

Continued on page 48

Inside

- Novell develops bridge to connect remote LANs, PCs to local LANs. Page 50.
- CXI rolls out five LAN workstation packages for PCs, PS/2s. Page 50.

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Baby Bells

FROM PAGE 43

controlling stock in a company that is developing fiber-optic links across the Atlantic Ocean, then applied to Greene for a waiver so that it could start to offer a link between the U.S. and Europe. MCI quite correctly pointed out that Nynex would have a built-in advantage in this market, since it controls local-loop traffic in New York — home to many international firms and a termination point for a lot of transatlantic cable.

These valid concerns justify the caution with which both the Federal Communications Commission and Greene are viewing the holding companies' proposals calling for new tariffs and business ventures.

However, there is a risk that certain parties are exaggerating the danger posed by the deregulation of the Bells simply as a way to stifle potential new competition on their turf.

For instance, AT&T claims that letting the Bell operating companies into the interexchange business will cancel out all of the gains wrought by divestiture — meaning, I presume, that one or more of the operating companies could duplicate predivested AT&T's near-monopoly in both long-distance and local telephone services.

Think about it. AT&T — which has been clobbering MCI and U.S. Sprint Communications Co. — is depicting the Bell operating companies, which would have to acquire or build their long-distance lines from scratch, as the potential new Godzillas of the long-distance market.

Perhaps the most far-fetched case against the operating companies that I have heard to date is from a representative of a Fortune 500 financial company, who claimed that if Greene allows the regional holding companies to enter the information services market, they'll have a field day in the financial and insurance industries — for two reasons. One, they could sell communications to their customers at cost; and two, they would have "proprietary access" to the telephone companies' data bases, which they could then use for demographic studies.

I find it hard to picture emancipated holding companies running roughshod over the likes of Chemical Bank or Citicorp. They would have to build the expertise and the staffs from ground zero, and the FCC and Greene have been on the watch against cross-subsidization and unfair pricing ever since divestiture.

A lesson learned

Nor does past history support the premise that the operating companies will run amok in new markets. During the first year or two after divestiture, several companies showed a disconcerting tendency to purchase computer stores and software firms and to market themselves as "full-service systems integrators." But they learned the same lesson AT&T learned from trying to sell computers — running a regulated monopoly does not necessarily prepare you for competing in an unregulated, cutthroat market in which you have to buy most of your expertise.

Perhaps their past experiences have made the holding companies more cagey. Right now, while they lobby Greene to lift his restrictions on information services, many of them are busy trimming organizational fat and performing user surveys to determine market demand for various types of basic and enhanced services.

This seems like a far better strategy right now than peppering the FCC with new tariffs. As one consultant pointed out recently, the regional holding companies need to identify markets that will make use of their peculiar combination of resources and expertise. Right now, they are still too communications-oriented, trying to sell plain vanilla transport when they should be selling applications. Until they do, they won't be electrifying many new markets; and consumers, if not competitors, may be the poorer for their absence.

Horwitt is a *Computerworld* senior editor, networking.

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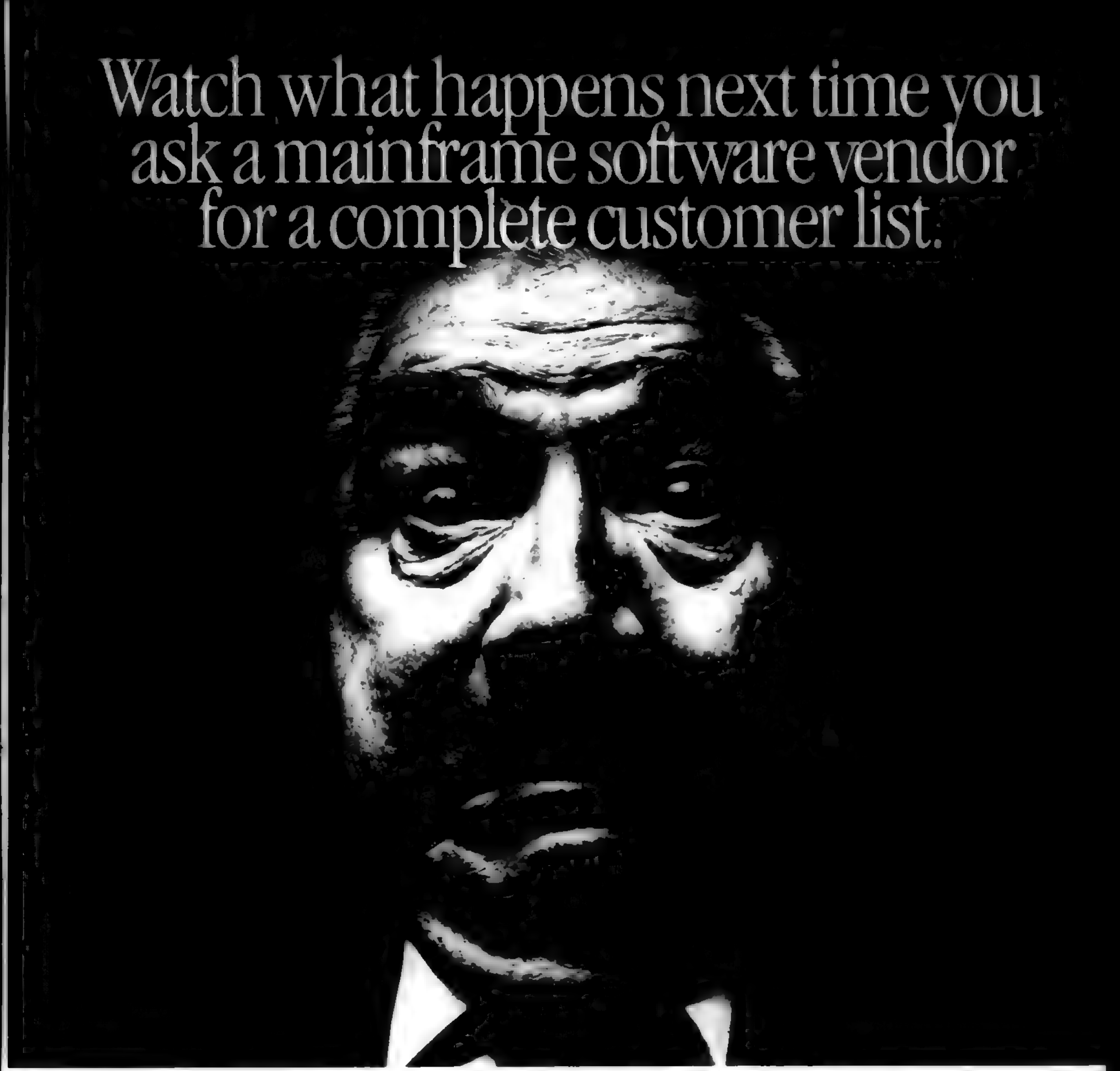

You may get a convincing song and dance, but underneath it's a different story. Behind those pat answers that software vendor is actually sweating and squirming.

Why don't they want you to see a complete list? Simple. They know that their size and name familiarity do not guarantee happiness. Many "single source" or "all-things-to-all-people" vendors have, at best, uneven quality across a multi-application product line. They know that their customer list may contain a good number of less-than-happy clients. It's difficult for these vendors to commit the human and monetary resources necessary to produce the type of superior product available from a firm that specializes in a single application area. A firm like Data Design.

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Prudential

CONTINUED FROM PAGE 43

Prudential-Bache branch offices in the U.S, will communicate with a Ku-band hub station from GTE Spacenet Corp. in McLean, Va. GTE Spacenet says it will supply the transponder bandwidth on its Gstar satellite. The company is also providing network monitoring and management services and field maintenance of on-premises equipment.

Currently, Prudential-Bache says at least 20 branch offices are using the satellite network on a full-time basis, with the remaining branches scheduled to be added by December. The network is expected to reduce the firm's data communications costs by as much as 40%, cut response times by 20% or more, reduce downtime by at least half and more than double capacity.

Reliability became a key issue for Prudential-Bache when branch offices began relying solely on computer-based communications with the central office, according to William T. Rush Jr., vice-president of telecommunications. "The account executive no longer has the paper backup he used to have. All of a sudden, the reliability that was great a couple of years ago is no longer acceptable."

Rush says the sheer complexity of the company's terrestrial system, which involves more than 100 multidrop lines, allows too much room for human error. "For every central office these lines go through, you have human beings [responsible for maintaining lines]. Human beings have a potential for making mistakes," he adds.

Previously, an average of 2% of the terrestrial network was down at any one time, Rush says. But he projects that the satellite network will be down "significantly less than 1%" of the time when fully implemented.

Another major benefit of the satellite implementation is the ability to quickly reconfigure the network for new applications. According to Rush, even fine-tuning a terrestrial network can be a "horrendous" experience, while many changes on a satellite network can be accomplished overnight via software alterations. He notes that Prudential-Bache once spent a year changing the way the branches were being fed data.

The use of Tridom's 1.8-meter dish, which is larger than many VSAT terminals, should minimize weather-related problems that sometimes plague satellite networks, Rush claims. "Also, if the signal drops out, our autodial backup facility automatically steps in."

Another potential trouble spot is the possibility of security breaches, especially since Prudential-Bache will be sharing a GTE Spacenet hub with other firms. But Rush says the network includes security levels such as complex polynomial algorithms and traditional passwords, making it "very, very difficult to crack."

Prudential-Bache had originally intended just to add reliability, ease of deployment and other improvements to its existing terrestrial networking system, but "the key [terrestrial network] vendors said, 'You can't do much more than what you have right now,' so we cast our net a little wider," Rush explains.

3Com plans

CONTINUED FROM PAGE 43

CCITT X.25 routing, CCITT X.400 access and Integrated Services Digital Network interfaces. 3Com said it expects to support the full Open Systems Interconnect model at the multivendor Enterprise Event scheduled for June 1988, allowing direct access to minicomputer systems.

3Com said it will focus more strongly on Unix in 1989. "Unix stations are likely to be the newest workstation of choice for business desktops, and 3+ will allow for the integration of these high-powered devices," 3Com said. Specifically, FTAM and NFS server protocols will be added to Microsoft's Server Message Block server protocols, allowing users to select the appropriate protocol.

Also slated for 1989 are limited use of artificial intelligence and network-intrinsic applications such as scheduling, tracking and calendaring as part of 3Com's basic system offerings. In addition, multimedia integration will be provided for all workstations through voice store-and-forward, voice-annotated text, high-resolution graphics and facsimile capabilities, 3Com said.

Pronet-10

CONTINUED FROM PAGE 43

all network performance, configuration management and troubleshooting activities automatically, Proteon said. Phase 3 is said to enable Network administrators to perform problem determination and error recovery via the network management system to minimize network downtime. Pricing is not yet available.

Proteon also announced a high-speed interface card for IBM's Micro Channel architecture that it said will provide a direct connection to IBM's Personal System/2 Models 50, 60 and 80. Proteon said the PS/2 Model 30 is already supported by the Pronet-10 P1303 interface for IBM Personal Computer ATs. The new card should be available in November.

Proteon also announced it has reduced the cost of its P1300 IBM PC and P1303 IBM PC AT Pronet-10 interface cards by more than 30%. The P1300 card now costs $545, and the P1303 costs $595.

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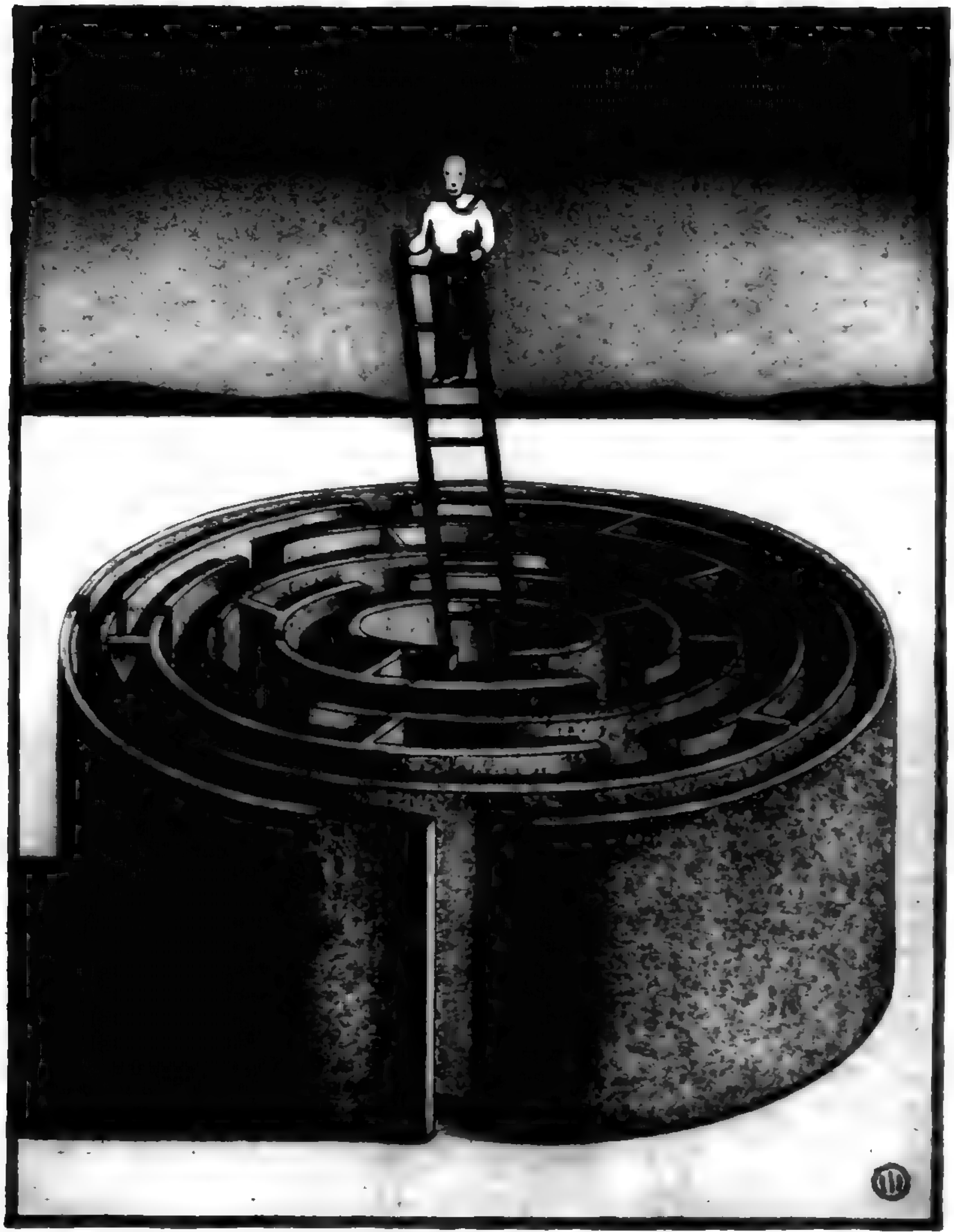

Seeing how all the pieces of the puzzle fit together becomes more achievable when there are tools available that permit some perspective. Accounting and financial software packages are just now beginning to provide organizations with that long view.

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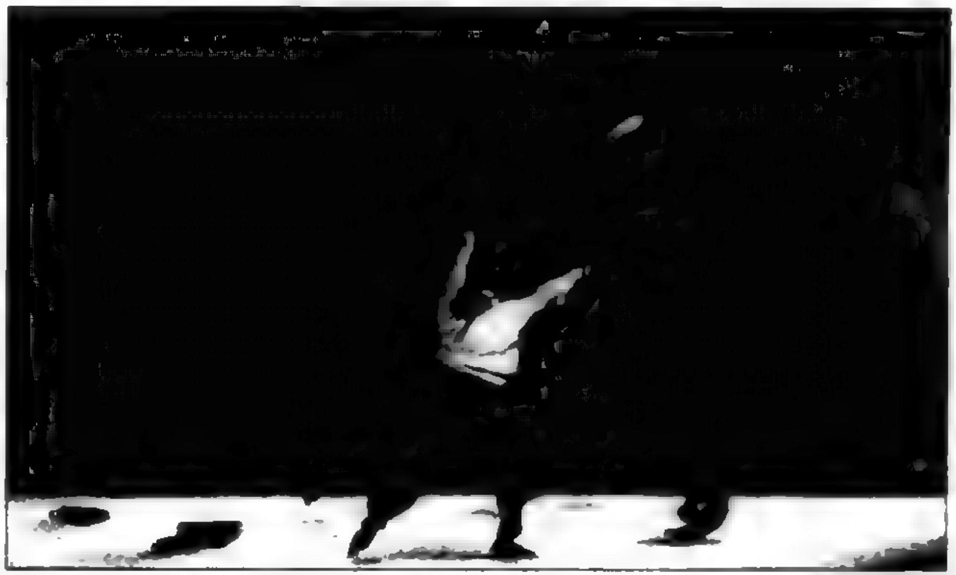
Managing by numbers is becoming easier with advances in accounting software's data exchange and reporting capabilities.

NUMBERS GAIN NEW MEANING

BY SHAWN BRYAN



KAREN STOLPER

Most people regard accounting as a necessary evil, an exercise that must be performed to satisfy the Internal Revenue Service and ensure the business is still afloat. By the same token, accounting software is considered a tool of the most mundane sort. That attitude is both unfortunate and misguided because changes are taking place in accounting software that promise to transform accounting from a bean-counting function into an integral part of management information. The emphasis is shifting from using numbers strictly to control finances to using them to communicate information about the totality of an enterprise.

Accounting software programs are beginning to take on attributes normally associated with financial modeling packages and other management information systems. This new orientation can be seen very clearly in the number of programs that now offer custom report generation, the most basic form of communication.

It wasn't very long ago that purchasing an accounting package meant learning to live with a limited menu of standard reports that could not be modified or augmented. Now, even the least expensive software packages offer users the ability to custom-design reports for their particular needs.

Another even more obvious change is found in the number of accounting programs that currently offer some sort of graphics analysis of information in the accounting files. Graphs used to be available only on spreadsheets or modeling programs, but many accounting programs now offer graphic presentation of elements such as ratio trends and cash flow. In some cases, accounting programs have even ventured into the territory of "what-if" analysis, which allows the entry of theoretical data or assumptions about future events and then the projection of various possible outcomes. This type of activity has been almost the sole domain of modeling programs in the past and is the most recent breakthrough in some accounting programs.

Two trends just taking shape that bode well for the future are single-file and data-based accounting systems.

Most accounting software is file based, meaning the information for accounts payable is in an accounts payable file, the payroll information is in a payroll file, the receivables information is in a receivables file and so forth.

The problem with this approach is that, because each file has its own unique structure, records from one file cannot be easily joined with records from another. If a user wants something more than predefined reports, he has to reprogram the system.

Some software firms are addressing this problem by adding report writers to their libraries. MCBA, Inc. and Great Plains Software, Inc. have released report writers that allow the user to custom-design reports by drawing data from more than one file in the system. While this approach offers a quick and easy solution to the problem, an even more exciting development is the recent entry into the market of single-file or unified-file accounting systems.

If you view accounting as a series of

Bryan is vice-president of finance and administration for Cabot Farmers' Cooperative Co. in Cabot, Vt., and heads his own consulting firm, Datatek, in Montpelier, Vt.

Numbers

FROM PREVIOUS PAGE

transactions that take place over time, then the unified-file system begins to make sense. What the concept says is that all the accounting transactions can be dumped into one big file. The computer then sorts out what is needed and the form in which it is needed. The result is a system in which all the data is available all the time.

Unified-file accounting systems do not recognise the normal close concept. The system is up all the time and does not have to be formally closed, except when you wish to remove historical data for archival purposes. For practical purposes, though, you can close the books any time you want, simply by specifying the time period you wish to see.

Quickslice approach

Newviews, a highly touted accounting package from Q. W. Page Associates, Inc., uses this approach very effectively.

The program offers the user a visually familiar approach to accounting. The screen looks very much like a ledger sheet. You can look at an item on the ledger and then quickly move to the next level of detail to see the component parts. Repetitive use of the function that Q. W. Page calls Document Expand will, in fact, allow the user to get to the heart of the accounting system where the individual transactions reside.

For example, the accounts receivable item on the balance sheet is made up of various accounts for firms that owe your company money. The account for each firm is composed of invoices and payments, and each invoice is made up of individual items for which you have charged the company.

WITH one file, Newviews gives you a total accounting system, because it allows complete flexibility in designing reports and viewing data.

With one file, Newviews gives you a total accounting system, because it allows complete flexibility in designing reports and viewing data. You design all reports and views for your system from scratch. Each sheet requires definitions concerning which accounts get summarised into the totals being viewed.

Also, Newviews goes against the grain of traditional accounting software by suggesting the use of mnemonics rather than account numbers to identify accounts. Thus ACME Manufacturing becomes customer ACME rather than customer No. 1299. While easier to understand and remember, mnemonics are slower to use during data entry than the numeric identifications.

Newviews' visual approach to accounting is appealing, but its flexibility demands an investment from the user. Designing a large or complex system can be tedious, and just learning to work with the software requires a fair amount of practice and effort.

Another unified-file program with a more traditional interface is Keystone from Keystone Software. Keystone is a fast, bombproof program that offers the same flexibility as Newviews with some additional features. Recognizing that most of accounting is data entry, the designers of Keystone made the program as fast as possible in this crucial area.

THE development of unified-file systems on microcomputers augers well for the future development of similar accounting systems for larger computers.

Keystone is also about as crash-resistant a program as you are likely to find. Data is written to disk as you enter it, so pulling the plug on the system has essentially no impact on your files. You simply plug it back in and start working where you left off. Newviews requires a more graceful exit, however, and will crash if you do not use the proper exit procedures.

Keystone uses indexes to link general-ledger accounts to subaccounts, which are the banks, customers, vendors and others with whom you do business. General accounts are the traditional accounts found on a company's financial statements.

These indexes can be used any time you wish to create direct relationships between the detail and general levels. Once grasped, the concept behind the system is beautiful in its simplicity and is a perfect supporter of the transaction-based system.

What is most exciting is that the development of unified-file systems on microcomputers augers well for the development of similar accounting systems for larger computers. The advent of larger, faster systems with increasingly more storage makes unified-file accounting even more plausible. The speed and storage capacities of mainframes makes this concept a natural and

Continued on page S5

Forecasting financial futures with models

If accounting systems specialize in recording history, then modeling programs are the specialists in predicting the future.

A financial model allows a user to simulate how a business works or might work, extracting instructive trends from the past and combining past performance with variables for forecasting.

Unlike spreadsheets, which offer the most basic form of modeling, or accounting programs, true modeling packages, of which there are perhaps 20 to 25 on the market, are designed with one application in mind: To create well-documented models.

Modeling programs such as Javelin Software Corp.'s Javelin and Encore from Ferox Micorsystems, Inc. use descriptive variables to hold data and permit multiple manipulations with the same data set. Data is kept separate from the matrix in which it is manipulated and displayed.

Data exchange

The best of both worlds is to have a modeling program and an accounting program that can trade data easily. You can then extract historical data from the accounting system, manipulate it in the model and even put it back into the accounting software.

Fortunately, software developers have been sensitive to this need to share information, and most modeling programs, as well as many of the newer accounting systems, offer data import and export capabilities.

IFPS from Execucom Systems Corp. is a modeling program that offers a useful data-sharing feature. Available in mainframe as well as microcomputer versions, each has a built-in communications protocol that makes the movement of models from system to system transparent to the user. This frees the host system from supporting many people working on models while keeping mainframe avenues open for the extra large models or those that require access to other mainframe software and data.

One of the beauties of some modeling programs is that they are nonprocedural; thus, you can define your model in any order and it will execute properly.

Javelin is a good example of such software. This program uses a single file to hold data and the model, so you can set up any number of views that you wish. Once relationships are established, it makes no difference in what order they are displayed, as the answers will still be correct. Once you get over the shock of working nonprocedurally, the Javelin approach is refreshingly simple and lifelike.

If there is a drawback to the Javelin approach, it is that the entire model remains in one file. This does not pose much of a limit with Javelin's support of the Expanded Memory Specification (EMS) and enhanced EMS systems now available. Models of 2M, 3M, 4M bytes or more are possible. The problem is that the data and the model logic are in one file, and several models cannot share the same data easily.

Encore solves this by keeping the data and the model in completely separate files. Several models can use the same set of data, or several data sets can be used by one model. It is a more flexible way of working with large models.

Encore is a procedural system, however, so model design is more important. The model executes from the top down and will fail if it encounters a statement that needs information from a variable that is not yet defined.

Exotic modeling

Modeling programs are used routinely by businesses to forecast and analyse cash flow, sales and expenses. Models are not limited to just these routine applications, however.

Real estate developers use models to simulate various occupancy rates in condominiums and to evaluate various tax implications of their building and sales strategies. Bankers use models to review financial statements furnished to them by businesses seeking loans. In fact, the bank's modeling program often reviews a model created by a business — models testing models, as it were. Accountants use models to assist in planning tax strategies for their clients. Businesses use models to analyze new product introductions, especially those in which large capital outlays are required.

Models can also be used in science, agriculture and almost any endeavor in which numbers are used to analyze or predict.

What sets modeling programs apart from accounting software? They allow more freedom of expression. Whereas modeling programs are designed to encourage you to tinker with the data, accounting programs are designed primarily to prevent unauthorized tinkering with it. Modeling software generally permits "on-the-fly" changes in data and allows numerous changes to similar data sets. Accounting software is not designed for this type of free expression.

Modeling programs usually offer an extensive graphics repertoire. In most modeling situations, you would want to identify and deal with the data at the macro rather than the micro level. Graphs allow you to spot micro anomalies quickly, freeing you to concentrate on the underlying assumptions that make the model work.

Since experience tends to repeat itself, modeling graphs also make it easy to spot trends from historical data and carry them forward into the future. If the trend varies remarkably from the historical pattern, there should be a good reason why.

Modeling software normally has excellent report-writing capabilities designed for external reporting. They often contribute to the development of a formal presentation, whether on a new product or on last year's sales.

The unique language of modeling programs could be called a programming language, but it is actually a control language that often resembles English. This language is easy to use; it is what drives the data gathering and reporting functions of a model.

Using the control language, models can be put together to prompt user input and then offer menus of options. An inexperienced user can be made productive through the use of menus and Help screens, and the company can rest secure knowing that the model logic being used is tested and bug-free.

MODELS can also be used in science, agriculture and almost any endeavor in which numbers are used to analyze or predict.

This feature of modeling software is especially helpful in large companies where the MIS department writes the models and then distributes them to the departments needing them. The model users do not need to know how the model works, just what to put into it.

Modeling programs lend themselves very well to the personal computer environment, in which the general rule mandates one user on the system at a time. This allows the model user to work with data from the host but frees the host machine of the support tasks associated with models running on larger systems. This can extend host system resources. It also means the model user gets instant response, something often lacking in the host environment.

Modeling programs do not offer crystal ball glimpses into the future, but they do permit a logical study of the past and encourage creative study of the possible.

SHAWN BRYAN

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Wooed by the frills, won by the basics

BY BECKY BATCHA

For one of Canada's largest conglomerates, an initial attraction to the flashier aspects of microcomputer financial software — modeling, "what-if" analyses, graphics and the like — has deepened into a dependence more substantive than originally envisioned. George Weston Ltd., a broadly based company with interests in food products, fisheries and the forestry industry, now relies on its personal computer package as the cornerstone of its financial reporting structure.

George Weston, which recorded sales of $10 billion (Canadian) last year, began using Ferox Microsystems, Inc.'s Encore financial modeling package in its corporate headquarters in 1983. According to Geoff Flood, information systems officer at the Toronto-based firm, early users tapped mainly into the package's planning and forecasting features.

"Initially, we were excited about the modeling and analysis capabilities of the program," Flood says. Analysts at the corporate level manipulated financial data to gain better perspective on the corporation's direction. In the process of pursuing their forecasts, these early users discovered the general efficiencies of microcomputer software. They found it fast, easy to use and extremely capable, Flood says, especially in relation to the system it replaced.

Before George Weston installed the Encore package on in-house PCs, the company had channeled its financial modeling through a service bureau's mainframe. The microcomputer system beat the service bureau arrangement hands down, Flood says. "It was faster, and it had things like graphics — which were unheard of then."

Under the service bureau arrangement, George Weston paid tens of thousands of dollars each year to crank out its financial reports, and turnaround was slow. The in-house microcomputer system, Flood says, cut turnaround time in half.

Financial analysts were so pleased with the microcomputer modeling package that the firm slowly migrated the bulk of its bread-and-butter financial reporting to the new system.

> IN THE process of pursuing their forecasts, early users discovered the general efficiencies of microcomputer software.

Eventually, the central office mandated that each of its 50 operating companies and divisions maintain a dedicated IBM Personal Computer, running Encore and equipped with a modem, for the sake of streamlined financial reporting.

Today, every subsidiary runs its monthly financial results through the microcomputer software and sends its consolidations to one of four divisional offices. A bakery with 15 plants, for example, gathers the 15 financial reports, consolidates them and sends one set of figures to the food processing division.

At the divisional level, financial officers consolidate the figures further, so that the food processing division, for example, comes up with one set of figures for all its constituent bakery and cookie-making companies. Each of the four divisions then passes its vital figures, via modem, to George Weston headquarters, where a PC on a local-area network receives the data.

With the information they receive, corporate officers track the operating companies' performance, looking for strengths and weaknesses as well as signals of future direction. The officers prepare and manipulate five-year plans and other models, performing "what-if" analyses to determine, for example, what effect a prospective acquisition might have on the corporation's overall financial results.

George Weston's policy is to allow its operating companies almost total autonomy, with operating decisions resting in the hands of the operating companies. Still, the corporate staff needs to maintain some checks, Flood says, and the reporting system provides them. "It's important for us to have at least some understanding of how the companies are performing," he says. "The purpose of the system is financial control."

Although the company has come to rely on the Encore system for its bedrock reporting needs, it continues to encourage use of the package as a modeling and analysis tool. To increase activity at that level, George Weston signed a site-licensing agreement with Ferox this spring that allows unlimited use of the package. Between 50 and 100 employees now work with the software regularly, Flood says.

The operating companies and divisions support heavier DP activity than does the corporate staff and can take special advantage of the modeling tool, Flood says. "Some of them have taken it and have built systems of their own that are in some cases far more sophisticated than the one we have," he says.

Ironically, although the use of the software was initially imposed on the operating companies by the infrequently invoked power of corporate mandate, it has, Flood says, actually resulted in more independence. "They're able to have greater control over the numbers that they're reporting to us." ●

Batcha is a free-lance writer based in Boston.

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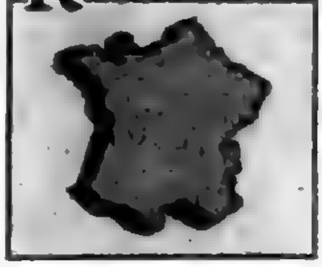

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Always watch your language

Machine dependence affects system price and portability

One of the things you may want to ask about your accounting program is, "What language is it written in?"

The possibilities are myriad and include Cobol, Basic, C, assembler, RPG, RPG-II, RPG-III, Ashton-Tate's Dbase, Microrim, Inc.'s Rbase, Micro Data Base Systems, Inc.'s MDBS-III and Data Access Corp.'s Dataflex, to name a few.

Why should you care about the language used to create your data base? Two reasons are foremost: portability and cost.

Some languages, such as Cobol, are fairly standard. There is a generally recognized standard for Cobol that means a program written in that language can be moved from one system to another and, with some modifications, can run well in a new environment.

Portability

This type of system-to-system portability can mean significant cost savings for people who are happy with their software but need hardware upgrades or changes. Some languages, however, are machine-specific and difficult to maintain. A program written in assembler will generally run on only one type of machine and require a significant investment of time and effort if modifications are required. A minor hardware change may also more severely impact a machine-dependent language.

Source code provides another good reason to ask in what language your accounting system is written. If the program is written in a data base language such as Dbase, like SBT Corp.'s SBT series of accounting programs, you can purchase the source code and a copy of the Dbase program and modify the accounting system on your own. You don't have to be as much of a technician to program in Dbase as you do in C.

If you aren't interested in honing your programming skills, there is often a number of competent programmers around who use the more common data base languages and can do maintenance programming for you at a reasonable cost.

Data extraction

One drawback to accounting systems written in a data base language is that the systems may tend to run slower than those written in a regular programming language.

Accounting systems written in a common data base language may be easier to interface with other software than programs that use a unique file structure. There are many programs that can read and write Dbase and other data base language files directly, so extracting data from them may be less difficult than with other languages.

While the language used to write your data base may not be the first question that pops into your mind, you should remember to ask that before you buy your accounting program.

It may not change your decision, but it will make you a more informed purchaser, and it may allow you to better estimate the future costs associated with your accounting system.

SHAWN BRYAN

Numbers

FROM PAGE S2

evolutionary one.

McCormack & Dodge Corp., one of the largest accounting software firms in the country, is expected to be making some announcements soon that, according to Dean Redfern, M&D's corporate vice-president, will include references to data-based accounting, the second major trend developing in accounting software systems. Recent improvements in data base technology have, he says, spurred M&D to develop systems to take advantage of data-based accounting instead of file-based accounting. Data-based technology on large hardware systems has advanced to a point at which it can support new accounting system approaches.

> RELATIONAL data base theory has evolved into practical application, and hardware and software combinations from large computer makers are starting to make flexible accounting systems a reality.

A data base is a collection of information. In the case of accounting systems, the data base is a series of accounting transactions. The software manages the information, keeping track of where it is and what it looks like. Relational data base theory has evolved into practical application, and hardware and software combinations from large computer makers are starting to make flexible accounting systems a reality.

Relational data base technology is founded on a conceptual data base of relations, and all manipulations are accomplished by operations on relations. Using a nonprocedural language, it is possible to build new relations involving fields from several previously specified relations. What this means, Redfern says, is that "your wildest informational dreams can come true."

M&D is also currently working on applying artificial intelligence and natural-language technology to accounting software. This, Redfern says, is a "leap to the next level of usability in accounting software."

Accounting software is not just for large companies, however, and the cost of buying the latest technology is high. Fortunately, the difference in price between high- and low-end programs is shrinking.

There are some surprisingly complete programs on the market available for a very low price. Dac Software, Inc. started the trend with its Dac-Easy Accounting system originally priced at $49.95 (now $69.95), which included general ledger, accounts receivable and payable, purchase order, billing, inventory and forecasting functions. The market was ready for such a program, and Dac's product took off. Success encourages competition, and now a number of programs vie for the position of the most full-featured, inexpensive program available.

While these programs often have some shortcomings, they offer an inexpensive solution to the accounting problems of a small business with limited accounting experience.

At the next level reside the integrated accounting systems. These provide more flexibility and features than the small systems, but their major limitation is that they work in only one hardware environment.

At the high end of the spectrum are various programs — such as MCBA's accounting/distribution system — that provide all the features and functions found on mainframe systems for a much lower price. In fact, many mainframe systems can't touch these programs for versatility and flexibility. MCBA's system, for example, includes nine separate modules, each retailing for anywhere from $750 to $1,500, while other programs running on networks and minicomputers can end up costing hundreds of thousands of dollars.

In addition, MCBA's system runs on large and small computers, so you can start with a personal computer system and evolve into larger systems, such as Digital Equipment Corp.'s VAX line.

Programs such as the MCBA accounting system allow you to grow from your existing hardware to larger systems as the need arises.

This adaptability is a function of programming conventions. MCBA's accounting system is written in Cobol, a language that makes system-to-system transportability simple. Standards inherent in Cobol allow a program written for one system to run on another, provided the conventions are followed.

The variables

There are some prerequisites to shopping for accounting software. A thorough knowledge of the business you are going to be accounting for is a good place to start. You need to establish a chart of accounts if one doesn't exist. Frankly, most people would be well served to enlist the aid of their certified public accountant for this job. Constant changes in tax laws make proper design an annual review for many businesses. For example, the recent changes in business expense deductions requires revisions of expense accounts for many companies. Various types of businesses require different accounting information to satisfy Internal Revenue Service needs, too. A partnership differs substantially from a corporation. State and local tax codes may also present unique problems.

> SUPPORT FROM THE VENDOR of the program is just as important as the program itself. If the vendor does not offer on- and off-site training programs on a regular basis, be suspicious. In fact, most reputable software firms will not sell a large system without requiring training.

The second general rule is to spend enough time analyzing your business to be able to identify the things you need to know to keep it running smoothly and efficiently. If inventory is an important factor, be sure you can set up your accounts to provide you with the information you need.

Do likewise with receivables, payables and other aspects of your business. Every business has certain pressure points that require only a little change to have an undue effect on the entire operation. They work just like a lever, with a little change at one end making a great deal of change at the other. In some companies it is receivables or inventory. Make sure you know your pressure points, and then design your chart of accounts to give you the maximum amount of information about those points.

Before you begin the actual software selection process, you should try to estimate the amount of information you will be entering into the system on a regular basis. This will help you select hardware as well as software. If there is likely to be a lot of data entry, a multiuser system may be in order.

For all but the smallest businesses, fixed disk storage and reliable backup are two hardware musts. In this context, "reliable" means the purchase of a system that will encourage daily backup.

Armed with this hardware information, it's time to begin the software hunt. What are some of the key components to look for in accounting software?

First, there must be some sort of general ledger. The general ledger is the heart of any accounting system, as it is home for the chart of accounts and the base to which all other functions report. From it, the balance sheet and the income statement are derived.

There are a number of other functions usually found in accounting software packages, either integrated into the general ledger or configured as separate modules.

An accounts payable program tracks vendors and check writing. It tells you who you owe, how much you owe them and when you owe it. It should also keep track of early-payment discounts so that you can write checks in time to take advantage of the discounts. Frequently, a purchase order program serves as the front-end for the accounts payable and/or inventory systems.

An accounts receivable section keeps track of who owes you money. It should offer the user as much flexibility as possible in obtaining reports about who owes how much and for what.

Included in the accounts receivable section or as a separate module is often an order entry system, which speeds the entry of orders from customers. This program should provide a complete record of which products are moving and which are not. Sales analysis is the secret to staying profitable. Quite often, the order entry program drives the accounts receivable system as well as the manufacturing control system.

A payroll system is not uncommon and will sometimes trade information with other areas of the system to charge labor costs to manufactured inventory.

Manufacturing accounting systems may also include some kind of scheduling program to help track work in progress or organize the manufacturing process, also known as material requirements planning or MRP II.

Inventories also need to be tracked during the manufacturing process. A lot-tracking system for process manufacturers provides vital information about perishable, controlled or regulated products that might undergo a recall. Inventory control systems are often offered as free-standing modules.

> THINGS ARE MOVING in the accounting software field, and the company that is not putting time and effort into research and development probably will not be in business in a few years.

Fixed-asset systems keep track of plant and equipment depreciation and may also double as inventory systems for fixed assets.

Other modules appear in systems, and many specialized application programs for specific industries have custom programs designed to handle just one aspect of the business.

A full-blown system can be an expensive and complicated investment, requiring considerable expertise to get it up and running. Even microcomputer systems can cost much more than $10,000 for software alone. Add to that the cost of systems consulting and design work and the training time it takes to get a system running, and you have a substantial capital asset in your accounting software, hardware and systems.

When you purchase a system of this size and complexity you need help getting set up, so support from the vendor of the program is just as important as the program itself. If the vendor does not offer on- and off-site training programs on a regular basis, be suspicious. In fact, most reputable software firms will not sell a large system without requiring training. Their reputation is hurt by a bad installation, and that reputation is more valuable than a single sale.

If you choose the right vendor and the right software, you will be well on your way to a successful installation.

There are many changes worthy of note in accounting systems. These make great topics of conversation with your software vendor. If you get a blank look from the sales representative, you may want to reconsider the firm he represents. Just as in every other aspect of technology, things are moving in the accounting software field, and the company that is not putting time and effort into research and development probably will not be in business in a few years.

There is no "best" accounting system. As with all things in life, various choices offer various strengths and weaknesses.

> THERE is no "best" accounting system. As with all things in life, various choices offer various strengths and weaknesses. What is encouraging is that technology is making improvements possible in accounting systems.

What is encouraging is that technology is making improvements possible in accounting systems.

The next few years will see expert systems and AI technology finding practical applications in accounting software. Expert accounting systems will be able to study incoming orders and optimize the production-line schedule without human intervention. Appropriate inventory levels will be maintained by systems that automatically know when to order replacement stock. Cash-flow management will be handled by systems that review trends and predict the future cash needs of a company based on the budget.

This is not a long-range forecast; people have already begun to produce prototype accounting systems using these technologies. The value of such systems is that they provide more and more information to those that need it, while relieving the drudgery associated with grinding out the numbers. M&D's Redfern is already talking about nondisruptive processing (systems that come up once and never come down), AI and natural-language systems. "We are entering an era of significantly more unrestricted systems," Redfern says. "It is the software vendor's responsibility to take advantage of the advancements in systems software."

M&D and other forward-looking firms have already seen the future, and they are building for it today. It remains for these innovative firms to seize the opportunity to work with more information and less data. That, ultimately, should be the goal of all accounting software. ●

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IBM Value Added Remarketer

The well-educated sell: CPAs take on software

BY ED SCANNELL

Asking computer retailers to devote less time to selling popular productivity packages and more time to selling accounting software is like asking an 8-year-old to eat fewer M&Ms and more brussels sprouts.

What has always made selling accounting software to corporate accounts an unattractive proposition, at least for dealers, is the extensive aftermarket support required. Because few dealers have certified public accountants on their staffs, they rarely ask a customer all the right questions at the point of sale and, consequently, are continually fine-tuning installed multiple-module programs.

"I actually go out of my way to discourage my people from selling [accounting software], because the sale never seems to end," says one large East Coast dealer who requested anonymity.

This attitude has been one of the most important factors holding back sales of microcomputer accounting software since it was introduced in the late 1970s.

There is some relief in sight, however. During the past year, vendors and dealers have been finding an increased willingness on the part of the Big Eight and large regional accounting firms to sell and support accounting software. Many vendors say they believe this will create greater awareness and stimulate sales.

"Until recently, nobody appreciated the lucrative accounting software market," says David Samuels, president and chief executive officer of State of the Art, Inc., a Costa Mesa, Calif.-based developer of accounting packages. "But in the past 12 months, we've begun to see some genuine interest."

"I think the accounting software vendors now understand that this market belongs to the certified public accountant," says Wayne Harding, founder of Wayne Harding Associates, an accounting firm in Denver. "The bottom line is that accounting software is integral to the services provided by public accountants."

Since 1983, Big Eight firms have been setting up groups to write and/or sell accounting software to corporate accounts. Arthur Andersen & Co. was the first Big Eight firm to develop and distribute its software to clients in the early 1980s.

Most accounting firms have long been willing to write or customize software for their clients. Until recently, however, all but one or two were hesitant about endorsing or selling other suppliers' packages, fearing it would compromise their integrity if they were to endorse one package over another. Now, many preserve that integrity by endorsing products from two or three vendors, leaving the final selection up to the client.

While most Big Eight firms still will not readily admit to selling other suppliers' products, more are actively reselling third-party packages, according to several accounting vendors.

"Accountants are a natural conduit for data processing information, whether it is the evaluation of a system or ongoing installation or support," says Bruce Milne, president of Accountants Microsystems, Inc., a developer in Bellevue, Wash.

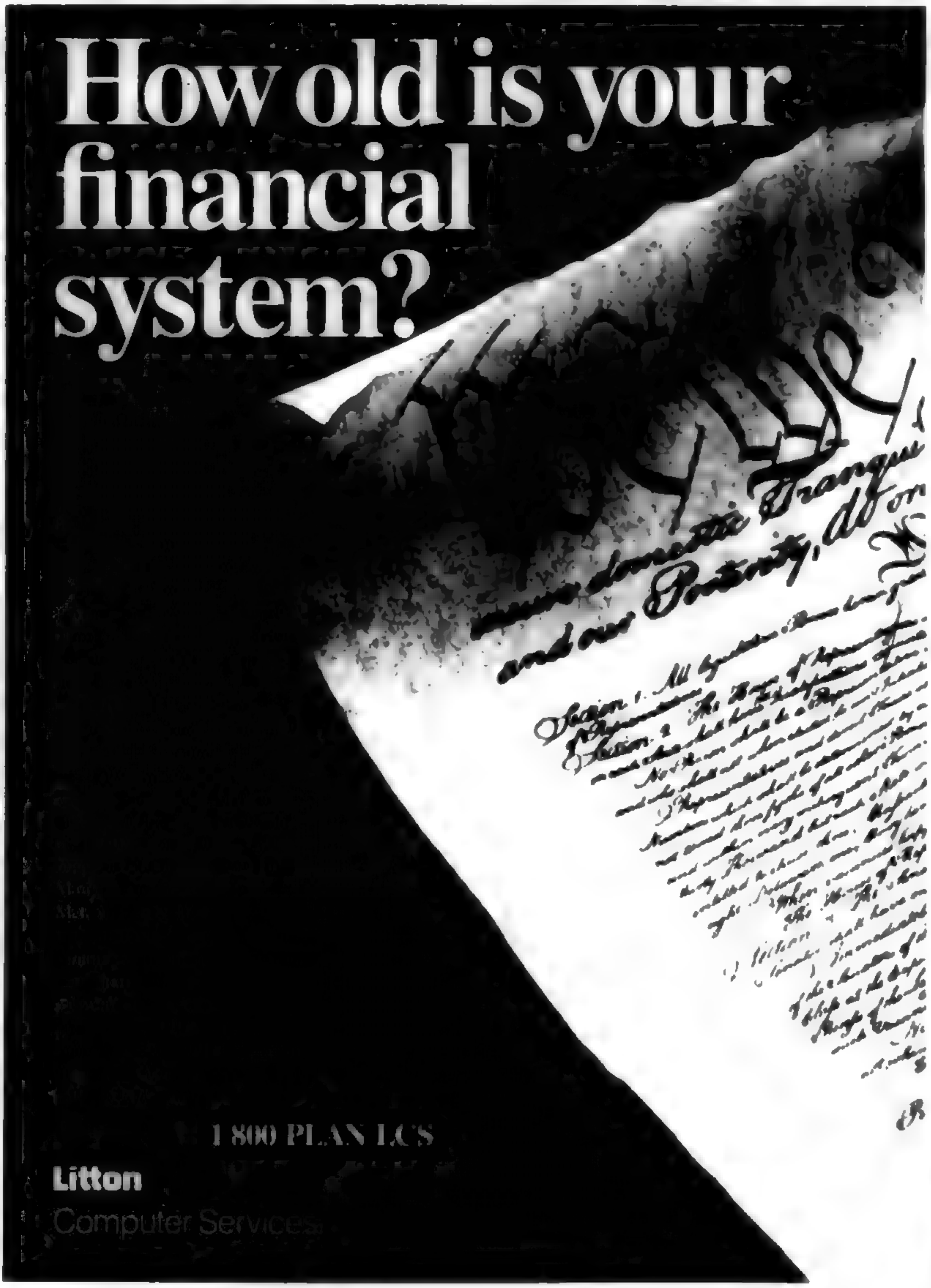
One example of the kind of relationships vendors and Big Eight firms are forming these days is the pending agreement between State of the Art and Deloitte Haskins & Sells. The two firms are scheduled to sign an agreement shortly under which the latter will add State of the Art's MAS 90 Master Accounting series to a list of packages it recommends to its clients and offer training for the package to all its accountants.

"Not all 100 offices [of Deloitte Haskins] will immediately become resellers of our applications," Samuels says. "Personnel are currently being trained in MAS 90 applications, and individual offices will withhold final determination on whether to become MAS 90 resellers or offer consulting services for the package for 90 to 120 days. But most want to be hooked up with a value-added reseller in their area that they can work with," he adds.

According to Rob Kuhns, senior manager in the executive office at Deloitte Haskins, the firm has similar agreements with Computer Associates International, Inc. for its Easy Business Systems series and TLB, Inc. for its Solomon III package. "With the number of packages out there today, it's impossible to know all of them well," Kuhns says. "We decided to centrally look at 30 to 40 and, from that, select two or three products that will fit the needs of our clients or potential clients."

The larger accounting firms are not waiting for accounting software developers to come to them. Some of the more aggressive firms are approaching developers. Many believe selling software and providing consulting services affords them an advantage over competitors that have not yet caught the wave. ●

Scannell is *Computerworld*'s senior editor, microcomputers.



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Altering the code to suit the business

BY SHELDON NEEDLE

Accounting systems that allow for some level of customization are attracting increasing interest from end users as well as consultants. Consultants favor these packages because they create a demand for custom-programming services. Users are drawn because standard off-the-shelf programs often lack specific capabilities, and they would rather change their software than their way of doing business.

There are currently some 15 to 20 accounting systems on the market that could be called customizable. Some, like Realworld Corp.'s and Open Systems, Inc.'s product lines provide modifiable source code. Others, like Reveille from Microx, Inc. in Houston and Pro-IV Accountant from Applications Systems Corp. in Laguna Hills, Calif., are written in fourth-generation data base systems.

These systems address levels of customization beyond modification of an invoice or report. Such modifications used to require modification of source code but now can be accomplished more simply. Many programs offer built-in invoice-design functions or ad hoc query and reporting programs that either come with the system or can be purchased separately. Examples are Open Systems' Report Writer and Great Plains Software, Inc.'s Report Maker Plus.

Customizable accounting software is most needed when standard systems are not configured to handle certain types of data or when complex calculations are required. For example, you may need to keep multiple sets of books for different currencies or consolidate purchase orders from different vendors.

The risk of customizing

Customizing methods involve varying degrees of risk. Changing code in applications software can be dangerous because vendors will not support systems containing code that has been modified. And, of course, custom programming can cost dearly.

Using a data base-driven accounting package can be a high-risk affair, because once you have access to the data base functions, anything can be done to the data files. There is really no restriction on changing information and compromising key data. This risk applies to security as well, since users can easily change access codes with the data base functions.

A compromise to dealing with custom requirements is to handle them off-line. This means passing data from the accounting system to productivity software like Lotus Development Corp.'s 1-2-3 or Ashton-Tate's Dbase. While this approach involves extra steps and requires familiarity with more software, it protects the accounting data from unauthorized changes.

You should ask two questions before selecting your approach: How absolute is the need? Is data available in the master file? If the answer to the second question is yes, there should be a way of getting it out.

> YOU should ask two questions before selecting your approach: How absolute is the need? Is data available in the master file?

Vendor solutions

Many accounting software vendors now offer tools that assist in modifying their systems. Some, like IBM's Business Adviser, feature data managers that work directly with the accounting files and create custom reports and data entry screens.

BPI Systems, Inc. offers Productivity Connection and Tool Kit for importing data to a system as well as for preparing special reports and analyses. The data import features allow users to set up validation criteria. These are ideal tools for consultants and value-added resellers.

TLB, Inc.'s Solomon III offers its External Systems Interface program for importing data directly to Solomon III files. Easy Business Systems offers its accounting software along with easily integrated Easyfiler, Easywriter and Supercalc spreadsheet, all from Computer Associates International, Inc.

Some companies will never require more than off-the-shelf accounting packages. For others, however, a customizable package offers the only reasonable solution for handling unique requirements. The key is to understand your company's particular needs and what is required to satisfy them. •

Needle is president of Computer Training Services in Rockville, Md., publisher of accounting software reference materials and *The Guide to Accounting Software for Microcomputers.*

Flexible accounting system furnishes needed efficiencies

BY SALLY CUSACK

At the Danbury, Conn., headquarters of Ethan Allen, Inc., a mainframe accounting system allows the home furnishings company to track accounts payable functions for its 16 warehouses and its distribution and service centers across the country.

Simple, easy to use and flexible are the three adjectives that Joseph Hart chooses to use when discussing Global Accounts Payable and Global General Ledger, accounting systems from Global Software, Inc. Hart is corporate division controller at Ethan Allen, a division of Interco Corp. All accounting functions for the scattered warehouses and centers are handled by his office.

Ethan Allen installed Global Software's on-line accounts payable, general ledger and financial reporting system on an in-house IBM 4341 two years ago, after using an earlier version of the software for several years for batch-processing.

"As business and volume increased, we were looking to gain efficiency from the accounting system. Sixty percent to 70% of our general-ledger transactions come from accounts payable activity," Hart says. "We wanted a centralized function without increasing our staff."

> THE INTEGRATION, which was accomplished with some in-house programming, has resulted in daily reconciliations that are completed in ten minutes.

Necessary integration

The company needed a product capable of integrating with its existing packages, which include inventory control and sales statistics programs developed in-house. Ethan Allen's large volume of transactions makes it essential for the in-house programs to integrate with accounting and general ledger functions.

The integration, which was accomplished with some in-house programming, has resulted in daily reconciliations that are completed in 10 minutes. A total consolidation program was also developed, a program Hart finds invaluable to his operations.

Another software vendor with a product found in the Ethan Allen shop is Natick, Mass.-based McCormack & Dodge Corp., whose accounts receivable package is used in Ethan Allen's credit department. Hart says Global was a "very close" second choice for that application, but the company found that McCormack & Dodge offered a slight edge in credit functions with the accounts receivable program.

Although Ethan Allen writes much of its own software, the firm decided that in-house development of an on-line accounting system would be unnecessary and time-consuming. Hart estimates it would take a minimum of two years to write such a program, with three to six months alone spent in the preliminary planning process.

"The accounting software marketplace is very competitive," Hart says. "There are 50 to 100 packages out there. It is easier to purchase a pretested product that will be maintained and enhanced by the vendor."

Making the rounds

Hart traveled to Raleigh, N.C., with the intention to meet with Global Software President Ron Kupferman and his staff. After a product presentation there, he decided to visit a Global user site located in Detroit.

"Before signing on that dotted line, I find it necessary to visit a user site — a user who has been up on the system for some time, perhaps even a user who has experienced problems," Hart says. "It is important to see the system with the reports and the on-line screens."

Hart also looked at many other software packages and viewed several different product demonstrations before deciding on Global.

Five days after installation, the system was on-line, with the accounts payable function up and running. Although the company's original intention was simply to handle a higher volume of transactions without an increase in the number of staff, Hart has actually reduced his accounts payable staff by one third in the past two years.

The Global accounting package handles invoicing, deliveries and stock receiving for the remote operations. All but the five service centers function on-line via terminals, and the company plans to connect them as well in the near future. Accounting is accomplished by product line, for example, wood furniture, case goods or accessories. All told, there is a total of 15 different lines, each categorized into multiple subdivisions.

> "BEFORE signing on that dotted line, I find it necessary to visit a user site — a user who has been up on the system for some time, perhaps even a user who has experienced problems."
>
> JOSEPH HART
> ETHAN ALLEN, INC.

Millions of transactions

The accounts payable department processes 10,000 invoices monthly, with inventory control held responsible for several million transactions annually. By creating separate statements for individual operations, such as warehouse or trucking, the system increases the accuracy of local operations monitoring. The financial results are then distributed to all upper level executives, as well as to 16 distribution managers.

Hart is especially pleased with the program's report writer. User-driven, it eliminates the necessity of programming while allowing greater flexibility. Reports can be created quickly and then duplicated and distributed in different divisions without involving data processing personnel.

"The report writer function has resulted in two important gains," Hart claims. "Finance has a better knowledge of operations, and the field operations staff has a clearer picture of what finance is doing. The program is easy to read and produces the types of reports management wants to see — clean and concise." •

Cusack is a researcher at *Computerworld.*

The rise of vertical accounting software

The accounting software market is taking on an increasingly vertical orientation. Packages designed for specific industries currently represent more than half of all accounting software sales, according to the market research firm Future Computing, Inc. Demand for more precise and defined solutions will continue to fuel this trend.

There is no clear division between the functionality of horizontal or general-purpose accounting software and vertical software. Indeed, one of the major horizontal vendors, Great Plains Software, Inc. in Fargo, N.D., estimates it has customers in more than 400 industries.

So what defines a vertical package? In two words: specialization and price. Vertical-market packages are highly specialized to meet the needs of a particular industry and usually cost from two to four times as much as their generic counterparts.

For example, a vertical-market construction system typically costs between $6,000 and $8,000, while a horizontal system with job costing included falls between $2,000 and $3,500. In some cases, the degree of specialization justifies the price, but there are also many packages on the market that are priced for vertical ability more in name than reality.

VERTICAL-MARKET packages are highly specialized to meet the needs of a particular industry and usually cost from two to four times as much as their generic counterparts.

Characteristics

Typically, today's vertical software performs well in one capacity but weakly in general applications. It is not unusual to find a construction package with an outstanding job-cost capability but a mediocre general-ledger or accounts payable system.

Some examples help to demonstrate the difference between a vertical and horizontal package in selected industries. For manufacturers, a horizontal system may offer a multilevel bill of materials function, but a true vertical-market system will also include manufacturing resource planning and shop floor control.

A horizontal construction system will offer cost-to-complete reporting and possibly retention accounting, but vertical packages may also offer estimating, subcontractor control and change-order control.

Market concentration

Software vendors are more precisely defining vertical-market opportunities. In the health field, vendors will segment a market by Standard Industrial Classification codes and break down health-care services into such categories as physician offices, nursing homes, hospitals and clinics. Other areas of significant activity in the vertical market are point of sale, manufacturing and real estate and property management. Companies generally choose to concentrate on those markets in which they can offer the best fit.

Vendors are also working closely with value-added resellers (VAR) to provide the right vertical-market solution. They see VARs as partners that can provide a total accounting solution in a vertical market. This encompasses needs evaluation, installation, training and ongoing support.

Many users are looking for specialized software priced somewhere in the $1,000 to $3,000 range. Unfortunately, few such packages exist. So far, the market has successfully supported a price gap, although this situation is changing.

Targeting market needs

Some vendors, such as State of the Art, Inc. and Advanced Business Microsystems, Inc., are moving into this vacuum by developing strong, low-cost vertical-market packages for distribution and construction. These companies are working on job-costing systems that are reportedly more powerful than those offered by most horizontal vendors.

The best source of information on industry software are the associations particular to that industry. Some have even published industry-specific software directories. Datapro Corp. publishes a reference on vertical software.

Software manufacturers constitute another important source of vertical-market software information. Companies like Computer Associates International, Inc. — which develops Easy Business Systems — Open Systems, Inc. and Realworld Corp. publish their own directories of third-party developers that have modified their basic systems to meet special industry needs.

SHELDON NEEDLE

VENDOR VIEWPOINT

Software designers must merge finance, relational data bases

BY RICHARD LAWSON

Software designers of mainframe-based accounting and financial applications are entering a new realm — that of relational data base. Some designers are excited, others frightened. And there's the usual amount of foot-dragging going on in the middle.

But no one really has any choice. The market is moving designers into relational data base environments, and it's happening fast.

THE COMPANY CONTROLLER wants the full capacity of the main machine, and he wants it available with the same kind of flexibility and speed he is accustomed to getting from his personal computer.

Two primary forces are generating this movement. One is the pull of executive, accounting and DP management at user companies; the other is the push of major computer companies, most notably IBM.

Personalized systems

What's happened on the user side of this application-merger issue is that executives and accounting managers have grown used to personal computers and their data bases. The company controller, for instance, can build his own system on his PC, using a data base, and have a program up and running in approximately an hour.

That same company controller now wants more. He is demanding the full capacity of the main machine, and he wants it available with the same kind of flexibility and speed he is accustomed to getting from the PC on his desk. When the controller goes to the DP department and expects instantaneous answers, it is useless for the DP manager to say, "Fine, but that will take at least three months, and it will cost you 'X' amount of dollars."

However, that's exactly the answer the DP manager will, in fact, give the controller — if he doesn't have a built-in data base management system in his environment, particularly a relational DBMS. These tools cannot match the speed of the personal computer, but they can at least help the DP manager narrow the gap substantially.

Applying force from another direction is IBM, which has capitalized on a large but previously underutilized reservoir of expertise in relational technology with the development of both the DB2 relational DBMS, which runs in MVS, and the SQL/DS relational data base, which runs in PC-DOS.

What IBM offered previously, in terms of a mainframe DBMS, was IMS. But IMS was constantly criticized as cumbersome, slow and expensive, and it faced steady competitive pressure — from Cullinet Software, Inc.'s IDMS and from the various flavors of relational data base technology offered by companies such as Unisys Corp., Hewlett-Packard Co. and Data General Corp.

Now, IBM is pushing DB2 and SQL/DS very hard in order to maintain market control and feed everyone the IBM SQL technology.

As companies like Oracle Corp. have already seen, SQL is becoming the industry de facto standard for relational data bases, thanks to IBM's muscle and the fact that it is an excellent product.

Ten years from now, there will not be a valid mainframe machine on the market that doesn't utilize a very valuable data base. That data base will be relational and will be SQL-based or have an SQL interface.

This will make many corporate DP managers very happy. Finally, there will be an industry-standard DBMS they can work with, which will mean portability from PCs to different brands of software. And the relational technology will offer the flexibility of data gathering and reporting that company executives and accounting managers want — like the ability to run on-line and batch transactions simultaneously.

Drawbacks

But what about the trade-offs or the outright negatives? A major question lingers about the use of computer resources. Does DB2, for instance, really eat memory like a hungry elephant? And does it take up too much CPU capability?

Based on my experience in designing SQL-based application software for accounting systems such as general ledger, accounts payable and receivable, fixed assets and project accounting, I would have to say that the answers are the following: Yes, it uses more memory but not that much, and, yes, it uses more CPU, but it's not that bad.

There are challenges, of course. There will be conversion costs for taking the old systems and reprogramming for DB2 or SQL/DS, for instance. However, IBM's push is working, as is the pull from users, company executives and accounting managers, which means that corporate DP departments don't really have a choice.

SOFTWARE COMPANIES offering accounting and financial software that doesn't follow this data base orientation will be out of business sooner rather than later, because nobody is going to buy non-data-base-oriented accounting and financial software.

There is also no choice for the designers and developers of software packages for accounting and financial applications. Nowadays, software must be designed using the industry's generally accepted practices for normalized data bases. Software companies offering accounting and financial software that doesn't follow this data base orientation will be out of business sooner rather than later, because nobody is going to buy non-data-base oriented accounting and financial software.

Pull or push, it comes to the same thing — something's always got to give and, in this case, it's going to be non-data-base systems. ●

Lawson is a co-founder, chairman of the board and vice-president of research and development at Lawson Associates, Inc., a Minneapolis-based application software company.

Microcomputer accounting software

COMPANY	PRODUCT	MODULAR OR INTEGRATED PACKAGE	STANDARD MODULES, FUNCTIONS	OFFERS USER-DEFINABLE REPORT FORMATS	CREATES COMPARATIVE STATEMENTS	POSTS RECURRING TRANSACTIONS	MINIMUM MEMORY REQUIRED (IN BYTES)	INTERFACES WITH EXTERNAL SPREADSHEETS, DATA BASES	OFFERS MULTIUSER CAPABILITIES	PRICE
ACS, Inc. (714) 472-8186	**ACS Accounting series**	**Modular**	**General ledger, accounts payable, accounts receivable, payroll, inventory**	**Yes**	**Yes**	**Yes**	**256K**	**Ashton-Tate Dbase III, Lotus 1-2-3**	**Yes**	**$300 (per module)**
	Firm	**Modular**	**General ledger, accounts payable, accounts receivable, payroll**	**Yes**	**No**	**Yes**	**256K**	**No**	**No**	**$495 (per module)**
ADS Software, Inc. (800) 672-4422	ADS General Accounting series	Modular	General ledger, accounts payable, accounts receivable, payroll, inventory	Yes	Yes	Yes	128K	Lotus 1-2-3, Ashton-Tate Dbase III	No	$1,095 (total system cost)
AIMS, Inc. (800) 551-5157	**AIMAS**	**Modular**	**General ledger, accounts payable, accounts receivable, inventory control, sales order processing, purchase order processing, time and billing, payroll**	**Yes**	**No**	**Optional**	**128K**	**Microsoft Multiplan, Lotus 1-2-3, Visicalc (via optional report generator)**	**Yes**	**$495 (per module)**
AT&T/American Business Systems, Inc. (800) 247-1212	Business Accounting System	Modular	General ledger, accounts payable, accounts receivable, payroll, order and inventory management	No	—	—	128K	No	No	$2,325 (total system cost)
Accountants Software Co. (619) 583-6046	**ASC Client Accounting**	**Integrated**	**Client accounting, payroll reporting, live payroll check writing**	**Yes**	**Yes**	**Yes**	**256K**	**Lotus 1-2-3, Symphony**	**Yes**	**$1,495 (total system cost)**
Accountants Microsystems, Inc. (800) 426-8201	Business Partner series	Modular	General ledger, accounts payable, accounts receivable, payroll	No	Yes	Yes	384K	Any ASCII or DIF file, Lotus 1-2-3, Ashton-Tate Dbase	Yes	$795-$1,095 (per module)
Advanced Business Microsystems, Inc. (714) 851-6722	**Platinum series**	**Modular**	**General ledger, accounts payable, accounts receivable, payroll, consolidations, fixed assets, inventory control, order entry, purchase order processing, job costing, bank book, report writer**	**Yes**	**Yes**	**Yes**	**384K**	**Lotus 1-2-3, any ASCII or DIF file**	**Yes**	**$295-$1,095 (per module)**
Alpha Microsystems (714) 957-8500	Alphaledger	Modular	General ledger, accounts payable, accounts receivable, order entry, inventory control, fixed-assets tracking, payroll, purchase order processing, check reconciliation, report writer, screen writer	Yes	Yes	Yes	90K (per user)	No	Yes	Contact vendor
American Business Systems, Inc. (617) 692-3600	**ABS Accounting**	**Modular**	**General ledger, accounts payable, accounts receivable, payroll, fixed assets, order inventory, report writer**	**Yes**	**Yes**	**Yes**	**128K**	**Lotus 1-2-3, Microsoft Multiplan, Informix**	**Yes**	**Contact vendor**
American Fundware, Inc. (800) 551-4458, (800) 227-7575 (in Colo.)	PC-Fund	Modular	General ledger, accounts payable, accounts receivable, payroll, fixed assets, obligation tracking, budget forecasting, donor receipts, security system	Yes	Yes	Yes	512K	Any package that supports ASCII files	Yes	$995-$1,595 (per module)
American Softech, Inc. (404) 391-9101	**Maxx**	**Integrated**	**General ledger, accounts payable, accounts receivable, order entry, inventory control, payroll, job costing, sales analysis**	**Yes**	**Yes**	**Yes**	**512K**	**Lotus 1-2-3**	**Yes**	**$995 (total system cost)**
American Standard Computers (804) 467-1789	Boardroom III +	Modular	General ledger, accounts payable, accounts receivable, order entry, sales invoicing, inventory, payroll, job costing, check reconciliation	Yes	Yes	Yes	256K	No	Yes	$895-$1,095 (total system cost including license fee)
Analytic Services, Inc. (713) 974-6043	**Oasis**	**Modular**	**General ledger, accounts payable, accounts receivable, payroll, procurement, job costing, overhead burden/general and administrative expense, inventory and manufacturing**	**Yes**	**Yes**	**Yes**	**640K**	**Any ASCII file**	**Yes**	**$2,000-$3,000 (per module)**
Applied Digital Corp. (609) 234-3666	Financial MGR	Modular	General ledger, accounts payable, accounts receivable, financial analysis	Yes	Yes	Yes	64K	No	Yes	Contact vendor
Armor Systems, Inc. (305) 629-0753	**Excalibur Plus**	**Modular**	**General ledger, accounts payable, accounts receivable, inventory control, point of sale, purchase order processing, job costing, payroll, billing, customer information and billing**	**Yes**	**Yes**	**Yes**	**256K**	**Lotus 1-2-3, any ASCII file**	**Yes**	**$395-$695 (per module)**
	Bravo Retail Management System	**Integrated**	**Accounts receivable, billing, point of sale, inventory control**	**Yes**	**No**	**No**	**256K**	**Lotus 1-2-3, any ASCII file**	**Yes**	**$995 (total system cost)**
	Bravo General Accounting System	**Integrated**	**General ledger, accounts payable, payroll**	**Yes**	**Yes**	**No**	**256K**	**Lotus 1-2-3, any ASCII file**	**Yes**	**$495 (total system cost)**
Bedford Software Corp. (206) 883-0074	Integrated Accounting	Integrated	General ledger, accounts payable, accounts receivable, payroll, inventory, job costing	No	No	No	256K	Lotus Symphony, any ASCII file	No	$249 (total system cost)
Boss International (800) 531-5483	**Boss Financial Series**	**Integrated**	**General ledger, accounts payable, accounts receivable, payroll, inventory control, order entry, invoicing, spreadsheet interface, time and billing**	**No**	**Yes**	**Yes**	**128K**	**Lotus 1-2-3, Microsoft Multiplan**	**Yes**	**$195-$1,595 (per module)**
Bristol Information Systems, Inc. (617) 679-1051	BIAS	Modular	General ledger, accounts receivable, accounts payable, payroll, inventory	Yes	Yes	Yes	384K	Any ASCII file	Yes	$800 (per module)
CBM Associates, Inc. (516) 483-3122	**The Accountant**	**Modular**	**General ledger, accounts payable, accounts receivable, sales order processing, inventory, purchase order processing, materials management, payroll, human resources, job costing**	**Yes**	**Yes**	**Yes**	**256K**	**Lotus 1-2-3, Ashton-Tate Dbase III**	**Yes**	**$1,500 (per module)**
CIE Systems, Inc. (714) 660-1800	CIES Accountant/680	Modular	General ledger, accounts payable, accounts receivable and sales analysis, inventory control, order processing and invoicing	Yes	Yes	Yes	512K	No	Yes	Contact vendor
CYMA/McGraw-Hill Corp. (800) 292-2962	**CYMA Professional Accounting series**	**Modular**	**General ledger, accounts payable, accounts receivable, payroll, inventory and order processing**	**Yes**	**Yes**	**Yes**	**128K**	**Paperback Software VP-Planner, Lotus 1-2-3, Ashton-Tate Dbase II, III**	**Yes**	**$495-$995 (per module)**

The companies included in this chart responded to a recent telephone survey conducted by *Computerworld*. Further product information is available from vendors.

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California Software Products, Inc. (714) 973-0440	Baby/36 Financial Application	Modular	General ledger, accounts payable, accounts receivable, payroll, fixed assets	Yes	Yes	Yes	[illegible]	No	Yes	[illegible] (per module)
Case, Inc. (801) 226-0826	Eagle series	Modular	General ledger, accounts payable, accounts receivable, payroll, inventory, checkbook	No	Yes	Yes	512K	Lotus 1-2-3	Yes	$595 (per module)
Certifiex Corp. (214) [illegible]	Certifiex	Modular	General ledger, accounts payable, accounts receivable, payroll, inventory, order entry and purchase order	Yes	Yes	Yes	512K	Any ASCII file	Yes	From [illegible] (per module)
Chang Laboratories, Inc. (800) 972-8800	Rags to Riches	Modular	General ledger, accounts payable, accounts receivable, inventory control and time billing, payroll	Yes	No	Yes	256K (MS-DOS), 512K (Macintosh)	Lotus 1-2-3, Microsoft Excel, any file that supports Clipboard	Yes	$199.95 (per module)
Charter House Software Corp. (818) [illegible]	Charter House Accounting Systems	Modular	General ledger, accounts payable, accounts receivable, job costing, billing and inventory, payroll, order entry, purchase orders, data link and report writer	Yes	Yes	Yes	384K	Any ASCII or DIF file	Yes	$700-$1,700 (per module)
Chilson's Management Controls, Inc. (714) 980-5338	Chilson's Management Accounting Package	Modular	General ledger, accounts payable, accounts receivable, payroll, fixed assets	Yes	Yes	Yes	128K	Yes (no examples available)	Yes	$1,800 (per module)
Chuck Atkinson Programs (817) [illegible]	Quick Check	Modular	Accounts payable, accounts receivable, bookkeeping	No	Yes	Yes	256K	No	Yes	From $49.95 (per module)
Colman, Organ & Co. (403) 482-5751	Costar	Integrated	General ledger, accounts payable, accounts receivable, financial reporting, point of sale, order entry, purchase order processing	Optional	Yes	No	640K	No	Yes	Contact vendor
Commercial Solution, Inc. (404) [illegible]	Accounting Classics	Modular	General ledger, accounts payable, accounts receivable, payroll, inventory	Yes	Yes	Yes	256K, 512K (inventory module)	No	Yes	[illegible] (per module)
Computer Associates International, Inc. (408) 432-1727	Easy Business Systems Accounting	Modular	General ledger, accounts payable, accounts receivable, payroll and sales analysis, job costing, inventory control and analysis, retail invoicing, time billing	Yes	Yes	Yes	128K	Lotus 1-2-3, Computer Associates Supercalc, Ashton-Tate Dbase, any ASCII, SYLK or DIF file	Yes	$149-$995 (per module)
Core Software, Inc. (718) [illegible]	[illegible]	Modular	General ledger, accounts payable, accounts receivable	Yes	Yes	Yes	512K	Any Dataflex product	Yes	$100 (per module)
Corporate Consulting Co. (617) 484-1715	Corporate Consulting Co. Integrated General Ledger Package	Integrated	General ledger, accounts payable, accounts receivable, payroll (optional)	Yes	Yes	Yes	512K	Proprietary	Yes	$4,500 (total system cost)
[illegible] Technologies Corp. (516) [illegible]	Pro-Fit series	Modular	General ledger, accounts payable, accounts receivable, inventory control, payroll, order entry, purchase order, sales analysis	No	Yes	Optional	256K	Any ASCII or DIF file	Yes	From [illegible] (per module)
	[illegible]	Integrated	Client write-up, after-the-fact payroll, time billing, due-date accounting	Yes	Yes	Yes	256K	Any ASCII or DIF file	Yes	[illegible] (total system cost)
Custom Software Consulting Services, Inc. (516) 271-1000	Business Manager	Integrated	General ledger, accounts payable, accounts receivable, order entry, inventory, purchase order, payroll, sales reporting	Yes	Yes	Yes	512K	Any ASCII or WKS file, Lotus 1-2-3, Ashton-Tate Dbase III	Yes	Contact vendor
D & S International, Inc. (801) [illegible]	Hardhat Management System	Integrated	General ledger, accounts payable, accounts receivable, job costing, inventory, order entry, equipment	Yes	Yes	Yes	256K	Lotus 1-2-3, any ASCII file	Yes	[illegible] (total system cost)
Dac Software, Inc. (214) 458-0038	Dac-Easy Accounting 2.0	Modular	General ledger, accounts payable, accounts receivable, billing, purchase orders, inventory and forecasting	Yes	Yes	Yes	256K	Lotus 1-2-3	No	$69.95 (total system cost)
Data Graphics, Inc. (314) [illegible]	Sr. Accountant	Integrated	General ledger, accounts payable, accounts receivable, inventory, graphics, trial balance, monthly reports	Yes	Yes	Yes	—	No	Yes	$99.95 (total system cost)
Datamaster Business Center (a division of Crownetek, Inc.) (506) 458-8877	York St. Software	Modular	General ledger, accounts payable, accounts receivable, purchase order, sales order processing, inventory management, payroll, job costing, inventory costing, bill of material	Yes	Yes	Yes	512K	Lotus 1-2-3	Yes	$800 (per module)
[illegible], Inc. (714) 730-5110	Pro Accountant	Modular	General ledger, accounts payable, accounts receivable, inventory control, sales order entry	Yes	Yes	Yes	512K	No	Yes	From [illegible] (per module)
Deneb Systems, Inc. (513) 223-4849	Deneb Construction Accounting and Estimating	Modular	General ledger, accounts payable, accounts receivable, payroll, job costing, inventory, purchase order, item billing, equipment control, estimating, report writer	Yes	Yes	Yes	512K	Any ASCII file	Yes	From $895-$1,995 (per module)
Digital Software Corp. (216) [illegible]	Gold Software	Integrated	General ledger, accounts payable, accounts receivable, payroll, job costing, order entry, inventory, invoicing, report generator	Yes	No	Yes	[illegible]	Yes, no examples available	Yes	Contact vendor
Financial Information Systems, Inc. (800) 527-4681 (214) 680-8696 (in Texas)	Multipac	Modular	General ledger, accounts payable, accounts receivable, invoicing, inventory, payroll, job costing, checkbook manager, data base manager, departmental accounting	Yes	Yes	Yes	320K	Any ASCII or SYLK file	Yes	$595 (per module)
	Powerpac	Integrated	General ledger, accounts payable, accounts receivable, invoicing, inventory	Yes	Yes	Yes	320K	No	No	$765 (total system cost)
Fiscal Systems, Inc. (205) [illegible]	Fiscal Business Management System	Modular	General ledger, accounts receivable, accounts payable, payroll, inventory control, point of sale, sales order processing, purchase order processing	Yes	Yes	Yes	256K	[illegible]	Yes	[illegible] (per module)
Frontrunner Development Corp. (800) 654-7494 (818) 376-1322 (in Calif.)	CPA Plus	Integrated	General ledger, accounts payable, accounts receivable, payroll	Yes	No	No	384K	Lotus 1-2-3, Paperback Software VP-Planner	No	$199 (total system cost)

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G. B. Systems, Inc. (714) [illegible]-1811	The Business Manager	Integrated	General ledger, accounts receivable, accounts payable, order entry, inventory control, purchase order processing, job costing, fixed assets, sales reporting	Yes	Yes	Yes	256K	Any ASCII file	Yes	$2,000-$8,000 (total system cost)
Great American Software, Inc. (800) 528-5015	One-Write Plus	Modular	General ledger and checking, accounts payable, accounts receivable, payroll, transfer utility	No	No	Yes	256K	Any ASCII, SYLK or DIF file	No	$79.95-$295 (per module)
Great Plains Software, Inc. (800) 345-3276	Great Plains Accounting series	Modular	General ledger, accounts payable, accounts receivable, inventory, order entry, purchase order processing, report writer, network manager	Yes	Yes	Yes	384K	Lotus 1-2-3, Ashton-Tate Dbase, any ASCII or DIF file	Yes	$395-[illegible] (per module)
Hal Systems and Services, Inc. (214) 248-8008	Pathal/Net	Integrated	General ledger, accounts payable, accounts receivable, joint-interest billing, revenue distribution	Yes	No	Yes	250K	Lotus 1-2-3	Yes	$10,000-$15,000 (total system cost)
Howe Software (914) 273-[illegible]	Small Business Accounting	Integrated	General ledger, payroll	No	No	No	128K	No	No	$100 (total system cost)
Hurricane Systems, Inc. (305) 774-8888	Businessmaster	Integrated	General ledger, accounts payable, accounts receivable, payroll, inventory, system utilities, letter processing	Yes	Yes	Yes	10M	No	Yes	$2,595 (total system cost)
IBM (800) 447-4700 or contact local IBM office	Business Adviser	Modular	General accounting, accounts payable, accounts receivable, payroll, order entry, inventory control, network extension, information management	Yes	Yes	Yes	512K	Any ASCII or DIF file	Yes	$345-[illegible] (per module)
	Accounting Assistant	Modular	General accounting, accounts payable, accounts receivable and billing, payroll, inventory control and purchasing, job costing	No	No	Yes	256K	Any ASCII or DIF file	Yes	$595 (per module)
IBS Computer Services (703) 434-4177	Alpha/Omega Business Management System	Modular	General ledger, accounts payable, accounts receivable, payroll, sales and billing, inventory, cash receipts and disbursements, data management	Yes	Yes	—	2M	Lotus 1-2-3	Yes	$1,500 (average total system cost)
Idea Computers, Inc. (713) 342-5846	Iacct	Integrated	General ledger, accounts payable, accounts receivable, payroll, letter writing, fixed assets, mail	No	Yes	No	512K	Ashton-Tate Dbase III	No	$150 (total system cost)
	Iman	Integrated	General ledger, accounts payable, accounts receivable, payroll, letter writing, fixed assets, mail, parts	No	Yes	No	512K	Ashton-Tate Dbase III	No	$350 (total system cost)
	Iretail	Integrated	General ledger, accounts payable, accounts receivable, payroll, letter writing, fixed assets, mail, product inventory	No	Yes	No	512K	Ashton-Tate Dbase III	No	$250 (total system cost)
Intellisource, Inc. (314) [illegible]-1242	Intellisource	Modular	General ledger, accounts payable, accounts receivable, payroll, inventory, sales order processing, sales analysis, point of sale	Yes	Yes	Yes	512K	No	Yes	$295-$795 (per module)
Interactive Information Systems, Inc. (602) 790-4214	IFAS	Modular	General ledger, accounts payable, accounts receivable, order entry, payroll, fixed assets	No	Yes	Yes	512K	Oracle SQL Calc	Yes	$1,500 (per module)
International Microsystems, Inc. (800) [illegible]	Focus on Business	Integrated	General ledger, accounts payable, accounts receivable, payroll, inventory control, job accounting, church management, dental management, medical management, wholesale management, legal and nonprofit accounting	No	Yes	Yes	512K (RAM), 10M (hard disk)	Any ASCII file	Yes	$850-$1,995 (per module)
James River Group, Inc. (612) 339-2521	Accounting for Micros	Modular	General ledger, accounts payable, accounts receivable, payroll, inventory, job costing	No	Yes	Yes	192K	Any ASCII file	No	$125-$195 (per module)
	Desktop Accountant	Modular	General ledger, accounts payable, accounts receivable, payroll	No	Yes	Yes	192K	Any ASCII file	No	$495 (total system cost)
	Open for Business I	Modular	General ledger, accounts payable, accounts receivable, payroll (optional)	No	Yes	No	256K	No	No	$595 (total system cost)
	Open for Business II	Modular	General ledger, accounts payable, accounts receivable, inventory, payroll (optional)	No	Yes	No	256K	No	No	$995 (total system cost)
Jones & Erickson Software Technology, Inc. (416) 491-6620 (in Canada) (914) [illegible] (in U.S.)	Jones & Erickson Accounting Software	Modular	General ledger, accounts payable, accounts receivable, payroll	Yes	Yes	Yes	—	Any ASCII file	Yes	Contact vendor
KIS Information Systems, Inc. (604) 662-8100	KIS Integrated Accounting System	Integrated	General ledger, accounts payable, accounts receivable, billing, bank reconciliation, export and import	Yes	Yes	No	256K	Any ASCII or DIF file	No	$695 (total system cost)
Keystone Software Ltd. (713) [illegible]	Keystone Financial Accounting System	Integrated	General ledger, accounts payable, accounts receivable, payroll, job costing, government accounting	Yes	Yes	Yes	256K	Any ASCII or DIF file	No	$795
Keystone Technologies, Inc. (717) 975-7130	The Practice Management System	Modular	General ledger, accounts payable, accounts receivable, payroll, word processing	Yes	Yes	Yes	1,000K	No	Yes	$7,000 (total system cost)
LAN Systems, Inc. (612) [illegible]	Pro-[illegible]	Modular	General ledger, accounts payable, accounts receivable, payroll, financial statements	Yes	Yes	Yes	640K	Lotus 1-2-3	Yes	$2,500-$3,500 (per module)
Lake Avenue Software, Inc. (818) 351-5483	Assistant Controller series	Modular	General ledger, accounts payable, accounts receivable, enhanced financial reporting, inventory, order entry and invoicing, payroll, job costing, professional time and billing	Yes	Yes	Yes	384K	Ashton-Tate Dbase III, Framework, Lotus 1-2-3	In development	$595 (per module)
Landmark Software Systems, Inc. (301) [illegible]	Landmark Accounting and Financial Management Systems	Modular	General ledger, accounts payable, accounts receivable, financial reporting, fixed assets, job costing, commercial tenant accounting, cash management, residential tenant accounting, brokerage accounting	Yes	Yes	Yes	Varies	Any ASCII file	Yes	$5,000-$30,000 (per module)

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Libra Corp. (800) 453-3827	Libra Accounting Software	Modular	General ledger, accounts payable, accounts receivable, order entry and billing, inventory control, payroll, job costing, property management, client write-up	Yes	Yes	Yes	256K	Lotus 1-2-3, Symphony, Ashton-Tate Dbase, any ASCII file	Yes	$1,950-$3,900 (per module)
Link Systems International (201) 894-1388	Link Accounting	Integrated	General ledger, accounts payable, accounts receivable, invoicing, purchase order, sales order, sales representative, information retrieval	Yes	Yes	Yes	64K	No	Yes	$1,500 (per module)
Lincon Computer System (801) 539-7195	Lincon Accounting System	Modular	General ledger, accounts payable, accounts receivable, inventory, invoicing, payroll	Yes	No	Yes	640K	No	Yes	$200-$300 (per module)
M & C Systems, Inc. (201) 739-9080	Finspac	Modular	General ledger, accounts receivable, accounts payable, sales analysis, payroll	Yes	Yes	Yes	256K	Any ASCII file	Yes	$3,000 (total system cost)
M & D Systems, Inc. (716) 662-6611	Myte Myke	Modular	General ledger, accounts receivable, accounts payable, order entry/billing, purchase order processing, sales analysis, inventory control	Yes	Yes	Yes	256K	No	Yes	$795-$1,495 (per module)
MCBA, Inc. (818) 242-9600	MCBA Accounting/ Distribution System	Modular	General ledger, accounts payable, accounts receivable, payroll, customer order processing, purchase order and receiving, inventory management, bill of materials, report writer, data bridge	Yes	Yes	Yes	256K	Lotus 1-2-3, Ashton-Tate Dbase III, Microsoft Multiplan, any ASCII, DIF or SYLK file	Yes	$750-$1,500 (per module)
MCC Software (818) 376-3387	Integrated Accounting System	Modular	General ledger, accounts payable, accounts receivable, payroll, financial analysis	No	Yes	Yes	256K	No	No	$395-$695 (per module)
MC Software, Inc. (916) 756-8104	Income	Modular	General ledger, accounts payable, accounts receivable, payroll, inventory, purchasing, sales order entry, report writer	Yes	Yes	Yes	512K	Any ASCII file	Yes	$695-$1,295 (per module)
Macola, Inc. (800) 468-0834 (800) 468-0838 (in Ohio)	Macola Financial Software	Integrated	General ledger, accounts payable, accounts receivable, payroll, assets and depreciation, inventory management, customer order processing, purchase order and receiving, bill of materials processor	Yes	Yes	Yes	512K	Lotus 1-2-3, Ashton-Tate Dbase	Yes	$795-$895 (per module)
Management Information Systems Corp. (800) 872-6472	MIC Accounting System	Integrated	General ledger, accounts payable, accounts receivable, inventory, payroll	Yes	Yes	Yes	90K	Alpha Microsystems Alpha Base, Alpha Calc	Yes	$5,000-$10,000 (total system cost)
	Job Costing and Accounting System	Integrated	General ledger, accounts payable, accounts receivable, job costing, payroll, inventory, asset maintenance, estimating, word processing	Yes	Yes	Yes	90K	Alpha Microsystems Alpha Base, Alpha Calc	Yes	$4,500-$20,000 (total system cost)
Mamasoft Corp. (800) 288-6120	Ready-to-Run Accounting with Lotus 1-2-3	Modular	General ledger, accounts payable, accounts receivable, payroll, inventory and order entry	Yes	Yes	Yes	384K	Lotus 1-2-3	No	$49.95-$99.95 (per module)
Manzanita Software Systems Corp. (916) 781-3880	Businessworks PC	Modular	General ledger, accounts payable, accounts receivable, inventory control, payroll, sales invoicing, system manager	Yes	Yes	Yes	256K	Lotus 1-2-3, Microsoft Multiplan, any ASCII or SYLK file	No	$395 (per module)
Magnum Systems, Inc. (801) 487-0788	Megafino	Integrated	General ledger, accounts payable, accounts receivable, payroll	Yes	Yes	Yes	32K	Any spreadsheet or data base that runs on Pick operating system	Yes	From $2,000 (total system cost)
Micro-Art Programmers (805) 962-0922	MBAcount	Modular	General ledger, accounts payable, accounts receivable, inventory	Yes	Yes	No	128K	No	No	$50-$89 (per module)
Micro Associates, Inc. (800) 882-2661	Mica Accounting series	Modular	General ledger, accounts receivable, accounts payable, sales invoicing, inventory control, payroll, job costing, network manager, application manager, productivity interface	No	Yes	Yes	256K	Any ASCII or DIF file	No	Contact vendor
	C³	Modular	General ledger, accounts payable, payroll, job costing, network manager, productivity interface	No	Yes	Yes	256K	Any ASCII or DIF file	No	Contact vendor
Micro Business Applications, Inc. (612) 894-3470	Micro Business Applications Accounting Software	Modular	General ledger, accounts receivable, accounts payable, payroll, inventory, purchase order processing, sales order entry, fixed assets, job costing, professional time accounting, multicompany option, network interface, integrated manager	Yes	Yes	Yes	128K	Lotus 1-2-3, Computer Associates Supercalc, Ashton-Tate Dbase III, any ASCII file	Yes	$595 (per module)
Micro Computer Business Services (800) 307-6227	Complete Accounting Package V.4.1	Modular	General ledger, accounts payable, accounts receivable and order entry, inventory and purchase order, payroll	Yes	Yes	No	256K	Ashton-Tate Dbase, Lotus 1-2-3	No	$99.95 (total system cost)
Micro Financial Corp. (818) 961-0237	Flexware	Modular	General ledger, accounts payable, accounts receivable, inventory, payroll, purchasing, order processing, job costing	Yes	Yes	Yes	256K	Any SYLK or ASCII file	Yes	$795 (average per module)
Microplus Software, Inc. (707) 586-0101	Accounting Plus	Integrated	General ledger, accounts payable, accounts receivable, payroll, inventory, sales order processing, purchase order processing, point of sale, fixed assets	No	Yes	Yes	256K	Lotus 1-2-3, Computer Associates Supercalc, any DIF file	Yes	$495 (per module)
Micron, Inc. (713) 461-6383	Reveille Customer Accounting Software	Integrated	General ledger, network system manager and report writer, accounts payable, accounts receivable, sales analysis, customer callback (inventory, order entry, payroll)	Yes	Yes	Yes	512K	Any ASCII file	Yes	$795 (per module)
Mid-American Control Corp. (800) 426-5818	Prompt Financial System	Modular	General ledger, accounts payable, accounts receivable, budgeting	Yes	Yes	Yes	256K	Lotus 1-2-3, Symphony	Yes	$1,000 (per module)
	Public Budgeting and Accounting	Modular	General ledger, accounts payable, accounts receivable, budgeting	Yes	Yes	Yes	256K	Lotus 1-2-3, Symphony	Yes	$1,000 (per module)

COMPANY	PRODUCT	MODULAR OR INTEGRATED PACKAGE	STANDARD MODULES, FUNCTIONS	OFFERS USER-DEFINABLE REPORT FORMATS	CREATES COMPARATIVE STATEMENTS	POSTS RECURRING TRANSACTIONS	MINIMUM MEMORY REQUIRED (IN BYTES)	INTERFACES WITH EXTERNAL SPREADSHEETS, DATA BASES	OFFERS MULTIUSER CAPABILITIES	PRICE
Mitrol, Inc. (617) [illegible]	Mitrol ACC	Modular	General ledger, accounts payable, accounts receivable, fixed assets, cash management system	Yes	Yes	Yes	Varies	Any DIF file	Yes	$5,000 (per module)
Monogram, Inc. (213) 533-1190	Dollars and Sense	Integrated	Double-entry accounting, assets, liabilities, expenses, income, checking, income statements, balance statements, year-to-date summaries, cash-flow budget analyses, forecasting	Yes	Yes	Yes	256K	Yes (no examples available)	No	$179.95 (total system cost)
[illegible] Systems, Inc. (818) 779-1722	[illegible]	Modular	General ledger, accounts payable, accounts receivable	Yes	Yes	Yes	512K	Lotus 1-2-3, any ASCII file	Yes	$1,400 (per module)
Noguska Industries (419) 435-0404	Standard Accounting Package	Modular	Payroll, accounts payroll, accounts receivable, sales inventory and purchasing, general ledger, fixed-assets inventory	Yes	Yes	No	256K	No	No	$190 (per module)
	Advanced Accounting Package	Modular	General ledger, accounts payable, accounts receivable, sales inventory and purchasing, fixed-assets inventory	Yes	Yes	No	256K	No	Yes	$490 (per module)
O'Hanlon Computer Systems, Inc. (800) [illegible]	O'Hanlon Data Base Management series	Integrated	General ledger, accounts payable, accounts receivable, payroll, sales order entry, purchase order entry, inventory control	Yes	Yes	Yes	256K	Lotus 1-2-3, Microsoft Multiplan, any DIF or SYLK file	Yes	$[illegible] (per module)
Open Systems, Inc. (800) 328-2276	Open Systems Accounting Software	Modular	General ledger, accounts payable, accounts receivable, inventory, purchase order processing, sales order processing, payroll, report writer, fixed assets, human resource management, job costing, project estimating, time and billing, resource manager	Yes	Yes	Yes	256K (DOS), 512K (Xenix, Unix)	Lotus 1-2-3	Yes	$395-$995 (per module)
Osprey Business Software, Inc. (301) [illegible]	Osprey	Modular	General ledger, accounts payable, accounts receivable, invoices and sales order processing, inventory control, payroll, job costing, bill of materials, Osprey Elite data base	Yes	No	No	128K	Lotus 1-2-3, Microsoft Multiplan, any CSV file	No	$[illegible] (per module)
	Osprey Senior (U.S. version slated to be available this fall)	Modular	General ledger, accounts payable, accounts receivable, invoices and sales order processing, inventory control, payroll, job costing, bill of materials, Osprey Elite data base	Yes	Yes	Yes	[illegible]	Lotus 1-2-3, Microsoft Multiplan, any CSV file	Yes	$795 (per module)
	Harmony	Modular	General ledger, accounts payable, accounts receivable, payroll, inventory system manager, order entry, word processing, spreadsheet, inventory manager, purchasing, client accounting	Yes	Yes	Yes	512K	No	No	$[illegible] (per module)
PEP Engineering (619) 481-7259	IBS Accounting Software	Integrated	General ledger, accounts payable, accounts receivable, inventory, payroll, fixed assets	No	No	Yes	512K	No	No	$795 (total system cost)
Pansophic Systems, Inc. (312) [illegible]	[illegible]	Integrated	Accounts receivable, accounts payable, general ledger, payroll, human resources	Yes	Yes	Yes	NA	Lotus 1-2-3, Symphony	Yes	$[illegible] (total system cost)
Paxus Information Services Corp. (303) 799-6060	Integrated Business System	Integrated	General ledger, accounts payable, accounts receivable, inventory, report writer, job costing, order entry, purchasing, word processing	Yes	Yes	No	512K	No	Yes	$275-$990 (per module)
Peachtree Software, Inc. (800) 247-3224	Peachtree Complete Business Accounting System	Modular	General ledger, accounts receivable, accounts payable, invoicing, inventory, job costing, fixed assets, payroll	No	Yes	Yes	128K	Lotus 1-2-3, Ashton-Tate Dbase III, any ASCII, SYLK or DIF file	No	$[illegible] (total system cost)
Pearlsoft, Inc. (800) 652-6600	Basic Accounting	Integrated	General ledger, accounts payable, accounts receivable, invoicing, payroll, inventory	Yes	No	Yes	256K, 640K (Framework)	Ashton-Tate Framework	Yes	$495 (total system cost)
Prentice Hall Professional Software (800) 241-[illegible]	Financial Reporting	Modular	General ledger with after-the-fact payroll, accounts payable, accounts receivable, payroll, depreciation, time, billing	No	Yes	Yes	256K	Any ASCII file	Yes	$[illegible] (per module)
Promark, Ltd. (800) 331-9916	MAI Integrated Accounting series	Modular	General ledger, accounts payable, accounts receivable, inventory control, payroll, order entry, sales analysis, financial statements, fixed assets, purchase orders, report writer, data link	Yes	Yes	Yes	256K, 320K (report writer)	Any ASCII, DIF or CSV file	Yes	$245-$295 (per module)
Prosystems, Inc. (800) [illegible]	Computer Magic	Modular	General ledger, accounts payable, accounts receivable, inventory, payroll	No	Yes	Yes	256K	No	No	$2,000 (total system cost)
Q. W. Page Associates, Inc. (416) 923-4567	Newviews	Integrated	General ledger, accounts payable, accounts receivable, work-in-program reports, cash flow, balance sheet, income statement, payroll, time and billing, sales and order entry, job costing, consolidations, client write-ups	Yes	Yes	Yes	512K	Any ASCII file	No	$695 (total system cost)
Queue Associates, Inc. (201) [illegible]-1212	General Accounting	Modular	General ledger, accounts payable, accounts receivable, payroll	No	Yes	No	384K	Optional	Yes	Up to $4,000 (per module)
Realworld Corp. (800) 255-1115	Realworld Accounting System	Modular	General ledger, accounts payable, accounts receivable, payroll, order entry and billing, inventory control, sales analysis, job costing, purchase orders, check reconciliation	Yes	Yes	Yes	256K	Lotus 1-2-3, any ASCII file	Yes	$695 (total system cost)
	4-In-1 Basic Accounting	Integrated	General ledger, accounts payable, accounts receivable, payroll	Yes	No	Yes	256K	Any ASCII file	No	$595 (total system cost)
Red Wing Business Systems, Inc. (612) 388-1106	Red Wing Accounting Software	Modular	General ledger, accounts payable, accounts receivable, payroll, business inventory	No	Yes	Yes	256K	Lotus 1-2-3	No	$[illegible] (per module)
Ross Systems, Inc. (415) 856-1100	MAPS series	Integrated	General ledger, accounts payable, accounts receivable, fixed assets, modeling, micro link, data base, cross-view	Yes	Yes	Yes	2M	Any DIF file	Yes	$5,000-$23,000 (per module)

COMPANY	PRODUCT	MODULAR OR INTEGRATED PACKAGE	STANDARD MODULES, FUNCTIONS	OFFERS USER-DEFINABLE REPORT FORMATS	CREATES COMPARATIVE STATEMENTS	POSTS RECURRING TRANSACTIONS	MINIMUM MEMORY REQUIRED (IN BYTES)	INTERFACES WITH EXTERNAL SPREADSHEETS, DATA BASES	OFFERS MULTIUSER CAPABILITIES	PRICE
S & S Programming, Inc. (317) 42[illegible]-4472	CPA	Modular	General ledger, accounts payable, accounts receivable, order entry, business inventory, payroll, budget cash flow, enterprise analysis	Yes	Yes	No	256K	No	Yes	$495-$[illegible] (per module)
SBT Corp. (415) 331-9900	Data Base Accounting Library	Modular	General ledger, accounts payable, accounts receivable, payroll, time and billing, sales order processing, billing and inventory control, payroll, assets, job cost accounting, check writing, property, manufacturing resource planning	Yes	Yes	Yes	512K	Ashton-Tate Dbase III, Framework, Lotus 1-2-3 Microsoft Multiplan	Yes	$95-$595 (per module)
San Luis Software, Inc. (805) 466-6508	TABS	Modular	General ledger, accounts receivable, accounts payable, payroll, name and address, inventory control, point of sale, serialized inventory, multilocation inventory, kits and sales quotations	Yes	—	—	—	—	Yes	$900-$2,100 (per module)
Semaphore, Inc. (212) 697-1196	Semaphore Financial Manager	Modular	General ledger, accounts payable, accounts receivable, job costing, financial analysis, budget	Yes	Yes	Yes	256K	Any ASCII file	Yes	$100-$500 (per module)
Sierra On-Line, Inc. (209) 683-6858	Mac One Write	Modular	General ledger, accounts receivable, cash disbursement	No	No	Yes	512K	Microsoft Excel, Multiplan, Lotus Jazz	Yes	$99.95 (per module)
Softsync, Inc. (212) 685-2080	Accountant Inc. (Commodore 128 version)	Modular	General ledger, accounts payable, accounts receivable	No	No	Yes	128K	No	No	$99.95 (total system cost)
	Accountant Inc. (Macintosh version)	Integrated	General ledger, accounts payable, accounts receivable, inventory, financial analysis	No	Yes	Yes	512K	Any ASCII file	In development	$299.95 (total system cost)
Software Shop Systems, Inc. (800) 554-9865	Construction System	Modular	General ledger, accounts payable, accounts receivable, payroll, job costing, inventory	Yes	Yes	No	512K	Lotus 1-2-3, Computer Associates Supercalc, Ashton-Tate Dbase III, any DIF file	Yes	$2,000 (per module)
Software Technology, Inc. (402) 423-1440	TABS III	Modular	General ledger, accounts payable, trust accounting, critical date	Yes	Yes	Yes	192K	Any ASCII file	Yes	$300-$2,500 (per module)
Sourcemate Information Systems, Inc. (800) 233-6866 (800) 782-7780 (in Calif.)	Accountmate	Modular	General ledger, accounts payable, accounts receivable, sales orders, purchase orders, manufacturing inventory control, time and billing, fund accounting, telemarketing, job costing, payroll, [illegible]	Yes	Yes	Yes	512K	No	Yes	$195-$1,195 (per module)
Southware Innovations, Inc. (800) 547-4179	Southware Business series	Modular	General ledger, accounts payable, accounts receivable, payroll, inventory, sales	Yes	Yes	Yes	256K	Any DIF file	Yes	Contact vendor
Star Software Systems, Inc. (800) 242-7827	Accounting Partner Plus	Integrated	General ledger with check writing, accounts receivable with invoicing, accounts payable with check writing and purchasing, multistate payroll	Yes	Yes	Yes	256K	Proprietary, any ASCII or DIF file	No	$795 (total system cost)
	Accounting Partner	Modular	General ledger, accounts payable, accounts receivable, purchasing, invoicing, payroll	Yes	Yes	No	256K	Any ASCII file	No	$99 (total system cost)
State of the Art, Inc. (800) 854-3415 (800) 422-2151 (in Calif.)	MAS 90 Master Accounting series	Modular	General ledger, accounts payable, accounts receivable, payroll, inventory management, sales order processing, purchase order processing, bank reconciliation, job cost and analysis, library master	Yes	Yes	Yes	512K	Lotus 1-2-3, Ashton-Tate Dbase III and compatibles	Yes	$795 (per module)
Systems Plus, Inc. (415) 969-7047	Double Entry	Modular	General ledger, accounts payable, accounts receivable, invoicing, payroll	No	Yes	Yes	256K	No	No	$595 (per module)
TCS Software, Inc. (800) 231-6454	TCS Total Accounting System	Modular	General ledger, accounts payable, accounts receivable, sales order entry, invoice control, fixed-assets depreciation, payroll, purchase orders	Yes	Yes	Yes	256K	Lotus 1-2-3, Symphony, Microsoft Multiplan, any ASCII file	Yes	$595-$795 (per module)
TOM Software, Inc. (206) 246-7022	TOM Software Commercial System	Modular	General ledger, accounts payable, accounts receivable, payroll, fixed assets, purchase order, order entry, invoicing	Yes	Yes	Yes	96K	Proprietary	Yes	Contact vendor
Technicraft Distribution Systems, Inc. (804) 346-1100	Business Management System	Modular	General ledger, accounts payable, accounts receivable, payroll, labels	Yes	Yes	Yes	128K	No	Yes	Contact vendor
Thoroughbred Software (division of Concept Omega Corp.) (800) 524-0430	Thoroughbred Accounting System	Modular	General ledger, accounts payable, accounts receivable, fixed assets, payroll, purchase orders, order processing (sales analysis, inventory control)	Yes	Yes	Yes	256K	Proprietary	Yes	$595-$795 (per module)
Timberline Software, Inc. (503) 626-6775	Medallion series	Modular	General ledger, accounts payable, accounts receivable, inventory and payroll	Yes	Yes	No	512K	Lotus 1-2-3, Ashton-Tate Dbase, any ASCII or SYLK file	Yes	From $625 (per module)
Trac Line Software, Inc. (800) TRACLIN	Integrated Accounting	Integrated	General ledger, accounts payable, accounts receivable, order entry, billing, purchasing, inventory control, sales analysis	Yes	Yes	Yes	256K	Lotus 1-2-3, any ASCII file	Yes	$1,695-$2,995 (total system cost)
	Financial Controller	Integrated	General ledger, accounts payable, accounts receivable, cash flow, sales analysis	No	Yes	Yes	256K	Lotus 1-2-3, any ASCII file	No	$595 (total system cost)
Vertical Business Software, Inc. (800) 632-8305 (914) 632-8305 (in N.Y.)	Complete Accounting series	Integrated	General ledger, accounts receivable, accounts payable	Yes	No	Yes	256K, 512K (Macintosh)	No	No	$750 (total system cost)
	Complete Accounting series with Inventory Control	Integrated	General ledger, accounts payable, accounts receivable, invoicing, purchase order, return, price quote	Yes	No	Yes	256K, 512K (Macintosh)	No	No	$900 (total system cost)
Wichita Software Corp. (316) 684-0684	Petroleum Account	Modular	General ledger, accounts payable, accounts receivable, joint interbilling, payroll, revenue distribution, investments, production verification, lease management	No	Yes	Yes	512K	Any ASCII, DIF or SYLK file	Yes	$995-$1,295 (per module)
Worldview Software, Inc. (416) 860-1616	The Dollar Manager	Integrated	General ledger, accounts payable, accounts receivable, payroll, inventory control, estimating and invoicing, banking, time billing	Yes	Yes	No	128K	Lotus 1-2-3, any ASCII file	Yes	$1,200 (total system cost)

Issues of the Information Age:

The way beyond Babel.

Imagine trying to build a railroad system if every locomotive manufacturer used a different track gauge. And each local stretch of railroad had a different load-carrying capacity and its own unique set of signals.

The business of moving and managing information is in a similar state today. Machines can't always talk to each other. Proprietary systems and networks abound. And the enormous potential of the Information Age is being dissipated by incompatibility.

The way beyond Babel lies in setting firm, far-reaching standards. In developing products and services that conform to those standards while establishing new standards for higher-level functions and applications.

The process must be continuous. Dynamic. And cooperative. We must share our visions, technical approaches and experiences. AT&T is committed to that course.

Our involvement in the evolution of ISDN (Integrated Services Digital Network) is a good example of this process at work.

AT&T works closely with national and international coordinating groups to establish standards through consensus and insure that they are consistently interpreted.

Where standards are firmly established, we've developed products and services that conform to them and address a broad range of customer needs. From voice/data work stations and ISDN PBXs for business to central office switches for Operating Telephone Companies.

Wherever possible, we've also shared the benefits of our experience, as we did in a recent Chicago test where, in partnership with Ameritech's Illinois Bell, AT&T began the nation's first customer application of a production ISDN system for McDonald's.

We must, as an industry, continue working together to provide our customers with maximum flexibility and utility. Then they can decide how and with whom to work.

Once we've taken those important steps, we foresee a time when the promise of the Information Age will be realized. A time when people will participate in a worldwide Telecommunity through a vast, global network of networks. A merging of communications and computers which will enable them to handle information in any form—conversation, data, images, text—as easily as they make a phone call today.

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COMPUTERWORLD

THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

NEW PRODUCTS

Local-area network hardware

Lanex has unveiled its personal computer-to-broadband interface, the **Model PC588**.

The IBM Personal Computer-compatible device is an intelligent interface board that is said to allow PCs to communicate via a broadband local-area network (LAN). The PC interface utilizes a 16-bit microprocessor and performs a variety of functions, ranging from terminal emulation to file tranfers, as well as printer and disk sharing through an IBM Netbios interface. The LAN access protocols are consistent with IEEE 802.3.

The PC interface, Model PC588, costs $695.

Lanex, 10727 Tucker St., Beltsville, Md. 20705.

American Photonics, Inc. has introduced the **RL3000** Ethernet transceiver featuring diagnostic capabilities, activity indicators for network monitoring and a user-selectable heartbeat signal.

The RL3000 is said to provide access to Ethernet local-area networks for transmitting and receiving data packets in IEEE 802.3 and Ethernet Version 2.0 specifications for Carrier Sense Multiple Access/Collision Detect operation at 10M bit/sec. The RL3000 can integrate with either thick or thin Ethernet coaxial cable.

The RL3000 is priced at $250.

American Photonics, 71 Commerce Drive, Brookfield Center, Conn. 06805.

Links

An asynchronous remote bridge said to connect multiple remote Novell Netware local-area networks (LAN) to a local Network LAN over telephone lines has been introduced by **Novell, Inc.**

The **Netware Asynchronous Remote Bridge** also allows remote personal computers to access a local Netware LAN. It uses asynchronous modems to support speeds to 19.2K bit/sec. Features include transparent operation and a traffic sensing mechanism that drops a line that has been quiet for a specified length of time.

The product is scheduled to be available in the third quarter in both a single-line version that allows one connection and a multiline version that allows up to four concurrent connections.

The single-line bridge costs $395. The multiline bridge costs $995.

Novell, 122 E. 1700 South, Provo, Utah 84601.

CXI, Inc. has announced five local-area network (LAN) workstation micro-to-mainframe communications packages for IBM Personal Computers and Personal System/2s on LANs equipped with CXI's PCOX coaxial and remote gateways.

The packages support both IBM's Netbios and Novell, Inc.'s SPX LAN interfaces. Users can run IBM 3270-based applications, access mainframe files, save the contents of host screens and transfer files to and from the host.

PCOX/One provides IBM 3278 and 3279 terminal emulation with one host and one DOS session. It costs $150. **PCOX/Two** allows users to run a personal computer printer that emulates an IBM 3287 printer while working on a host session. It costs $200. **PCOX/Multi** provides concurrent access to five host sessions. It costs $275.

PCOX/One-APA provides the features of an IBM 3179 G graphics display terminal. It costs $295. **PCOX/Multi-APA** allows the user to run up to four display or printer sessions along with one APA graphics host session. It costs $395.

CXI, 1157 San Antonio Road, Mountain View, Calif. 94043.

Diagnostic equipment

A **built-in RS-232 communications feature** for its portable DW300 Channel Monitor has been announced by **Data/Ware Development, Inc.**

DW300 *Channel Monitor*

The RS-232 feature allows the DW300 to be used by field service engineers to diagnose I/O channel faults detected between IBM or plug-compatible mainframes and their peripheral controllers from a remote location. The user can view a complete replica of the DW300's front panel on a personal computer or terminal display screen. The keyboard allows the user complete remote control of the DW300 located at the mainframe site.

The basic DW300, including the built-in RS-232 communications feature, costs $11,995.

Data/Ware Development, 4204 Sorrento Valley Blvd., San Diego, Calif. 92121.

A **multi-LCN emulation package** used to test loading and throughput on CCITT X.25 communications links has been announced by **Digilog, Inc.** for use with its Digilog 800 Protocol/Performance Analyzer.

Features of the package include the ability to emulate up to 4,095 logical channels on any X.25 port; routines that check the loading or usage of all logical channels; and the ability to test X.25 links. Statistics provided include number of active channels, number of data packets sent or received and number of packets transmitted per second.

The software is available on diskette for $300.

Digilog, 1370 Welsh Road, Montgomery, Pa. 18936.

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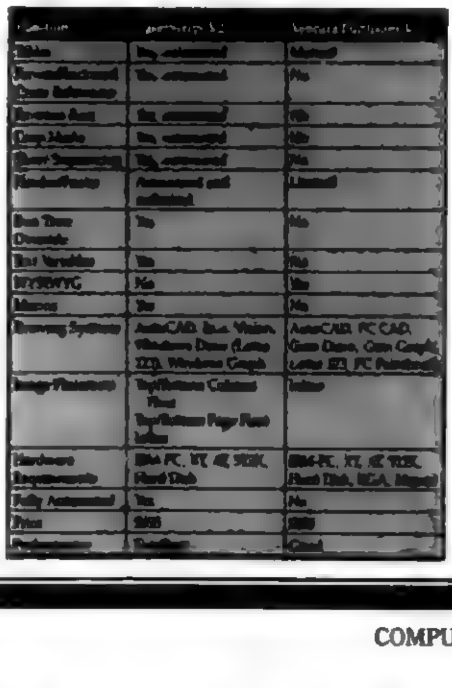

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SYSTEMS & PERIPHERALS

HARD TALK

James Connolly

Name of the game

There is a new game in town known as "The Early Shipment Game," and the winners, playing with a stacked deck, can only be computer vendors.

The game is simple. For example, in January or so a vendor introduces a product and says it will be available during the third quarter. Then, in May, a press release and a flood of sales representative calls to customers trumpet an announcement that the product will be shipped earlier than originally scheduled. The spiel continues with the proclamation that development proceeded faster than expected and all of the vendor's loyal employees worked extra hard to get the system out the door months ahead of schedule.

With the advanced schedule, the system will ship in July rather than during the third quarter, the vendor boasts. One question should be raised, however: Since when is July not part of the third quarter on a Gregorian calendar?

One of the most notable players in this game during the

Continued on page 52

Aging PDP-11s get kickers

DEC says enhancements reaffirm commitment to 17-year-old line

MAYNARD, Mass. — Digital Equipment Corp. recently announced enhancements for several members of its PDP-11 series of minicomputers, including new packaging, memory and storage options.

DEC officials said the announcements represent a demonstration of the company's commitment to the 17-year-old product line.

The introductions include the PDP-11/84E series, which is based on the existing PDP-11/84 CPU and a nine-slot backplane. DEC said the PDP-11/84E is the first series of PDP-11/84s to support a 5¼-in. form factor. It is also available in a 10½-in., 27-slot box. DEC said the enhancements are intended to provide the basis for a building-block approach to system configuration.

DEC also announced a 40% decrease in the basic monthly service charges on all PDP-11/84 systems.

PDP-11/84E prices start at $16,000 for the 5¼-in. box and $20,000 for the 10½-in. box. Prices for typical systems configured with multiple DEC RA series disks, DEC TU series tape drives and 32 to 48 terminal lines range from $55,000 to $75,000.

A-to-Z system premiers

DEC also announced the A-to-Z Business System, which is a packaged system that includes a MicroPDP-11/53 processor and A-to-Z systems and applications software designed to run under DEC's VMS operating system.

Four configurations are available, each with a CPU in a deskside enclosure, 2.5M bytes of memory, a diskette drive, a Winchester disk drive, six asynchronous lines and licenses for DEC's A-to-Z Base System, A-to-Z Electronic Mail and A-to-Z Supercomp-twenty software. The configurations range in price from $14,788 to $19,765.

The company also introduced the MicroPDP-11/53 Plus system, which features an additional 1M byte of memory over existing 500K-byte models. It was designed to improve performance by 25% for the same price as a similarly configured MicroPDP-11/53. Prices start at $14,500.

DEC also announced 5% to 15% price cuts on MicroPDP-11/83 systems. In addition to the hardware price cuts, DEC slashed the operating system price on a MicroPDP-11/83 by 57%. Entry-level prices for the MicroPDP-11/83 now start at about $25,000 with a CPU, a floating-point accelerator, a 159M-byte disk drive, a 71M-byte tape drive and eight asynchronous lines.

Data View

Internal throughput of IBM 4381

Rates compared with corresponding models of previous generation

Models	Internal throughput rate ratios					
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
11-41	1.5	1.5	[illegible]	1.3	1.4	1.4
11-22	2.1	2.2	1.8	1.9	2.0	2.0
[illegible]	1.7	1.7	1.7	1.6	[illegible]	1.6
13-23	1.3	1.3	1.3	1.3	1.3	1.3
14-24	1.3	1.3	1.3	1.3	1.3	1.3

INFORMATION PROVIDED BY IBM

386 add-in targets VAX

BY DAVID BRIGHT
CW STAFF

GLENDALE, Calif. — The Intel Corp. 80386 microprocessor and Digital Equipment Corp.'s VAX family may seem like an unlikely combination, but Avalon Computer Systems has designed an 80386-based add-in board

Continued on page 54

Intelogic discounts service

BY STANLEY GIBSON
CW STAFF

SAN ANTONIO — Moving from its base in personal computer maintenance to larger systems, Intelogic Trace, Inc. recently announced discounts of 40% below IBM list prices on maintenance of IBM's System/34 and 50% discounts on IBM's System/36 maintenance prices.

The firm said the discounts are available in 28 major metropolitan areas. It also announced a guaranteed response time of four hours for customers located within 25 miles of an Intelogic Trace service office in the same 28 major cities. Customers between 25 and 50 miles away can receive guaranteed response for the next half of the business day, Intelogic Trace said.

In 54 smaller cities, Intelogic Trace guaranteed service within a half business day and said it will offer 30% off regular IBM maintenance charges for System/34 and 20% off System/36 prices.

Continued on page 54

Inside

- Esprit ASCII terminal aimed at multiuser PC environments. Page 52.
- Zetaco unfurls memory modules for DG processors. Page 56.

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ASCII terminal targets multiuser PCs

BY ALAN ALPER
CW STAFF

MELVILLE, N.Y. — Esprit Systems, Inc. recently unveiled an ASCII terminal optimized for multiuser microcomputers running Microsoft Corp.'s MS-DOS and Xenix.

Called Opus PCT4, the terminal is said to allow users to access applications on IBM Personal Computers, PC XTs, ATs or compatibles as well as on all Intel Corp. 80386-based micros. In addition to MS-DOS and Xenix, the Opus PCT4 is compatible with a variety of operating systems, including Unix/DOS, Pick Systems' Pick, Novell, Inc.'s Advanced Netware/286 and The Software Link, Inc.'s PC MOS/386.

Like many ASCII terminals, the Opus PCT4 emulates a range of popular displays, including Wyse Technology, Inc.'s Wyse 50, Televideo Systems, Inc.'s Televideo 920/925 and Digital Equipment Corp.'s VT 52. In addition, the terminal's keyboard and display emulate the IBM PC user interface.

The Opus PCT4 offers dual ports, which enables concurrent connection through the same host running different sessions or separate hosts. It also enables users to hot-key between any two emulations or between PC terminal and standard ASCII display operations.

In its PC mode, the terminal is said to duplicate the complete IBM 256-character font set, keyboard layout and PC codes. It also uses the 25th line for display rather than status purposes.

Single-stroke storage

The terminal also features remote dial-in capability via Hayes Microcomputer Products, Inc. or compatible modems. Included in the terminal's pop-up window is a utility to store and dial computer numbers using a single keystroke. Esprit said it has made the pop-up window accessories standard on its most recently released terminals.

Priced at $649, the Opus PCT4 will begin shipping to Esprit's resellers at the end of the month, according to Sal Lanuto, director of marketing. The terminal is covered by the firm's 24-hour replacement service, he added.

The advent of true multiuser operating systems for microcomputers such as Digital Research, Inc.'s Concurrent DOS and Xenix has created a market niche for ASCII terminals makers to fill, Lanuto said. Esprit will compete with Kimtron Corp. and Wyse's Link, Inc. subsidiary in the marketplace, he added.

Stacking

FROM PAGE 51

past year or so has been IBM, although it has not been the only vendor using the strategy. IBM has played the game with its 9370 minicomputers.

The 9370s were introduced in October 1986, with deliveries scheduled for third-quarter 1987 for the 9373 Model 20 and 9375 Model 60 and fourth-quarter 1987 for the 9375 Model 40 and 9377 Model 90. In March, IBM advanced those dates by "up to two months earlier than previously planned." This brought delivery up to July and October, respectively — still the third and fourth quarter that were in the original announcement.

Of course, there is no bloodshed in the advanced delivery game; it isn't serious enough to knock someone out of business. Using terms such as "fourth quarter" gives vendors a three-month window to work within rather than the 30 days they would be boxed into if they named a month in the original announcement. However, the public's intelligence is insulted when vendors make it sound like they are doing customers a favor when they are really just living up to their promises. And there is no shame in doing that.

Connolly is *Computerworld's* senior editor, systems & peripherals.

SCIENCE/SCOPE®

The HR-3000, a new generation version of the Hughes Air Defense Radar (HADR), can detect and precisely locate fighter-sized aircraft more than 470 kilometers away. The phased array radar is designed for air traffic control in peacetime and can automatically detect wartime threats that appear simultaneously from several directions, even in the presence of heavy environmental clutter and severe electronic interference. The HR-3000 system is in full production at Hughes Aircraft Company and will be used in Portugal and integrated with Hughes-built NATO Air Defense Ground Environment (NADGE) in Italy, Greece, and Turkey.

A two-way television system enables Minnesota students to be taught by teachers miles away. A consortium of seven school districts in east-central Minnesota operates this system in conjunction with local cable television operators as part of an elementary and high-school program to promote telecommunications technology in education. It allows each district to produce and transmit live video and audio signals to other schools. Thus, specialized classes such as foreign languages and advanced mathematics and science are shared among the seven districts. The system also allows administrators to attend regional meetings without traveling. It consists of a microwave path from Cambridge to six outlying school districts 6 to 26 miles away. The microwave transmitters and receivers were manufactured and provided by Hughes.

U.S. Army's Fiber Optic Guided Missile (FOG-M) uses a new winding technology to deploy its plastic-coated glass fiber. This fiber permits a two-way jam-proof communication link for transmission of television-like pictures of enemy armor and helicopters to a gunner station located in a protected position. Using technologies learned from 20 years of producing Tube-launched, Optically tracked, Wire-guided (TOW) missiles, Hughes engineers developed a method of precisely winding optical strands so that they can be dispensed at missile velocities without interruption of the data transmission. Because the optical fibers are not much larger than the thickness of a strand of human hair and are elastic and pliable, Hughes invented a device which precisely measures the elasticity of each fiber thus allowing it to be spool-wound with precision. Another Hughes technological advancement is a diagnostic instrument that detects defects in the fiber.

Upgraded flight simulators will depict mission imagery realistically for U.S. Navy F/A-18 pilots. Hughes is modifying its Weapons Tactics Trainers (WTT) to project high-resolution, full color, real-time simulated images of terrain features and man-made structures on 360-degree field-of-view dome screens that surround the trainer's cockpit. The out-the-window scenes will be produced by advanced computer imaging technology, using a digital database that represents 70,000 square miles of western Arizona and southern California terrain. The new simulated visual system will allow pilots to safely practice a host of complex combat scenarios without expending fuel or weapons.

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Intelogic

FROM PAGE 51

To be eligible, a company must be within a 50-mile radius of the cities specified in the plan.

In addition, if Intelogic Trace fails to respond within the specified time, maintenance for the equipment to be serviced will be provided free of charge to the customer for one month, the firm said.

Previous discounts had been 15% to 20% below regular IBM maintenance prices for System/34 and 36, said Roger Grant, vice-president of marketing and sales for Intelogic Trace.

In February, IBM slashed regular maintenance prices by 20% for System/34 and 36 and 12% for System/38. In the fall of 1986, IBM announced its Corporate Service Amendment (CSA), a discount program under which users can gain up to 33% savings by showing they normally handle some service problems themselves.

For the little guys

Grant claimed Intelogic Trace's discount program is aimed at both small and large users, but he said IBM's discount program is aimed solely at large customers.

Grant also pointed out that under the Intelogic Trace plan, no maintenance duties are being handed over to the customer, as they are under IBM's CSA. But Grant also said that customers with help desks and problem-resolution procedures in place can count on additional discounts of an unspecified amount.

Grant said the Intelogic Trace discounts signify a greater emphasis by the company on minicomputers and departmental systems.

Datapoint provider

The former maintenance wing of Datapoint Corp., Intelogic Trace is the major maintenance provider for Datapoint equipment.

The company has been servicing System/34 and 36 computers for about eight months, according to Grant.

Intelogic Trace also services the equipment of major local-area network vendors and maintains System/38 processors in some areas, Grant said.

Add-in

FROM PAGE 51

that it said triples the speed of DEC's Q-bus-based systems.

Intended primarily for value-added resellers of DEC's Microvax, the AP/20 Attached Processor increases a machine's performance by running compute-intensive programs off-loaded from the DEC host.

"What we're doing is providing a way for Microvax users to build themselves a parallel computer," said marketing director Ross Harvey. He said programs that typically degrade system performance, such as large Fortran programs, computer-aided design and manufacturing, graphics and simulation software, will run much faster on the AP/20 by taking advantage of the 80386 chip's native 32-bit mode.

Harvey claimed the board provides better performance than the addition of a DEC floating-point option would. He said the board can run general-purpose programs, and performance can be further increased by adding several AP/20 boards.

According to Harvey, programs for the AP/20 are written and executed in the same manner as host VAX programs. To run on the AP/20, programs need only be recompiled with Avalon's C, Fortran or Pascal compilers, he said. The board's proprietary operating system runs the computational parts of a program while transferring I/O functions to the VAX, Harvey said. "The program still thinks it's running on the VAX even though it's not."

The board's software currently does not support Microsoft Corp.'s MS-DOS operating system.

The board's $10,000 price includes the operating system kernel and 4M bytes of random-access memory. An optional Weitek Corp. floating-point chip set is $1,900. Harvey said the board has a socket for Intel's 80387 math coprocessor, but that the Weitek chip set is faster.

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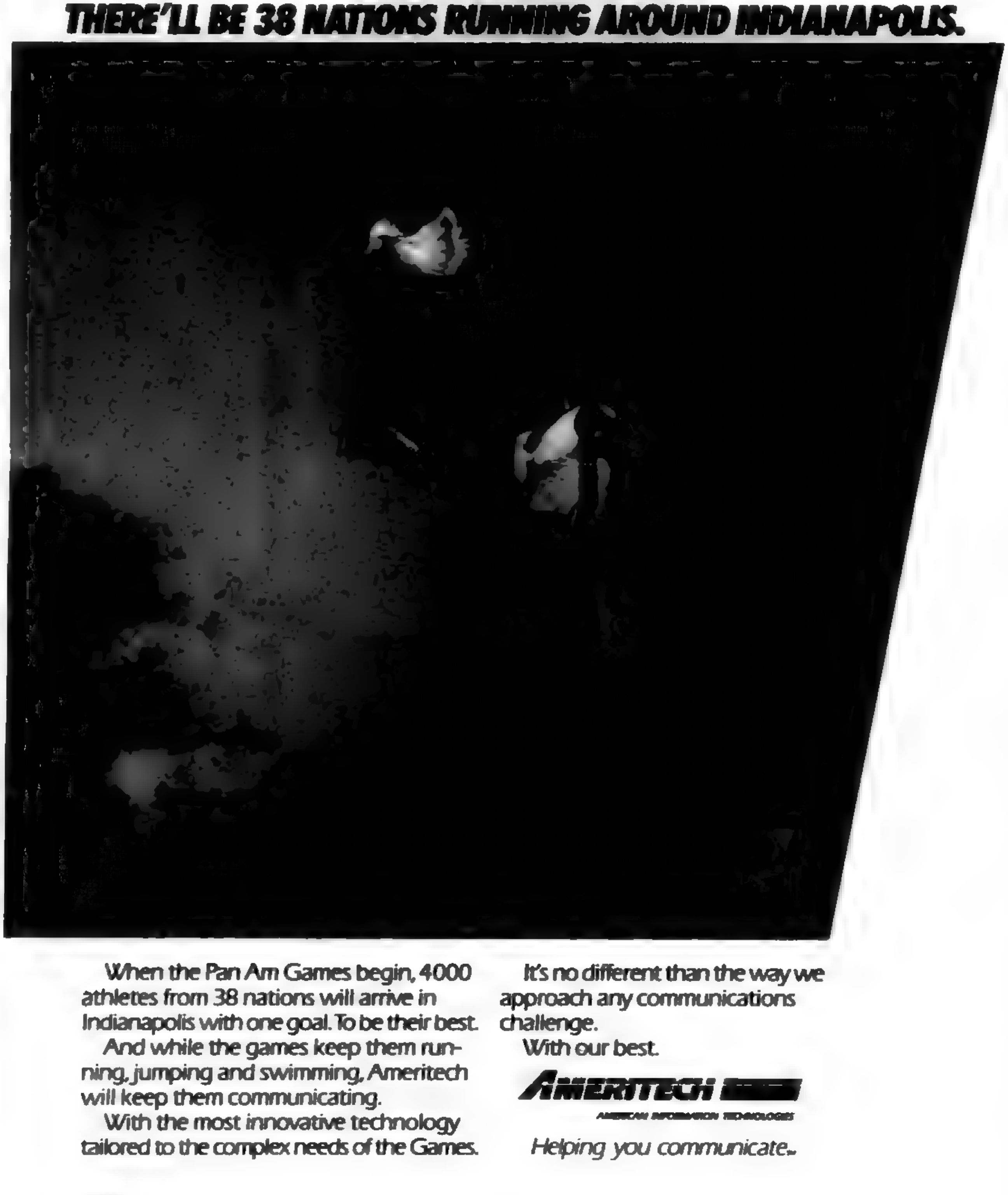

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NEW PRODUCTS

Processors

An industrial image processing subsystem designed for the VMEbus has been announced by **Matrix Electronic Systems Ltd.**

The **MVP-VME** provides such functions as real-time convolutions, morphological transforms, pattern matching and feature extraction.

The three-board set features 12-bit monochrome display, a memory-mapped frame buffer and nondestructive graphics overlay.

The MVP-MVE is priced at $5,995.

Matrox, 1055 St. Regis Blvd., Dorval, Que., Canada H9P 2T4.

Data storage

A ½-in. magnetic tape coupler said to implement Digital Equipment Corp. TS11 and TSV05 emulations has been introduced by **Distributed Logic Corp.** for use with the DEC Microvax, MicroPDP-11 and LSI-11 computers.

The **DQ152 tape coupler** uses a very large-scale integration circuit that provides device-independent interface features for adding peripherals to Q-bus systems. The dual-height board operates transparently to the TS11 and TSV05 software driver contained in the operating systems.

The DQ152 contains a 64K-byte data buffer and features a drive transfer rate of 1.25M byte/sec.

The coupler costs $1,400.

Distributed Logic, P.O. Box 6270, 1555 S. Sinclair St., Anaheim, Calif. 92806.

Three **add-on memory modules** designed for Data General Corp.'s MV/4000, MV/10000 and S/280 processors have been introduced by **Zetaco**, a subsidiary of the Carlisle Corp.

The printed-circuit boards install in the DG computer chassis and are available in three capacities: Model MZ-412 adds 2M bytes of memory; Model MZ-414 adds 4M bytes; and Model MZ-418 adds 8M bytes.

The memory modules support 7-bit on-board error-correction code and use a 256K-byte, 150-nsec dynamic random-access memory.

The MZ-412 costs $3,995; the MZ-414 costs $7,495; and the MZ-418 costs $12,495.

Zetaco, 6850 Shady Oak Road, Eden Prairie, Minn. 55344.

A multifunction controller designed to interface 5¼-in. optical disk drives to the Digital Equipment Corp. Microvax II has been announced by **Scientific Micro Systems, Inc.**

The **SMS 0109** controller is said to provide a small computer systems interface port that allows an optical disk drive to be attached to any Microvax II running standard DEC VMS software.

The controller also supports two fixed Winchester drives and two floppy drives, the company said.

The vendor has also introduced Optical System Software, a software utility and set of callable software routines that reportedly allow the VMS operating system to communicate with the write-once read-many disks.

The controller costs from $1,150.

The software costs $2,000.

Scientific Micro Systems, 339 Bernado Ave., Mountain View, Calif. 94043.

Printers/Plotters

A universal subsystem adapter for Data General Corp. systems, said to drive any Xerox Corp. centralized electronic printer, high-speed Hewlett-Packard Co. printer or IBM 3800 series laser printer, has been announced by **Spur Products Corp.**

The **USA/Data General** also drives the IBM 3211 high-speed impact printer and other laser printers that emulate the 3211, the vendor said.

The printers are said by Spur to offer operating features such as unlimited type fonts, type sizes ranging from four to 24 points, variable line and character spacing, variable page length and width and the ability to print on both sides of the paper.

The rack-mountable USA/Data General costs $9,000.

Spur Products, 13469 Beach Ave., Marina Del Rey, Calif. 90292.

NEC Information Systems, Inc. has introduced the **LC-3000** series of laser printers.

The LC-3300 features 30 page/min output and 300 dot/in. resolution.

The LC-3400 offers 22 page/min output at 400 dot/in. resolution.

The printers, designed for multiuser environments, provide output on sheets up to 11- by 17-in. in size.

They feature a standard video interface, dual 250-sheet paper input cassettes, a 250-sheet output tray and a 20-sheet manual feed guide, according to the vendor.

NEC controllers are said to provide serial and parallel interfaces as well as page-description languages and support for Diablo Systems, Inc., Epson America, Inc., Hewlett-Packard Co. and Dataproducts Corp. command codes.

Prices start at $10,995.

NEC Information Systems, 1414 Massachusetts Ave., Boxboro, Mass. 01719.

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Is the competition ahead? Then leapfrog them

The chief technology officer as innovator and integrator

BY DIMITRIS CHORAFAS

In the coming decade, the chief technology officer will play an important part in business, industry and finance. He will deal with the chaotic state of many computer and communications installations, healing the wounds that result from unplanned integration of incompatible systems, devices and services. Providing for efficient links is also an urgent task, one vital to the organization's survival; this, too, will fall into the chief technology officer's realm.

The less precise title of chief information officer generally indicates a high-level executive in a financial services or manufacturing organization responsible for integrating information and knowledge within the organization. This title, however, goes beyond the role of integrator; it includes duties expected in the realm of top management.

Until recently, more attention has been placed on the devices in use rather than on how technology could be used to better the organization. The results of this imbalance are obvious in the difficulties office automation created for many DP organizations as well as classical DP's inability to reap from what it had at its disposal.

While the effective implementation of new technologies requires a more conceptual than analytical mind, this does not exclude those with DP and MIS backgrounds from becoming chief technology officers, as in the cases of Carmine Vona at Bankers Trust Co. and George DiNardo at Mellon Bank NA. Nothing guarantees that good DP managers will reach the top, however, unless they continually train themselves in new technologies throughout their careers.

Success as a chief technology officer calls for a person with an open mind, a person of vision who can be satisfied with only the best. The person in this position must be ready to abandon old, trusted paths and take risks. Chief technology officers must be people of stature and recognized leaders in their fields. As full-fledged members of top management, they should be able to explain to their colleagues the strategic directions of technology and to demonstrate how these strategies affect the company's business.

A chief technology officer should be a pacesetter, not a day-to-day operator. For example, the intervention of the chief technology officer at Sanyo Securities Co. in Tokyo was instrumental in the firm's use of computers and communications to reduce back-office support to fewer than one worker per securities sales representative. Other securities houses use an average of two people to support each sales representative.

Sanyo Securities' chief technology officer has also been the impetus behind large-scale adoption of AI in dealer operations. Of the three-dozen banks and security houses I visited during 1986 in the U.S., Japan and Europe, Sanyo Securities is by far the most successful in implementing real-life AI, using AI to forecast market trends, projecting exchange-rate fluctuations and generating investment advice.

Innovator and consultant

Chief technology officers will be the innovators and technology consultants to top corporate managers in the following areas:

Engineering. In the case of banking or insurance, expertise

Chorafas is a business consultant and author living in Saint Laurent D'Eze, France. His books include *Interactive Workstations, The Handbook of Data Communications and Computer Networks* and *The Software Handbook.*

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in high technology at the board director level — as well as in executive management — is still limited. Yet hardly a banking product is offered today that does not require a significantly high degree of automation. Technology plays an important role in banking. Although the modern bank has been said to be "information in motion," the motion is not achieved without technology.

Technology also gives rise to new banking products. At a banking symposium in Paris in June 1986, Francois Pasquier, general manager of Banque Internationale de Placements in Paris, said 35% of his bank's business results from products that did not exist 18 months earlier. It takes technology — not just information — to make a profit with new products. A chief technology officer needs the technical expertise to nurture these products and bring them into play.

IT TAKES technology — not just information — to make a profit with new products. A chief technology officer needs the technical expertise to nurture these products and bring them into play.

Forecasting. In manufacturing, a tremendous amount of technology goes into new product development. Increasingly, the new product development effort and a company's information systems merge. Today, the microprocessor is an integral component of many man-made products. In a few years, products of distinction will not feature only microprocessors and memory but will also show their competitiveness through AI constructs.

Determining the upcoming generation of intelligent man-made products requires more than a polished information systems background. In the years to come, forecasting will be one of a chief technology officer's key responsibilities.

The executive's conceptual abilities will range from research and development to systems design and implementation.

Peer advising. The board of directors needs a colleague with whom to communicate on equal terms, as does internal management's executive committee. While specialists in their own fields, board members are not necessarily well-versed in high technology.

Currently, some leading-edge technologies — such as very large-scale integration and optical storage media — are capable of loosening a company's competitive grip if they are not incorporated into the organization. To face the challenge of these technologies and to capitalize on them — rather than expose the company's flanks — the board needs the advice and assistance of someone with perspective.

Enter the integrator

Along with the role of innovator and consultant, a chief technology officer must be an integrator.

Systems integration needs to be approached at the conceptual level. It does not occur simply by adding one, two or even a thousand interfaces. If MIS installs 65 incompatible physical networks, it will not be able to integrate them at the physical level through gateways or at the networking CCITT X.25 level.

As far as a chief technology officer is concerned, the critical problem in integration is the management of partially understood and poorly defined systems. Systems integration requires a valid concept, computer-aided design, a broad perspective in implementation and flexibility for renewal and expansion.

Integration solutions supported by computers and communications must be directed both into the firm and out toward its business environment. They should reach clients and suppliers and include sales, up to direct client dial-up; factories; and all facets that come into play at the corporate level. Electronics should replace paper, with employees working online through terminals, communications links and data bases.

Manufacturers Hanover Trust Co., like other organizations, has defined the integration role by instituting a new corporate division: Strategic Research and Technology. Established at the corporate level and directed by the company's board of management, this function underscores the role of high technology in launching new banking products and improving existing products to make them more competitive.

The division is split into the following four main functions, each allocated to a corresponding department:

Technical research. This includes AI, data base machines and the setup of pilot applications within one or more of the organization's five major operating divisions.

Systems architecture. This function's goal is to develop business plans for the implementation of computers and communications as well as to establish future directions in systems directions.

Data base architecture. This is primarily a planning function aimed at locating appropriate new tools and providing corporate policies for data base management.

Policies and standards. This department affects all corporatewide technological issues — both software and hardware — and assures homogeneity

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throughout the different divisions.

A fifth department might also be included in this list:

Technology planning. Objectives here should range from following up on new tools (particularly programming tools and packages) to technology transfer. Also included is market evaluation: How far along is the competition in respect to our company?

Focus on strategy

A company's strategy is its master plan against an opponent. Other plans more specific in function and more detailed in nature are subordinate to it. Strategy is specific to the industry in which it is applied and to the company it concerns. Goals, resources, environment and organizational culture must be considered in shaping strategy.

Strategic planning must rest on three pillars: market perspective, human capital and modern equipment. Chief technology officers are not necessarily strategic planners, but they can contribute much to the strategic plan. They place information systems at the disposal of management to use as tools in planning.

> CHIEF technology officers are not necessarily strategic planners, but they can contribute much to the strategic plan.

Every organization needs to establish valid management approaches for addressing strategic and operational issues concerning computers and communications. One key question constantly confronting top management is, "What is our product line?"

The questions a chief technology officer can answer are, "What can technology do for our product line? Is our use of technology making our products more appealing? Sharply cutting our costs? Giving us a competitive edge in distribution? Increasing our products' reliability and availability?" For all these questions, the strategic aspects have to be answered first.

For example, one multinational bank takes the following approach in looking to technology to gain the upper hand against competition:

- The banking industry depends on computers and communications for the development, production and delivery of its products. Therefore, the technical solutions that are developed closely connect with the products and services that are offered. Just the same, the products and services depend on the technical solutions that are available — or can be made available.
- The change from a regulated to a nonregulated banking environment greatly affects competition. The strategic aspects have changed. The new opportunities for profit in banking services greatly affect the kinds of technology that can be used to give a bank competitive advantage. In addition, the technology to be adopted influences both the perspectives and the setting of the organizational framework.

With these two premises, the bank's top management analyzed the technological supports that characterized the last two generations of product strategy: the second-generation product strategy — distributed data processing — of the early to mid-1970s and the third-generation product strategy — networking and distributed data bases — of the late 1970s to mid-1980s.

With this background, they took the forthcoming fourth-generation product strategy into consideration — a fully online system enriched with AI and other sophisticated features.

In a regulated banking environment, the now-obsolete second-generation banking products and associated technology might have been fine. But such a market does not exist. The market today is dynamic and competitive. Because of its need to compete, this innovative, nonregulated environment demands high technology for survival. But it also requires getting the banking products to the marketplace faster.

According to the bank's analysis, if an organization is first in the market with a product and uses a fourth-generation product strategy, it can reap a good profit. It will make less with a third-generation product strategy. It will lose money with a second-generation strategy.

If, on the other hand, there are delays in bringing the product out and reaping its benefits, then the market will pass the organization by. Even a fourth-generation strategy will show losses — at least a few losses. Much more money will be lost with a third-generation strategy, and a second-generation strategy will amount to being bled dry.

This system solution exemplifies the implementation of corporate strategy. At the same time, the corporate strategy defines both the investment in and the nature of the system to be developed and implemented.

A chief technology officer is the innovator, the agent of change and the consultant to a chief executive officer.

Adapting to a new culture

At Nomura Securities Co. in Tokyo, the chief technical officer was instrumental in networking workstations throughout the organization. The goals of the new system design were to develop the best solution possible for account executives, managers and other professionals and to integrate all information sources into one

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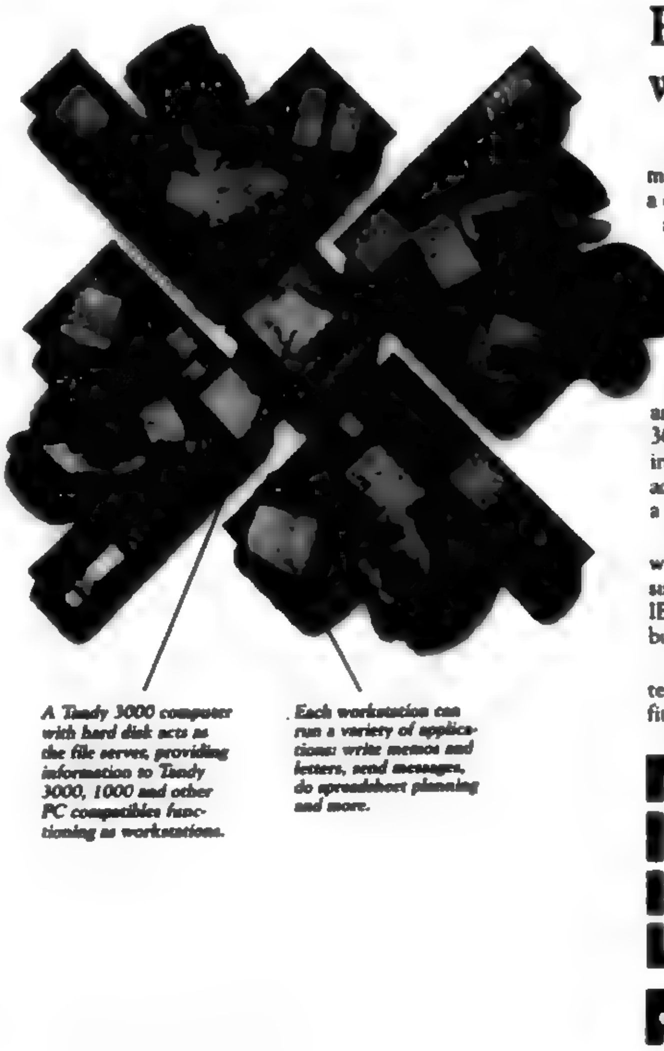

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intelligent terminal as well as to merge in-house information and outside financial information and market data into one logical structure. All account executives are connected to the Nomura Securities network. Each employee has a personal multifunctional workstation.

In network design, the goal is to achieve a single, AI-enriched solution. Physical structures will be integrated into it, but the top logical layer, currently under development, is universal. Decisions on the direction the implementation should take are necessary. In a banking environment, basic questions might include the following:

- Can we really afford to invest in a partial, near-sighted modification of a paper-based debit transfer system when the world is moving swiftly toward satellite communications, interactive workstations and electronic mail?
- Can we afford to divert scarce resources for five to seven years to modify an already obsolete system when our competitors are learning to use electronics to deliver products on-line and increase customer service?
- Does it make sense to invest in low-return changes and pass up high-return opportunities with new avenues such as expert systems?

Trying to increase paper-processing efficiency by solving pseudo-problems and proliferating specialized changes that hold little appeal in the marketplace does not make sense. This view consists of unrelated fragments that, in a few years, will leave a bank wondering what happened to its market position, its clientele and its profits.

A new culture is needed — one based on high technology and the management of change. Chief technology officers should be an organization's change agents. To be such, they should be instrumental in convincing their peers at the top management level of the wisdom of organizationwide computer literacy.

Taking it from the top

Any successful computer literacy program starts at the top. The chairman, president and members of the board should be the first to embrace it. The board of directors must decide that the organization will use every opportunity to educate its people — from chairman to janitor — on technology. Harry Gray, former chairman of United Technologies Corp., demonstrated this point by being the first to take a computer literacy course in his organization; Mellon Bank Chairman and Chief Executive Officer J. David Barnes did the same.

To do this job ably, a chief technology officer must spend 100% of his time riding horses, not desks. To stay on top of technological advances and keep his personnel informed, his time should be spent as follows:

- Visiting the vendors of high-tech products, particularly computers and communications products.
- Meeting with top people of other organizations in the same or similar line of business.
- Talking to research personnel about future products.
- Attending seminars in order to learn from a lecturer who can offer perspective.
- Participating in conferences or symposia and being ready to exchange opinions.

Shared knowledge is the key to future growth. Free communication among technologists lubricates further progress. If communication is hindered, an organization's competitive edge will be dulled, and development will proceed much more slowly.

Logical resources are the foremost level of wealth at the end of this century. Logical resources differ from physical resources in one important way: The more we distribute them, the more we have.

For 15 years, I worked as a consultant to the chairman of a large financial and industrial group whose topmost priority was to focus on a given subject. He cared less about the decision than the process. He was convinced that not focusing on key subjects would eventually destroy the organization.

The role of a chief technology officer is now under scrutiny. How you implement it in your organization is your business. But the mission, I hope, is clear. ●

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TAKING CHARGE

Les Gilliam

MIS's paper investments

The story I am about to share with you is true. The names have been omitted to protect the innocent, the guilty and the lucky. This story is about a project that was on the ropes, so to speak. But with a small investment in some very crude documentation, complaining users turned 180 degrees, becoming supportive, excited and willing to pay the bill.

First, let's put the subject of documentation in perspective. Do you consider documentation an expense or an investment? If it can make a difference in the success or failure of a development project, it certainly has potential value as an investment. If it speeds up the training of the personnel responsible for the operation of the system, doesn't that have a dollar value? Quicker recovery from system failures and outages certainly can be translated into dollars. If one of your key employees quits and no useful documentation is left behind, the time it takes you to diagnose a problem could be embarrassing and maintenance costs could be high.

Now for the story. For many years, the users had to work with some complex and unhandy batch programs to perform certain calculations. Then a quick-

Continued on page 68

Managers playing the numbers

To gauge performance, MIS leaders target customer satisfaction

BY DAVID A. LUDLUM
CW STAFF

Data processing managers plan to step up recently launched efforts to measure the quality and productivity of their systems, and they view customer satisfaction as the best gauge, according to a survey by the Quality Assurance Institute in Orlando, Fla.

The results of the survey, conducted for the first time, suggest that the use of quantitative measurements of DP quality and productivity is not widespread but is poised for growth.

The institute conducted the survey by polling 71 organizations that took part in its National Conference on Data Processing Quality and Productivity in Orlando last year.

The institute noted that this group is probably more advanced in the field of DP measurements than are typical organizations. "These are some of the largest corporations in the country, the Fortune 50-type companies," said William E. Perry, the institute's executive director. "It's not representative of the community. They came to a conference on the subject."

Among the respondents, 55% said their organizations make quantitative measurements of DP quality or productivity through a formal program.

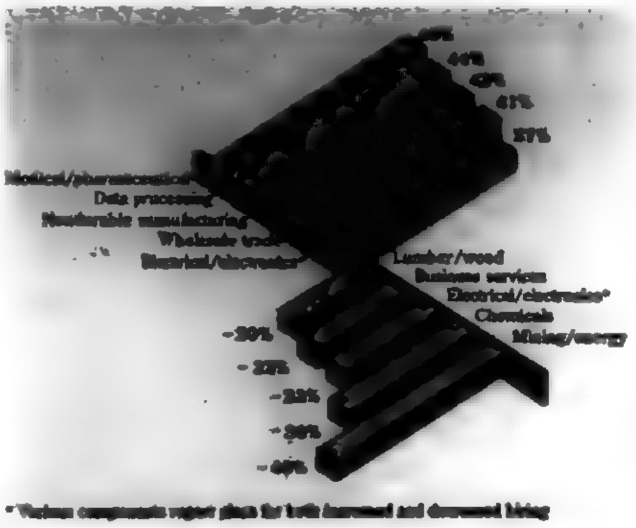
The organizations reported

Continued on page 67

Data View

Hiring trends

In a survey on hiring in data processing, respondents from these industries most frequently reported plans to increase or reduce work forces in the second half of this year



*Various components report plans for both increased and decreased hiring

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CW CHART: AMY J. SWANSON

State MIS eyes security

BY DAVID A. LUDLUM
CW STAFF

State government data processing managers face many of the same concerns as their private-sector counterparts, including lack of security and management support, according to an annual study.

A lack of physical and data security poses "frightening" prospects to state government information systems managers, just as it does in the corporate world, says Carl Vorlander, executive director of the National Association for State Information Systems, Inc. in Lexington, Ky., which recently released the results of its 1987 study of state government systems.

"One of the needs is a recog-

Continued on page 72

Tymnet unifies work force

BY JEFFRY BEELER
CW STAFF

SAN JOSE, Calif. — In a move aimed in part at improving interpersonal communications, the owner of the Tymnet public data communications service is embarking on a consolidation of its facilities in the San Francisco area.

The process is set to begin this week when McDonnell Douglas Network Systems Co., which owns Tymnet, moves some 250 software developers from their current workplace in nearby Cupertino, Calif., to a just-completed complex in this Silicon Valley city.

Slightly less than one month later, the consolidation should continue when the firm relocates its customer support and maintenance staff and its local network control center to the same site.

If all goes well, the process is expected to be completed by Sept. 15. By then, McDonnell Douglas will have moved roughly 1,100 employees and unified nine previously separate facilities stretching in a 40-mile arc from Cupertino to Fremont, Calif., according to project leader Phil Arroyo.

For Tymnet, the impending consolidation promises to improve the flow of internal information by removing barriers to

Continued on page 68

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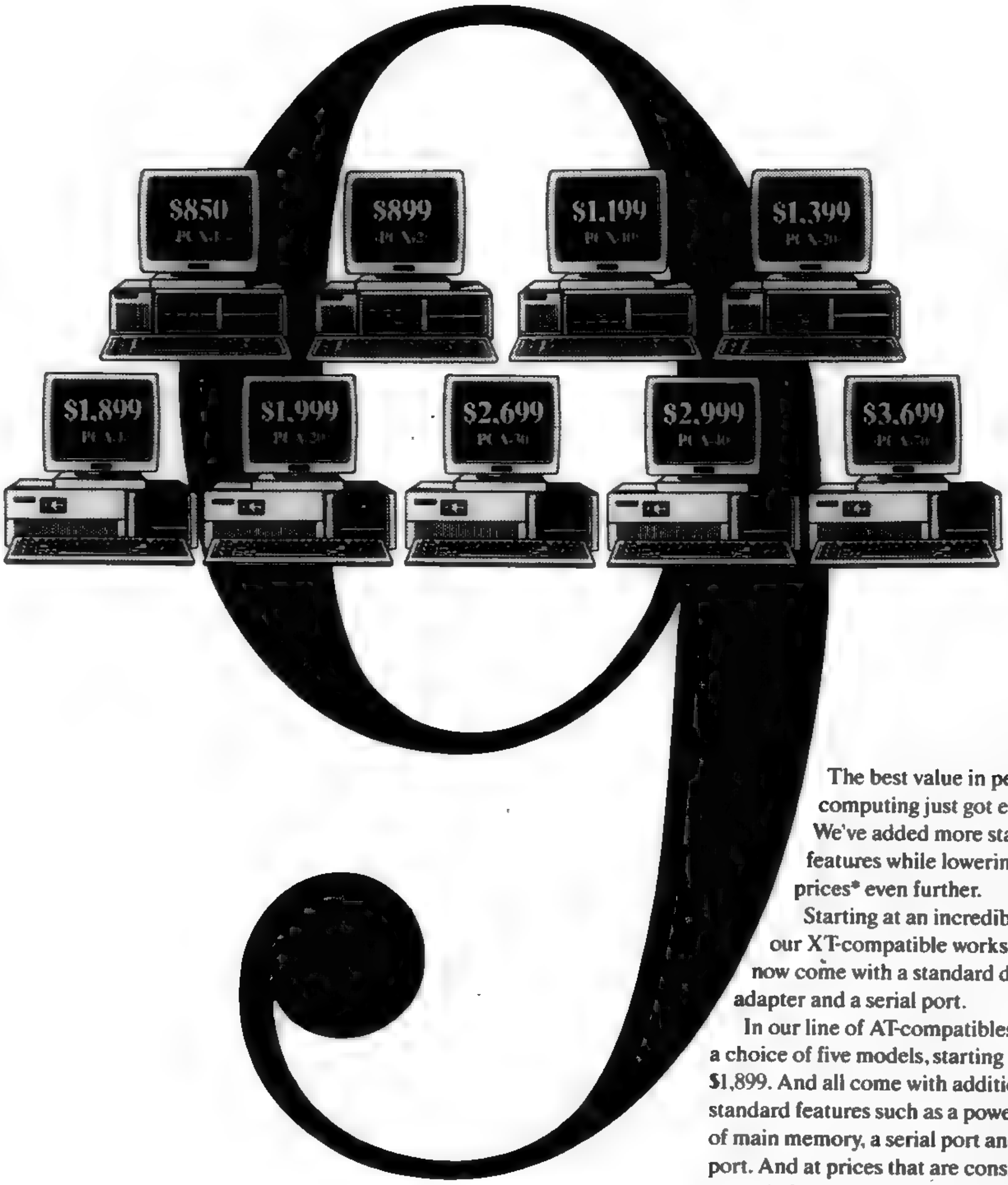

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Playing numbers

CONTINUED FROM PAGE 65

they have been making the measurements for an average of 2.7 years, with 85% having started within the last three years.

The respondents suggested plans for significant increases in the use of the measurements, with 88% indicating they will use additional measurements in the next year. When asked to rate their direction during the next two years on scale of one to five, with one representing an increase in use of measurements and five a decrease, the average response was 1.7.

Customer's always right

When asked to cite the most effective measures, respondents most frequently named customer satisfaction. That was followed by availability of applications to customers, adherence to budgets and keeping up with schedules.

When asked which activities they currently measure, however, respondents cited customer satisfaction fifth most often. It was preceded, in order, by project status, computer availability, computer operations and completion of system development documents.

More than one-third of the respondents — 38% — said they could not identify tangible benefits from the measurements, but most of those firms are probably those with little or no experience with measurements, Perry said.

The payoff

Of the tangible benefits cited, the most frequently named were reduced maintenance, improved customer satisfaction, establishment of standards, fewer production errors and reruns and increased awareness of problems.

Most frequently cited as ineffective measures were adherence to project schedules, sticking to project budgets, employees' time reporting and the number of lines of code employees produce per day. "There's been an idea that the more lines per day, the more productive. The institute believes that's false. It's got nothing to do with how good the quality is," Perry said.

Adherence to budgets and schedules was reported as both effective and ineffective because "what some companies are doing well, other companies are doing very poorly," he said. "Some companies are just kind of picking numbers out of the air. That's my interpretation of why they're ineffective."

Respondents indicated that their best sources of data for developing measures are logs or other records from previously produced software, customers or end users, problem or incident reporting systems, accounting systems and quality control checklists.

More than two-thirds of the respondents — 70% — said they do not use software tools to collect quantitative information on data processing or to analyze it. No single tool was reported to be used by more than 17% of the group, the same percentage that indicated they use internally developed tools.

The obstacles to measurement programs most frequently cited were staff acceptance, lack of tools, getting started and reliability of data reported by staff members. Data that is reported by staff members can be unreliable on account of their lack of objectivity, ability or time, according to Perry.

Perry claimed the lack of quantitative measurement in data processing reflects a general lack of control. "Without some reliable numbers, DP management doesn't really know what they're doing," he said. "The tools of management are measurement and control. You can't control what you can't measure. If you don't measure DP, by definition it's out of control."

He said one participant in the conference cited the lack of measurement in speculation that senior managers rarely promote data processing managers to general management positions because "they're afraid they will run the company like DP — as an artistic endeavor without measures."

CALENDAR

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Computer Associates International, Inc. Annual User Conference. Orlando, Fla., July 26-31 — Contact: Computer Associates International, 711 Stewart Ave., Garden City, N.Y. 11530.

1987 Summer Computer Simulation Conference. Montreal, July 27-30 — Contact: The Society for Computer Simulation, P.O. Box 17900, San Diego, Calif. 92117.

Siggraph '87 — The Fourteenth Annual Conference on Computer Graphics and Interactive Techniques. Anaheim, Calif., July 27-31 — Contact: Siggraph '87, Conference Management, Smith Bucklin and Associates, Inc., Suite 600, 111 E. Wacker Drive, Chicago, Ill. 60601.

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Recognition Technologies Users Association Annual Forum: Remittance and Document Processing. San Francisco, Aug. 2-5 — Contact: Recognition Technologies Users Association,

Continued on page 72

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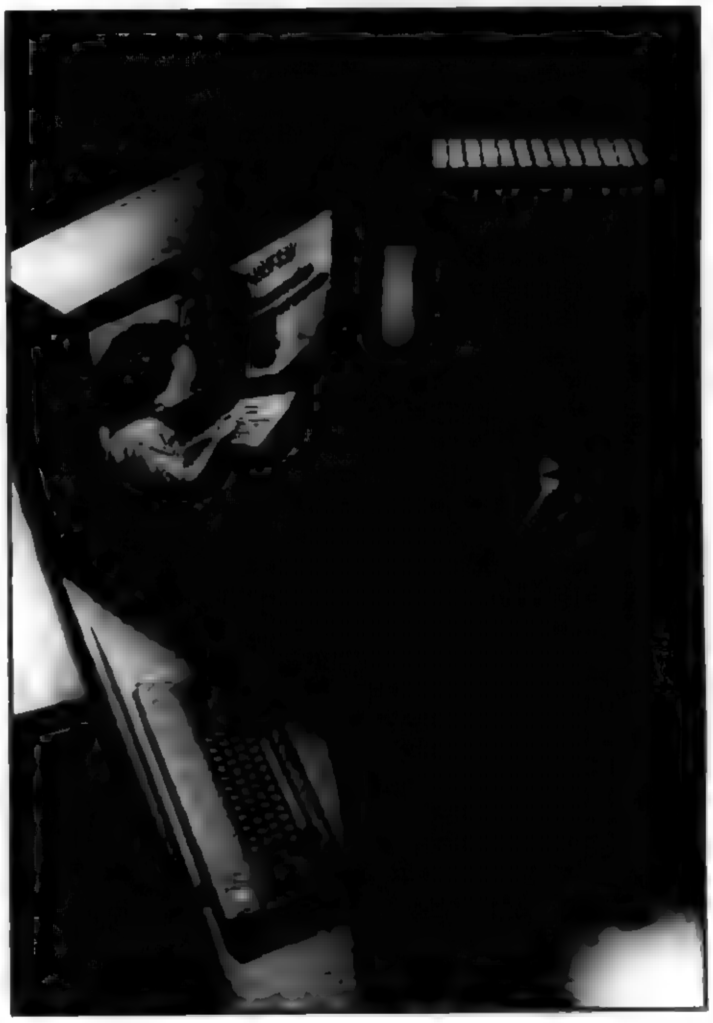

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Investments

CONTINUED FROM PAGE 65

and-dirty project was initiated to develop a front-end program to present users with a menu of choices and then call in the selected program for execution.

Enter an outside vendor with an "easy-to-use" package of programs and clear instructions on how to use them. The users envisioned a short learning curve and increased productivity. What they didn't fully appreciate was the limited capability of the vendor's programs.

A decision was made to develop a simple tutorial that would provide an overview of the in-house system. The results were amazing. Users requested another tutorial on specific segments of the system. More tutorials were written. Consideration of the outside vendor's product was shelved. Relationships between MIS and user management improved.

There are a couple of factors that merit comment. One is the simplicity of the tutorials. The goal was to make them so simple that any member of the user organization, including the top manager, could sit down at a terminal and in just a few minutes successfully execute the system, albeit with simple examples.

The other factor concerns the cost and appearance of the tutorials. They were drafted on a personal computer and printed on a dot matrix printer. Hard copies of display screens were reduced on a copy machine and pasted on the pages. Facilities were available to prepare very professional, high-quality publications, but the project manager wanted the tutorials to reflect a project that was still under development.

Write for hackers, lackers

There are some other factors MIS managers might consider in creating appropriate user documentation. The documentation must have a target audience. You may have to divide it into basic and advanced documentation. The basic documentation would be aimed at the novice and be used for training. The advanced documentation would be directed toward the experienced user and prepared for reference use.

Programmers in general have never been good at preparing documentation. One reason is that they know too much about the system. In preparing user documentation, you do not have to tell everything you know.

Try to target the basic documentation at learning or training. Then, target the advanced documentation at referencing a majority or high percentage of the situations that might arise. Next, let the help desk, backed up by the programming staff, serve as the resource for other rare or more complex questions.

If you do not have qualified staff with time to do the user documentation, there are alternatives. Perhaps the user could supply an individual to prepare the documentation. Or perhaps an investment in outside help would be wise in order to meet the schedule and satisfy the user.

Finally, remember that the documentation carries a very clear message. It reflects your concern for and interest in the users' needs. Preparing quality documentation suited to the purpose can pay great dividends, even to the point of being a key factor in your success.

Gilliam is an independent computer and management consultant based in Ponca City, Okla.

Tymnet

CONTINUED FROM PAGE 65

interpersonal communication. "Because of the distances separating them, people in different sections that should have been communicating sometimes haven't done so," said Clint DeGabrielle, the network systems firm's vice-president of marketing and domestic field operations. "But once all of us are in a single location, employees who have never worked together before will finally be able to interface."

The imminent move is also expected to prove a boon to Tymnet's productivity by eliminating unnecessary travel between the firm's various local sites.

For Tymnet's users in the Fortune 500, the move is expected to improve response times to inquiries about the nature and scope of the network's services. With the new, consolidated complex, "Our entire Bay Area staff will be connected to the same general incoming phone number," DeGabrielle said.

For all its promised advantages, though, the proposed move is by no stretch of the imagination wholly without risk. "Our greatest fear," Arroyo said, "is that we'll shut down our phone and data communications systems on a Friday evening and won't be able to bring them up again in the new location by the following Monday morning."

To avoid such a calamity and ensure continuity of customer service, Arroyo said he will take some commonsense precautions. "We plan to have all the data lines and systems in our consolidated facility installed, checked and operational before we disconnect any equipment in the old site," he said.

As part of the upcoming move, Tymnet said it intends to replace its network control center's existing communications processors with some improved models, installing them before the move. The processors, manufactured by the McDonnell Douglas Computer Systems Division, will reportedly verify user passwords, collect customer accounting data, monitor data communications traffic and pinpoint network problems.

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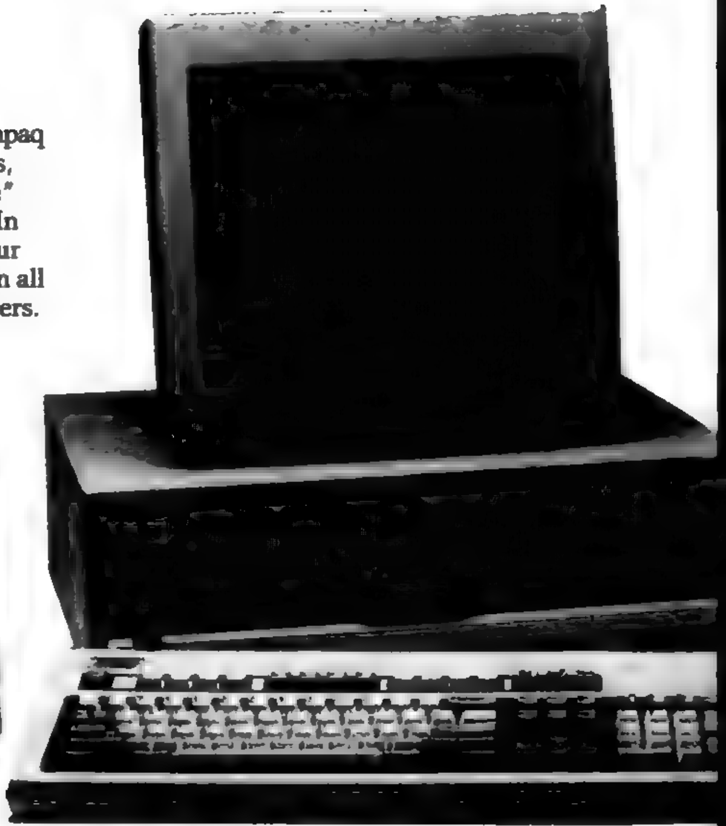

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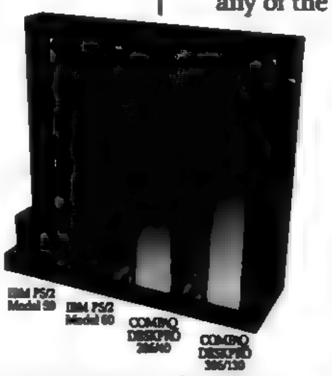

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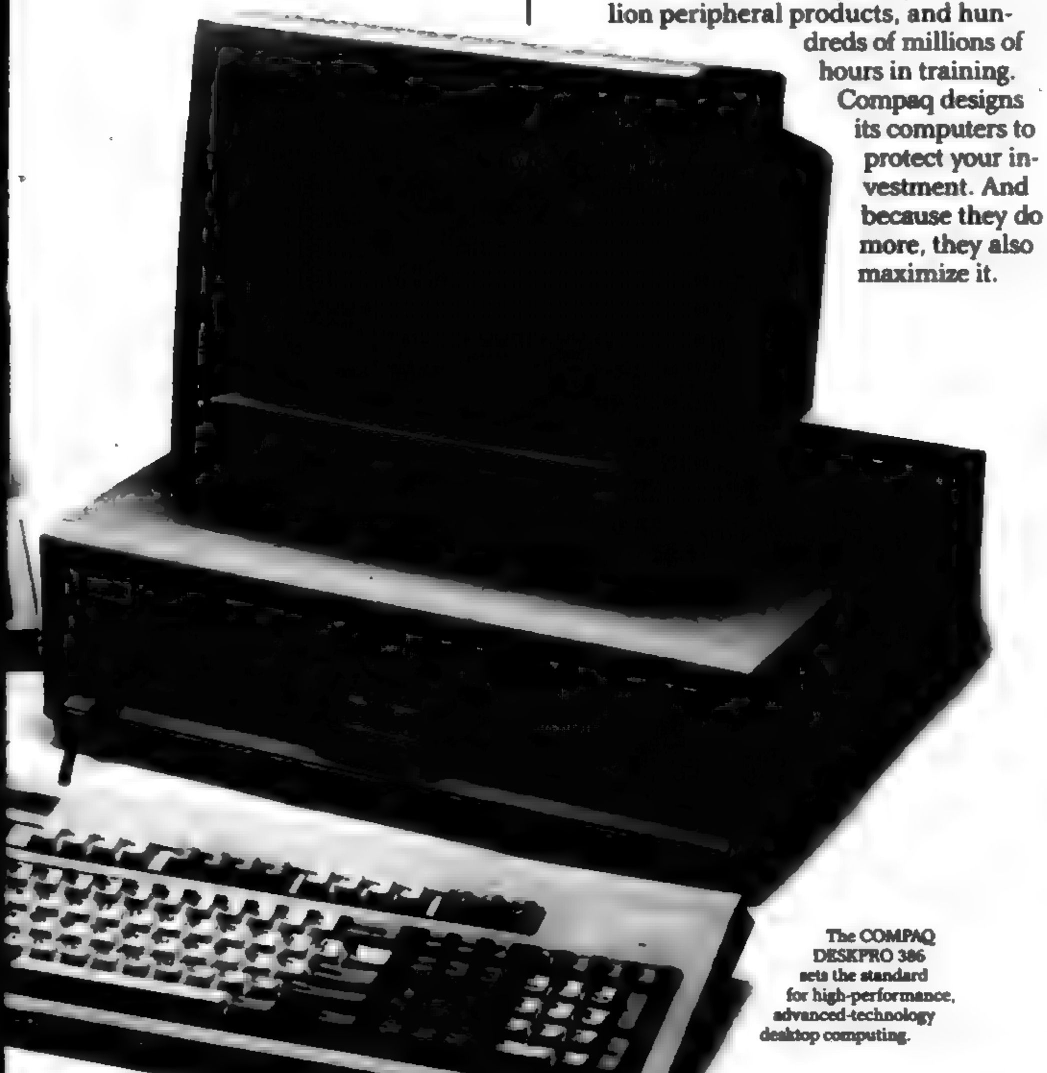

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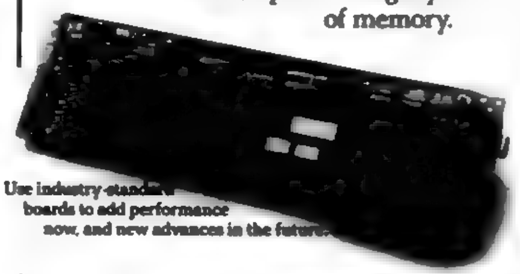

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Oct. 12	Leasing & Used Equipment	Oct. 2

State MIS

CONTINUED FROM PAGE 65

nition on the part of the policymakers that [a lack of security] does exist. There's no sense of urgency. People say, 'You've never been hurt, so maybe we don't need to spend this kind of money,' " Vorlander said.

"Maybe that's our fault," he added. "Maybe we're not yelling loud enough, but we've certainly been yelling since we've been writing these reports."

State governments tend to run large, relatively sophisticated DP installations, Vorlander said. "You're talking about some pretty big files — three million automobiles or taxpayers." Like corporations, the states are rapidly installing IBM 3090-class mainframes and wide-area networks, he said.

The states' spending for software and communications grew 100% in 1986 from the previous year, with one reason being the greater availability of software applications, the study indicated. "A few years ago, all this was in-house. Now they're finding more and more off the shelf," Vorlander said. "Communications has just grown."

The study also points to a "dramatic" rise in the use of service contracts for designing systems and programming, perhaps in part because of a cautious economic outlook, Vorlander said. "Where it's a one-shot upgrade, we're not going out and hiring programming staff; we're not staffing up to the same degree," he said.

Some state budgets for computer training grew more than 50%, the study said. Some of the increase reflects an improved financial picture after severe budget constraints in the early 1980s, Vorlander said. "The emphasis has always been there; the cash may not have been."

State organizations also resemble the private sector in a shift in the role of information systems managers from control to coordination with the expansion of end-user computing, according to the study. This decentralization stresses the need for standards, integration, documentation, budget reviews and studies of cost-effectiveness, Vorlander said.

"There comes a time when this field has grown large enough that there's got to be a little decentralization to get the most effectiveness out of the current state of the art," he said. "I've always felt that state government pretty well reflects the corporate world. In some cases, they lead it. In some cases, they are behind."

INDUSTRY INSIGHT

Bohdan O. Szuprowicz

Faster chip within sight

A few years ago, gallium arsenide semiconductors were touted as faster, cooler and more immune to electromagnetic radiation than conventional silicon chip technologies. Some market researchers predicted that these semiconductors would account for multibillion-dollar markets by the mid-1990s.

But reality has not borne out those lofty projections. The high cost of gallium arsenide microchips, advances in complementary metal oxide silicon technology and the semiconductor industry slump have combined to prevent the gallium arsenide markets from taking off as rapidly as was originally expected.

Many electronic systems designers have concluded that gallium arsenide will remain a niche market for specific uses in high-speed telecommunications, signal processing, military intelligence and some supercomputers.

Back in limelight

Now, new forces are at work again boosting gallium arsenide, and IBM is believed to have a large gallium arsenide research and development program. The inevitable drive for higher speeds in supercomputers is undoubtedly a major factor.

The latest R&D programs suggest it may be possible to increase by fivefold the currently known penetration velocity of electrons through gallium arsenide materials. Because gallium arsenide is five times faster than silicon on this score already, these microchips may be 25 times faster in the future.

If computing is following a trend toward optical technology because of the physical limitations of silicon technology at very high speeds, then gallium arsenide microchips, with their optic capabilities, appear even more attractive. Thus, even skeptical venture capitalists are again giving attention to gallium arsenide start-ups.

Kopin Corp. in Taunton, Mass., is one of the latest ventures involved in the development of thin films of crystalline material, which are expected to lead to larger and cheaper galli-

Continued on page 75

Industry rebound continues

Apple, NCR exceed expectations; Oracle, DCA continue to thrive

BY ADAM STONE
CW STAFF

Led by NCR Corp., Apple Computer, Inc. and Tandem Computers, Inc., the computer industry last week reported generally strong second-quarter financial results that continued the upswing trend of the first quarter.

In addition, the semiconductor industry showed strong recovery signs, with both Intel Corp. and Advanced Micro Devices, Inc. (AMD) reporting their strongest quarters in two years or more (see story page 74).

NCR. NCR exceeded its earnings expectations for the quarter and reported its seventh consecutive quarter of double-digit revenue increases.

NCR posted earnings of $98.6 million, an increase of 25% from the $78.9 million in earnings it reported in the like quarter a year ago. Sales grew to $1.35 billion, up 16% from last year's figures. Earnings per share were $1.05, up from 80 cents in the like quarter last year.

NCR's earnings came in above most industry expectations, primarily because of the firm's personal computer sales, according to Bob Grandhi, an analyst with Interstate Securities, Inc.

Increased sales of NCR's personal computer and Tower supercomputer lines, both introduced within the last five years, contributed heavily to the revenue increases, according to Jonathan Fram of Bear, Stearns & Co. in New York. "I think the company made a good bet on new products a few years ago," Fram said.

The weakening of the dollar abroad also contributed to the company's revenue increases, analysts said. NCR's Pacific and European marketing groups led the overall revenue advances.

Apple. Analysts said Apple's third-quarter sales wildly exceeded industry expectations. The company reported net income of $53.5 million, or 40 cents per share, an increase of 65% from the $32.3 million, or 25 cents per share, reported in the like quarter last year.

Revenue grew to $637.1 million, up 42% from the $448.3 million in sales it reported in the corresponding 1986 quarter.

Willard Brown of First Albany Companies, Inc. in Albany, N.Y., called the revenue increases "almost unbelievable."

Apple attributed half of its quarterly revenue to the high acceptance of new Macintosh products, especially the Macintosh SE and the Mac II, as well as

Continued on page 75

1987 second-quarter earnings

The industry showed solid growth in many sectors, but IBM continues to lag

Reported loss of $[illegible] million in 1986
Reported loss of $20.3 million in 1986
Reported earnings of $806,000 in 1986

CW CHART

Hogan chairman resigns

BY ALAN ALPER
CW STAFF

DALLAS — In a major shock at one of the software industry's hottest recovery companies, Hogan Systems, Inc. Chairman and Chief Executive Officer George L. "Larry" McTavish abruptly resigned last week over "philosophical differences" with the banking software company's board of directors.

McTavish, who just last month was promoted from president to succeed Gregor Peterson [CW, June 15], could not be reached for comment. A company spokesman said McTavish and the board have agreed not to reveal the nature of their differences.

Gary Fiedler, a Hogan board member and chairman of First Interstate Bank of Nevada NA, was named to replace McTavish. Fiedler, who has held a number of positions within the banking

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Inside

- U.S. chip makers battle back; Intel, AMD notch strong quarters. Page 74.
- Sprint names president, faces $350M pretax charge for second quarter. Page 74.
- Product integration concerns cause Arete, Plexus to abort merger. Page 75.

Ask to swallow competitor NCA

Acquisition furthers firm's position in DEC manufacturing software

BY JAMES A. MARTIN
CW STAFF

LOS ALTOS, Calif. — Ask Computer Systems, Inc. said last week it plans to acquire NCA Corp., a competitor in the Digital Equipment Corp. manufacturing software market, for $43 million.

Under the agreement, Ask will make a tender offer to acquire NCA's outstanding common and convertible stock, and NCA will become a wholly owned subsidiary.

Ask developed and markets a manufacturing management information software system, called Manman, for use in DEC and Hewlett-Packard Co. HP 3000 minicomputers.

NCA currently offers a manufacturing resource planning system that integrates manufacturing, financial and sales and marketing information. The firm's software is DEC VAX compatible, and the company is a reseller of VAX systems and peripherals.

Strengthens presence

The acquisition should enable Ask to "get more products onto the factory floor," said John Girton, an analyst with Birr, Wilson Securities & Co. in San Francisco.

"This may be a way for Ask to take NCA's software, which helps companies manage inventories, and integrate it onto the factory floor through computer-integrated manufacturing," Girton said. "So they'll be able to integrate the two packages, if that's what they intend to do."

However, NCA might prove to be "a drag on Ask's earnings" for a while, Girton said.

"NCA's debt level — about $10.7 million — is a little heavy, and the company has lost money for several years in a row," he added.

'Buying customers'

According to William Shattuck, a software analyst with Montgomery Securities in San Francisco, the merger will help Ask move further into the desirable DEC manufacturing market. "On the surface, however, it looks like Ask is really just buying customers and market share rather than expanding into any new markets," Shattuck said.

Ask approached NCA for acquisition as a means of increasing its own market share, according to Ronald Braniff, chief executive officer of Ask. The combined companies are expected to have an installed base of about 2,000 systems, divided equally between HP and DEC environments.

Plans for integrating products and for staff changes have not been determined yet, Braniff said. "There will be some degree of overlap in all areas of the company, but our goal is to bring into the company all the people we can," he said.

Officials at NCA were not available for comment.

Sprint replaces president

Former United Telecom exec to take charge of troubled firm

BY ELISABETH HORWITT
CW STAFF

KANSAS CITY, Mo. — After a year of aggressive expansion coupled with mounting operating losses under President Charles Skibo, U.S. Sprint Communications Co. has replaced Skibo with Robert Snedaker Jr., the company announced recently.

Snedaker is the former vice-chairman and chief operating officer of United Telecommunications, Inc. He may have been hired to introduce bottom-line consciousness to the troubled company, or to evaluate whether the Sprint joint venture between GTE Corp. and United Telecom should be terminated, according to John Bain, a senior vice-president at Shearson Lehman Brothers, Inc.

"Snedaker has been put in there to fix things or else to write the venture off," Bain said.

GTE and United Telecom jointly announced that Sprint's financial results for the second quarter of 1987 will include a nonrecurring pretax charge of approximately $350 million. Of this charge, $76 million reflects a write-off of uncollectible accounts receivable from problems experienced during the start-up of the joint venture, rapid customer growth and the transition to a consolidated billing system.

An additional $260 million stems from a write-down of analog-microwave network assets, which are being made redundant as the company nears completion of its fiber-optic network. The network is scheduled to carry 90% of the interexchange carrier's traffic by year's end, the partners said.

On a losing streak

Inefficient bill collection has been just one of Sprint's woes under Skibo's year-long tenure, according to Bain. The analyst noted that the company's losses have grown larger each quarter, and predicted that the second quarter would show a $600 million to $650 million loss on $600 million to $700 million in revenue.

Bain estimated that uncollectibles constituted 19% of Sprint's first-quarter revenue, while leased facilities for WATS and other telecommunications accounted for 27%. The latter figures reflect Skibo's strategy of aggressive and expensive recruitment of new customers, Bain said.

"Last year, Sprint offered an additional 10% discount if customers signed up for a year. They got a tremendous response, and were forced to lease more facilities from MCI [Communications Corp.] and AT&T because they couldn't support the increased traffic on their existing facilities," Bain said. This may have completely erased Sprint's profits from those new customers, he added.

Chip industry on the mend

Intel, AMD report healthy revenue, income for quarter

BY JAMES A. MARTIN
CW STAFF

The U.S. semiconductor industry showed further signs of recovery last week, with two of Silicon Valley's leading chip makers, Intel Corp. and Advanced Micro Devices, Inc. (AMD), reporting strong revenues and income. AMD reported its first profitable quarter in two years.

Each company's revenue growth reflects a strong upturn in the chip industry as a result of sales of a variety of chip technologies, according to Thomas A. Thornhill, technology analyst for Shearson Lehman Brothers, Inc. in San Francisco.

"These companies have been through a difficult period already, so they're fairly lean and more efficient, and they're getting good earnings increases as a result," Thornhill said. "But more importantly, their growth has been based on a broad range of products. The micro area has been important for sales, but so have discrete and standard logic products. That's the best indicator of a strong recovery."

Intel said its second-quarter sales were $439 million, compared with $305 million for the same period last year. Net income was $46 million, or 38 cents per share, compared with a net loss last year of $20 million, or 17 cents per share. Intel had not enjoyed a net income of that size since third-quarter 1984's $70 million.

For the first six months of fiscal 1987, Intel's revenue was $833 million, up 42% from $585 million. Net income was $72 million, or 59 cents per share, compared with a loss of $43 million, or 36 cents per share.

Intel's actual income would have been higher without the $10 million spent to surprise its 18,000 employees with a bonus check equaling one week's pay. The company rewarded those employees on board since Dec. 31, 1986 for helping Intel through its slump.

AMD, Motorola show gains

Sunnyvale, Calif.-based AMD reported first-quarter sales of $192.4 million, compared with $154 million for the same quarter last year. Net income was $4.1 million, or 2 cents per share, compared with a net loss last year of $28 million, or 49 cents per share.

In another encouraging sign for the chip industry, Motorola, Inc. reported that sales of its semiconductor products increased 13% in the second quarter.

Motorola also said its semiconductor profits increased by an unspecified amount. New orders, led by demand from computer vendors, consumer electronics firms and semiconductor distributors, rose 19%.

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Hogan

CONTINUED FROM PAGE 73

industry, has resigned his post at First Interstate to run Hogan on a full-time basis, the Hogan spokesman said.

Although Fiedler has not previously held a position within the software business, analysts said he has been around Hogan long enough to understand its products and position in the market.

"He's been more involved in Hogan than his position as a board member would connote," said Terence Quinn, an analyst with E. F. Hutton & Co. "Hogan's board has been more actively involved in running the company than most boards are."

Analysts expressed surprise at the timing of McTavish's departure. "It's absolutely a surprise; it's something of a shocker," noted David Thomas of Hambrecht & Quist, Inc. "Apparently, the board suddenly lost confidence in him for some reason."

Masterminded profit strategy

Many industry observers have credited McTavish with masterminding the strategy that enabled the once-foundering company to regain profitability and credibility. Through the first nine months of fiscal 1987, Hogan's revenue was up 36% to $30.7 million, while operating profits reached $4.8 million, compared with a $4 million loss for the corresponding period last year.

Expense reduction and a strengthening of its international customer base have played a part in returning the company to profitability this year after two consecutive years of losses, analysts have said.

Analysts have also lauded McTavish's recent acquisitions of Systems Four of Durango, Inc. and GDK Systems, Inc., which have enabled Hogan to flesh out its product line and are expected to provide incremental growth.

A key to the firm's strategy is the unprecedented relationship McTavish forged with IBM last year, when IBM became the exclusive marketer of Hogan's banking software in the U.S. and Canada in return for royalties. Analysts last week said IBM reportedly has recently reached contract agreements with a number of unidentified banks. "The IBM deal appears to now be taking off," Hambrecht & Quist's Thomas said.

Speculation about McTavish's unexpected exit centered around a variety of issues, including disagreements with certain board members on the future direction of the company and personality conflicts.

McTavish "may have planned several more acquisitions that, in terms of size, were bolder than what the company had done before," E. F. Hutton's Quinn noted. "Perhaps the board would not go along with him."

McTavish may have been pushing to broaden Hogan's relationship with IBM on either a product or geographical basis, Quinn suggested. McTavish is also believed to have been interested in getting Hogan into the professional services business, he added, a move the board may have contested.

One analyst, who requested anonymity, said McTavish's resignation may have resulted from a power struggle with former chairman Peterson, who remains on the board. "There may have been some professional jealousy between Peterson and McTavish, since McTavish is credited with turning around the company," the analyst noted.

Rebound

CONTINUED FROM PAGE 73

the Apple II GS.

"The most important thing is that they are making progress in the corporate accounts," Grandhi said. "They are opening doors in the Fortune 1,000. That's a very strategic thing for Apple. It seems that corporate America has decided to make new investments in the PC area."

Brown speculated that in 1983 and 1984, there was a mad corporate rush for PCs, and when massive productivity increases were not instantly forthcoming, the storm died down a little.

Apple spokeswoman Barbara Krause said she believes the Apple experience this quarter is indicative of a general upswing in the industry, brought on by the introduction of new products from Apple, IBM and other companies.

The September quarter should boost year-end revenue even higher, as personal computer sales to students and schools increase, according to William O'Connor Jr. of Fourteen Research Corp. in New York.

Tandem. Strong international business, accounting for 44% of fiscal third-quarter sales, propelled the Cupertino, Calif.-based fault-tolerant systems vendor to a 41% profit gain on a 31% rise in revenue. Tandem earned $25.6 million, or 26 cents per share, on revenue of $264 million.

Tandem reported major new contracts in its target markets during the quarter, including a pact with Morgan Guaranty Trust Co. of New York's Belgian operations center and deals with two of Japan's three leading retailers.

Tandem won all of those contracts in conjunction with other vendor partners under the firm's Alliance partnership program.

Honeywell, Inc. The only remaining wholly owned part of Honeywell's computer business, its Federal Systems unit, experienced a drop in profits compared with the like quarter in 1986. Most of Honeywell's noncomputer divisions had profit increases, contributing to an overall 24% rise in earnings from continuing operations to $54.3 million. Revenue increased 19% to $1.57 billion.

The company would not disclose the exact amount of the Federal Systems drop. However, the decline was sufficient to wipe out an otherwise increased profit in the company's aerospace and defense business.

When Honeywell Bull, Inc. was formed, Honeywell agreed to divide future Federal Systems profits with the spin-off company.

A Honeywell spokeswoman said that this profit splitting accounted, at least in part, for the reported drop in profits. The company would not disclose results from Honeywell Bull, which Honeywell jointly owns with Compagnie des Machines Bull and NEC Corp.

Honeywell Bull recently announced that Executive Vice-President Eugene Manno, a 26-year Honeywell veteran, had resigned to pursue other interests. Manno had headed Honeywell's Billerica, Mass.-based small systems division since 1982. Manno said his departure was not related to the formation of Honeywell Bull earlier this year. His responsibilities have been divided among several executives.

Oracle Corp. Oracle made a strong showing in its fourth quarter ended May 31, as it had throughout the fiscal year. Revenue increased 142% to $50.4 million, up from $20.8 million in the like period last year.

Net income increased 195% to $7.6 million, compared with $2.6 million in the corresponding quarter of 1986. Earnings per share increased from 8 cents in the like quarter last year to 24 cents.

Oracle, headquartered in Belmont, Calif., markets the Oracle relational data base management system. Its principal competitor in the field is Ingres, a product from Relational Technology, Inc.

"Oracle has jumped ahead of Ingres because of its focus on the IBM mainframe and IBM Personal Computer and on building a strong worldwide distribution network," said Scott Smith of Donaldson, Lufkin and Jenrette, Inc. in New York.

Fiscal 1987 revenue was up 137% to $131.3 million, from $55.4 million in the previous fiscal year. Net income was up 165% to $15.6 million, compared with $5.9 million last year. Earnings per share increased from 21 cents in 1986 to 50 cents.

Digital Communications Associates, Inc. (DCA). The Alpharetta, Ga.-based vendor of network communications systems reported that its net income for the year was up 91% from that of 1986.

Revenue for the fiscal year ended June 30 totaled $181.4 million, up 20% from fiscal 1986 figures.

Net income was $28.4 million, or $1.91 per share, compared with $1.10 per share a year earlier.

Net income for the fourth quarter was $6.9 million, an increase of 72% over the like period in 1986. Net income per share was 47 cents, up from 27 cents last year. Revenue for the quarter was $45.3 million, up 22% from last year but down 10% from the previous quarter.

Industry analysts said that the 10% quarter-to-quarter dip was caused by a decrease in sales of DCA's micro-to-mainframe communications product line, Irma.

According to Stephen Cotler at Montgomery Securities in San Francisco, the drop-off in sales was the result of a normal industry slowdown brought on by IBM's Personal System/2 announcement.

Now that companies have had a chance to evaluate the impact of the IBM announcement, Cotler said, DCA will be "on its way back to solid growth."

Seagate Technology. The Scotts Valley, Calif., manufacturer of rigid magnetic disk drives reported a strong quarter and year, with annual revenue more than doubling 1986 figures.

Revenue for the fourth quarter ended June 30 was $250 million, an increase of 77% from the $141.5 million reported in the fourth quarter of 1986. Net income for the quarter was $37.1 million, or 74 cents per share, up 126% from $16.4 million, or 34 cents per share, in last year's like quarter.

For the year, revenue was $980 million, up 108% from the 1986 total of $459.8 million. Year-end net income was $139.7 million, or $2.81 per share, up from $34.5 million, or 72 cents per share, reported last year.

Sales to IBM accounted for 17% and 24% of revenue for the quarter and the year, respectively. No other customer accounted for 10% or more of Seagate's revenue during either period.

Senior Editor Clinton Wilder contributed to this story.

Arete, Plexus scrap merger plans

SAN JOSE, Calif. — Unix-based systems makers Arete Systems Corp. and Plexus Computers, Inc. have canceled their previously announced intent to merge because of concern about integrating the two Unix-based product lines.

The decision to abort the merger was mutual, as each company's board arrived at it separately, according to both companies.

The combined company, which was to have retained the Plexus name, would have created a firm with about $65 million in annual revenue [CW, April 27].

The companies said they felt their multiuser system product lines, originally thought to be complementary, contained too much overlap for the merger to make sense.

Both firms said they expect no major changes because of the merger cancellation.

Arete sells primarily to OEMs, including Unisys Corp., while Plexus utilizes direct sales and value-added reseller channels.

Faster chip

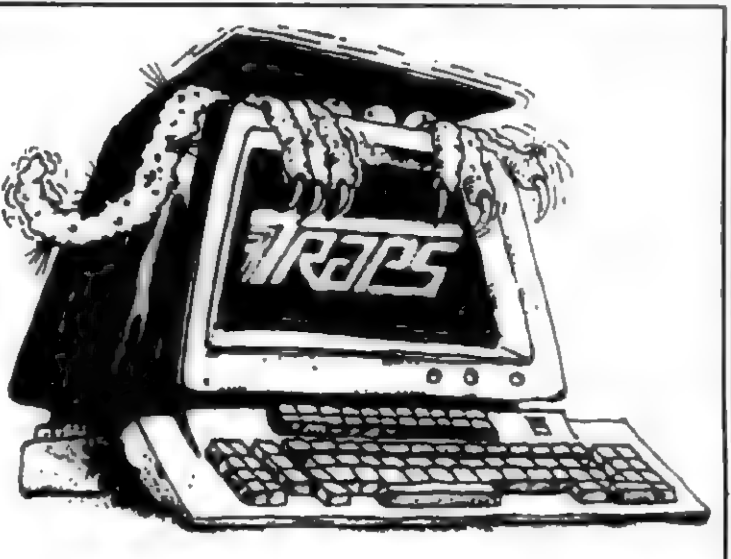
CONTINUED FROM PAGE 73

um arsenide microchips. The 1984 start-up has received $25 million in two rounds of financing from leading venture capitalists, including the Charles River Partnership, Venrock Associates and a major unidentified industrial corporation.

Gigabit Logic, Inc. in Newbury Park, Calif., is the granddaddy of gallium arsenide microchip ventures, with a total of $49 million in three rounds of financing from a large syndicate of venture capital firms and major corporations, including Analog Devices, Inc., Cray Research, Inc. and Digital Equipment Corp.

With another two dozen or so major electronics manufacturers in the U.S., Japan and Europe positioning themselves to clean up on any gallium arsenide bonanza in the future, only the best financed ventures will have a chance of survival.

Szuprowicz is president of 21st Century Research in North Bergen, N.J., and publisher of "Supergrowth Technology USA."



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EMPLOYMENT TODAY

Getting paid what you're worth

Understand employer's salary range, approach negotiations cautiously

BY ROSE MULA
SPECIAL TO CW

Many MIS professionals approach salary discussions the same way they make new car purchases: They prepare to negotiate with a mixture of excitement and dread. Can they get the best deal, or will the slick interviewer talk them into accepting less than they deserve?

"I really hate job interviews," says one MIS applicant. "I don't mind talking about my qualifications, but I never know what to say when they ask about salary requirements. I want to make as much money as possible, naturally. On the other hand, I don't want to price myself out of the picture."

On the other side of the table, an employer depends on his workers to do their best possible jobs every day — unlike an automobile dealer, who is primarily concerned with short-term profits. The employer knows workers will not perform well if they feel cheated on salary.

"Salary negotiations are not adversarial situations," says Howard Specter, president of Gilbert Lane Personnel in Hartford, Conn. "Companies are looking for value, and they are prepared to pay for it. In fact, many employers often make unexpectedly generous offers."

Good impressions pay off

The best way for MIS professionals to make sure they experience such largess is to simply make a good impression on the employer throughout the interview process.

"Candidates should make the best possible impression on everyone from the receptionist to the employment manager to the potential boss," says Robert Hammond, president of R. F. Hammond & Associates in Lexington, Mass. "You should try to impress them all with your ability, energy and professional demeanor. Every position has a salary range. The more they want you, the more likely your offer will be at the high end of the range."

Despite the willingness of both the candidate and the interviewer to straightforwardly discuss salary, applicants should still be somewhat cautious about revealing their ideal salary, according to recruiters.

Moment of truth

Candidates should avoid specifying their salary expectations until they know that the company wants them and that they really want the job.

However, at some point during the interview process, candidates must answer the question: "What kind of a salary are you looking for?"

It's the moment of truth. The job is exactly what you want. Should you ask for less money than you expect because you don't know what the company will pay, so as not to risk losing the job? If you do present a low figure, you may regret it and find it awkward to retract.

> "SALARY negotiations are not adversarial situations. Companies are looking for value, and they are prepared to pay for it. In fact, many employers often make unexpectedly generous offers."
>
> HOWARD SPECTER
> GILBERT LANE PERSONNEL

Candidates who deal through an employment agency are sometimes in a better position to negotiate because agencies usually know the salary range for the job.

The want ads seldom list salaries. But applicants can make an educated guess. "Check agency newspaper ads to determine salary levels for similar jobs," Hammond says. "However, keep in mind that some agencies follow the unfortunate practice of printing slightly inflated salaries in order to attract applicants. Use the figures shown only as a rough guide."

Hammond also suggests checking with friends who hold similar jobs. "You can't ask them what they are earning, of course, but you can say something like, 'How much do you think a good software engineer is worth?' "

In most cases, a candidate's salary requirements are closely tied to his current earnings. "A candidate can anticipate an average increase of 5% to 8% of current salary," Hammond says. "If you make an outstanding impression, a company might extend itself to 10%."

Hammond advises his clients to initially ask for a salary 10% higher than their current earnings. "If you feel you are in a strong position, you might even go as high as 12% to 15%, if such a figure is within the company's range for the job," he adds.

Howard Levin, director of RSVP Services in Cherry Hill, N.J., concurs. "A 5% to 15% increase over current salary is a good rule of thumb," he says. "The higher end is justified if you possess critical skills that the company is having difficulty finding or if you've been working in a typically low-paying environment, such as a college."

Honesty's the best policy

Deborah Schrader, employment representative for Arkwright Mutual Insurance Co. in Waltham, Mass., suggests another approach. "It's very simple," she says. "To get the best offer, a candidate should simply tell the truth."

Often, people will lie about their current salaries, she observes, because they want a higher base from which to negotiate. "That is always a mistake," she says. "You eventually trip yourself up when you lie — you forget what you said to whom. It really isn't necessary, even if you are underpaid in your present job. Your current salary does not determine your worth. Your talents, skills and experience do. Our company often offers more than we know a candidate would accept because we want to be fair."

The bottom line is that most companies are not looking for bargain employees, Schrader adds. They want to hire good people who will stay with them at least three to five years.

Mula is a Waltham, Mass.-based freelance writer.

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Software Engineer - Analyze users needs; design, develop, implement and maintain hardware and software for telecommunications system. Interface hardware and software. Use IBM 4000 series, MVS system, COBOL, Assembler, EPABX system; write program specifications as needed. Bachelor's degree in Computer Science. 1 year experience. 40 hours per week. $24,354 per year. Mail resume: NYS Job Service, JO #NY8026748, 97-45 Queens Blvd, Rego Park, NY 11374.

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This is a senior level DP position that will involve data base design, implementation and data administration functions. Position will involve the promulgation and maintenance of data standards. The DB/DA will work with other GIS and Data Center staff on system design, implementation and operational procedures involving DBMS software. Other responsibilities will include data standard maintenance for other non-data base files. The DB/DA will also be responsible for maintaining the Data Dictionary and other related operational procedures.

Salary: $33,966-$46,592. Graduation from an accredited college or university with a Bachelor's degree in computer or systems science, business or public administration, accounting, engineering or a related field and 4 years experience as a data base administrator or closely related position, to include use of data base design software in developing data dictionaries. Additional related experience may be substituted for the required education on a year-for-year basis.

GIS MAPPING/GRAPHICS ANALYST

This is an experienced position requiring "hands-on" experience with mapping and graphics software, system analysis and design and development of required software. Close cooperation will be maintained with the GIS participating agencies. Specific tasks will include: procedure development, application design and coding, troubleshooting and problem resolution, vendor coordination, staff training and macro/symbol set development. First key assignment will involve the implementation of GIS/mapping and CADD software packages on new City and County hardware.

Salary: $27,892-$38,292. Graduation from an accredited college or university with a Bachelor's degree in computer or systems science, business or public administration, accounting, engineering or a related field and 3 years technical or supervisory experience using query, report writer and related software in computer assisted drafting/engineering or graphics/mapping applications. Additional related experience may be substituted for the required education on a year-for-year basis. (Prefer local government graphic/mapping, plotter/driver software and FORTRAN, PASCAL or C experience).

GIS PROGRAMMER ANALYST

This position is for an experienced candidate who will be responsible for the design and implementation of advanced, on-line systems using Fourth Generation Language tools. Systems will use DBMS technology and will be integrated with graphics and mapping applications. Design environment will include the use of automated design tools, rapid prototyping and rigorous participant agency involvement. First major involvement will be the design and implementation of a Subdivision Approval and Monitoring System.

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GIS TECHNICAL SUPPORT

This is a technical support position for an experienced candidate with a background in computer graphics peripherals, plotters and workstations/terminals. Position will involve much interaction with GIS agencies and software/hardware vendors. Basic duties will involve system operation, training, troubleshooting and support activities. Will also work with other professional Data Center and telecommunications staff.

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Candidates should respond with a resume, proof of education, salary history and copy of Social Security card by August 14, 1987 to:

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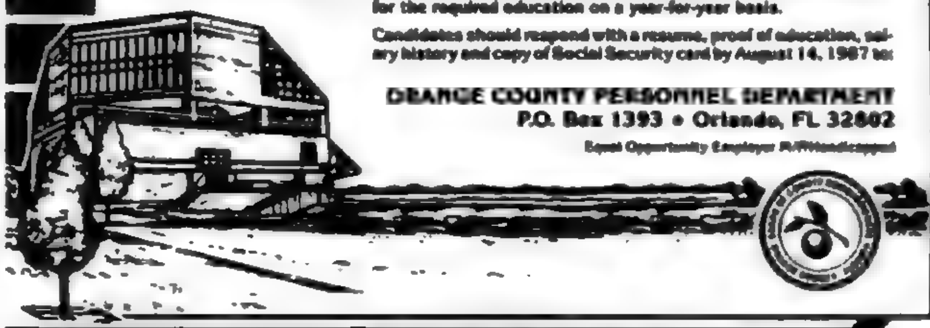

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MICHELIN: A Quality Environment

Michelin Tire Corporation, located in Greenville, SC, built its reputation on quality and we remain at the forefront as a result; providing state-of-the-art challenge to our employees at every level. We currently have two outstanding opportunities for Data Processing professionals with application experience in a manufacturing environment. A BS degree is preferred.

PROJECT LEADER
Database Administration

The qualified individual will have technical experience in IDMS-DB/DC, LRF, Schema/Subschema compilers and on-line IDD and IDMS system utilities. Culprit, OS-JCL, VSAM, ADS-O, TSO /SPF, ANS Cobol, Assembler and ASF required. Experience in Cullinet's ICMS and IDB a plus.

Responsibilities include supervising a database systems staff, installing and maintaining Cullinet system software, conducting design reviews, training Operations and Response Center staff in IDMS, monitoring and tuning IDMS Central Versions, and assisting the Applications staff in problem-solving and database enhancements.

SENIOR DATABASE ANALYST

The qualified candidate will have technical experience in IDMS-DB/DC, and Cullinet's utilities (DDDL, ADSOBGEN, MAP compilers). OS-JCL, ADS-O, TSO/SPF, Assembler, Culprit, VSAM, and ASI required. Experience with DBMS including migration utilities a plus.

Responsibilities include working with Applications staff in the use of Cullinet's applications packages, installing and maintaining Cullinet applications packages, assisting in design reviews, writing procedures and in-house development. Will be working in a multiple dictionary environment.

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We are a Fortune 500 public utility located in Denver, Colorado. We offer a competitive salary structure and an excellent benefits package.

The initial contract period is two years with potential for permanent employment.

Applicants must have advanced skills in: IBM S370; 3090 MVS-TSO; VM/CMS (9370); JCL; PL/I; IMS DL/I; VSAM. Experience in GPG, GDBS, MARK IV and Fortran desirable.

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Send resume and salary requirements
no later than July 31 to
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Denver, Colorado 80202

COMMUNICATION SOFTWARE ENGINEER

Seeking Communication Software Engineer. Must be able to design and develop sophisticated software and/or systems for telecommunication equipment, especially for telephony switching applications and digital transmission equipment. Bachelor of Science degree in Electrical Engineering, Computer Science or related degree is required. Qualified applicants must have experience in such areas as Data Base management, call Processing Voice and Data Interface, Integration and test or specification requirements planning for Central Office or PABX applications. Must have minimum of one year experience in job offered. Advanced degree accepted in lieu of experience but must have knowledge of telecommunication software applications. Forty (40) hours per week; $32,000 per annum. Send resumes to:

Job Service of Florida
195 E. Broward Blvd.
Ft. Lauderdale, FL 33301
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- IBM S/38, RPG-III (N. Cal/S. Cal)
- PC LAN, NETBIOS (San Francisco)
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SOFTWARE SPECIALIST (Systems Programmer)

The University Library at California State University, Long Beach is seeking an experienced computer professional to provide systems programming support for the development and operation of a new automated library processing system (NOTIS) operating on a dedicated IBM 4381 computer system.

Experience and qualifications should include minimum of 2 years experience in operating systems programming in an IBM mainframe environment, equivalent to 4 year degree, working knowledge of DOS/VSE, CICS, ICCF, VSAM, VTAM, and familiarity with PL/1 programming language is highly desirable, as is experience with the VM environment.

Salary: Minimum $28,788 depending on experience and qualifications. Send application with resume and 3 references to: Staff Personnel, California State University, Long Beach, 1250 Bellflower Blvd., Long Beach, CA 90840, (213) 498-4881. An Equal Opportunity/Affirmative Action/Title IX Employer

Data Processing

"Where Innovation is a Tradition"

The California State Automobile Association, a large AAA affiliated auto club and inter-insurance bureau offers an opportunity for Data Processing Professionals to join our state-of-the-art IBM shop. Our internal promotion policy and friendly working environment make employment at CSAA an excellent professional opportunity for you.

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This position will research, recommend, implement and support methods of connecting CSAA office systems and end-user computing equipment. The emphasis will be on micro-mainframe terminal emulation and file transfer functions, and may also include telecommunication, cooperative processing, and Local Area Networks as well as data transfers between diverse microcomputer environments. The successful candidate must have a minimum of 3 years of business experience, including at least 2 years in a Systems role. Mandatory requirements include: Mainframe Systems Analysis preferably using structured methodologies in an IBM 370 shop with VM/SP, MVS; experience with connection of IBM PC to other computers (both micro and mainframe); equipment interfacing skills, teamwork, diplomacy, patience; and excellent English communication skills (both oral and written) are absolute musts. End-user support experience and Apple Macintosh experience would be helpful. **This position requires the ability to lift and carry up to 40 lbs. as part of the equipment installation process.**

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If working as a Data Processing Professional is your specialty, and you are looking for a challenge, please send your resume, to: **Jolan Hegedus, Personnel Department, California State Automobile Association, 150 Van Ness Ave., 5th Floor, San Francisco, CA 94102.** We are an Equal Opportunity Employer.

California State
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Data Processing

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Assisting user/scientists, you will develop and install data retrieval/analysis systems, conduct formal training and provide consultation as necessary. You will need a B.S. in Computer Science or a related discipline and at least 5 years' computer/systems experience; 2 years' in a VAX VMS/Oracle environment is preferred. Excellent communication-interpersonal skills and the ability to conduct formal training are also important.

Biochemistry Systems Analyst

Working primarily with data collected from laboratory instruments, you will provide hardware and software support to the Biochemistry laboratory and administrative personnel. You will develop software to collect, store and retrieve database information and train and assist users in the function of customer and commercial software packages. You'll need the ability to communicate articulately with various levels to determine needs, resources and strategies.

A B.S. in Computer Science, or a related business/scientific field, and 3+ years' experience, or an M.S. and 1-3 years', are required. Previous programming experience in FORTRAN on Hewlett-Packard 1000 series computers, PASCAL and systems support with real-time data acquisition computers in a laboratory environment is necessary.

We offer a competitive salary, comprehensive benefits and the opportunity for personal and professional growth. For immediate consideration, please forward your resume, with salary history and requirements, to: Site Personnel, CIBA-GEIGY Corporation, P.O. Box 18300, Greensboro, NC 27419. An Equal Opportunity Employer m/f/h/v.

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We have a new and challenging opportunity which will support our software development, PC, and office automation needs in a Burroughs (A15) shop. The ideal candidate must have a Burroughs background, including LINC, DMS2, and MCP, with proven supervisory skills. Transportation experience a definite plus.

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Sr. CICS Programmer

Beautiful Scenery, Great Outdoor Recreation, Mild Weather, Short Commutes, Affordable Housing, Good Schools, and a Challenging Job with a Progressive Governmental Data Processing Consortium. If you are an accomplished CICS programmer seeking to expand your skills, this may be the job for you. The Lane County Regional Information System is recruiting for the position of System Programmer 2 to join a technical support staff that maintains a multi-CPU system including MVS, CICS 1.7, and TCS -- a locally developed terminal control monitor used by a 1000+ terminal network. The person hired will be part of a small team responsible for supporting TCS and assisting with a gradual migration to CICS. Excellent CICS and IBM/370 assembler programming skills are required as well as in-depth knowledge of CICS. Experience with MVS internals, systems software development & support, ADR/Datacom/IDEAL, applications generators, and TCS or Software AG's Complete would be very helpful. Salary range is $26,354-$35,318 per year plus liberal employee benefits including generous paid leave, health and life insurance, and employer-paid pension. Contact Lane County Personnel, 125 E 8th Ave, Eugene, OR 97401-2926 (503) 687-4171, to obtain required questionnaire. EOE.

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Monthly salary range: $2,887 to $3,508. Requires a minimum of 3 years experience in the field of electronic data processing systems analysis and programming, computer operations, or data preparation and control, including some direct supervisory and management experience. Also requires graduation from an accredited 4 year college or university with major coursework in data processing or a closely related field. Additional qualifying experience may be substituted for the required education on a year-for-year basis. Apply by August 5, 1987 at the Tacoma-Pierce County Health Dept., Personnel Section, 3701 Pacific Ave., Tacoma, WA 98408. EOE.

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Business Analyst
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Programmer/Systems Analyst

Applicants must possess two or more years of programming experience in COBOL, and at least two of the three qualifications listed below:

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DEC

- Prog'r analysts w/VAX, VMS & Basic

IBM

- Prog'r analysts w/CICS, IDMS, ADSO 2 + yrs exp
- Prog'r analysts w/VTAM, TCAM, BTAM & CICS
- Systems prog'r w/MVS & IDMS

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Data Processing

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Minimum 1-2 years experience with ACP/TPF systems in large IBM mainframe environment. Duties include reviewing system outages and problems, making fixes to prevent recurrences, and recommendation and development of software tools to better monitor TPF systems. Good Assembler and dump reading skills required. Degree preferred

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Data Processing

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UNISYS

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Interested candidates should submit a letter of application, resume and 3 references by August 17th (extension) to: Office Of Human Resource Management, Duquesne University, 600 Forbes Ave., Pittsburg, PA 15282.

Duquesne University is a private, coeducational, accredited, urban university with an enrollment of approximately 6,500 students. It is located on a 39-acre site overlooking the downtown Pittsburg commercial and recreational centers of the City, which is rapidly becoming one of the nation's largest software research centers.

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PROGRAMMER ANALYSTS

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  - Florida Software
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SYSOREX provides medical, dental, life insurance and disability insurance at no cost to employees or their families, plus profit sharing. Please send your resume to Professional Staffing, Dept. CW-7/20, SYSOREX INTERNATIONAL, Inc., 3 Skyline Place, 5201 Leesburg Pike, Falls Church, VA 22041. An equal opportunity employer. Individuals only, please.

SYSOREX
Sysorex Information Systems, Inc.

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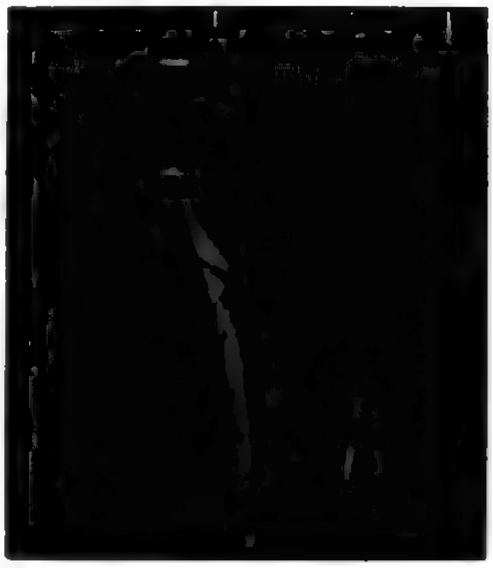

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John P. Bertsch is President of Bertsch & Company Advertising, Inc., a full service recruitment advertising agency headquartered in New York, with offices in Boston, MA and Irvine, CA. John is often asked by his clients to recruit data processing professionals and where to run their ads.

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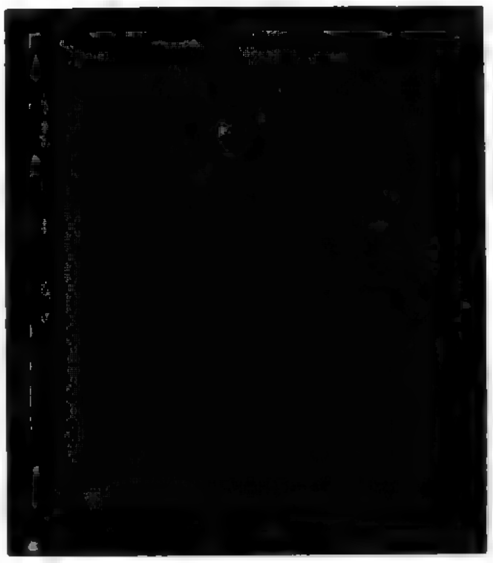

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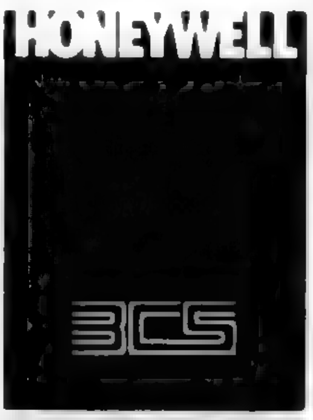
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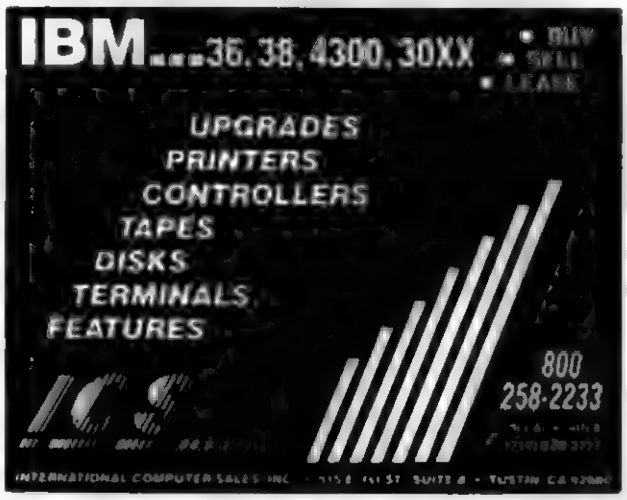
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BIDS & PROPOSALS

NEW YORK CITY HOUSING AUTHORITY PROPOSAL

Sealed Bids will be received by the Housing Authority at the Office of the Systems & Computer Services Dept (Rm 1221), 250 Broadway, NY, NY 10007

Bids will be publicly opened and read at the time and place stated UNTIL 11 am Friday, July 24 1987 Bid com002 to be opened at 11 15 AM

Housing Authority will receive sealed bids for the purchase of the computer equipment listed below Bids must be submitted on the forms provided by The Authority in the bid documents

Only Manufacturer will be considered "Responsible Bidders."

BID #com001; 1 CENTRAL PROCESSING UNIT FOR DISTRICT OFFICE USE

BID #com002; 10 CENTRAL PROCESSING UNITS FOR PROJECT USE

Bid documents may be obtained from Stanley Ferdinand, Assistant Director Systems & Computer Services Department (Rm 1209) NYC Housing Authority, 250 Broadway, New York, NY 10007

NEW YORK CITY HOUSING AUTHORITY REQUEST FOR PROPOSAL

The Housing Authority requests proposals from companies to provide persons with computer skills to carry out specific tasks for the Authority

Copies of the RFP will be made available beginning Wednesday, July 8 1987 in the offices of the Systems & Computer Services Dept, Rm 1207 250 Broadway NY, NY 10007 Responses must be returned not later than the close of business (4 30 PM) on Friday, July 24, 1987 Bids must be submitted on the forms supplied in the RFP package.

Inquiries should be directed to Stanley Ferdinand Assistant Director Systems and Computer Services Department, Rm. 1207, 250 B-way, NY, NY 10007 (212) 306-3502

NOTICE OF INVITATION FOR BID

The Parking Violations Bureau of the NYC Department of Transportation is soliciting bids to perform data collection and data processing service in relation to PVB's out-of-state program.

A copy of the bid and contract documents may be purchased for $30 (cash or certified check) at the NYC Department of Transportation, Division of Fiscal Affairs, Room 1232A, 40 Worth Street, New York, NY 10013, Monday through Friday, 9am-3pm, commencing Wednesday, July 15, 1987.

A pre-bid conference will be conducted at the Department of Transportation, 40 Worth Street, Room 1235, New York, NY 10013 at 10:30am on Thursday, July 30, 1987.

Bids are scheduled to be submitted to the NYC Department of Transportation, Division of Fiscal Affairs, Room 1236, 40 Worth Street, New York, NY, 10013, on Tuesday, August 25, 1987, no later than 11am

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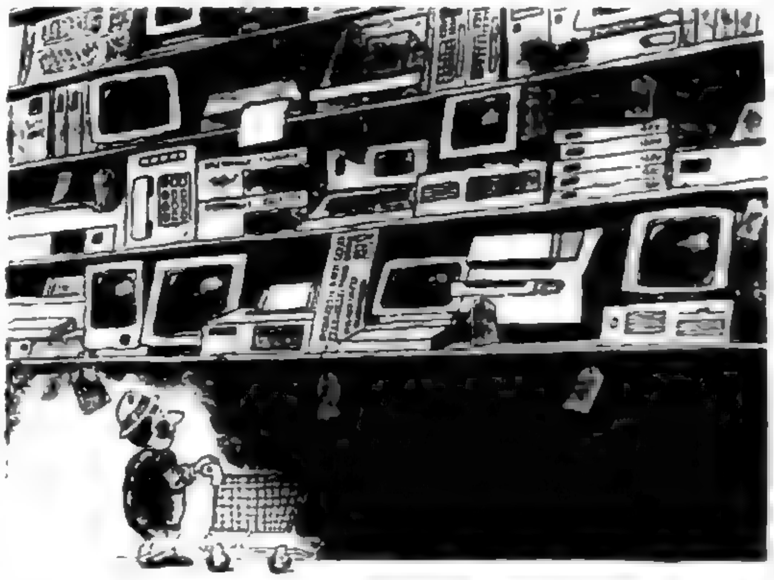

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Aug. 17	Field Service	July 31
Aug. 24	Education & Training	Aug. 7
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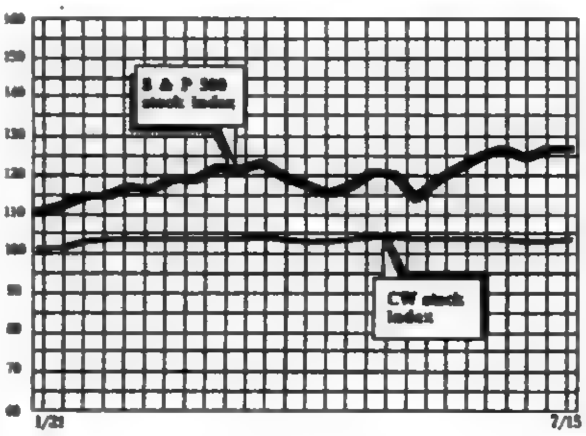

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Computer Systems	122.7	**128.1**
Software & DP Services	130.7	**133.6**
Semiconductors	111.2	**118.9**
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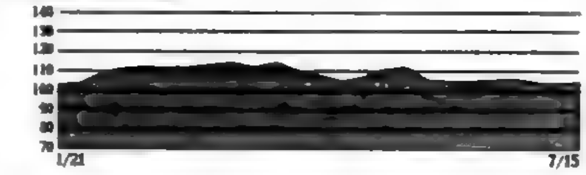

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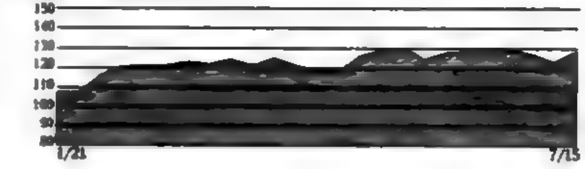

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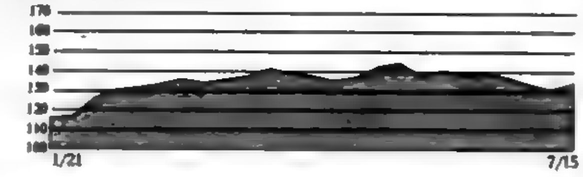

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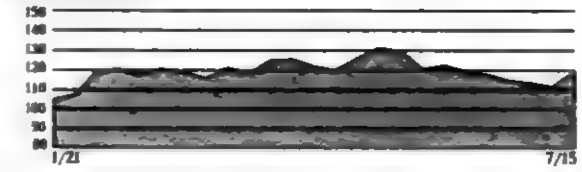

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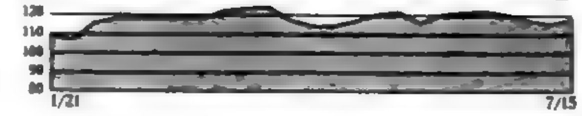
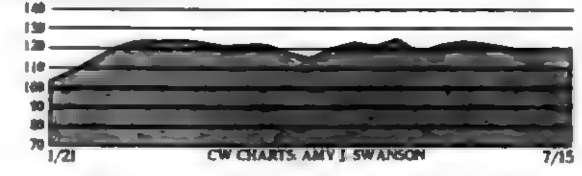


Leasing Companies



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Computerworld Stock Trading Summary

CLOSING PRICES WEDNESDAY, JULY 15, 1987

				PRICE		
EXCH		52-WEEK RANGE (1)		CLOSE JULY 15 1987	WEEK NET CHNGE	WEEK PCT CHNGE

Communications and Network Services

N	AMERICAN INFO TECHS CORP	101	77	83.88	-1.6	-1.9
Q	ANDREW CORP	19	14	15.00	-0.8	-4.8
Q	ARTEL COMM CORP	5	2	3.00	+0.0	+0.0
N	AT&T	31	22	30.25	+1.0	+3.4
Q	AVANT GARDE COMP INC	7	3	3.13	-0.4	-10.7
Q	AVANTEK INC	19	13	14.00	-0.5	-3.4
N	AYDIN CORP	38	18	33.50	+0.8	+2.3
N	BELL ATLANTIC CORP	77	62	65.50	-2.3	-3.3
N	BELLSOUTH CORP	46	35	38.00	-1.3	-3.2
Q	BRIDGE COMMUNICATION	27	11	23.13	+1.3	+5.7
Q	COMPRESSION LABS INC	13	4	5.00	+0.6	+14.3
Q	COMPUTER NETWORK TECH	8	4	3.81	-0.4	-9.0
O	CONTEL CORP	35	27	32.88	+0.0	+0.0
Q	DATA SWITCH CORP	9	5	6.75	-0.1	-1.8
Q	DIGITAL COMM ASSOC	49	17	36.25	+0.8	+2.2
Q	DYNATECH CORP	44	27	30.50	-0.3	-0.8
Q	EQUATORIAL COMM CO	7	2	3.38	-0.3	-4.9
Q	GANDALF TECHNOLOGIES	11	5	8.25	+0.0	+0.0
Q	GENERAL DATACOMM INDS	14	8	8.88	+0.1	+1.4
N	GTE CORP	43	34	38.25	+0.0	+0.0
Q	INFOTRON SYS CORP	13	7	9.50	-0.3	-2.6
N	ITT CORP	66	47	62.00	+1.6	+2.7
N	M A COM INC	16	12	14.25	+0.3	+1.8
Q	MCI COMMUNICATIONS CORP	10	5	7.75	+0.4	+5.1
Q	MICOM SYS INC	18	10	11.75	+0.4	+3.3
Q	NETWORK SYS CORP	19	9	10.13	+0.4	+3.8
N	NORTHERN TELECOM LTD	24	13	22.50	-0.8	-3.2
Q	NOVELL INC	27	9	21.00	+1.3	+6.3
N	NYNEX CORP	73	50	66.25	-1.6	-2.4
N	PACIFIC TELESIS GROUP	31	23	26.50	-0.4	-1.4
N	PARADYNE CORP	8	4	7.00	+0.3	+3.7
A	PENRIL CORP	6	4	4.75	-0.1	-2.6
N	PLESSEY PLC	41	24	36.88	+0.4	+1.0
N	SCIENTIFIC ATLANTA INC	20	9	16.63	-0.8	-3.9
N	SOUTHWESTERN BELL CORP	41	33	35.63	-2.1	-5.8
Q	3 COM CORP	24	9	17.88	+0.4	+2.1
N	TIMEPLEX INC	41	14	31.25	+1.8	+5.9
Q	UNGERMANN BASS INC	16	7	13.63	+1.4	+11.2
N	U S WEST INC	62	45	51.00	-1.3	-2.4

Computer Systems

Q	ALLIANT COMPUTER SYS	37	18	21.25	-0.8	-3.4
Q	ALPHA MICROSYSTEMS	7	3	5.88	+0.6	+12.5
Q	ALTOS COMPUTER SYS	17	10	12.50	+0.0	+0.0
A	AMDAHL CORP	42	17	40.00	+3.5	+9.6
Q	APOLLO COMPUTER INC	25	9	19.75	+1.6	+9.0
Q	APPLE COMPUTER INC	45	15	44.00	+6.8	+18.1
N	BOLT BERANEK & NEWMAN	80	37	40.25	+1.3	+3.2
Q	BRITTON LEE INC	5	3	2.75	-0.4	-12.0
N	COMPAQ COMPUTER CORP	51	12	47.00	+2.3	+5.0
Q	COMPUTER AUTOMATION INC	17	2	11.50	-1.3	-9.8
A	COMPUTER CONSOLES INC	12	7	9.25	+0.4	+4.2
Q	CONCURRENT COMP CORP	19	11	18.25	+1.0	+5.8
N	CONTROL DATA CORP DEL	35	20	28.88	+0.8	+2.7
Q	CONVERGENT TECH	12	4	7.63	+0.5	+7.0
Q	CONVEX COMPUTER CORP	22	8	15.75	+1.9	+13.5
N	CRAY RESH INC	136	69	102.50	+3.4	+3.4
Q	DAISY SYS CORP	13	8	7.88	-0.1	-1.6
N	DATA GEN CORP	39	25	31.38	+1.3	+4.1
N	DATAPOINT CORP	9	4	6.38	-0.6	-8.9
N	DIGITAL EQUIP CORP	175	82	165.63	+4.5	+2.8
N	FLOATING POINT SYS INC	35	8	11.25	+0.9	+8.4
N	GOULD INC	22	15	19.88	-0.1	-0.6
N	HARRIS CORP DEL	43	27	34.50	+0.3	+0.7
N	HEWLETT PACKARD CO	67	36	62.63	+2.1	+3.5
N	HONEYWELL INC	86	58	85.63	+5.1	+6.4
N	IBM	170	116	168.00	+1.3	+0.7
Q	INFORMATION INTL INC	17	13	14.25	+0.5	+3.6
Q	IPL SYS INC	3	2	3.25	+0.5	+18.2
Q	MASS COMPUTER CORP	10	5	9.00	+0.6	+7.5
N	MATSUSHITA ELEC INDL LTD	159	77	146.00	+3.3	+2.3
Q	MEGADATA CORP	7	2	5.50	+0.0	+0.0
Q	MENTOR GRAPHICS CORP	34	11	28.50	+2.8	+10.7
N	NBI INC	14	8	13.38	+0.6	+4.9
N	NCR CORP	80	42	77.88	+4.9	+6.7
N	PRIME COMPUTER INC	30	16	28.25	+2.5	+9.7
Q	PYRAMID TECHNOLOGY	12	4	9.00	+0.0	+0.0
Q	STRATUS COMPUTER	41	18	33.00	+1.3	+3.9
Q	SUN MICROSYSTEM INC	46	11	38.00	+1.1	+3.1
Q	SYMBOLICS INC	8	4	3.88	+0.0	+0.0
N	TANDEM COMPUTERS INC	38	14	31.00	+1.9	+6.4
N	TANDY CORP	56	31	45.50	+4.5	+11.0
N	ULTIMATE CORP	30	13	29.13	+3.4	+13.1
N	UNISYS CORP	131	64	129.88	+6.4	+5.2
A	WANG LABS INC	19	11	16.38	+0.8	+4.8

Software & DP Services

Q	ADVANCED COMP TECH	6	3	3.63	-0.4	-9.4
N	ADVANCED SYS INC	25	12	23.50	-0.3	-1.1
N	AGS COMPUTERS INC	22	8	17.50	+1.3	+7.7
Q	AMERICAN MGMT SYS INC	19	7	14.63	-0.9	-5.6
Q	AMERICAN SOFTWARE INC	22	7	15.25	+0.3	+1.7
N	ANACOMP INC	10	3	9.50	+1.3	+15.2
Q	ANALYSTS INTL CORP	11	4	8.75	+0.0	+0.0
Q	ASHTON TATE	30	10	26.25	+1.5	+6.1
Q	ASK COMPUTER SYS INC	17	9	13.88	+1.4	+11.0
Q	AUTODESK INC	285	8	22.25	+1.3	+6.0
N	AUTO DATA PROCESSING	51	29	48.50	+1.1	+2.4
Q	BOOLE & BABBAGE INC	11	4	10.75	+0.0	+0.0
N	COMPUTER ASSOC INTL INC	29	10	24.63	+1.1	+4.8
Q	COMPUTER HORIZONS CORP	15	10	13.13	+0.5	+4.0
N	COMPUTER SCIENCES CORP	61	30	56.25	+0.1	+0.2
N	COMPUTER TASK GROUP INC	18	11	13.25	+0.8	+6.0
Q	COMSHARE INC	28	11	23.50	-2.3	-8.7
N	CULLINET SOFTWARE INC	13	6	12.00	+0.4	+3.2
Q	CYCARE SYS INC	13	7	8.63	+0.0	+0.0
Q	DUQUESNE SYS INC	33	12	18.38	-1.6	-8.1
Q	ENDATA INC	12	5	11.75	+0.9	+8.0
N	GENERAL MTRS (CLS E)	45	24	42.13	+1.3	+3.1
Q	HOGAN SYS INC	17	9	12.75	-0.6	-4.7
Q	INFORMIX CORP	23	7	19.25	+2.0	+11.6
Q	INTELLICORP INC	11	4	7.75	+0.5	+6.9
Q	KEANE INC	15	5	8.00	+0.0	+0.0
Q	LOTUS DEV CORP	37	9	30.25	+1.0	+3.4
Q	MANAGEMENT SCI AMER	21	11	12.38	+0.3	+2.1
Q	MICRO PRO INTL CORP	8	2	5.31	-0.6	-9.6
Q	MICROSOFT CORP	128	26	102.25	+9.0	+9.7
Q	NATIONAL DATA CORP	27	17	23.75	+0.8	+3.3
Q	ON LINE SOFTWARE INTL INC	20	6	17.88	+1.5	+9.2
Q	ORACLE SYS CORP	30	7	23.75	+2.1	+9.8
N	PANSOPHIC SYS INC	23	12	20.75	+1.9	+9.9
Q	POLICY MGMT SYS CORP	30	15	24.75	-0.3	-1.0
Q	PROGRAMMING & SYS INC	13	8	10.50	+0.3	+2.4
Q	REYNOLDS & REYNOLDS CO	42	27	33.00	+0.0	+0.0
Q	SEI CORP	18	8	17.00	-0.5	-2.9
Q	SHARED MED SYS CORP	53	23	27.88	+0.1	+0.5
Q	SOFTWARE AG SYSTEMS INC	20	10	14.25	+0.9	+6.5
Q	SOFTWARE PUBG CORP	17	5	8.50	-0.3	-2.9
A	STERLING SOFTWARE INC	19	9	11.25	+0.5	+4.7
Q	SUNGARD DATA SYS INC	21	10	18.00	+0.0	+0.0
Q	SYSTEMATICS INC	30	14	25.50	+1.3	+5.2
N	UCCEL CORP	45	19	40.50	+1.5	+3.8
N	URS CORP	21	13	18.50	+1.0	+5.7
Q	VM SOFTWARE INC	45	15	18.50	-3.8	-16.9

Semiconductors

N	ADV MICRO DEVICES INC	25	13	17.75	-0.4	-2.1
N	ANALOG DEVICES INC	24	14	21.25	+1.6	+8.3
Q	ANALOGIC CORP	13	10	12.00	+1.1	+10.3
Q	INTEL CORP	49	16	48.25	+4.6	+10.6
Q	LSI LOGIC CORP	17	8	10.88	+1.0	+10.1
Q	MONOLITHIC MEMORIES INC	19	10	15.13	-0.1	-0.8
N	MOTOROLA INC	64	34	57.38	+4.3	+8.0
N	NATL SEMICONDUCTOR	17	8	14.00	+1.3	+9.8
N	TEXAS INSTRS INC	66	34	63.13	+3.4	+5.6
A	WESTERN DIGITAL CORP	33	11	26.50	+2.3	+9.3

Peripherals

N	AM INTL INC	9	5	6.88	-0.6	-8.3
Q	AST RESH INC	23	11	13.25	-1.5	-10.2
Q	AUTO TROL TECH CORP	9	3	6.00	+0.1	+2.1
Q	BANCTEC INC	16	6	13.38	+0.3	+1.9
Q	CIPHER DATA PRODS INC	18	9	10.75	+1.1	+11.7
A	COGNITRONICS CORP	5	2	4.25	+0.0	+0.0
N	COMPUGRAPHIC CORP	24	16	23.25	-0.5	-2.1
N	COMPUTERVISION CORP	23	10	15.63	+0.6	+4.2
N	CONRAC CORP	30	12	27.25	+0.0	+0.0
A	DATAPRODUCTS CORP	16	10	10.75	-0.4	-3.4
A	DATARAM CORP	10	7	7.38	+0.3	+3.5
N	DECISION INDS CORP	12	7	11.63	+1.6	+16.3
N	EASTMAN KODAK CO	90	52	89.75	+2.5	+2.9
Q	E M C CORP MASS	34	11	28.75	+0.3	+0.9
Q	EMULEX CORP	10	6	8.25	+0.8	+10.0
Q	EVANS & SUTHERLAND	40	20	32.50	-0.6	-1.5
Q	ICOT CORP	13	6	6.50	+0.1	+2.0
Q	INTERLEAF INC	20	8	16.38	+0.4	+2.3
Q	IOMEGA CORP	12	2	3.13	-0.4	-10.7
Q	LEE DATA CORP	10	5	5.13	-0.3	-4.7
Q	MASSTOR SYS CORP	5	2	4.56	-0.1	-1.3
Q	MAXTOR CORP	34	11	18.00	+1.1	+6.7
Q	MICROPOLIS CORP	44	14	39.00	+4.0	+11.4
Q	MINISCRIBE CORP	18	5	14.50	-0.6	-4.1
N	MINNESOTA MNG & MFG CO	73	60	70.88	+1.0	+1.4
A	MSI DATA CORP	18	10	16.88	-0.3	-1.5
Q	PRIAM CORP	6	2	4.13	-0.4	-8.3
Q	PRINTRONIX INC	14	10	12.38	-0.1	-1.0
N	QMS INC	19	11	18.25	+2.4	+15.0
Q	QUANTUM CORP	38	15	17.75	+1.4	+8.4
Q	RAMTEK CORP	6	4	5.25	+0.3	+6.0
N	RECOGNITION EQUIP INC	27	10	20.00	+0.1	+0.6
Q	REXON INC	14	5	9.88	+0.5	+5.3
Q	SCAN TRON CORP	17	11	12.25	+0.0	+0.0
Q	SEAGATE TECHNOLOGY	46	11	31.75	+2.3	+7.6
N	STORAGE TECH CORP	5	2	3.50	+0.1	+3.7
Q	TANDON CORP	7	2	5.25	+0.5	+10.5
A	TEC INC	7	3	5.25	+0.1	+2.4
N	TEKTRONIX INC	43	27	38.13	-1.3	-3.2
Q	TELEVIDEO SYS INC	3	2	2.50	-0.1	-4.8
N	TELEX CORP	102	52	99.75	-2.0	-2.8
Q	WYSE TECH	35	13	28.00	+2.5	+9.8
N	XEROX CORP	81	49	75.50	-1.0	-1.3
Q	XIDEX CORP	20	11	12.50	+1.1	+9.9

Leasing Companies

N	COMDISCO INC	33	15	30.00	+1.3	+4.3
N	CONTINENTAL INFO SYS	14	7	11.63	-0.3	-2.1
Q	PHOENIX AMERN INC	8	3	4.75	+0.0	+0.0
Q	SELECTERM INC	7	5	5.25	-0.3	-4.5
N	U S LEASING INTL	53	38	51.63	-0.4	-0.7

EXCH: N = NEW YORK; A = AMERICAN; Q = NATIONAL, O = OVER-THE-COUNTER; S = SPLIT

O-T-C PRICES ARE BID PRICES AS OF 3 P.M. OR LAST BID
(1) TO NEAREST DOLLAR

The grapevine

Rumors responsible for IBM ups and downs in volatile week

The stock market proved its volatility to rumors last week, and IBM was the yo-yo.

On Monday, a last-minute wave of expectations that IBM would report better-than-expected second-quarter results touched off a buying surge. IBM rose 2⅞ points to 169⅞, its high for the year.

The rumor, spurred by strong actual earnings reported by Apple Computer, Inc. and NCR Corp., lifted most major computer stocks. But on Tuesday, when IBM's actual results showed a 10% drop in earnings, a sell-off erased most of Monday's gain as the stock dropped 2⅜ points to 167½. Thursday, IBM closed at 168⅛, up 1⅛ points for the four days.

Apple maintained its momentum, gaining 6 points in four days to reach 44. AT&T, another firm with better-than-expected earnings, rose 2¾ points to 31¾. Digital Equipment Corp. edged closer to IBM price levels, moving up 6¾ points to 166¼.

NCA Corp. in Santa Clara, Calif., surged 38%, up 2¼ points to 8¼, after its announced acquisition by Ask Computer Systems, Inc. Ask gained 1½ points in four days to close at 13⅞ Thursday.

CLINTON WILDER

System/36, 38 hybrid held up

Hardware ready, but software isn't; System/36 upgrades due this year

BY STANLEY GIBSON
CW STAFF

DALLAS — IBM will not announce its much-anticipated processor to bridge the gap between the System/36 and 38 until 1988, the firm told a gathering of consultants here last week.

However, IBM said it will enhance the System/36 line later this year, probably by adding a new low-end machine and boosting processing speed and memory capacity.

In what attendees called a radical degree of candor, IBM gave some 30 industry observers details of its mid-range strategy and outlined plans to extend its version of the Unix operating system to a wider range of processors.

Some 20 IBM executives were in attendance, including Vice-Presidents Stephen Schwartz and George Konrades.

"This was easily the most candid they have ever been," commented Marty Gruhn, vice-president of The Sierra Group in Tempe, Ariz.

The System/36-to-38 bridge — dubbed Silverlake — will be housed in an IBM 9370-type box and will use the same peripherals as the 9370, said Frank Dzubeck, president of Communications Network Architects, Inc. in Washington, D.C.

"The operating system is the key. But it is not there yet," Dzubeck said, claiming that IBM has the hardware of the new machine essentially complete.

The operating system will be designed to run existing System/36 and 38 programs. However, System/36 and 38 hardware will not be upgradable to the new processor, IBM told the gathering.

> "THIS was easily the most candid they have ever been."
>
> MARTY GRUHN
> THE SIERRA GROUP

IBM said the new system will have ease-of-use features adapted from the System/36 combined with the integral data base of the System/38. IBM did not use the widely known code name Silverlake to describe the computer, but called the machine, "the follow-on 3X product," consultants said.

IBM also said it will offer electronic diagnostics and support for System/36 and 38 products, similar to what it offers for its 3090 mainframes, which have the ability to notify a remote site of a malfunction.

Gruhn said the System/36 enhancements could be expected in the fourth quarter of this year and that a low-end System/36 is likely.

Craig Symons, vice-president of the Gartner Group, Inc. in Stamford, Conn., said the new machine could be based on IBM's Personal System/2, noting that the current low-end System/36 Personal Computer is based on IBM's PC AT.

Dzubeck said the System/36 enhancements could include an external disk-storage cabinet, which could include use of the 9335 disk drive that is used with 9370 and System/38 processors.

Much time at the conference was devoted to IBM's Systems Application Architecture (SAA), with company executives saying SAA applications cannot be expected until 1990.

However, consultants were told that communications protocols will be brought to AIX, IBM's version of AT&T's Unix, so that it can coexist in an SAA environment.

AIX will also be brought to more families of IBM processors, including the 370 line, several consultants said. AIX for the PS/2 will appear in the second quarter of 1988, IBM reportedly told one analyst.

According to Dzubeck, IBM also said both RPG-II, the language used to program the System/36, and RPG-III, used on the System/38, will be included under SAA. "This will make migration to the 370 world simpler," he said.

Consultants agreed that IBM called the meeting to reinforce the notion that its mid-range does indeed consist of two architectures: the System/36 and 38, which it calls one family, and the 9370.

Several attendees said they thought IBM was trying to change a prevailing negative opinion about its mid-range.

IBM said that it has sold 250,000 products in the System/34, 36 and 38 lines, and two-thirds of the total are installed outside the U.S. Consultants said IBM stressed that it would not abandon an installed base of this size.

Consultants were virtually unanimous in praise of the conference and in the opinion that IBM is closing the gap between itself and Digital Equipment Corp.

"IBM is doing more than [simply] posturing about it being the year of the customer. They are changing, fundamentally, their way of doing business," Gruhn said. She said IBM made a convincing case that it can offer better price/performance in the mid-range.

However, Gruhn added, IBM still has ground to make up in the areas of functionality and ease of use.

Court orders Samsung to halt PC sales

SANTA CLARA, Calif. — Delta Computer Corp. was granted a temporary restraining order last week barring Samsung Semiconductor, Inc. from selling products similar to Delta's IBM-compatible personal computers.

The Superior Court of California here ordered a restraining order effective immediately and lasting until a scheduled court hearing July 31.

Mansfield, Mass.-based Delta filed a $60 million lawsuit against Samsung, its supplier, for allegedly marketing Samsung PCs to dealers directly against the same products bearing the Delta label.

Delta claims Samsung signed an agreement in March for Delta to be the exclusive U.S. supplier of specific Samsung PCs.

Delta terminated the agreement last month and then filed suit.

"Before we even had our product out, they were advertising theirs," said Jim Patterson, Delta's vice-president of marketing and sales. "It was very unprofessional."

Patterson said Delta alleges that Samsung sales representatives from the Korean firm's Santa Clara subsidiary have been calling on Delta's authorized retail dealers.

IBM 9370

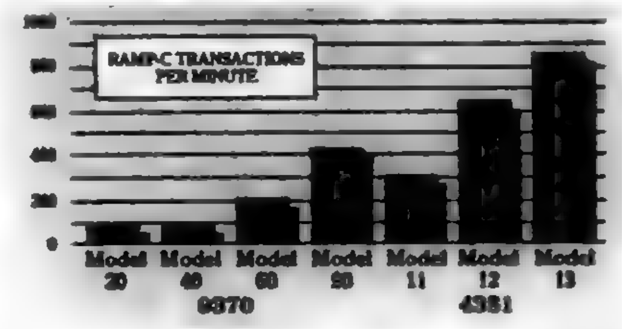
FROM PAGE 1

ed the same story but said he cannot use the processor that soon.

IBM spokesmen last week confirmed that deliveries have been rescheduled as much as six months earlier on account of improved manufacturing capacity.

Transaction points

IBM laboratory measurements distributed by IBM compare commercial interactive performance of 9370 and 4381 processors



CW CHART

Forrester's McCarthy said he was also told that general availability of shipments of the 9370 Models 60 and 90 will begin in late October, which is consistent with IBM's previously announced timetable.

At last week's analysts' briefing, IBM also outlined a number of plans for 9370 enhancements. The firm said it will offer MVS/XA on the 9370 Model 90, said Frank Dzubeck, president of Communications Network Architects, Inc. in Washington, D.C. Bob Tasker, an analyst with The Yankee Group in Boston, said the 9370 will offer CICS under VM later this year.

In addition, consultants were told that the 9370 will grow in power to further overlap the company's 4381 family. Although the 4381 may gain more power, smaller processors will be added to the 3090 line. The result will be greater overlap among the 9370, 4381 and 3090 product groups.

'Architecture of future'
The Yankee Group's Tasker said IBM referred to the 9370 as "the architecture of the future." Bob Randolph of Framingham, Mass.-based International Data Corp.'s Digital Equipment Corp. advisory service, said the implication was that the 9370 would grow both upward and downward, like DEC's VAX, eventually obscuring the 4381 line.

IBM has been testing the 9370 processor at its Dallas facility, and, in a departure from past practice, the company made the testing information available to consultants at last week's meeting, promising more complete information as it becomes available.

The charts released by IBM detail the performance of 9370 and System/36 and 38 processors in comparison with DEC VAXs and processors from Hewlett-Packard Co. and other vendors.

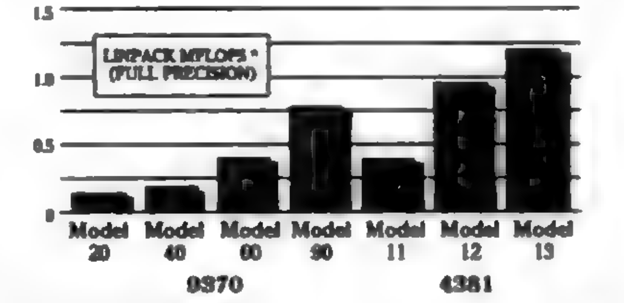
Several graphs show the results of IBM's proprietary Ramp-C commercial interactive benchmark, in which the 9370 stacks up as a solid competitor to the VAX and other processors, sometimes coming out ahead and at other times trailing other machines.

'Slinging mud'
Forrester's McCarthy said the new emphasis by IBM on mid-range benchmarks shows the firm has "jumped into the ring and are slinging mud, just like other vendors."

But McCarthy criticized the testing environment because it does not include real terminals and printers but just a connection to a 4381 that simulates the presence of terminals.

Ratings game

Argonne National Laboratory results distributed by IBM rate compute-intensive performance of 9370 and 4381 models



*Million floating-point operations per second

CW CHART

In what IBM claimed to be greater openness concerning benchmarks, the company announced that this fall it will make public the characteristics and features of its Ramp-C standard, according to Marty Gruhn, vice-president of The Sierra Group in Tempe, Ariz. However, IBM will not publish the code for the test, she added.

"For the last two years, IBM has been muddling along," Randolph said. "Then along came DEC and pointed the direction. IBM watched their success and then said, 'Aha! That's the way to go. Now, how fast can we get there?' "

Computer bill clears legal hurdle

BY JEFFRY BEELER
CW STAFF

SACRAMENTO, Calif. — A bill aimed at strengthening the state's computer crime law now seems virtually assured of enactment after clearing last week what its proponents regarded as its most serious obstacle.

With last-minute amendments added by the California Assembly's Public Safety Committee last week, the bill would spare from prosecution any workers who use employers' systems for personal reasons as long as their misdeeds result in no data destruction or alteration.

In the bill's original form, employees who misused their companies' processors could be charged with a felony, even if their actions left the employer's data and programs intact. The rationale behind Senate Bill 255's (S. 255) provision was that even the most innocent electronic security breach can force organizations to spend great sums to recertify their systems' integrity.

The exclusion was grudgingly added in response to claims that S. 255's original language would make a serious crime of even minor infractions, such as the use of corporate systems for drafting resumes.

First raised by the Teamsters union during testimony before the Public Safety Committee on June 29, the objection drew a swift reply from the bill's backers, who denied any intent to outlaw benign systems access by employees. "Our purpose in drafting the legislation was to address full-blown computer crimes, not the unauthorised typing of personal letters," said Charles Fennessey, legislative consultant to state Sen. Ed Davis, S. 255's author.

In another rebuttal to the teamsters' stated fears, proponents also dismissed as highly improbable the suggestion that law enforcement officials would take the trouble to prosecute insiders for the nonmalicious misuse of corporate CPUs.

Reaction to the changes in S. 255's language ranged from delight to disappointment.

Some displeased

"I'm not very happy with the amendments," said Los Angeles City Attorney Alice Hand. "But right now, I'm not sure whether the proposal to exclude investigative expenses from the bill's provisions is a major drawback."

But Organization Management, Inc. President Don Burns, one of S. 255's staunchest defenders, viewed last week's legislative developments somewhat differently. "I'm very pleased with what has happened to the legislation thus far," Burns said. "The amendments were added to the bill with the full understanding that they would be reviewed very carefully and might be altered at some future date."

If enacted, S. 255 would repeal California's existing computer crime law.

Firms lobby

FROM PAGE 1

cense to ship U.S.-made products out of the U.S.

Toshiba Machine Co.'s sale of submarine propeller technology to the Soviet Union was "outrageous," testified Joseph Tasker Jr., a Washington-based attorney who is representing the two trade associations. But, he said, there is a "risk that imposition of sanctions in the form of an import ban can cause serious economic harm to the American information technology industry."

Toshiba's subsidiaries make semiconductors, microcomputers, computer printers and disk drives, private branch exchanges, telephone equipment and consumer electronics products.

Other compensation

Tasker said that before imposing sanctions, the U.S. should use the Toshiba incident as leverage to press for stronger enforcement of export controls among U.S. allies and to press for financial compensation for the damage to national security.

If sanctions must be imposed, the import ban should be limited to the offending subsidiary, Toshiba Machine, and not imposed on all units of the Toshiba parent, Tasker said. In any case, he added, an import ban should have a broad exemption for imported components used in U.S.-made products, similar to the exemption in the Senate bill.

Tasker said it would set a bad precedent for the U.S. to unilaterally impose sanctions against foreign firms for export control violations, because it could invite foreign countries to do the same against U.S. corporations, perhaps with less justification.

Positive punishment

James A. R. Johnson, director of government affairs for Apple, said Toshiba has made custom components for Apple's microcomputers since 1981. He praised the high quality of the Toshiba components and noted that it would take at least two years to switch to another supplier.

"Instead of trying to bankrupt Toshiba and all of its subsidiaries around the world, let's make them pay for the costs of new research and development necessary to regain America's lead in military technology over the Soviets," Johnson suggested.

Tokyo Electric Power Co., a Toshiba subsidiary, makes Apple's low-end Imagewriter printer, an Apple spokeswoman confirmed.

Several members of the House Ways and Means Committee said they would try to draft sanctions that balance the need to penalize Toshiba with the need to protect U.S. manufacturers and distributors from economic harm.

However, Rep. Duncan Hunter (R-Calif.), supporter of a permanent ban on Toshiba imports, said Congress should put the interests of U.S. military security and personnel above the "convenience" of U.S. businesses and consumers.

INSIDE LINES

PSsst — keep it quiet. Drumbeating over the next series of PS/2 announcements from IBM filled the air last week. According to one source, Big Blue will announce several systems, including the Intel 80386-based Model 70, the week of Aug. 10. "They're all the obvious systems people have been talking about," the source said. The Model 70 has been described by some as a desktop 80386-based system that will compete directly against Compaq's increasingly popular Deskpro 386 system. Other much-expected systems are the Model 20, also known as the PC ET, for the education market and the Model 40, a less expensive version of the Model 50.

The sun also rises. Developers and users last week said Compaq plans to release a 20-MHz 386-based system in early September. One or two users said they believe the company will position the system as a graphics workstation with Microsoft's 386-Windows and Autocad's Autodesk bundled in. One user thinks this would be a smart move by Compaq. "People are skeptical about buying 386s because there is no OS or applications. But if you come in with one that has a purpose, like a graphics workstation, and give them some stuff to run on it, it's a good way to position it," he said.

Could it finally happen? Compaq is also debating whether to announce a Toshiba-like laptop, according to one user, but still can't decide if there is enough of a market for it. "The reception within Compaq is lukewarm, but I told them with the possibility of Toshiba being banned or hit hard with [congressional sanctions], there is a good opportunity there," he said.

Catcall of the week. One of AT&T's salesmen recently contended that reports that the Big Bell's computer division is up for sale are absolutely not true. "Everyone is too busy putting their resumes together to do any selling," he explained.

Rather switch than fight. Tandem announced last week that it has purchased a minority interest in third-party IBM Systems Network Architecture (SNA) networking vendor Netlink, Inc. The two companies will be working on products to expand Tandem's already impressive array of SNA connectivity products. Netlink now markets a network concentrator that allows different types of terminals to switch back and forth between IBM and non-IBM hosts.

Remote commission. The American National Standards Institute has commissioned a work item that might become the first part of a standard for distributed data base management systems. The X3H2 Committee has been asked to evaluate a suggested remote data base access protocol. The International Standards Organization is reviewing a protocol suggested by Briton A. P. G. Brown, and X3H2 Chairman Don Deutsch said he is awaiting its report. The protocol uses SQL but incorporates other language forms as well, Deutsch said.

Do not pass Go. Is nothing sacred? Even Parker Brothers, maker of the Monopoly board game, is waving its software copyright infringement saber. Beverly, Mass.-based Parker Brothers issued a press release warning "a number of individual programmers and software companies" against selling unauthorised software versions of Monopoly. Parker Brothers says it has officially licensed Monopoly to only two game software developers — Sega Master Systems and Virgin Games.

Network listings. The "then-current NCP" noted in ivory letters accompanying IBM's June 16 announcements heralds a new Network Control Program, according to industry sources. One source claims that IBM was all set to announce the new NCP on June 16, except that the program was designed to run with another long-awaited IBM introduction: the beefed up, dual-processor 3725. The source claims IBM insiders said there were unexpected last-minute glitches in the 3725, which delayed its unveiling, thus stalling the date when the "new" NCP will become current as well.

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"Graphically Vivid"

CommunicationsWeek, February 16, 1987

"Pizazz"

"Graphics puts the pizazz into network analysis."
Computerworld, March 16, 1987
Frank Dzubeck, Communications Network Architects, Inc.

"Exciting Future"

"NETCENTER™ GNM meets several important needs of SNA network managers, and does so in innovative and effective ways... the Yankee Group believes the NETCENTER GNM has a potentially exciting future as a platform for add-on network management applications."
The Yankee Group, *Product Watch*, May 19, 1987

"On the money"

"U S WEST is right on the money in terms of understanding and being able to present what users need."
Computer Systems News/CommunicationsWeek, April 27, 1987
Joaquin Gonzalez, Gartner Group

"Very Smart"

"...a network management tool enhanced with color graphics can greatly improve an operator's productivity. That's very smart of U S WEST."
CommunicationsWeek, April 27, 1987
Victoria Marney-Petix, Dataquest, Inc.

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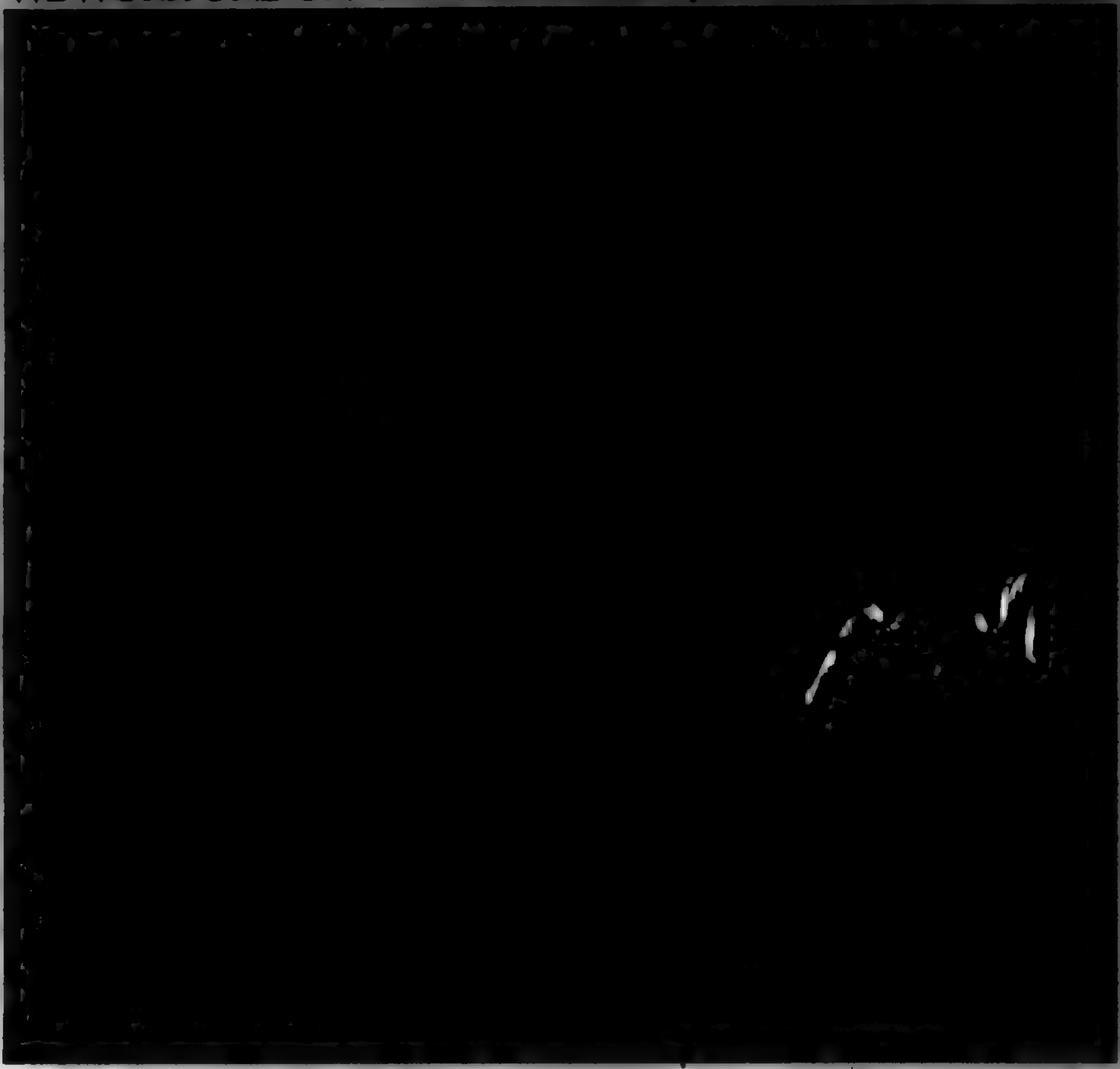

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COMPUTERWORLD

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In Depth — Keeping your best players on the team. **Page 51.**

Compaq expected to beat IBM's PS/2 Model 80 to market with a 20-MHz 80386-based personal computer. Page 6.

Independent tests of IBM 9370s indicate the machines boast power to spare and are easy to use. Page 4.

Britton Lee powers data base machine line up to 10 MIPS with 32-bit version. Page 8.

CMI's bid to remain independent is blocked by court ruling approving acquisition by new leasing giant Continental Information Systems. Page 94.

Is DEC's success going to its head? Some observers say IBM is now the easiest to deal with. Page 43.

While DG whimpers, Microsoft, Amdahl and even Wang ride a profit boom. Pages 67 and 93.

Business users issue demands for phone system Open Network Architecture. Page 37.

In yet another attempt to grow through merger, 3Com last week agreed to link up as the majority partner in a pooling of interests with Bridge Communications. Page 93.

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Key OS/2 veil lifted

Presentation Manager to ship in first half of '88

BY ED SCANNELL
CW STAFF

A Microsoft Corp. official last week said the Presentation Manager, the graphics interface for the firm's MS OS/2 operating system, will be available by the end of next year's second quarter. The statement marks Microsoft's first public indication of an availability date for the key operating system component.

A source close to IBM last week confirmed that IBM also plans to ship its own version of the Presentation Manager during the first half of 1988.

The disclosures are expected to help users and software developers better formulate their plans for using OS/2, which is scheduled to ship in the first quarter of next year. There has been some confusion in both camps about when the Presentation Manager will ship. Moreover, some developers last week said they are skeptical over whether Microsoft can meet its shipment dates, and users said deliveries are too far off to have much impact on their current purchasing plans.

In an interview with *Computerworld*, Paul Sribhibhadh, marketing manager of Microsoft's Xenix group, said, "A delay in the availability of the Presentation Manager would stretch out development under OS/2. It would be to our disadvantage not to deliver by the end of the second quarter, because it opens the door for some other product to step in and fill the void."

The source close to IBM said Sribhibhadh's remarks "are on target with IBM's internal scheduling."

Interface date shrouded

Sribhibhadh also said Microsoft will develop a Presentation Manager-style interface for its version of Unix, being jointly developed with AT&T. While Sribhibhadh said the Microsoft-AT&T product would be available in the middle of 1988, he declined to say when the graphics interface for the program will be

Continued on page 16

Users: DB2 chokes on volume test

BY CHARLES BABCOCK
CW STAFF

SAN FRANCISCO — Results from a recent benchmark by Charles Schwab & Co. indicate that the IBM DB2's performance as a transaction processor is highly application-dependent and that in most cases, DB2 cannot deliver the 62 transaction/sec. measured at a Danish bank and often cited by IBM.

In addition, the Schwab benchmark raises the question of how much IBM will be able to improve the performance of DB2 without changing the system's approach to record locking. Schwab MIS officials not only found DB2 limited to 18 transaction/sec. for their complicated discount stock brokerage trans-

Continued on page 10

IBM musters forces on application front

BY ROSEMARY HAMILTON
CW STAFF

RYE BROOK, N.Y. — IBM last week reorganized its application software resources in a move observers called a stepped-up effort to keep major software vendors in the IBM fold and to ward off encroachment by Digital Equipment Corp.

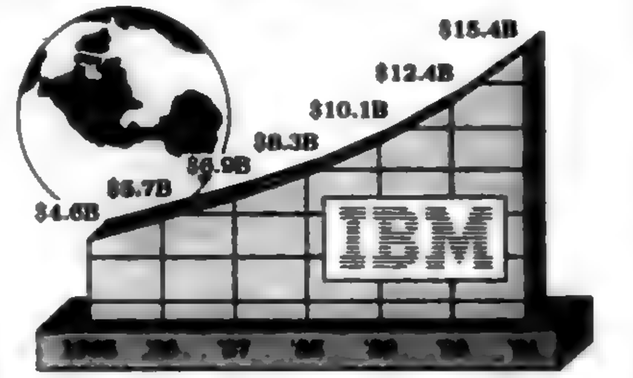
The new organization, called the Application Systems Division, is IBM's first serious step in a long-range plan to become a major provider of applications software, an area in which it has done poorly in the past, observers and third-party vendors said.

The move was also seen as a peace offering to third-party developers, who have been lured into the DEC camp by weakness in the mainframe market and by fears of IBM competition. IBM officials took pains last week to point out that the new division would not compete with major third-party developers in cross-industry markets.

"One of the fears of indepen-

Continued on page 6

Attractive solutions
Projected worldwide growth for applications software is the focus of IBM's new software division



INFORMATION PROVIDED BY INTERNATIONAL DATA CORP
CW CHART: MITCHELL J. HAYES

DG in tailspin; sales dip, losses threaten recovery

Mini maker lays off 950 as competitors soar

BY CLINTON WILDER
CW STAFF

WESTBORO, Mass. — Data General Corp. last week announced its fourth loss in the past nine quarters and its third massive corporate layoff in three years, prompting several analysts to express concern about the company's long-term chances for recovery.

DG reported a loss of $65.1 million, or $2.40 per share, with most of the loss resulting from charges related to an announced layoff of 950 people, or 5.8% of its worldwide work force. Revenue declined 3.6% to $313.6 million. The company indicated it will downgrade efforts to sell into large corporate accounts.

Since reaching a peak of 17,970 employees in early 1985, DG's work force has now seen three major reductions that have lowered it by a total of 15%. DG laid off 1,400 employees in 1985 then cut 900 more positions and closed two manufacturing plants last year.

Particularly troublesome to corporate observers is the way DG's continued financial ills stand in stark contrast to the recently ended quarters of its competitors in the minicomputer industry — Prime Computer, Inc., Wang Laboratories, Inc. and, in particular, Digital Equipment Corp., its traditional rival.

DEC reported another record-shattering quarter last week, ending a fiscal year in which profits soared 84%.

Vicious downward spiral

To many industry analysts, DG is caught in a vicious downward spiral that threatens its long-term viability as a full-service minicomputer and office automation provider.

Although some analysts have expressed confidence that DG can climb out of its hole with continued cost controls, others see a serious warning in the current rising industry tide that is leaving DG behind.

"Their repeated attempts to cut back and restructure raises

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Speed demons. Striving to stay one step ahead of IBM in the 80386 market, Compaq is preparing a 20-MHz version of its Deskpro 386 to compete against IBM's 20-MHz PS/2 Model 80, scheduled for fourth-quarter release. Page 6.

Three from Britton Lee. Britton Lee showcases three configurations of 32-bit relational data base machines, repackaged versions of its mid-range systems and a series of low-end processors. Page 8.

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> *"I think it's anti-DEC, it's not antisoftware."*
>
> JOHN P. IMLAY JR.
> MSA CHAIRMAN
>
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Bill to loosen controls on low-level exports

BY MITCH BETTS
CW STAFF

WASHINGTON, D.C. — The massive trade bill passed by the Senate last week contains an industry-backed section that would relax U.S. export controls on low-level computer equipment.

The export controls section in that bill and a House version would eliminate the current requirement to obtain export licenses for 16- and 32-bit computers with less than 8M bytes of random-access memory that are sent to any of 15 noncommunist countries.

This action would allow systems based on Intel Corp.'s 80286 and 80386 chips and Motorola, Inc.'s 68020 chip to be exported with a minimum of red tape, according to William Chastka, vice-president of Washington Resources International, a computer export consulting firm in Washington, D.C.

Cocom members safe

As a practical matter, the bills allow firms to export any product that they now can send to the People's Republic of China — such as the IBM Personal Computer AT and the Digital Equipment Corp. Microvax II — to countries that are members of the Coordinating Committee on Multilateral Export Controls (Cocom) without prior U.S. government approval, Chastka said.

The House and Senate bills also contain a variety of other provisions aimed at loosening controls on exports and re-exports of high-technology goods to foreign countries.

"Members of the computer industry should recognize the importance of getting involved and expressing support for these provisions, because they could be traded away or watered down in conference," Chastka said, referring to the forthcoming joint House and Senate conference that will resolve differences in the trade bills passed by each chamber.

Export controls are intended to prevent the diversion of high-technology products to Soviet-bloc countries for military use. In the past, the U.S. export controls program was dominated by the Department of Defense, but this year, the Reagan administration and Congress decided to side with business interests in light of the U.S. trade deficit [CW, Feb. 2].

The computer industry has long argued that overly stringent export controls on low-level products hurt the competitiveness of U.S. firms and do little to help national security because the low-level products can be obtained from other sources, such as countries in the Pacific Rim.

"We should focus our limited resources on controlling those items that really make a difference [in national security] and aren't available around the world . . . in other words, build a higher fence around fewer items," said Jim LeMunyon, senior manager of governmental affairs for the American Electronics Association.

'Soviet Technology Relief'

However, legislation aimed at relaxing export controls is fiercely opposed by conservatives, who have dubbed it "The Soviet Technology Relief Act of 1987." Rep. Duncan Hunter (R-Calif.) and Richard N. Perle, a former Pentagon official, warned that the decontrol measures will send U.S. allies the wrong message at a time when the U.S. is urging them to strengthen export controls in response to the sale of submarine technology to the Soviet Union by Japan's Toshiba Machine Co. and Norway's Kongsberg Vapenfabrik [CW, June 29].

"Ship American technology with reckless abandon to any Cocom country — as the House bill would authorize — and there will be countless cases like Kongsberg-Toshiba," Perle said at a recent congressional hearing. He said it is hypocritical for Congress to impose sanctions on Toshiba and Kongsberg in one part of the trade bill and to weaken U.S. export controls in another. The Senate bill contains a two- to five-year import ban on Toshiba and Kongsberg products [CW, July 6].

Although the computer industry supports the export control reforms and several other provisions in the Senate trade bill, the Computer and Business Equipment Manufacturers Association (CBEMA) said it is "deeply unhappy" with major parts of the omnibus trade bill and may support a presidential veto.

CBEMA spokeswoman Charlotte LeGates cited several objectionable sections in the bill, including one that calls for mandatory retaliation against foreign unfair trading practices and another that requires manufacturers to give workers advance notice of plant closings and layoffs.

LeGates said CBEMA favors the bill's provisions intended to open foreign markets to U.S. telecommunications equipment and services, strengthen international intellectual property rights and institute a standard coding system for products shipped in world trade.

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Users give thumbs-up to 9370

Throughput, simplicity impress early customers of mid-range unit

BY STANLEY GIBSON
CW STAFF

Several users who recently tested IBM's 9370 models gave the much-awaited mid-range processor generally high marks, noting that the high-end Model 90 in particular runs with power to spare.

A Midwestern retail chain, looking closely at leasing 9370 processors, recently tested its programs on two 9370 models at IBM's Dallas data center, where the vendor has been inviting a number of users and developers to test applications.

"The 9370 has a lot of horsepower. We are impressed with the box," the user said. His programs were designed to run on IBM 4361 Model Group 5 machines. In Dallas, the user tested two programs on 9370 Models 60 and 90.

Models 20 and 60 of the 9370 began general-availability shipments last week. Models 40 and 90 will be shipped on the same basis in late October, IBM said.

'Blew our mind'

The CPU time "blew our mind," the user said, adding that the low CPU utilization on the Model 90 gave him added reason to seriously consider moving to the machine. He said he may want to use 9370s at different store locations to keep track of inventory and billing.

The user had been concerned that he might be forced to move to a considerably larger and more expensive IBM 4381 system, which would require a communications controller and other specialized equipment.

In the user's tests, CPU utilization on the 4361 was as high as 32% for one application and 20% for another. The 9370 tests showed CPU use of only 22% and 12%, respectively, for the same applications (see chart).

Bench pies

Benchmark tests performed for a retail chain at IBM's Dallas data center indicate less CPU utilization by 9370 Model 90 than the 4361

Processor	*Number of DASD adapters*	*VSAMtune used*	*CPU utilization*	
			*Job 1**	*Job 2***
4361	1	No	32%	20%
4361	2	Yes	28%	20%
9370 Model 90	2	No	22%	15%
9370 Model 90	2	Yes	23%	12%
9370 Model 90	4	Yes	22%	12%
9370 Model 60	4	Yes	55%	28%

* Billing
** Daily item update

CW CHART

The user found that a software product called VSAMtune, made by Macro 4, Inc. in Mount Freedom, N.J., considerably increased performance, particularly in direct-access storage device efficiency.

VSAMtune can assist a user in setting up buffers and files of appropriate sizes, according to Geoff Parnell, director of marketing for Macro 4. Changing buffer sizes can be particularly helpful on batch jobs, according to Parnell.

The user found that IBM's older 3370 disk drives ran faster than its newer 9335 drives. But VSAMtune speeded up the 9335s considerably, the user found. IBM has made no claims that the 9335 runs faster than the 3370 and has said that in some instances, it may run slower. IBM has also said 9335 performance may be boosted by "system tuning."

The user said he had no problem porting his software applications over to the 9370s he tested. Other users have also reported little difficulty in getting 9370 operating systems up and porting applications.

"As far as ease of use is concerned, IBM is telling the truth," said software developer Kevin Gould, 9370 performance manager at Computer Corporation of America in Cambridge, Mass. He said the VM/IS operating system that is sold with the 9370 is packaged so that a nonsystems person can use it.

"We are very surprised at the overall performance," said Gould, who was in Dallas recently to test his firm's Model 204 data base management system on the 9370. He said he also found CPU utilization lower than expected.

Remote diagnostic feature

Gould also praised a remote diagnostic feature available on the 9370. Using an IBM Personal Computer AT or Personal System/2 as a terminal, IBM service headquarters in Endicott, N.Y., can remotely diagnose the system, he said.

"The 90 is incredibly powerful, but I'm a little hesitant about the 60. It's not that good for high volumes," said a representative of another software development company who recently performed tests in Dallas.

He said statistics showed that the Model 60 used more than twice as much of its CPU power and had double the response times of a Model 90 when both machines ran the same general ledger program.

However, he said he was able to tune the Model 60 system to get better performance by increasing buffers and using VSAM Shared Resources.

I/O bottlenecks

I/O bottlenecks also became apparent on high-volume programs while running the Model 60.

"On the 90, if you have I/O bottlenecks, it will chug along, but on the 60, you'll have some trouble, unless you know how to tune it. You need someone with technical expertise," the software firm representative said, indicating that the system cannot be run effectively in all applications by a nontechnical person.

The developer said he looks forward to additional high-end 9370 models, which IBM has indicated will be offered in the future.

However, he expressed some doubt about the future of the Model 40, reporting that few users are interested in testing the machine at the Dallas center.

Lotus buys Datext, aims move at CD-ROM market

BY CLINTON WILDER
CW STAFF

CAMBRIDGE, Mass. — Signaling that it considers compact disk/read-only memory (CD-ROM) products to be a strategic market, Lotus Development Corp. last week announced the acquisition of Datext, Inc., a supplier of CD-ROM corporate and business data bases. Terms were not disclosed.

Lotus said it will integrate the Datext products with its current CD-ROM product line, One Source, a series of data bases for investment analysis.

Lotus acquired those data bases when it purchased Isys Corp. in 1986 and has since transferred them from floppy disk and Bernoulli storage media to CD-ROM technology.

Woburn, Mass.-based Datext was founded three years ago as a unit of Atlanta-based Cox Enterprises, Inc., a large print and electronic media holding company. Datext had been owned partly by Cox and partly by its 65 employees.

'Determined to be leader'

"With this acquisition and future moves that you'll see us make, we are determined to be a leader in the CD-ROM market," said Don McLagan, vice-president and general manager of Lotus's Information Services Group.

"We have combined the two market leaders in really delivering products — as opposed to others, who have written books and held conferences," McLagan added.

Lotus archrival Microsoft Corp. has sponsored two annual conferences centering on CD-ROM technology.

There appears to be little overlap between the Datext and One Source products, said Steve Sieck, vice-president of electronic services at New York research firm Link Resources Corp.

Aimed at general users

Lotus's One Source is used primarily by professional investment analysts, while Datext's corporate and industry data bases and article abstracts are targeted at the general business user.

Lotus's 1-2-3 is the key to the company's CD-ROM strategy, Sieck noted.

"Lotus is the right company to be capitalizing on the potential of CD-ROM," he said. "They have the standard application for numeric business information, and CD-ROM is the fastest way to get information into that spreadsheet. Datext was worth more to them than to other companies."

Sieck estimated Datext's annual revenue at $8 million to $10 million.

Growing CD-ROM market

The CD-ROM market will grow to $1.5 billion annually by 1990, according to Link Resources.

Datext Chairman David Roux, who will manage both the One Source and Datext product lines and will report to McLagan, predicted that demand will increase dramatically as the price of CD-ROM technology comes down.

"The delivery piece itself will become a standard," Roux said. "All the value added is in the repackaging of the data."

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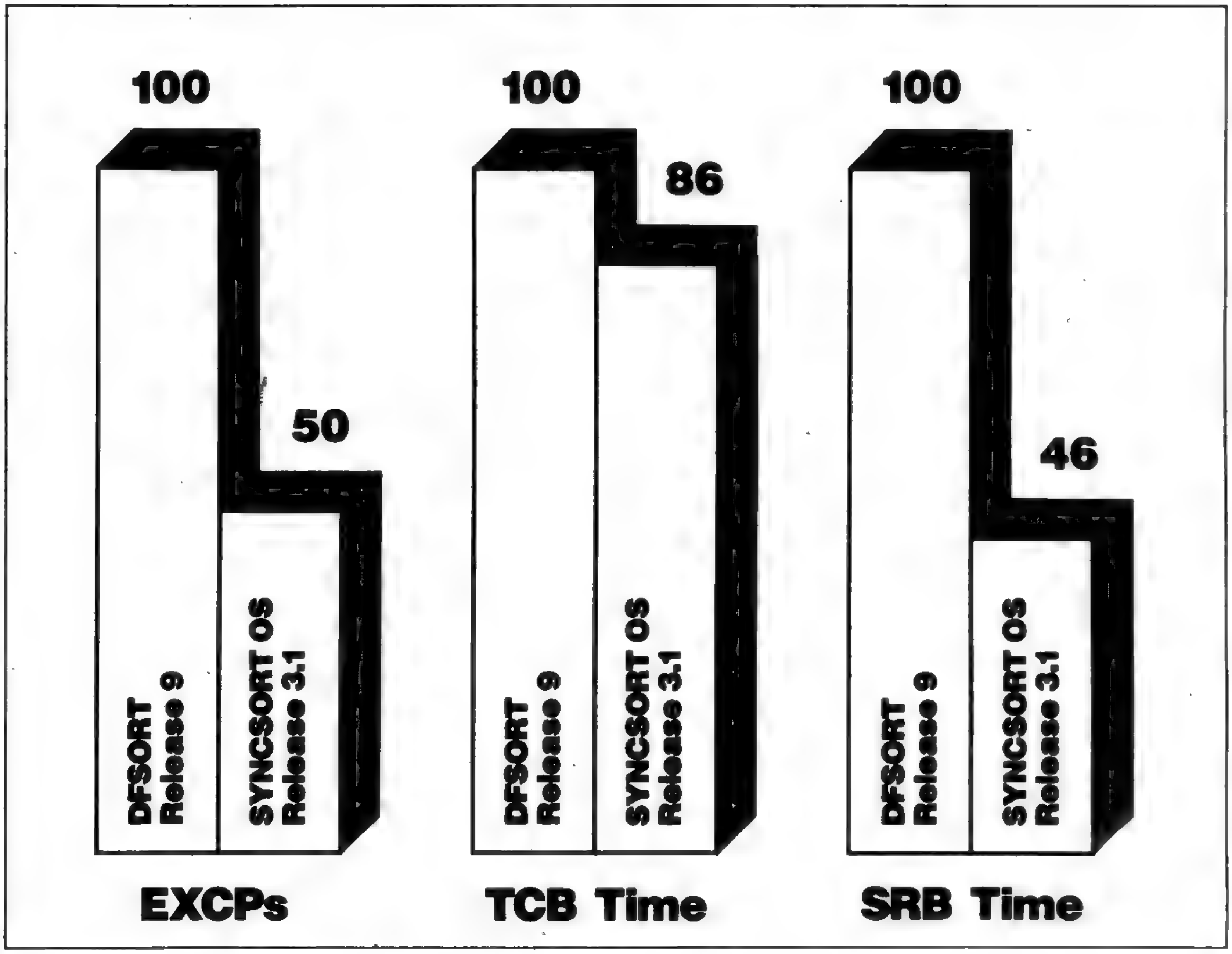

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IBM musters

FROM PAGE 1

dents has been that IBM will make an offering that competes with [the independents'], so they've been going to other vendors," said John Imlay, chairman of Management Science America, Inc. (MSA). Last week's announcement, he said, is "a peace offering from IBM to say, 'We're friends, and we want you.' "

Uphill climb

However, IBM must overcome much skepticism to establish itself in the applications industry. "I have never looked at [IBM] as being in the end-user market," said Terence Connor, information systems manager at the Animal Health Products division of Smithkline Beckman Corp. in Philadelphia. "I think they'll have an uphill climb in convincing us that what they have is just as good as third-party offerings."

The Application Systems Division will serve two functions, said Joseph Guglielmi, an IBM vice-president who was named president of the new division.

First, it will coordinate all future software development, including work on existing application offerings, at 11 software development facilities worldwide. This will bring together 6,000 development and development support staff members, the majority of whom previously worked for IBM's Information Services. That group has been responsible for development of such applications as Displaywrite for the IBM Personal Computer and the Manufacturing, Accounting and Production Information Control System.

Second, the Application Systems Division will be responsible for acquiring application software products in key market segments, including office systems, computer-integrated manufacturing (CIM) and financial systems. IBM will maintain its current software marketing structure, which encompasses the North Central Marketing Division, the Southwest Marketing Division and the National Distribution Division.

In addition to its focus on office, CIM and financial systems, the new division includes two software subdivisions.

One is categorized as integrated and enabling software and will cover application development tools. Current products in this area include IBM's Cross System Product, VS Cobol II, Query Management Facility and Screen Definition Facility.

The other subdivision has been dubbed a general systems group, which Guglielmi said is "our terminology for all other vertical markets." This group will develop systems for vertical markets such as hospitals, distributors and construction companies, he said.

Guglielmi said IBM will continue to select key market segments and does not intend to provide cross-industry applications. Frank Dodge, president of McCormack & Dodge Corp., said he received a telephone call from IBM following its announcement in which representatives "took great pains to tell me that in my area, they would be absolutely no competitive threat."

A vendor relations unit of the Application Systems Division is responsible for increasing IBM's alliances with software vendors and for encouraging these developers to write applications for IBM's Systems Application Architecture. IBM would not comment on what new products will emerge from the division. For now, the new division is intended to guide software industry efforts in the IBM direction, particularly for the mid-range market, analysts said.

Major battleground

The mid-range market has become the primary battleground between IBM and DEC, with IBM pitting the 9370 against DEC's VAX offerings. In the past few years, a number of major software vendors, including MSA, M&D and Cullinet Software, Inc., have moved into the VAX market, helping to position DEC hardware as a viable option for departmental and host systems in business.

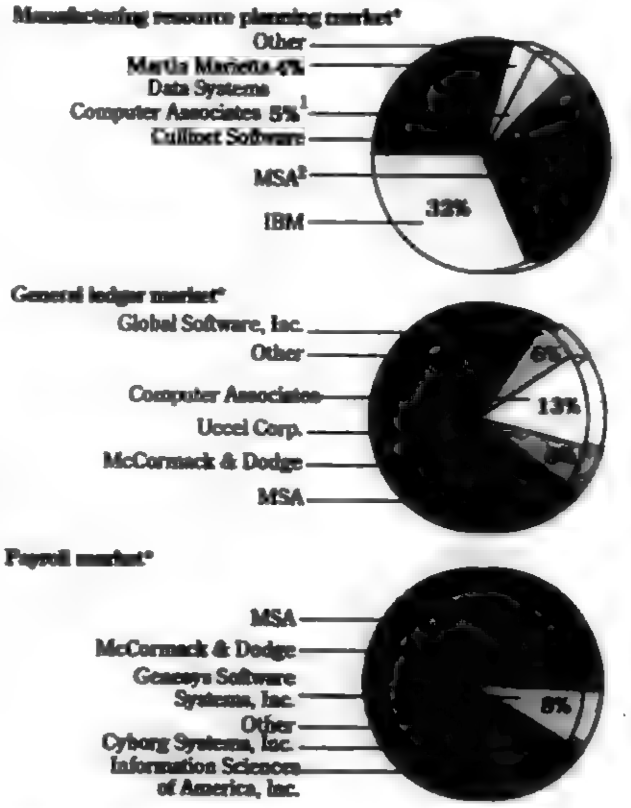
"We're not seriously considering DEC right now, but we're keeping our eye on them," said Paul Fusco, director of MIS at General Cinema Corp. in Chestnut Hill, Mass. "I've never looked at IBM as a strong application software supplier. It seems they've been forced to do this, and we'll benefit from it."

While Guglielmi would not comment specifically on DEC, he said a primary purpose for the Application Systems Division is the "continuation of our focus on mid-range opportunities."

Such efforts will be a direct shot at DEC, said Charlotte Walker, a senior vice-president at L. F. Rothschild, Unterberg Towbin in New York. IBM's announcement, she said, "is much less of a threat to the software companies than it is to DEC. Whoever has the most quality applications wins. They'll try to do it by forming strategic alliances."

Applied marketing

IBM is a leader in the manufacturing applications market, but its new division is likely to seek a presence in other areas dominated by independent vendors



* For IBM and plug-compatible mainframes

[1] Based on Software International Corp. acquisition last year

[2] Includes market share of Comserv Corp., which was acquired by MSA last year

INFORMATION PROVIDED BY FOCUS RESEARCH SYSTEMS, INC.
CW CHART

Compaq will offer 20-MHz Deskpro 386

BY ED SCANNELL
CW STAFF

In an effort to stay one step ahead of IBM in the Intel Corp. 80386-based microcomputer market, Compaq Computer Corp. is expected in early September to introduce a 20-MHz version of its Deskpro 386 that will be equipped with 170M-byte disk drives.

The system will compete directly against the 20-MHz version of the Personal System/2 Model 80 that IBM has promised to deliver in the fourth quarter. Compaq has scheduled a meeting for analysts in New York this week, at which some speculated the company will demonstrate and explain the market positioning of the system.

"They have said all along that they wish to accelerate the performance threshold in relationship to IBM. They want to keep that 'hot-box' leadership," said Michael Geran, an analyst with E. F. Hutton & Co.

'Beat IBM to punch'

"The timing is ripe for this. They are, unquestionably, going to beat IBM to the punch," said Paul Evans, an industry analyst with S. G. Warburg & Co. "I'm rather surprised they have waited this long. The only explanation is that demand for the existing product is so strong." Compaq sold more than 50,000 Deskpro 386s by the end of the second-quarter, several analysts said. They said they expect demand for the system to remain strong for the rest of the year, which will exert pressure on IBM's offerings in the 80386 market. IBM shipped its 16-MHz 80386-based Model 80 late last month. Compaq delivered its 16-MHz system last fall. IBM's 20-MHz system will have a 115M-byte drive and can accept another 115M-byte drive.

Asked to comment on the enhanced system's introduction, Compaq officials said company policy prohibits them from commenting on such reports.

The 20-MHz system is expected to be offered in several configurations, each with different memory capacities, according to one analyst. He said he also expects Compaq to lower the price on the Deskpro 386.

Sources also said last week that the company will deliver an 80386-based version of its portable and an 80386-based graphics workstation this fall.

West Coast senior correspondent Julie Pitta and staff writer Alan Ryan contributed to this report.

IBM unit zeros in on mid-range support

Shaking up its marketing strategy, IBM last week announced the creation of a mid-range support organization.

IBM Vice-President Larry Ford was named to the new position of assistant group executive, mid-range systems, Information Systems Group, where he will report to Edward Lucente, IBM vice-president and Information Systems Group executive. Previously, Ford was assistant group executive for marketing and support for all systems at the Information Systems Group.

Lee Dayton will succeed Ford, IBM said. Dayton will be responsible for large systems, workstations and several other marketing areas. A part of the strategy is to bring users of Digital Equipment Corp. and other vendors' equipment to IBM's mid-range products. "We want to have conversion and coexistence with all participants," Ford said. "We want all vendors to participate in Systems Application Architecture."

"They have set Ford up to go head-on with DEC," commented an MIS executive for a Midwestern machinery firm.

Ford said the creation of his organization is part of a pattern of IBM's targeting the mid-range more closely. He pointed out that since early this year, IBM's approximately 100 Customer Solution Centers around the country have been dedicated solely to the mid-range. In existence for a number of years, the centers had previously served all kinds of systems, Ford said.

"Giving an executive responsibility only for mid-range systems will allow us to increase our attention and resources on this very important part of our business," Lucente said in a prepared statement.

"We saw the principal issue in the mid-range as an application solution and support structure that can be flexible and tailored to users' particular requirements," Ford said. The restructuring will mean customers should be able to get quicker answers to their questions than before, he added.

STANLEY GIBSON

Unisys revamps workstation operating system

BY JEFFRY BEELER
[illegible]

SARATOGA, Calif. — Unisys Corp. last week enhanced its Intel Corp. 80286- and 80386-based workstation family with a revised operating system that reportedly allows the machines to run in protected mode and address 4M bytes of random-access memory.

A press conference here marked the introduction not only of Unisys's multiuser, multitasking BTOS II operating system but also of a cluster controller that links the vendor's workstations through twisted-pair wire. BTOS Tele Cluster simultaneously supports voice and data transmissions and allows Unisys workstations to coexist with IBM Personal Computers on the same network.

Like its predecessor, the BTOS I operating system, BTOS II permits Unisys's Intel 80186-based workstations to run in real mode, which gives the system a maximum memory-address space of 1M byte, the vendor said. But BTOS II offers the additional advantage of allowing the firm's 80286- and 80386-based systems to exploit more of their microprocessors' computing potential, which has remained untapped under BTOS I.

In theory, BTOS II's expanded support capabilities will allow customers "to do a lot more work than they've done in the past," according to Carl Jolley, manager of computer services for the city of Cincinnati. But in practice, the operating system's short-term impact will depend on the nature of a user's current applications.

"We probably don't have the need to go to larger memories right now, because most of our B20 equipment operates in a stand-alone mode with applications like word processing and spreadsheets," Jolley said. "But as we grow, we may be able to take advantage of the expanded capabilities in the future."

Unisys has positioned the latest release of its workstation operating system against IBM's System/36 and 38 and 9370, according to Executive Vice-President James Unruh. "The product's positioning may be a little more upmarket than expected," said Suzanne Purnell, an analyst who follows the workstation arena for Dataquest, Inc. "But at this point, the IBM products that Unisys is most likely to bid against with its BTOS II workstations are the System/36 and the 9370."

Depending on the workstation model with which it is configured, BTOS II ranges in price from $200 to $450. It is scheduled for shipment in late September. A 12-line Tele Cluster system costs $2,150.

Uccel slims Infoloans unit

DALLAS — Uccel Corp. recently laid off six developers from its troubled integrated loans project, although the vendor said this does not indicate a lessened commitment to Infoloans.

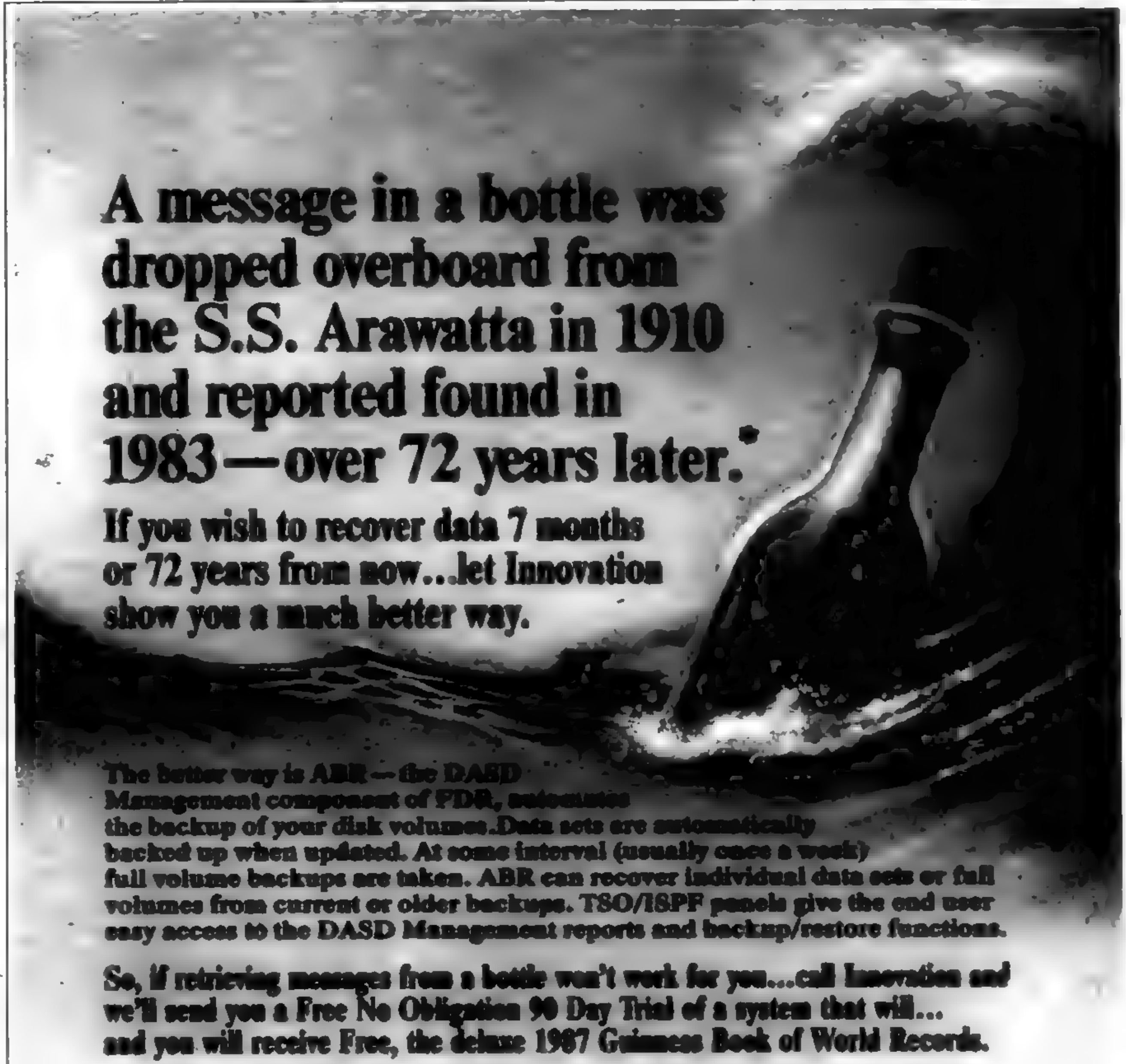
"There were too many people, not enough focus, and it was too difficult to manage," said Donald Steele, general manager of Uccel's Financial Systems Division.

Timothy McCollum, a vice-president at Dean Witter Reynolds, Inc., said he had met with Computer Associates International, Inc. executives, who said they intend to bring some of their development staff into the Infoloans project. Computer Associates had earlier announced plans to acquire Uccel.

McCollum also suggested that the layoffs came about because Uccel has just about used up the $20 million investment it received from Devinvest AG.

Steele, however, said, "We have plenty of our own money to continue investing in this."

ROSEMARY HAMILTON



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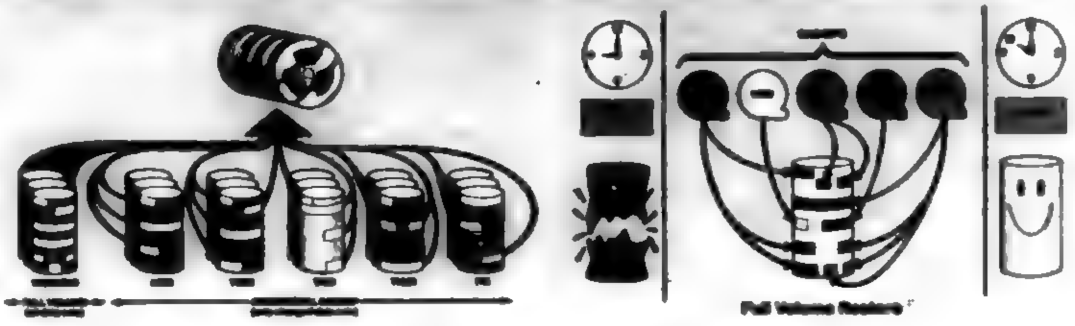

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Britton Lee uncorks data base series

High- and low-end machines, integrated manager highlight RISC intros

BY ALAN ALPER
CW STAFF

NEW YORK — Britton Lee, Inc. showcased a new series of 32-bit relational data base machines last week that employ a reduced instruction set computer (RISC) architecture and will reportedly process transactions at more than five times the speed of its current high-end system when they are made available in July 1988.

At the National Financial Computer & Automation Conference here, the Los Gatos, Calif., company also disclosed plans to unveil a new version of its integrated data base manager (IDM) that, when available one year from now, will reportedly support ANSI SQL and IBM's DB2 relational data base management system.

Under Britton Lee's shared data base approach, a dedicated processor is used to off-load data base management functions from the host processor, thereby reducing I/O constraints and providing greater resources for host application processing.

Offers shared access

The dedicated processor provides shared access to data base files stored on large hard disk drives for users working on microcomputers, minicomputers and mainframes.

The data base machine concept, similar to the positioning of the minicomputer as a network server in a corporate information system, offers benefits over a software-only DBMS, noted James Candlin, Britton Lee's vice-president of marketing.

"Software-only approaches usually result in redundant data and higher costs as a percentage of processor consumed," he added.

Britton Lee claimed that its new high-end data base machine — the BL8000 — has an optimal rating of 20 million instructions per second (MIPS) but will operate effectively at a minimum of 10 MIPS.

At those rates, the machine should offer between five and 10 times the performance of the firm's 16-bit BL700 processor using the TP1 benchmark, a standard used to measure financial transactions, Candlin noted.

Acts as cache

The BL8000's architecture, optimized for data base processing, utilizes large chunks of emitter-coupled logic memory to act as a cache for the system's disk storage.

Elements of RISC are used to streamline processing performance, the company noted.

Relative to competitor Teradata Corp. — which has targeted the high-end of the market — Britton Lee is positioning the BL8000 as "a departmental processor," Candlin noted.

Many analysts, however, are not convinced that data base machines will occupy more than a small niche in the data base management marketplace.

Surrounded by high-performance personal computers and technical workstations at one end and mini and mainframe computers at the other, many analysts believe the data base machine may be a trend that will fade away by the 1990s.

Britton Lee's new machines may give the firm some price/performance advantages over general-purpose processors, but, according to Shaku Atre, a consultant in Rye Brook, N.Y., the prospects for a market-share increase are somewhat dim.

No Blue stamp

"One major reason is that it lacks a Blue stamp," Atre said in reference to IBM and its primary emphasis on a software-only data base management approach with DB2.

Aimed at a variety of markets, including financial, telecommunications, government and aerospace, the BL8000 will reportedly support systems running IBM's VM/CMS and PC-DOS and Digital Equipment Corp.'s VAX/VMS as well as technical workstations and minicomputers running various flavors of Unix.

The machine can be connected to the host through an Ethernet local-area network, an RS-232 interface or an IBM block multiplexer channel, the company said.

Three varieties

The BL8000 will be available in three configurations, with disk storage ranging from 1G to 120G bytes and data memory ranging from 16M to 256M bytes.

Base price of the BL8000 with four 439M-byte hard disks is $320,000, while a high-end system with 14 850M-byte hard disks lists for $599,000. A backup 6.2K bit/in. tape drive is also provided.

Britton Lee also introduced repackaged versions of its mid-range machines and brought out a series of low-end processors, including a reconfigured entry-level system.

The BL300 family — previously known as the RS310 — consists of four models featuring 4M bytes of main memory and disk storage capacities ranging from 63M bytes to 3.5G bytes.

Filling a gap

The new machines fill a gap between the firm's previous entry-level machine and its mid-range BL700 family, previously known as the IDM500, noted Don Nammerman, director of product marketing.

BL300 Models 25, 40 and 60 list for $24,950, $49,950 and $90,950, respectively, and include 300M, 400M and 880M bytes of disk storage. A variety of tape backup devices is offered, including a cartridge or nine-track reel-to-reel tape drive.

Spreading out

Addition of the BL300 and 32-bit BL8000 models expands Britton Lee's reach from PC servers to the mainframe level

Model	*Relative performance**	*Standard disk*	*System cost*
BL300 Model 20	1.0	63M	$17,950
BL300 Model 25	1.3	300M	$24,950
BL300 Model 40	1.3	400M	$49,950
BL300 Model 60	1.8	880M	$90,950
BL700 Model 40	2.6	880M	$129,950
BL700 Model 60	2.6	3.5G	$204,950
BL8000 Model 400	25	1.8G	$399,950

*Britton Lee scale

CW CHART

The reconfigured entry-level Model 20, priced at $17,950, offers 63M bytes of disk storage, expandable to 126M bytes. Including host and dedicated IDM software, the machine lists for $24,950. The previous low-end model was priced at $50,000 — including IDM software — and also offered 63M bytes of disk storage.

The repackaged BL700 Model 40 offers a data base accelerator and disk and tape options as standard features for the same $129,950 price tag as its predecessor.

The Model 60, priced at $204,950, is packaged in the same cabinet as the entry-level BL8000 to provide an easy migration path to the new system, Nammerman noted.

All models will ship in October, the firm said.

Software licenses for the IDM component residing on host systems range from $5,000 for PC-class machines to $60,000 for large mainframes. A license for the relational data base management component, which resides on the BL8000, is $75,000.

In addition to SQL and DB2 support, Version 2 of Britton Lee's IDM software will provide the facilities required for data base sharing among multiple hosts.

Facilities for data base definition and modification, query processing, transaction management, data integrity, security, backup, recovery and data base optimization will also be provided, the company said.

Extensions included

Version 2, which is upwardly compatible with the initial release of the software, will also include extensions for the 32-bit architecture that will be incorporated in all Britton Lee's next-generation data base machines.

The company is also working on a variety of extensions to the relational model, including relational integrity, although it could provide no timetable for availability of those functions.

Version 1 of IDM, installed on about 800 Britton Lee BL700 and BL300 systems worldwide, provided complete SQL and IDL data definition and query management functions, according to Edward Simon, director of product marketing.

Britton Lee is working to provide support for the IBM MVS operating system, the operating system of choice for a substantial number of large mainframe complexes, Candlin said.

Focus interface

As a precursor to providing MVS support, the firm also introduced an interface to Information Builders, Inc.'s Focus fourth-generation language.

Although the interface is currently aimed at IBM VM/CMS environments, a fourth-generation language like Focus, which offers report writing, graphics, spreadsheets and decision support facilities, is becoming a basic requirement of many MVS shops that are running DB2 data bases.

"We wanted to provide the interface to Focus before we offered the MVS support," Candlin explained.

The Focus interface is set to be released in read-only form in October and in read/write form in the fourth quarter, the firm said. Pricing was not disclosed.

The firm also brought out a software interface made by Micro Decisionware, Inc. that is said to convert data between Britton Lee and 24 PC file formats, including Lotus Development Corp. and Ashton-Tate Corp. formats. Called PC/SQL Link, the interface is priced at $5,000 for a 10-PC license.

European pact flies to Texas Air

BY DAVID A. LUDLUM
CW STAFF

Providing a boost to the third largest U.S. airline reservation system, a group of European airlines last week chose Texas Air Corp. over AMR Corp., parent company of American Airlines, as the software supplier for its European reservation system.

Texas Air's System One Corp. subsidiary, the Houston-based operator of the No. 3 U.S. system, will reportedly serve as a subcontractor to IBM, which holds a contract valued at more than $100 million to provide the European airlines with a reservation system they have named Amadeus.

System One and the Amadeus group have also agreed to link their reservation systems, giving 15,000 travel agents in the U.S. and Europe, as well as Africa and Latin America, equal access, according to Texas Air.

The Amadeus group consists of Lufthansa German Airlines, Air France, Iberia Air Lines of Spain and Scandinavian Airlines System, which together handle about 60% of scheduled European flights. Texas Air operates Continental Airlines and Eastern Airlines.

No partnership

Negotiations between the Amadeus group and the U.S. airlines included discussion of the U.S. partner sharing in the ownership of the European system, which is to be operated by a Spanish company jointly owned by the Amadeus group members. But System One will not become an equity partner in the system.

Attention was called to the issue of U.S. partnership earlier this month when three different European airlines with plans to build a rival European reservation system announced that United Airlines, operator of the second largest U.S. system, would join in the development, ownership and operation of their planned system.

American Airlines spokesman Joe Stroop said AMR, which has the No. 1 U.S. reservation system, proposed a share of ownership in Amadeus but did not make a demand and offered a range of terms.

In a prepared statement, System One President Richard E. Murray said the Amadeus group chose his company because its "corporate philosophy and technology promote connectivity of systems, technology sharing and cooperative access to travel information."

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DB2 chokes

FROM PAGE 1

actions, but they also encountered instances of "severe record locking" as they conducted their tests.

Record locking is one of the undefined limits on DB2's transaction-processing capabilities. DB2's technique of record locking was described by one knowledgeable observer as "crude" and by several DB2 advocates as something that one must design around in application building to avoid performance penalties.

As users move DB2 into heavier production use, the constraint of record locking on transaction processing becomes more acute, users and data base consultants said.

IBM said Release 2 of DB2, currently in use, can handle 47 to 50 transaction/sec. for production purposes, but the company has also widely cited the 62 transaction/sec. result from a benchmark by Provinsbanken in Denmark. Earlier this year, IBM urged DB2 customers to attend a Danish conference on the benchmark results as a way of learning what can be accomplished with DB2 in a production environment.

The Schwab benchmark, which tested DB2 in a CICS environment on an IBM 3090 Model 200, used the firm's established Stock Order Entry system without modification for DB2.

'More complex'

"I'm sure the typical Schwab transaction was more complex than the Provinsbanken transactions," said William Inmon, author of the manual *Building Production Systems with DB2* and a senior consultant with American Management Systems in Lakewood, Colo.

Inmon examined the Provinsbanken benchmark and concluded, "The application was very carefully designed, the data was highly denormalized, and the SQL queries were carefully restrained in the amount of data to be accessed." The application executed a simple transaction at a bank automatic teller machine, he said.

The Schwab system in San Francisco is used by brokers taking customer calls to buy and sell stock at a discount. A customer transaction "is not your simple credit card lookup," said Woodson Hobbs, executive vice-president of MIS at Schwab. A typical transaction involved 41 data base calls, five or six of which were updates, Schwab officials familiar with the test said.

The brokerage house processes 1.2 million transactions a day, most of them in a 7½-hour period. "We felt DB2, from an architectural point of view, was what we wanted. But we wanted to make sure its performance was adequate. It wasn't," Hobbs said.

The Schwab benchmark compared DB2 with the data base management system Schwab eventually selected, Applied Data Research, Inc.'s Datacom/DB. Both were tested using IBM's Teleprocessing Network Simulator, which fires a script of transactions against an application.

Hobbs said IBM representatives assured Schwab that Release 2 of DB2 could handle the firm's requirements and that IBM had supplied a team of specialists to gear the DBMS for the benchmark. IBM officials familiar with the benchmark could not be reached for comment.

On the average, Datacom/DB ran at 36 transaction/sec. vs. a rate of 18 transaction/sec. by DB2. CPU usage was monitored, and Datacom/DB accounted for 15% of CPU usage vs. 85% by CICS. In the DB2 test, DB2 accounted for 57% of CPU cycles, compared with 43% by CICS, said Kenneth Gladden, Schwab's director of systems testing.

Several observers pointed to DB2's method of record locking as part of the explanation for the difference. DB2 locks what is usually a 4K-byte page each time it accesses a record, preventing another user from accessing the same record or any other record on the page. The page may contain several or dozens of records that are locked along with the one accessed, explained Thomas H. Sawyer, senior consultant on DB2 operations at Codd and Date Consulting Group in San Jose, Calif.

In addition, a DB2 data integrity feature maintains the lock, even after the transaction is completed, until the application finishes its run or until it receives an order from the application to commit all updates and release the locks. The feature allows DB2 to redo any updates that are started but not completed on account of an abnormal ending of an application, Sawyer said.

The first version of DB2 imposed the locks at the start of an application's run and maintained them until the run finished. The second release, which is the one currently in use, allows programmers to insert commit orders periodically into applications, allowing the records to be released. The change was one of the primary reasons for the performance gains cited in Release 2, said Colin J. White, a DB2 authority and editor of "InfoDB," a San Jose-based newsletter.

'Horribly crude'

Inmon termed the locking method "horribly crude" in the first DB2 release and "just plain crude" in the second release. Locking at the record level rather than page level is more efficient, he said. White noted that the members of Guide, an IBM users group, had made record-level locking one of its priority requests to IBM.

> "WE FELT DB2, from an architectural point of view, was what we wanted. But we wanted to make sure its performance was adequate. It wasn't."
>
> WOODSON HOBBS
> CHARLES SCHWAB & CO.

Datacom/DB, a relational-like DBMS derived from an inverted-list product, employs locking at the record level with frequent checks for commit orders to release the locks, Inmon said.

Schwab officials indicated that no provision has been made to free locked pages of records since the Stock Order Entry system was tested without redesign for DB2. In initial tests with 100 terminals, the locking became so extensive that DB2 crashed, along with CICS. "Essentially, it came down to the way DB2 locks things, [that] is based on page size," Schwab's Gladden said.

Hobbs said Schwab would have tolerated a 10% disadvantage in transaction processing to get the advantages of using SQL and a relational data base. "But a 2-to-1 difference — we couldn't live with that," he said.

Other users said they have seen DB2's response time become less predictable as they increase the number of transactions to a level still far lower than IBM's cited maximums.

"We're moving cautiously. When we get into complex transactions, response time goes down," noted David Smith, a manager of DB2 use at Deere & Co. in Moline, Ill.

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	Los Angeles	Jul 16, Aug 13, Sep 8, Sep 30
	Newport Beach	Jul 21, Sep 17
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IBM ships publishing kit

Solutionpac weaves Postscript into processor, not printer

BY JEAN S. BOZMAN
CW STAFF

BOULDER, Colo. — IBM recently began shipments of its Personal Publishing Solutionpacs, which contain an expansion board that implements Adobe Systems, Inc.'s Postscript page-description language within IBM's Personal Computer or Personal System/2. IBM is the first vendor to implement Postscript in the processor cabinet rather than in the printer, according to Adobe.

The approach reportedly offers greater speed, the ability to download software revisions through the PC bus, storage of fonts on a hard disk and faster transfer to the printer through a 1.8M bit/sec. printer interface.

The Solutionpac publishing system is available for PC XTs and ATs as well as PS/2 Model 30s. However, IBM said it is not ready to ship Solutionpacs for the PS/2 Models 50, 60 and 80 because of problems in redesigning the Postscript board for use in those machines' different expansion chassis.

Officials would not estimate a shipment date.

The Personal Publishing Solutionpac, including a PS/2 Model 30, an IBM 4216 6 page/min printer, Microsoft Corp.'s Windows, Adobe's Postscript and Aldus Corp.'s Pagemaker, sells for $8,553. The same printer and software package is available as an upgrade kit to an existing XT or AT for $5,793.

The system is based on IBM's new Personal Pageprinter Adapter, an add-in board with 2M bytes of read-only memory, a 10-MHz Motorola, Inc. 68000 32-bit chip, Postscript specifications and a high-speed I/O channel. Data travels from the board to the 4216 printer through a video cable at 1.8M bit/sec., which offers higher throughput than standard 9.6K bit/sec. lines, IBM said.

"The Postscript board takes on the role of a coprocessor," said Damon Trimble, a marketing support manager at IBM. "As soon as the last bit of data goes across the PC's bus, the end user has the ability to use his keyboard and his mouse."

Ports to processor

Adobe Systems cofounder and Executive Vice-President Charles Geschke said the Postscript implementation is the only one that ports Postscript to the processor itself. "All the other implementations are in the printer," he claimed.

IBM, like other vendors, is under license with Adobe to manufacture Postscript chips.

Geschke said the IBM adapter is a modified version of Adobe's Scout controller board, which has been used in Texas Instruments, Inc. and Digital Equipment Corp. printers.

"They took our design and reconfigured it to fit on their PC card," Geschke said.

IBM managers at the independent Publishing Systems Business Unit here last week said the PC-resident Postscript board sets the IBM product apart from the pack of publishing solutions based on PCs.

"IBM happens to offer industry-standard products such as Postscript and Aldus Corp.'s Pagemaker and Windows in our publishing systems," Trimble said. "We put all of that very deliberately on a standard PC platform. But as much as possible, we're going to integrate them in favor of IBM."

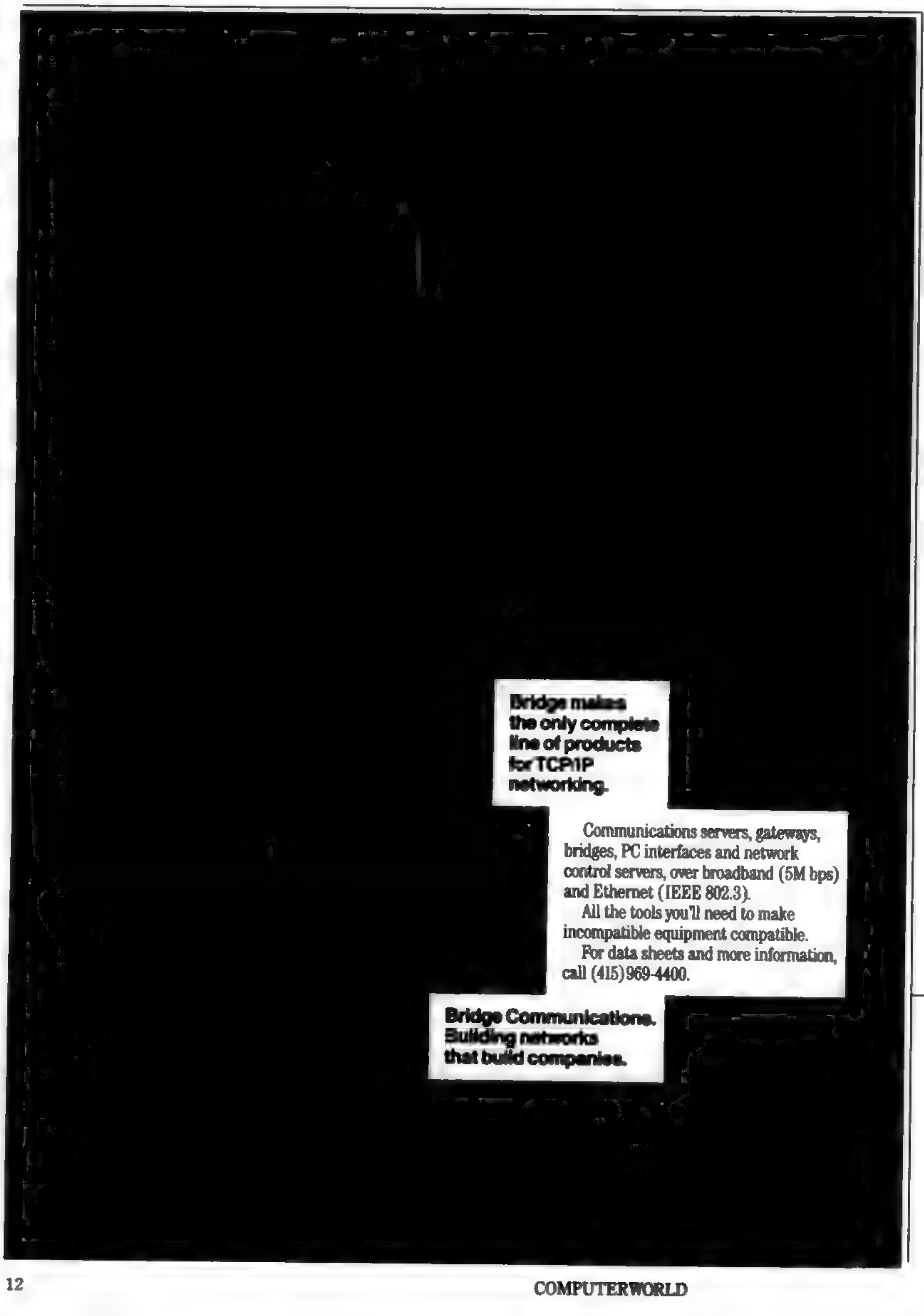
Solution limited

Industry analysts familiar with the Postscript implementation say it will serve to speed the IBM system's performance. But Tony Bove, editor of the "Desktop Publishing" newsletter, based in San Francisco, says he believes that the IBM solution is a limited one.

"The 4216 printer is still too expensive a resource for a personal publishing system," Bove said. "At about $4,000, it's almost like buying a car, and it's a resource that can't be shared with other personal computers. This is in contrast to Apple Computer, Inc.'s Laserwriter, which can be addressed by many computers."

Arlene Karsh, director of computer publishing systems market analysis at CAP International, Inc. based in Marshfield, Mass., said the major advantage of the Postscript card is flexibility.

"There is a slight advantage in sending a finished page over a video cable to the printer," Karsh said. "But there is even more advantage in being able to add Postscript additions or extensions through software that is downloaded from a PC disk drive."



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Telenet staking claim to EDI market

BY ELISABETH HORWITT
CW STAFF

OAKLAND, Calif. — Gambling that demand for electronic data services is on the verge of exploding, Telenet Communications Corp. last week entered the market through an agreement to resell Electronic Document Interchange (EDI) services.

The agreement with Sterling Software, Inc.'s Ordernet services division was announced at an EDI conference held here by Mountain View, Calif., research firm Input. The joint venture combines the strengths of two market leaders, analysts said.

Telenet, a subsidiary of U.S. Sprint Communications Co., reportedly has the largest commercial packet-switching network in the U.S. Ordernet was third in EDI service revenue last year, behind McDonnell Douglas Network Systems Co., owner of Tymnet, and General Electric Information Services Co. (Geisco), according to Input.

Both McDonnell Douglas and Geisco offer packet-switching and messaging services, which can be integrated with their EDI offerings. Neither company has been able to make its EDI venture profitable so far, noted Victor Wheatman, Input manager of EDI planning services.

Growth spurt seen

However, he added, both have significantly added to their customer bases this year. Furthermore, Input predicted that the EDI market, including software and services, will see an 88% average annual growth rate, reaching approximately $1.4 billion by 1991.

"I think this is the year that growth will begin climbing steeply," said Telenet director of EDI services Michael Mansouri. "We have done our own elaborate study of intercompany networking strategies, and we think the time is right." Telenet's own projection, less optimistic than Input's, is that EDI revenue will be just more than $400 million in 1991.

While Telenet will resell the Ordernet software and services, Ordernet will market the Telenet network as a cost-effective access link for its customers, noted Ordernet President William Plumb. Until now, Ordernet was accessible only through WATS, dial-up or dedicated 56K bit/sec. channels, he added. But customers will really benefit, according to Plumb, "when we jointly develop software to integrate Ordernet's EDI services with Telenet's electronic messaging."

Bergen Brunswig Corp., which currently uses Ordernet to process and electronically distribute 70% of its purchase orders, is interested in the integration of the EDI service with the hard-copy delivery feature of Telenet's messaging service, according to Michael Selman, Bergen Brunswig's director of corporate systems. This would allow the firm to send electronically processed documents to the remaining 30% of its suppliers that lack the technology for electronic delivery, Selman noted. Telenet will offer users alternate gateways to either Ordernet or to telex and hard-copy delivery systems, Mansouri said.

Bergen Brunswig has little interest in using Telenet's packet-switching facilities to send its business documents to Ordernet, Selman said. "We are a large user; we can justify 56K bit/sec. dedicated lines."

Telenet, which has been expected for some time to enter the EDI market, chose Ordernet as its partner because "it provides more than just a commodity service," Mansouri said. "They process information and generate quality-control reports" designed to ensure reliable delivery of documents, he added. Sterling also has differentiated itself from competitors by reselling EDI transaction data in the form of market analysis reports.

Telenet's EDI service is scheduled to be available in the fourth quarter, the company said.

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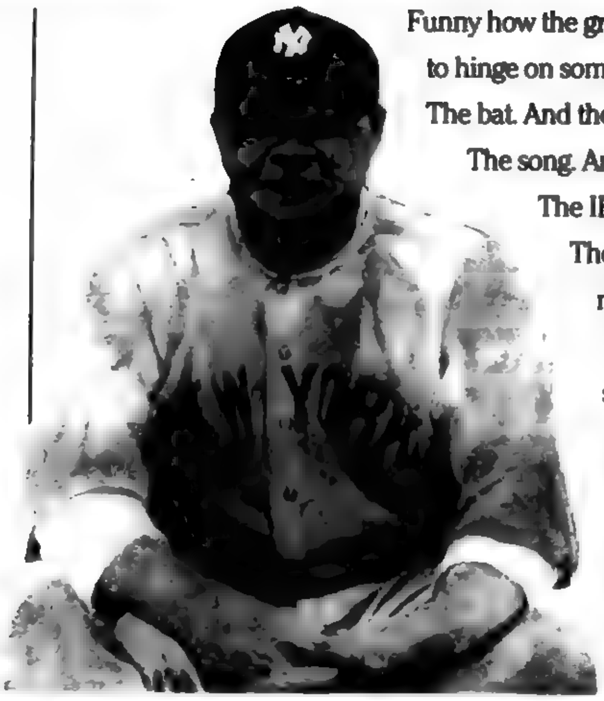

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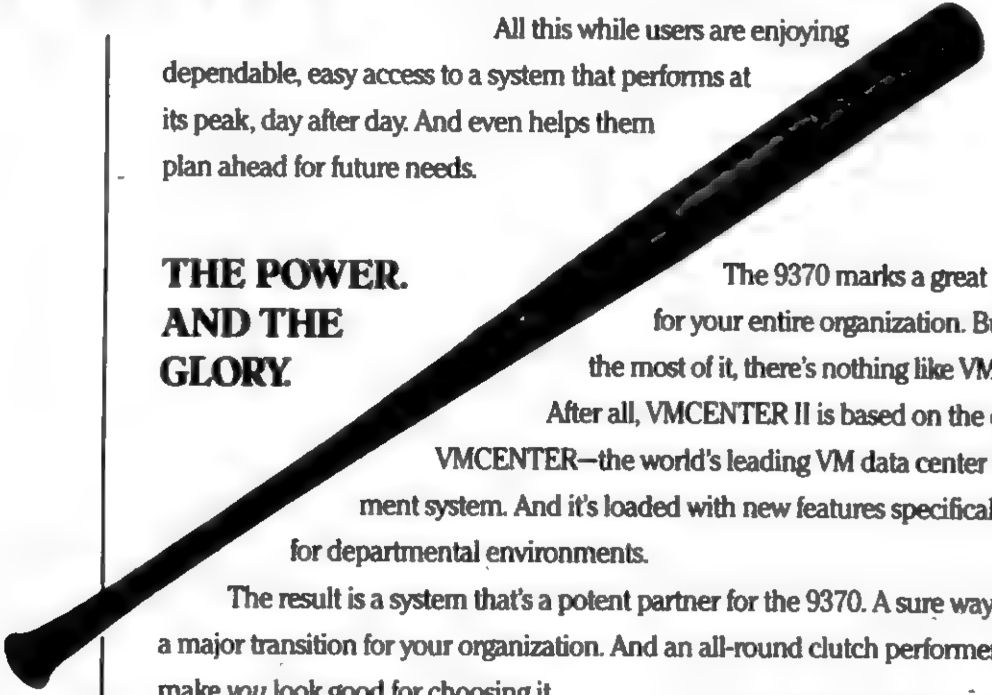

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PC accounting tool works with host

BY CHARLES BABCOCK
CW STAFF

RALEIGH, N.C. — Global Software, Inc. last week announced accounting systems said to work on personal computers in conjunction with related applications on the mainframe.

The PC-based applications, called the Cooperative Processing System, are scheduled to be available late this year at prices ranging from $10,000 to $30,000. They will work with the $75,000 to $130,000 General Ledger and other applications of Global's financial software product line, the company said.

The packages were designed to offload mainframe cycles to desk tops when the processing is appropriate for that level, according to Global President Ronald J. Kupferman.

Software tied via Irma board

The personal computer software is tied to the host via a Digital Communications Associates, Inc. Irma board, IBM 3270 terminal emulation or other standard data transfer link.

Each mainframe package includes an environmental manager that is set at the time of installation to channel communications through the correct teleprocessing monitor and to a predetermined mainframe data base management system.

Fred G. Dilger, executive vice-president of Global, said use of the environmental manager isolates the communications link from the application and will allow Global to take advantage of program-to-program, LU6.2 communications when that feature becomes better established in the marketplace. "The environmental manager isolates the mainframe application from the data base and monitor. It gives me one entry point into the mainframe," regardless of the subsystem environment, he said.

The current PC application set was designed to work under IBM's CICS teleprocessing monitor, which represents the largest share of Global's 2,400 sites.

The first application will be the PC Budgeting package to work with Version 10.0 of Global's General Ledger on the mainframe. PC Budgeting will provide menu selection, windowing and simplified screen manipulation to allow "a more civilized dialogue with the mainframe," Global representatives said.

Cooperative processing versions of fixed assets, general ledger, accounts payable and credit and accounts receivable applications are slated for the PC after the initial package is offered.

Tamperer convicted

BY ADAM STONE
[illegible]

ROCHESTER, N.Y. — A former Eastman Kodak Co. employee was recently convicted on two counts of computer tampering for twice shutting off the company's telephone lines.

Robert V. Versaggi of Oakfield, N.Y., is one of the first to be convicted under the state's new computer tampering laws, which took effect in November 1986. Those statutes prohibit "the alteration or destruction of a computer program," according to City Court Judge Joseph D. Valentino.

Kodak uses a Tellabs, Inc. local-area network (LAN) running on a Northern Telecom, Inc. SL-100 computer to operate its telephones. Versaggi was found guilty of tapping into the SL-100 through the Tellabs LAN from his home computer and shutting off 4,698 telephone access lines at the Kodak Park facility here shortly after midnight on Nov. 10, 1986. Technicians worked for two hours to restore service at the facility.

He was also convicted of shutting off, in the same manner, all 6,990 phone lines at the Kodak national corporate headquarters, also in Rochester, on Nov. 19, 1986. The lines stayed out for four minutes before the computer restarted itself.

Evidence found in phone bills

When a telecommunications supervisor suspected tampering as the cause of systems abnormalities in October and November last year, he ordered that a script file be installed on the system to monitor activity. Monitor printouts, SL-100 log printouts and Versaggi's telephone bills were presented as the crucial evidence that led to his conviction.

Versaggi's lawyer, Clark J. Zimmermann, argued that issuing the shutdown commands was merely a use of the Tellabs program and not an alteration. Since Versaggi did not rewrite the program or permanently damage it, the wording of the statute did not apply to this incident, Zimmermann said.

Valentino wrote in his decision that he had rejected Zimmermann's literal reading of the law in order to uphold its broader intention "to deter this kind of activity by employees entrusted with special computer privileges."

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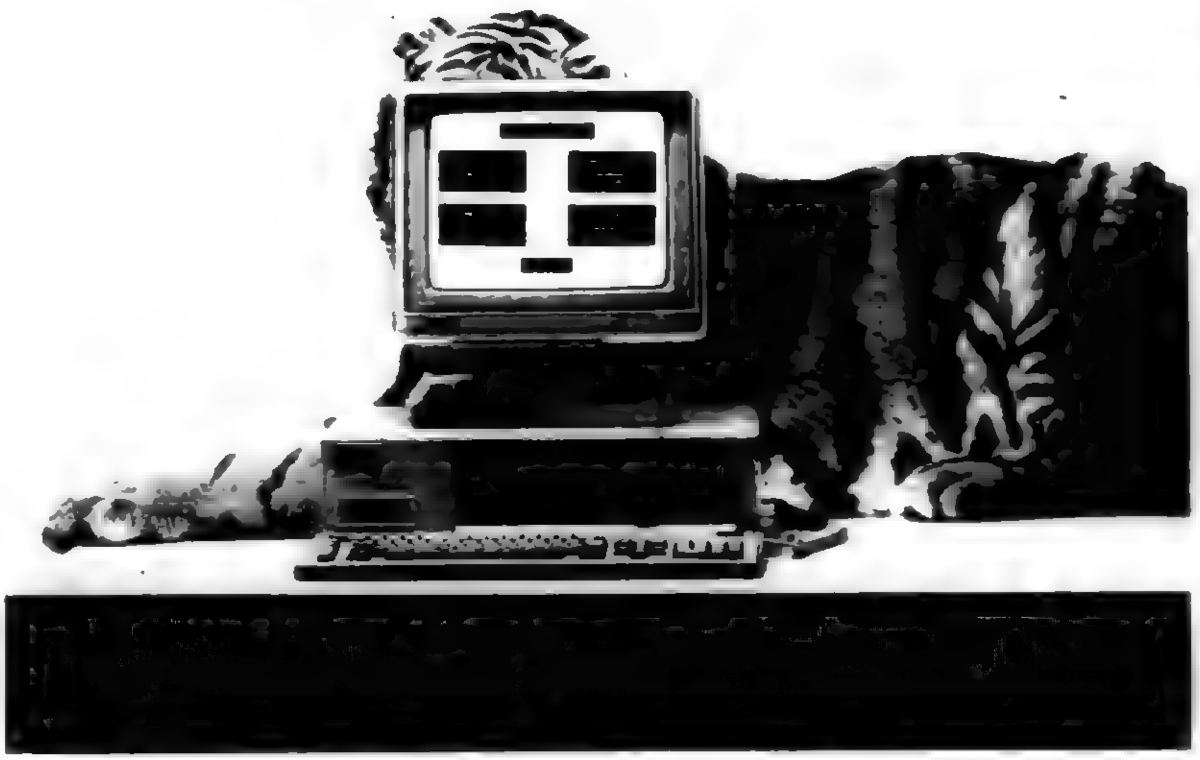

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Cullinet to launch VAX tool set

BY CHARLES BABCOCK
CW STAFF

WESTWOOD, Mass. — Cullinet Software, Inc. is about to launch an application development tool set, including an application generator, that will work with standard files on the Digital Equipment Corp. VAX.

A preview of the still unannounced product last week indicated that the supplier of the IDMS/R data base management system and related tools to mainframe IBM shops is preparing to move forcefully into the VAX marketplace. Although Cullinet officials declined to name specific products, they acknowledged that Cullinet can be expected to develop VAX versions of many of its mainframe application offerings.

The tool set, called Knowledge Build, will allow programmers to develop applications in Cobol, Fortran or Basic while using DEC Record Management System files. A later release is expected to add the C language and Cullinet's fourth-generation language, the Application Development System (ADS).

In addition, the same tools and the application generator will be included in Cullinet's relational data base management system for the VAX, IDMS/SQL, when it is announced this fall. The DBMS will use SQL as its data access and manipulation language.

The five tools provide data definition, screen painting, menu maintenance, report generation and code generation. "This is a very directed, menu-driven application development system," said Ann Thomas, a Cullinet sales representative.

User definitions

The tools make use of an underlying set of rules that allows data to be defined, screens to be painted and menus to be built in response to user prompts and short data entries. Screens can be constructed so that fields requiring telephone numbers to be entered will have automatic cursor jumps over the dash in the number. Fields requiring an employee name will automatically capitalize the first letter of each name, Thomas said during a demonstration of Knowledge Build.

A data dictionary checks and enforces data definitions, preventing a user from entering data that is inconsistent with the type defined for the field.

Users can invoke Help screens by hitting function key 2, a process typical of many VAX systems. "We tried to follow VAX conventions as much as possible," said Steve Romagna, assistant product manager.

The tool set, when available with IDMS/SQL, will include SQL, precompilers for preprocessing queries and Fastinfo, an end-user tool for building ad hoc queries through a series of windows.

Knowledge Build requires Version 4.4 of the VMS operating system.

A similar set of personal computer-based tools is currently being built to use a version of ADS called ADS Plus, according to Rogmagna.

Cullinet officials point out that when an SQL-based version of IDMS/R is available, in 18 to 24 months, Cullinet will be offering SQL-interfaced development tools on PCs, the VAX and mainframes.

OS/2 veil

FROM PAGE 1

made available.

-A major stumbling block for Unix has been its difficulty, which a graphics user interface would help alleviate. The availability of a Unix version with a graphics user interface shell would also help machines based on Intel Corp.s 80386 chip to "sneak into the single-user technical workstation market," where OS/2 is expected to be strong, Sribhibhadh said.

With the disclosure of the Presentation Manager delivery schedule, both users and software developers can more easily plan for the implementation of OS/2. Neither IBM nor Microsoft has previously announced a shipping schedule for the product.

At a recent analysts' meeting, William Lowe, president of IBM's Entry Systems Division, denied reports that the Presentation Manager is behind schedule. Lowe said the project is ahead of schedule but declined to say what the schedule is.

Flying blind

Without fairly precise knowledge of the schedule for the Presentation Manager, users cannot determine what type of software will be available for OS/2 and have difficulty deciding what hardware configuration they will need to run the bulk of OS/2 applications.

If the Presentation Manager ships in close proximity to OS/2, the bulk of OS/2 applications will require the Presentation Manager and will need at least an Intel 80286 machine equipped with a high-resolution graphics adapter and monitor, a mouse and additional memory.

Were the Presentation Manager to ship long after the OS/2 kernel, however, the bulk of applications would remain character-based and would not need high-resolution graphics or a mouse. They would also require less memory.

Software vendors contacted last week said they plan to place the bulk of their development efforts toward Presentation Manager-based applications and will benefit from any closeness in ship dates.

"It makes sense to do one port on any piece of software, because it is very expensive each time we gear up an effort, as well as time-consuming," said Ron Posner, president of Ansa Software.

Despite what may be viewed as an aggressive delivery schedule by IBM and Microsoft, many MIS and micro managers remain concerned that both OS/2 and the Presentation Manager are still too far off to mean much to their corporate computing strategies.

"There isn't a lot I can do with that information. It's not bad news, but it falls under the category of interesting. There is nothing I can run with it today," said Jeff Ehrlich, manager of product technology for General Electric Corp.'s Information Systems Division.

"If they are talking about just accelerating the release of the Presentation Manager but not all the other extended capabilities in OS/2, like [IBM's] Systems Application Architecture, which is essential in developing code we write in-house, it's not much help," said Robert Corr, director of technology planning for the Dealer Systems Division at Electronic Data Systems Corp.

Developers wary

Software developers too said they are skeptical about the value of an earlier release of the Presentation Manager, with many hedging their bets by offering programs that require the OS/2 kernel. Lotus Development Corp., for instance, has already announced a character-based version of 1-2-3 for OS/2 and will later release a version specifically for the Presentation Manager.

Others said they are skeptical over whether Microsoft and IBM can deliver the Presentation Manager on time.

"Every developer has to place their bets today on what approach they are going to take [to OS/2 and the Presentation Manager], said Brad Silverberg, Borland International's vice-president of engineering. "IBM and Microsoft will have to present some evidence that things are going well for this to mean anything."

Computerworld Senior Editor Doug Barney and West Coast Bureau Chief Jeffry Beeler contributed to this report.

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   - 20 Finance/Insurance/Real Estate
   - 30 Medicine/Law/Education
   - 40 Wholesale/Retail/Trade
   - 50 Business Service (except DP)
   - 60 Government — State/Federal/Local
   - 65 Communications Systems/Public Utilities/Transportation
   - 70 Petro Chem, Mining, Construction, Agriculture
   - 80 Manufacturer of Computers, Computer-Related Systems or Peripherals
   - 85 DP Service Bureau/Software/Planning/Consulting
   - 90 Computer/Peripheral Dealer/Distributor/Retailer
   - 75 User Other ________
   - 95 Vendor Other ________

   (Please specify)
2. TITLE/FUNCTION (Circle one)
   - IS/MIS/DP MGT
     - 19 Vice President, Asst. VP
     - 21 Dir., Mgr., Suprv. IS/MIS/DP Services
     - 22 Dir., Mgr., Suprv. of Operations, Planning, Adm. Services
     - 23 Dir., Mgr., Suprv., Analyst, of Systems
     - 31 Dir., Mgr., Suprv., of Programming
     - 32 Programmer, Methods Analyst
     - 35 Dir., Mgr., Suprv., OA/WP
     - 38 Data Comm. Network/Systems Mgt
   - OTHER COMPANY MANAGEMENT
     - 11 President, Owner/Partner, General Mgr
     - 12 Vice President/Asst. VP
     - 13 Treasurer, Controller, Financial Officer
   - ENGINEERING
     - 41 Engineering, Scientific, R & D, Tech. Mgt
   - SALES
     - 51 Manufacturing Sales Reps., Sales/Mktg. Mgt
   - OTHER PROFESSIONALS
     - 60 Consulting Mgt
     - 70 Medical, Legal, Accounting Mgt
     - 80 Educators, Journalist, Librarians, Students
     - 90 Others ________

   (Please specify)
3. COMPUTER INVOLVEMENT (Circle all that apply)
   Types of equipment with which you are personally involved either as a user, vendor, or consultant.
   - A Mainframes/Superminis
   - B Minicomputers/Small Business Computers
   - C Microcomputers/Desktops
   - D Communications Systems
   - E Office Automation Systems
   - F No Computer Involvement

336738-5

FCC expected to further deregulate AT&T

Large users fear abandoning rate-of-return method would boost private-line rates

BY MITCH BETTS
CW STAFF

WASHINGTON, D.C.— The Federal Communications Commission, at its next meeting on Aug. 4, is expected to propose a complete overhaul of the way it regulates AT&T's interstate long-distance rates.

The deregulation measure promises to make AT&T a more profitable company, but AT&T's largest customers are concerned it could lead to price increases, particularly for private-line services, according to several industry analysts.

Analysts recently predicted that the FCC, led by Chairman Dennis Patrick, will issue a proposed rule abandoning the traditional form of rate-of-return regulation, replacing it with a scheme allowing AT&T some pricing flexibility under an overall price cap.

In essence, the FCC will be scrapping the ceiling on AT&T's profits in favor of a ceiling on AT&T's interstate long-distance rates, according to George R. Dellinger, a telecommunications analyst at Washington Analysis Corp. He said the FCC is sympathetic to AT&T's contention that it faces several competitors in the long-distance market and thus should be deregulated.

Emulating Brits

Dellinger said the FCC's proposal may resemble England's regulation of British Telecommunications PLC, which uses a rate formula pegged to the consumer price index, minus 3%. For example, in a year in which British inflation is 5%, British Telecom can raise its prices a maximum of 2%.

The new regulatory model would "permit [AT&T's] costs to decline more quickly than rates, which would allow profit margins to expand," Dellinger said. That would give AT&T's interstate long-distance profit center a $500 million earnings boost, he predicted.

The FCC proposal, which will be subject to public comment before becoming a final rule next year, will be controversial enough that it may provoke challenges in Congress and in court, sources said.

The idea is being greeted with skepticism and suspicion by large network users [CW, April 13]. "There's a lot of ambivalence in the user community about AT&T deregulation," said one users group's attorney, who requested anonymity.

The source said that while AT&T lobbyists promise large users that pricing flexibility means they can get special discounts for long-term contracts, users are concerned that they also could be hit with price hikes for private-line and other services.

FCC officials, who in December 1986 supported deregulation of AT&T's packet and contract services, recently hinted that they will propose a complete replacement for rate-of-return regulation on AT&T in early August. The FCC has already released research papers suggesting that it is legal and appropriate to abandon the rate-of-return model.

The FCC adopted rate-of-return regulation in 1967, which required AT&T to set rates at levels that would cover properly allocated costs and earn a return on capital falling within an FCC-specified profit range, now 12.2% to 12.7%.

The driving force behind the FCC's forthcoming proposal is the contention that traditional rate-of-return regulation has numerous flaws. Critics have said it gives regulated companies a perverse incentive to inflate costs because they earn a guaranteed profit on expenses; it is too burdensome for companies and regulators to administer, delaying the introduction of new services; it creates an incentive for the regulated company to shift costs from unregulated businesses to the regulated business; and it regulates long-distance rates only indirectly.

Rate-based system 'outmoded'?

Last week, the Reagan administration's National Telecommunications and Information Administration (NTIA) released a report urging federal and state regulators to scrap the "outmoded" system of rate-based regulation.

The NTIA report recommended that all competitive telecommunications services be fully deregulated and all services that lack alternative suppliers be subject to a "modified social contract" form of regulation, which establishes a rate cap and allows some pricing flexibility.

"We have recommended the virtual deregulation of AT&T," said Alfred C. Sikes, who heads the NTIA, because the long-distance market is competitive.

MCI Communications Corp. also supports deregulation for AT&T. This is said to be in part because it believes that the FCC's use of rate-of-return regulation to push down AT&T's long-distance rates has hurt MCI's financial position [CW, March 9].

Slew of intros marks Siggraph

BY ALAN J. RYAN
CW STAFF

ANAHEIM, Calif. — ACM Siggraph '87 opens its doors today here to a projected 25,000 attendees. New products on display are slated to include low-end workstations, graphics software, graphical user interfaces, videographics boards, controller cards, paint packages and animation packages.

Among the products scheduled to be demonstrated at the show are the Iris 4D/60 Turbo Option from Silicon Graphics, Inc. and the PXCL 5500 Turbo Option from Natick, Mass.-based Prime Computer, Inc. The Turbo Option, announced by both companies last week, was jointly developed by Silicon Graphics, Prime and MIPS Computer Systems, Inc. in Sunnyvale, Calif.

The floating-point and integer computing performance upgrade was designed for Silicon's reduced instruction set computing-based Iris 4D/60 Superworkstation and for Prime's PXCL 5500. The Turbo Option, which sells for $7,500 from both companies and will begin shipping next month, is a CPU upgrade to a 12.5-MHz 32-bit CPU coupled with a 12.5-MHz floating-point coprocessor. It includes a high-speed dual-cache design and up to 16M bytes of on-board CPU memory. Also announced last week were price reductions on the Iris 4D/60 workstation and PXCL 5500; both were cut from $74,900 to $64,900.

Silicon Graphics also will demonstrate a low-end workstation to compete against Sun Microsystems, Inc. and Apollo Computer, Inc. workstations. The Iris 3115 will sell for $24,900, the company said.

Bala Cynwyd, Pa.-based Pictureware, Inc. is slated to demonstrate its updated version of Picturepower. The software package incorporates photographs into data bases and can display those photos in either gray scale or color, according to a spokeswoman. The program is now compatible with the Hewlett-Packard Co. Laserjet printer and sells for $940.

Also making its debut from Pictureware will be a hardware compression package coupled with Picturepower. Called Picturepower HC, the package reduces the amount of data base space required for Picturepower by a 10-1 margin, the spokeswoman said. The package will sell for $3,500.

Slide Manager, a generic-type program for slide cataloging that records a written description and the image from the slide onto a data base, will be announced by Pictureware. It will sell for $900 and is compatible with Ashton-Tate's Dbase Plus.

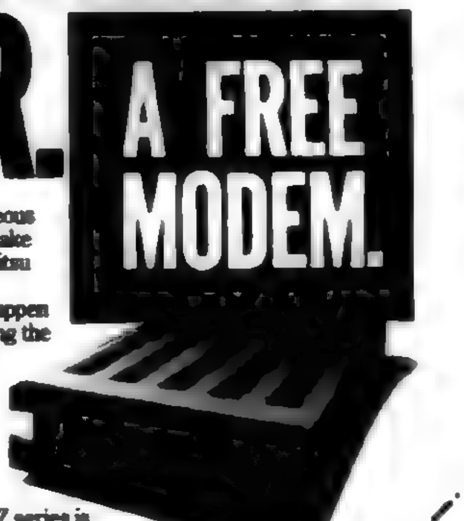
Productivity Products International in Sandy Hook, Conn., is set to introduce a graphical user interface construction package for the development of iconic user interfaces on bit-mapped display products on Tuesday. The object-oriented programming tool is written for C.

Nova Graphics International Corp. in Austin, Texas, said it will announce the Nova CGI, a firmware-based product that reportedly conforms to the Computer Graphics Interface standard. Also to be announced will be Nova's joint-marketing agreements with the Display Products Division of Calcomp, a Lockheed Company, and the Microcomputer Division of Motorola, Inc. in Tempe, Ariz.

AT&T's Electronic Photography and Imaging Center is slated to demonstrate its Vista videographics board at Siggraph. The single-slot personal computer board includes 4M bytes of on-board CMOS video random-access memory, multiple addressable resolutions and a 16-million color palette, the vendor claimed.

Kontron Datasystems in Mountain View, Calif., said it will unveil its 7000CB, an IBM Personal Computer AT-based graphics controller card that contains one or two Advanced Micro Devices, Inc. 95C60 Quad Pixel Dataflow Managers. Prices start at $2,995.

OUTRAGEOUS OFFER.



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EDITORIAL

CASE advantage

The "workstation wars" of recent months may present a hidden opportunity for an unlikely group of MIS professionals — software developers. With workstation prices plunging to below $5,000, many sites may be encouraged to experiment with the hot new technology called computer-aided software engineering. What they may find, however, is that CASE is more glitter than substance.

CASE products have drawn raves from some experts for helping developers computerize the laborious task of modeling data and documenting program flow. Most contain validation features. Several enforce one or more life-cycle methodologies. Nearly all feature elegant graphical interfaces.

Unfortunately, CASE technology is still relatively primitive. Most tools have grown up around the need to automate the manual process of drawing data flow or structure charts. Protyping aids, libraries and validation tools have been added, but mainly as extensions to the graphics core. To achieve real software engineering — not just design and analysis — users require much more.

MIS professionals need to start with tools that help model the organization and create and enforce related standards for data and programs. A code generator should accept those diagrams and turn out Cobol programs that can be maintained by hand or regenerated from specifications. All this needs to be accomplished from a flexible, friendly interface that does not require rigid adherence to a particular methodology.

Pieces of this puzzle are now becoming available, but the picture is still incomplete. One manufacturer has tied a host-based code generator to a workstation CASE tool but produces programs only in a proprietary language. Others have leveraged networking and cataloging into useful documentation aids for teams of developers but have failed to make the link to program generators. Still others have built data dictionary-oriented design tools but have tied them to rigid methodologies.

Much good work is now being done in this area. Knowledgeware, Inc. is tying its CASE environment to the Gamma code generator recently purchased from Tarkenton Software, Inc. Bachman Information Systems is working on CASE methods assisted by artificial intelligence. Index Technology Corp. has struck deals with several code generator developers. Cortex Corp., which has gone far in resolving the code generation problem with its Corvision and Application Factory products, is developing a port for IBM mainframes that will produce Cobol code.

However, these and other efforts are still in the development stage. While it is encouraging to see so much activity in the CASE arena, MIS departments should seize the opportunity to purchase cheap, powerful workstations and put them to work in CASE applications on smaller projects. The kind of feedback that such use generates is the only tonic for helping CASE tools overcome their current weaknesses.

LETTERS TO THE EDITOR

Another cure

In "A cure for C-sickness" [CW, June 8], William Zachmann continued to support the myth that personal computers are less expensive than multiuser systems.

He summed up this myth with the following naive and absurd assertion: "Contrary to what many still think, the result will be a devastating reduction in the demand for traditional mainframe and minicomputer systems. The vastly superior price/performance ratios in microprocessor-based systems, like personal computers, spell big trouble for vendors of traditional multiuser systems. Increasingly powerful PCs, linked by means of local-area networks and supplemented by network servers of various types, offer a far less expensive, more flexible way to build enterprise systems than traditional systems do."

What makes this kind of statement so ridiculous is the pompous, almost self-righteous context in which it is given. Zachmann gives no facts, information or data to support his statement.

Over the years, I have seen this technology-driven mentality assert itself over and over again in the information systems field. One does not see a similar disregard for economic analysis and facts in other fields such as marketing, manufacturing, engineering, accounting and administration.

Based on my experience in building and maintaining multiuser mainframe systems, I have never found a PC-based system that could compete costwise with a properly developed and maintained multiuser mainframe system.

The output products of any computer-based information system are the same regardless of whether the system runs on a microcomputer, minicomputer or mainframe.

Some people in our business like to talk about cost per million instructions per second, per million bytes of storage and per unit of memory. This data is useful to systems executives in evaluating purchase or lease trade-offs, but it is utterly useless when communicating with an end user.

The electronic data processing industry does itself a disservice by substituting jargon, innuendos and voodoo economics for the cold, hard and rational economics of computing.

Zachmann suggested a cure for "C-sickness." I recommend Zachmann take a cure for the voodoo economic malaise that afflicts him.

J. Robert Riggs
J. Robert Riggs Co.
Dallas

Right to the source

I would like to clarify the source of the IBM Personal System/2 performance data that appeared in a chart in the Microcomputing section [CW, June 15].

National Software Testing Laboratories, Inc. designed and conducted a series of 26 application-based benchmark tests on 22 hardware systems, which was included in National Software Testing Laboratories' April issue of *PC Digest*. These benchmarks are now considered the state of the art and are being used as a standard.

The source incorrectly referenced the chart used in the section as a CW chart. The significance of this chart was to highlight the impact of the combination of hardware speed and disk caching on certain types of machines.

National Software Testing Laboratories is well known for its work in the area of microcomputer comparison testing, particularly in the area of performance, and also publishes the *Software Digest Ratings Report* and *PC Digest*.

National Software Testing Laboratories is currently preparing an updated systems performance report for *PC Digest*.

Michael D. Stern
President
National Software Testing Laboratories, Inc.
Philadelphia

This week in history

July 25, 1977
A special police unit organized more than a year ago to train police in Tallahassee, Fla., in DP crime detection has yet to train anyone because of a lack of interest from the business community. "It's something the business community would rather not address until something happens," a special agent says.

July 26, 1982
The People's Republic of China has greatly increased its efforts to illegally obtain Western electronics technology in the past year, due primarily to increasing frustration at U.S. export controls and the resultant delay in technology acquisition, American military intelligence agencies say.

The importance of acting your wage

To be treated like a professional, work like one

READER'S PLATFORM

ROBERT CROSS

Each new year brings the hope that this year will be the one in which data processing will take its place beside other professions, such as medicine, law and engineering.

Many people already consider DP a profession, and you can receive several certificates in the field. However, the handing out of certificates and calling ourselves professionals does not make us so.

There are certainly professionals in data processing, but is the field truly a profession or just an occupation?

The U.S. Labor Department tends to classify DP jobs as clerical or technical as opposed to professional.

MANY of today's programmers are more interested in the rights to creativity than in getting the job done well and on schedule.

DP has been maligned in the past few years and often justifiably so. In fact, DP is often its own worst enemy.

There are no areas in DP that can go unblamed, but I have decided to pick on programmers in this column because they are the most visible.

Because of the huge demand for DP services, many people were hired as programmers that should not have been. When such an employee turns in less or inferior work, co-workers often adjust their output downward to match. This pattern, of course, lowers the productivity of the whole data processing organization.

Salary debate

At lunch one day, several DP professionals and myself were discussing a newspaper article about the salaries of another occupation. We were debating whether data processing salaries should be higher, lower or equal to the other occupation.

One person at the table shocked us. He actually said that he thought that most programmers were highly overpaid.

This statement caused quite a stir. He explained that he had observed — and we agreed — that a great majority of the programmers he had worked with were not turning out the quantity and quality of work that would justify their salaries.

There are far too many programmers in this country who are not effective at developing and implementing programs. We had all met programmers who had several years of experience in Cobol programming but could not debug the simplest error.

In data processing shops across the country — and across many positions — a growing percent of DP professionals are taking a more casual attitude toward their work. For them it is just a job from 9:00 to 5:00, some place to be five days a week and get paid for it. While the number of hours spent at work is not a measure of being a professional, it does reflect one's attitude about his job.

Cafeteria food

The conversation in DP shops is turning from new products and ideas to how bad the food is in the cafeteria or how the local high school football team is doing. These subjects may be interesting and should be discussed, but too few DP professionals express any interest in what is going on in data processing.

Programmers grumble about missing their bowling last night because a dumb user entered bad data into the system.

When something goes wrong with a program, the programmer will often blame everything from bad specs to computer glitches before admitting that the problem may be in the code.

Many of today's programmers are more interested in the rights to creativity than in getting the job done well and on schedule.

In order for data processing to obtain a professional status, all of us in the field must strive to be professionals ourselves, then look for ways of helping others raise the standards higher. If people don't treat us as professionals, maybe it is because we haven't done enough to raise the work standards by which we are measured to the professional level.

Data processing should be considered a profession — it requires great skills to do it right. However, too many people are getting by today without doing their best.

Cross, a data processing veteran of 17 years, is the general manager of C-Kaay, Inc., in San Francisco.

What is meant by 'performance?'

JOHN BARNES

Whatever it is, it's worth a lot. It's a selling point for general office software, spoolers, microcomputers, networks, motherboards, data bases, accounting software, high-resolution graphics boards, compilers and programs. It's better if it's "high" or "peak," and you may want it "enhanced" or simply "more."

Everyone else's product gives up something to get it — reliability, cost, upgradability, ease of use, power, cost-effectiveness, manufacturer support, simplicity or speed — something has been traded off to get it. Except in our product, which now offers it without any sacrifices whatsoever.

"It" is performance, of course. It and "power" are probably tied for the most overused and underexplained terms in the computer industry's advertising lexicon; like "power," it obeys Humpty Dumpty's Law — "When I use a word, it means exactly what I want it to mean, no less, no more."

The response is to give up on the word: Performance, like "power" and "high-tech," seems to be an elastic word, which turns out to mean "good." So a "high-tech power performance widget" (advertese) is a "real good widget" (English).

Indeed, in my brief and not particularly scientific survey, about half the ads that used "performance" used it that way. Others used it like "power" — "performance" is anything the product does well or has a lot of. For example, "We've got the performance. SPRI can cut your spooling time by up to 60% . . ."

Shorthand

That brings up another possibility. Is "performance" shorthand for "the ability of the product to do what you bought it to do?" And what did you buy it to do?

In other ads, performance appears to be a combination of qualities. "You get more performance from the AST Premium/286 AT-compatible personal computer with its 10-MHz processing speed and true zero-wait-state operation." "Version 2.0 gives you absolutely the best combination of user conveniences, power, efficiency and speed in the industry."

"Power" is just a list-lengthener, but they really are saying something about Version 2.0 here. It's fast, efficient and convenient — all three, with the implication that some competitors may be one or the other. But Version 2.0 is the all-around champ, the triathlete of its class.

Or look at another ad: "High-speed data retrieval and access . . . just two benefits of using Raima's network model DBMS, DB Vista. Combine these design benefits with those of C — speed, portability, efficiency — and you begin to understand DB Vista's real measure . . . performance."

This ad begins to make some sense. A performance car not only goes fast, it also steers well. High-performance bearings last longer and run smoother. So if performance means anything, it means the ability to do several different desirable things well.

And if that's what it is, then it's a concept we haven't seen enough of.

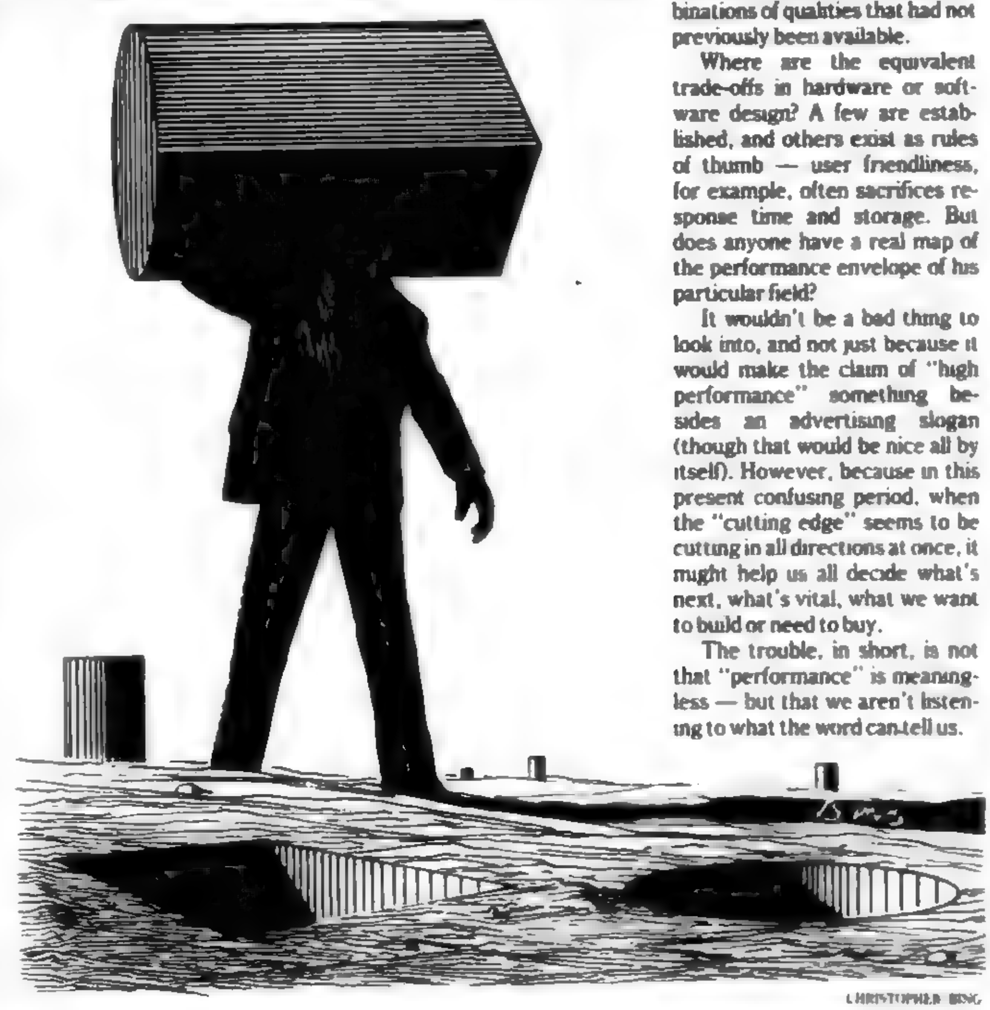
Aircraft designers talk about a "performance envelope." Within the existing technology, you trade one good thing (say fuel economy) to get another (an operational ceiling) or some combination of good things (top speed and rate of climb).

Products that are close to the edge of the performance envelope — that is, they lose the minimum possible X to gain the maximum possible Y — are "high-performance" or "state-of-the-art"; products that stretch the performance envelope are "innovative" or "advanced." Better performance, then, is defined as reaching combinations of qualities that had not previously been available.

Where are the equivalent trade-offs in hardware or software design? A few are established, and others exist as rules of thumb — user friendliness, for example, often sacrifices response time and storage. But does anyone have a real map of the performance envelope of his particular field?

It wouldn't be a bad thing to look into, and not just because it would make the claim of "high performance" something besides an advertising slogan (though that would be nice all by itself). However, because in this present confusing period, when the "cutting edge" seems to be cutting in all directions at once, it might help us all decide what's next, what's vital, what we want to build or need to buy.

The trouble, in short, is not that "performance" is meaningless — but that we aren't listening to what the word can tell us.



CHRISTOPHER BING

Barnes is the Pacific Northwest Area Manager for ADG, a high-tech marketing organization based in San Pedro, Calif. His first novel, *The Man Who Pulled Down the Sky*, was recently published by Congdon & Weed.

MOST DBMS PRODUCTS ARE BUILT ALONG THE SAME LINES. HOW THEY PERFORM IS SOMETHING ELSE.

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SOFTWARE & SERVICES

SOFT TALK

Charles Babcock

Fortran 8X tug-of-war

In watching another round of the standard-setting process, one is struck by the inherent tension within it. Serving on an ANSI committee is something like being part of a crew building a suspension bridge. The group must harness potentially destructive forces in order to accomplish a social good. When the outfit has no blueprint, as in the process of setting standards for computer languages, the task is accompanied by apprehension and debate.

The most recent example is the effort of the ANSI X3J3 Committee to set a new standard for Fortran. It has been 10 years since the Formula Translator language was revised; its predecessor, Fortran 77, took 11 years to surface after the original ANSI Fortran 66. What was envisioned as a five-year, periodic review process has doubled for both Fortran and Cobol.

One of the reasons for these protracted discussions is that when an ANSI technical committee convenes, it must hear

Continued on page 23

Beta-test user likes new Roscoe

Performance gains not verified for ADR program development system

BY CHARLES BABCOCK
CW STAFF

PRINCETON, N.J. — A new release of Applied Data Research, Inc.'s (ADR) on-line program development system, Roscoe, received praise from a Seattle beta-test user for several of its enhancements. But its claimed performance gains remain untested at the Washington insurance firm.

"ADR is coming up with a more unified approach to data set management," said Michael D. Murray, MVS systems programmer at Washington Mutual Financial Group. But he added that it was premature to pass judgment on a claimed 50% reduction in I/O editing and a claimed 40% reduction in CPU cycles for string searches. His firm has not put enough users on the new release to test its performance, he said.

Release 5.5 of Roscoe, a development system with an installed base of 2,000, includes a new user interface, simplified access to IBM OS and MVS data sets and dynamically defined program function keys, ADR spokesmen said.

Murray said a programmer using Roscoe no longer has to go through a cumbersome data set import/export technique while developing an application. Through a menu-selection process, the programmer can peruse partitioned data sets and attach to one with which he wishes to work. The data set can be placed in his active work space blocks through a COPY command, Murray explained.

Time saver

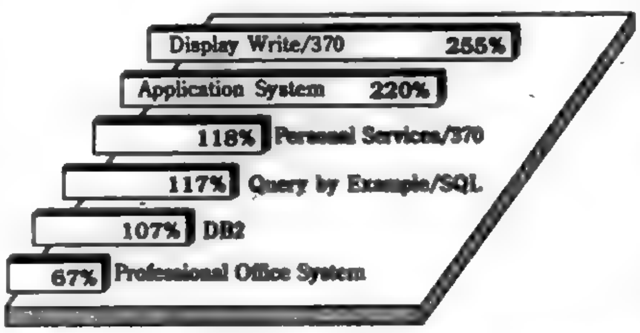
Previously, the same procedure required perusing a list of partitioned data sets outside of Roscoe, importing one to the programmer's active work space, which would wipe out any earlier contents of the work space, and entering a Roscoe session to see if it was the desired set. If not,

Continued on page 23

Data View

IBM's fastest growing information center products

Display Write/370 and Application System, IBM's decision support system, lead the list of mainframe software for information center users



INFORMATION PROVIDED BY CRWTH COMPUTER COURSEWARES
CW CHART: MITCHELL J. HAYES

TI slides out CASE system

DALLAS — Texas Instruments, Inc. is shipping the first two pieces of its computer-aided software engineering (CASE) system for mainframe production applications.

The front-end personal computer-based tools use a James Martin-Karma McClure diagramming method to graphically represent applications. The meaning of the symbols used in the diagrams, data definitions and other system definitions are stored in a mainframe encyclopedia for use by the developers. TI spokesmen said an application

Continued on page 22

Test tool gets CICS support

SUNNYVALE, Calif. — Boole & Babbage, Inc. recently said its Cobol testing and debugging utility is now supported under the IBM CICS environment.

Extended Productivity Facility (XPF)/Cobol Release 3.0.0 is currently available at a base price of $22,500. Release 3.0.0 provides for interactive testing for multiple users under CICS 1.6 and 1.7, the vendor said. Additionally, it offers an interface to IBM's ISPF that reportedly makes ISPF facilities available to programmers for test sessions.

Boole's XPF/Cobol, which supports both IBM's VS Cobol and VS Cobol II, was designed for development and maintenance of Cobol programs in the IBM MVS and MVS/XA environments. Under CICS, XPF/Cobol is compatible with most standard data base management systems, including IBM's DB2 and IMS and Cullinet Software, Inc.'s IDMS, the company said.

In addition to CICS support, the latest release is said to offer improved debugging techniques.

Inside

- **VM/CMS Unlimited offers [redacted] Focus. Page 22.**
- **Prime ports Intellect natural language system to its hardware. Page 23.**

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*Emc² supports its own super economical, multi-user environments to vastly enlarge the population that can use it. VAP is a special VTAM application for MVS and VSE. FIVS is the multi-user Fischer International Virtual System for VM.

VM/CMS unveils Focus utility

BOSTON — VM/CMS Unlimited, Inc., a maker of utility software for the IBM VM operating system, recently released a performance monitor utility for Information Builders, Inc.'s Focus fourth-generation language. The software company said it will also offer a security facility, called Autolink, for minidisk access.

CMAP/Focus is VM/CMS Unlimited's first product designed to work with a third-party software vendor's product. It is intended as a companion product to the firm's Command Monitor/Analysis Package (CMAP), which monitors IBM Conversational Monitor System (CMS) user activity. CMS is a teleprocessing monitor for the VM operating system.

The product for Focus will allow system managers to collect and record usage of this Information Builders data base and fourth-generation language environment.

CMAP/Focus carries a $1,000 annual license fee, and CMAP, which has a $3,000 annual license fee, is required.

Autolink provides end users with improved minidisk access, according to VM/CMS Unlimited spokesmen. It replaces minidisk user passwords with rules that enable users to set up parameters of their minidisk usage. It has an annual license fee of $2,500. Both CMAP/Focus and Autolink are available now.

Fortran 8X

CONTINUED FROM PAGE 21

from both the best advocates of additions to the language and the conservators of its existing state. In the debate over the upcoming Fortran standard, presently dubbed Fortran 8X, one compiler vendor who was not a member of the committee complained: "The charter of the committee is to validate and standardize existing practice. Why are they inventing new features?" This is the opinion of one who views standard setting as an inherently conservative process.

Often, this debate reflects self-interest. Consultants, academic experts and others who can experiment with the language confront those who must produce compilers conforming to the standard. Somewhere in between is the user, whose interest lies in both camps.

In the Cobol 85 debate, the users fell into the conservative camp because the version of Cobol initially reported out of committee contained features that would be incompatible with the existing library of Cobol applications. After retreating in the public review process, the modernizers on the ANSI committee fought back with the addenda process — a way of adding revisions to Cobol a step at a time.

In that debate, Jerome Garfunkle, an author and consultant on Cobol, is an advocate of adding Boolean, or bit-level, data handling to Cobol. Lawrence Madison, director of data processing at The Travelers Insurance Co., wants to keep Cobol simple. "The business community is better served by not having bit-fiddling," he says.

And so the debate continues. In the case of Fortran 8X, it is difficult to characterize the opponents as either conservatives or modernizers, since they are evenly divided between demanding more and demanding less in Fortran. The opponents include key compiler producers IBM, Digital Equipment Corp. and Unisys Corp., but the supporters also have their share of compiler producers: Cray Research, Inc. and Control Data Corp.

With the public review process likely to commence soon, users would be well-advised to study the Fortran changes and decide for themselves whether the mix offered by X3J3 is what they want.

Babcock is *Computerworld's* senior editor, software & services.

TI system

CONTINUED FROM PAGE 21

generator capable of producing Cobol code from the diagrams will be introduced later this year.

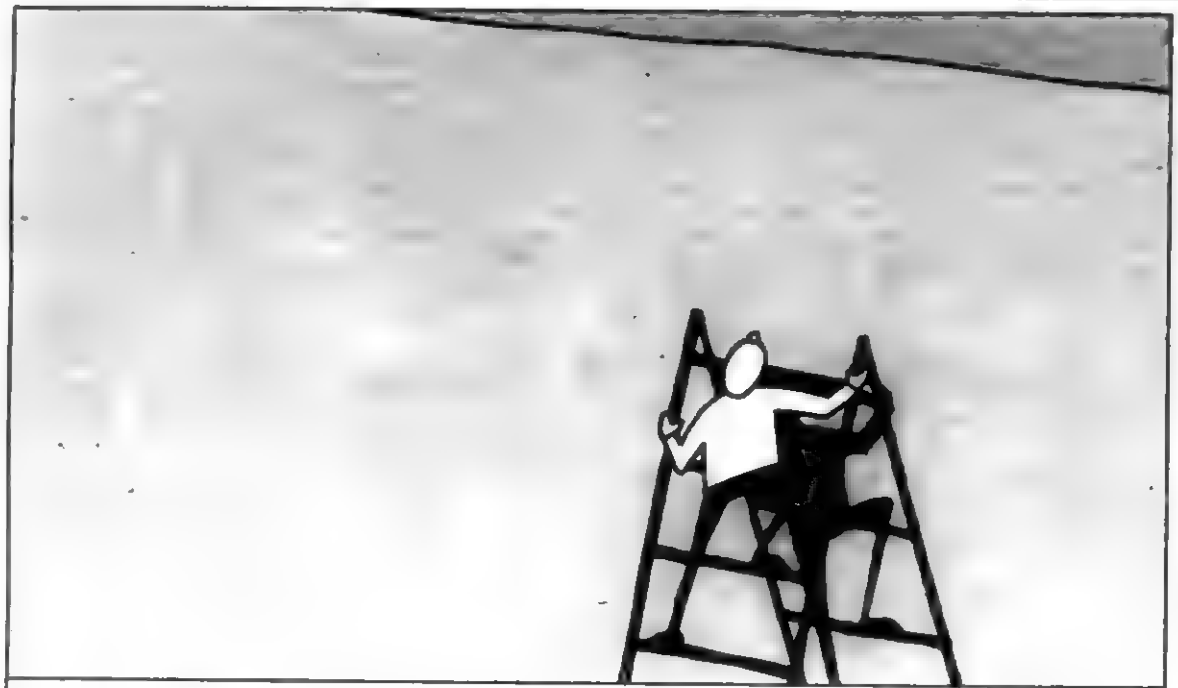
The product line has been dubbed the Information Engineering Facility, and its initial two products are the PC-based Analysis Toolset and Mainframe Encyclopedia, priced at $9,400 and $70,000, respectively.

Although many CASE diagramming, analysis and design tools already exist, TI claimed its tools will be integrated by the underlying encyclopedia and will cover the software life cycle.

They will also be designed to produce applications for IBM's MVS operating system and its major transaction processing subsystems: IMS DC working with IBM's DB2 relational data base management system, TSO/DB2, CICS/DL/1, CICS/DB2 and IMS DB/DC, said Bob Bledsoe, a TI spokesman.

The tool set itself will run under MVS and IBM's TSO and will support IBM's ISPF Version 2 and use of files from DB2, TI said.

Future pieces of the product line, in addition to the application generator, are expected to include a design tool set, a planning tool set and a data base generator. The tool sets will be IBM Personal Computer AT-based products running under Microsoft Corp.'s MS-DOS 3.1 or higher, while the data base generator, like the encyclopedia, will be used on the mainframe, the vendor said. No delivery schedule was announced for the succeeding tool sets.



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SOFTWARE NOTES

Prime to get Intellect; Excelerator honored

Prime Computer, Inc. in Natick, Mass., and **Artificial Intelligence Corp.** in Waltham, Mass., have agreed to port Intellect, a natural language query and reporting system, to all Prime hardware, officials for both companies said.

Integrity Solutions, Inc. in Denver has regained the rights to its product lines, formerly marketed by **Sterling Software, Inc.**, under an exclusive agreement. Integrity Solutions produces three data recovery and backup products as well as a journal management system that are installed at 300 sites, according to company officials.

Excelerator was named **Software Product of the Year** by the American Federation of Information Processing Societies, an award sponsored by *Fortune* magazine. Excelerator is a computer-aided software engineering analysis and design tool from Index Technology Corp. in Cambridge, Mass.

Have you ever hired a programmer who turned out to be less proficient than advertised? **Teckchek** from **Bookman Consulting, Inc. Software Development** offers a way to screen job applicants. Teckchek can test for proficiency in IBM Cobol, Cobol II, VSAM, CICS, SQL/DS and DB2 as well as others.

Convex Computer Corp. will market Oracle Corp.'s **Oracle** relational data base management system on its 64-bit minisupercomputers, the company recently announced.

Software Alliance Corp. in Berkeley, Calif., has acquired **Bankmatic Systems** in Beaverton, Ore:, a producer of software for medium-size and community banks using Data General Corp. minis.

Sterling Software, Inc. in San Bernardino, Calif., and **Tangram Systems Corp.** in Cary, N.C., said they will exchange technical expertise to build "a universal storage management system" between personal computers and mainframe storage devices. Tangram adds micro-to-mainframe cooperative processing know-how to Sterling's storage management expertise.

Citicorp Information Resources has purchased the Comprehensive Banking System from **The Newtrend Group, Inc.** in Orlando, Fla. The banking system is used on the IBM System/38.

Roscoe

CONTINUED FROM PAGE 21

the process would need to be repeated, he said.

"It's a very useful facility for me. Instead of scattered commands, you get unified commands," Murray added.

In addition to partitioned data sets, Roscoe can attach to the master files of ADR's change-control product, the Librarian; to IBM's disk drive indexes, known as the Volume Table of Contents; and to load modules of executable code, said Richard D. Specht, ADR's product manager.

The attached data set facility also allows a programmer to do a wild-card search for a data set that he can only partially name, Murray said.

In the past, programmers had to print out a copy of their program after it failed to compile to search for bugs. With the new release, a Roscoe user can attach to IBM's JES2 and examine the program after a compile attempt without printing it out. "You know it's not an executable module, so why print it out in the first place?" Murray asked.

Release 5.5 allows a site to specify caching for active work space blocks, with Roscoe maintaining the most recently accessed blocks in cache. ADR spokesmen said the move can cut in half the I/O needed for program editing.

Roscoe uses a new search algorithm for string character searches, which chooses a search technique based on the characteristics of the string, Specht said. The algorithm saves as much as 40% of the CPU cycles previously devoted to searches, he claimed.

Program function keys may be modified during sign-on to a Roscoe session so the commands that they execute apply to a specified type of data.

Previously, the progran function keys could not be tailored to a particular session and had to be applied to a general data set, Specht said.

The Roscoe Programming Facility command set has been extended to include commands that allow the user to review and import data sets, to simplify direct-access storage device management and to control Roscoe sessions, ADR spokesmen said.

The 17-year-old Roscoe has been a steady revenue producer for ADR and is regularly updated. Version 6 is expected out in early 1988 and will take the product in new directions, according to the firm.

Release 5.5 of Roscoe is priced at $60,400 and is available immediately.

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NEW PRODUCTS

Systems software

A software system for maintaining a library of IBM publications has been announced by **International Business Information Systems.**

LM/1 is said to provide a data base of more than 600 IBM 370-, 4300-, 3300-, 3080- and 3090-related publications. It can produce manual covers in multiple formats, control "IBM Technical Newsletter" distribution and maintenance and create borrower cards for establishing and maintaining a lending library.

The package also establishes a classification scheme for organizing manuals into a physical order and produces summaries by classification and volume.

Available for IBM DOS/VSE and MVS operating systems, an LM/1 license costs $500.

International Business Information Systems, P.O. Box 15780, 1926 Marengo St., New Orleans, La. 70175.

Applications packages

Evans Griffiths & Hart, Inc. has released **Version 4.1** of its **KDSS** key-to-disk data-entry software package for Digital Equipment Corp. VAX/VMS environments.

The native-mode Version 4.1 runs concurrently with other applications on the VAX, providing a multiterminal data entry system. It also runs as a stand-alone data entry system.

Facilities provided include entry, verification, examination and modification of batches of records and reformatting of that data on output to disk or tape.

A single-CPU license for KDSS Version 4.1 ranges from $7,500 to $10,500.

Evans Griffiths & Hart, 55 Waltham St., Lexington, Mass. 02173.

Languages

Philon, Inc. has ported its **Cobol, Basic** and **Fortran programming languages** to the Sun Microsystems, Inc. Sun 3 Workstation running under the University of California at Berkeley's Unix Version 4.2.

Fast/Cobol is an ANSI '74 compiler said to be compatible with Ryan-McFarland Corp.'s RM/Cobol. Fast/Basic-M is a true compiler said to be compatible with Microsoft Corp.'s Basic. Fast/Fortran is an ANSI '77 compiler designed for the develoment of scientific and engineering applications.

Fast/Cobol costs $2,200, Fast/Basic-M costs $600 and Fast/Fortran costs $1,200.

Philon, 641 Avenue of the Americas, New York, N.Y. 10011.

Utilities

Epilog 1000, a historical reporting facility that runs in an external address space, has been added to **Candle Corp.**'s CICS/MVS family of software products.

According to the vendor, Version 410 of the Epilog 1000 family extends external address-space operation to all of the products and includes support for IBM's DB2.

Epilog 1000 provides a method of collecting and reporting on CICS activity at the transaction level. It also has a tracking feature that enables users of IBM's CICS 1.7 to report on transactions that cross multiple regions, even on different machines.

The historical reporting facility costs from $6,000 to $13,500. The DOS version, scheduled to be available later this summer, costs $2,000.

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MICROCOMPUTING

SMALL TALK

William Zachmann

Windows' growing pains

The most important aspect of IBM's April 2 announcement of the Personal System/2 line of personal computers and the OS/2 operating system was actually available in the fall of 1985. It was at the Comdex/Fall '85 show in Las Vegas in November of that year that the first production copies of Microsoft Corp.'s Windows 1.0 were distributed.

Long in coming, Windows represented an enormous investment on Microsoft's part, aimed at providing — on Intel Corp. 8086-based IBM and compatible personal computers — a graphical user interface of the type pioneered on the Xerox Corp. Star and popularized on Apple Computer, Inc.'s Macintosh.

Intended as a higher priced product, Windows 1.0 was aggressively priced at $99. Even so, Windows wasn't exactly an immediate smash. Performance on Intel 8088-based systems wasn't adequate.

Despite compromises like offering tiled rather than over-

Continued on page 29

Deskpro 386 plays mini's role

BY ALAN J. RYAN
CW STAFF

DENVER — Making more effective use of the processing power of personal computers more than intrigues Rich Gonzalez.

As manager of microcomputer systems at Great-West Life Assurance Co.'s U.S. headquarters here, Gonzalez runs a Compaq Computer Corp. Deskpro 386 computer under Santa Cruz Operation's (SCO) Xenix operating system with Informix Software, Inc.'s Informix as its data base. With the addition of enhanced I/O boards, Gonzalez says he has transformed the Deskpro into a minicomputer that supports other terminals.

Great-West uses its 386 system to build administrative support systems.

"I'm not trying to give the impression that the Deskpro 386 can replace the IBM 3090 or that [it] is powerful enough to replace every mini on the market, because it isn't," Gonzalez says. "But it is powerful enough to fit in a certain niche, and it can give you good performance."

Additionally, Gonzalez says, the price of setting up a microcomputer based on the Intel Corp. 80386 microprocessor is low enough so that users can afford to upgrade in the future.

"What you can look at with [the Compaq system] is distributed processing, where you can begin to take some of the load off your mainframe. It may not replace a mainframe computer, but it might postpone having to purchase an additional one or upgrade your existing one," Gonzalez says.

Originally, the manager says, he had looked at IBM Personal Computer XTs and ATs and considered the power of those units. "We tied them into our mainframe and made them act as terminals for policy inquiries and underwriting status," he explains.

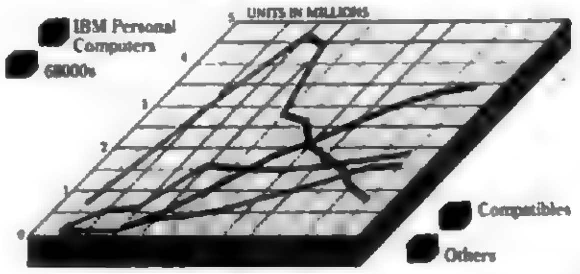
Next, Great-West purchased a copy of SCO's Xenix to run un-

Continued on page 29

Data View

U.S. PC shipments

Ten years from 1981



INFORMATION PROVIDED BY INTERNATIONAL DATA CORP.
CW CHART AMY J. SWANSON

DEC micro maven asks, 'PS/who?'

In mid-1982, nine months after archrival IBM introduced its future standard-setting Personal Computer, Digital Equipment Corp. entered the microcomputer race with three incompatible systems: the Rainbow, the Professional and the Decmate. The most popular of the trio, the general-purpose Rainbow, was never compatible with the IBM PC. And although many observers say they believe the Rainbow was better engineered than the IBM PC, IBM's entry outsold the Rainbow by a huge margin.

In September 1986, DEC announced the successor to the Rainbow: the Vaxmate, an IBM

DEC's John Rose

PC AT-compatible system with built-in Ethernet networking capability.

John Rose, manager of DEC's Personal Computing Systems Group, recently spoke with *Computerworld* senior writer David Bright about the minicomputer giant's PC strategy.

What is DEC's personal computer strategy right now?

Our strategy is to be the best integrator of [Microsoft Corp.] MS-DOS machines to corporatewide or enterprisewide networks.

How will the IBM Personal System/2 affect the Vaxmate and DEC's micro plans?

I read one of the industry reports recently that said there are 20 million MS-DOS PCs out there today. There's a standard that's already been set. Now, IBM has changed the standard with the introduction of the Micro Channel and, yet to be seen, their extensions to OS/2. So, like everyone else, we're going to wait and

Continued on page 32

Inside

- Intel positions its first 386-based system as net server. Page 28.
- Allstate to use Innovative Software's Smart system for workstations. Page 28.
- Zenith adds RAM to XT compatibles. Page 36.

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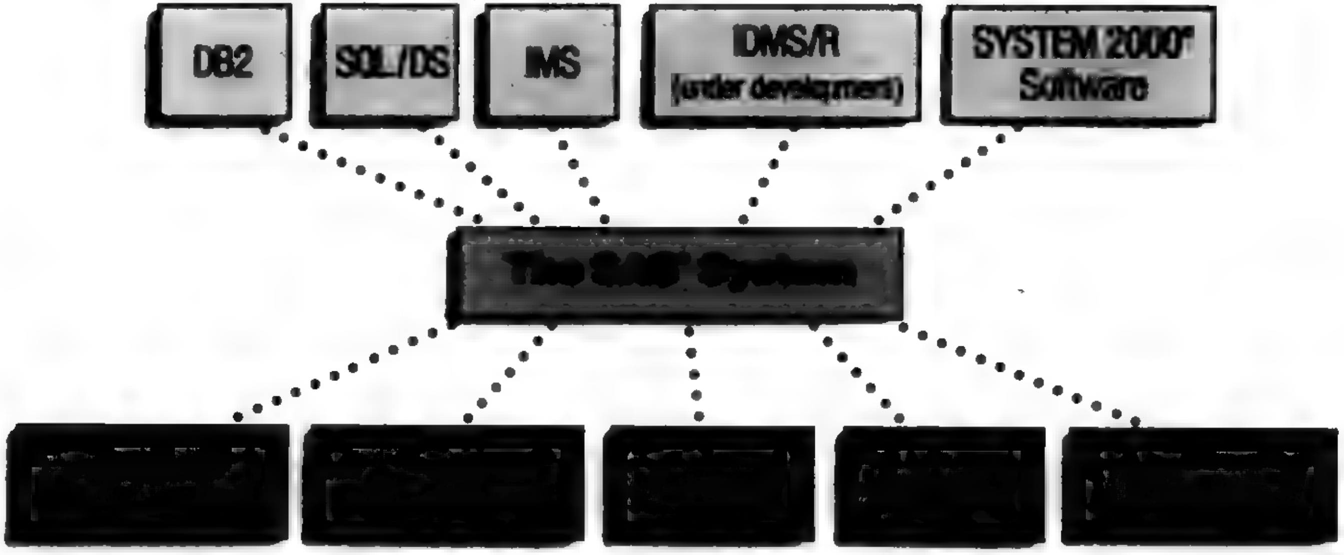

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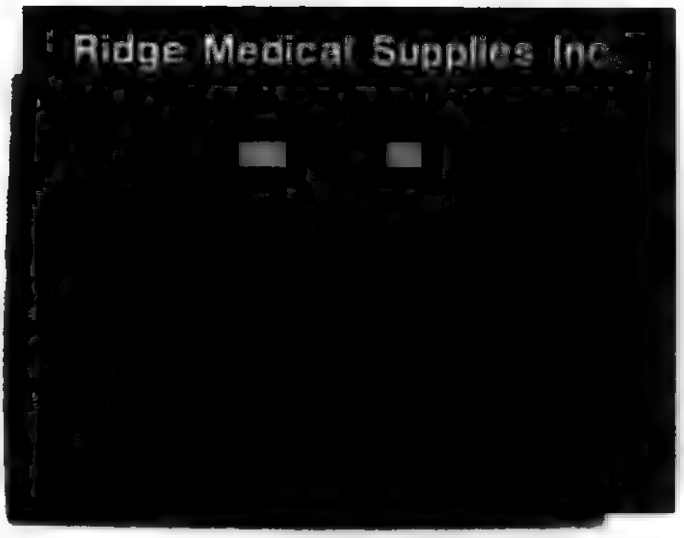

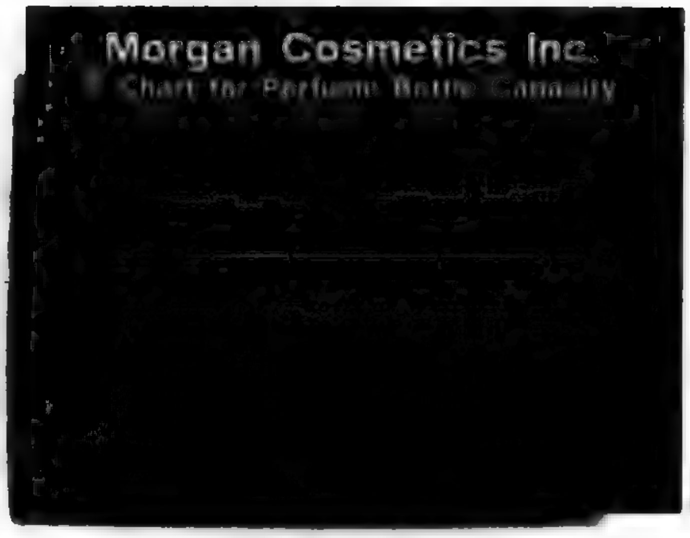

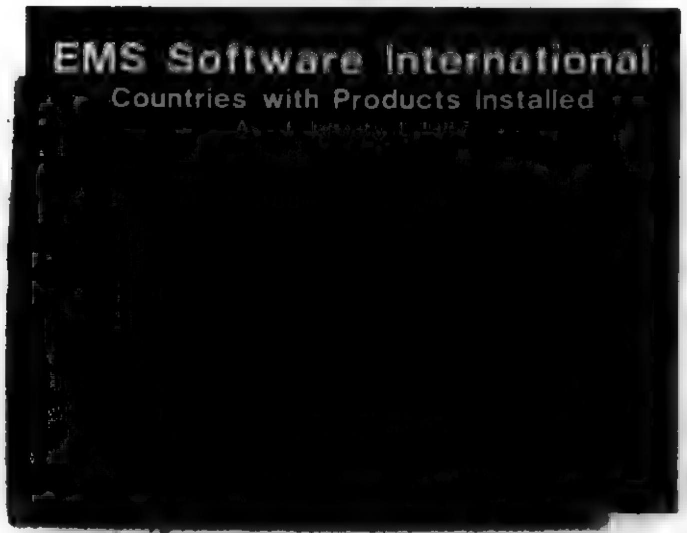

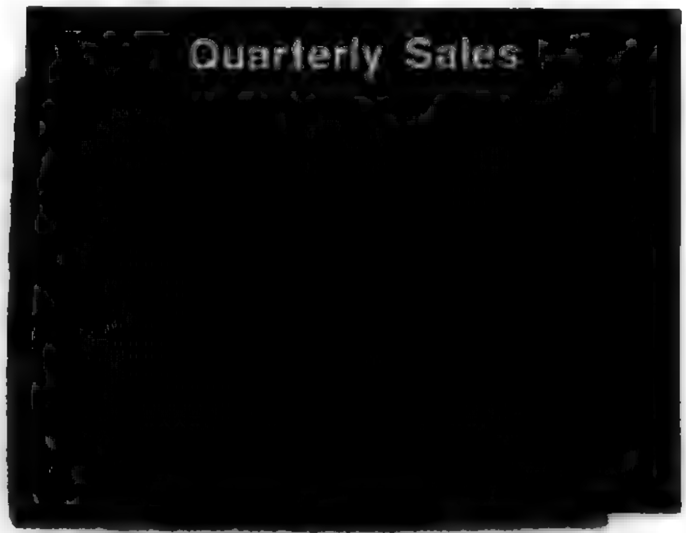

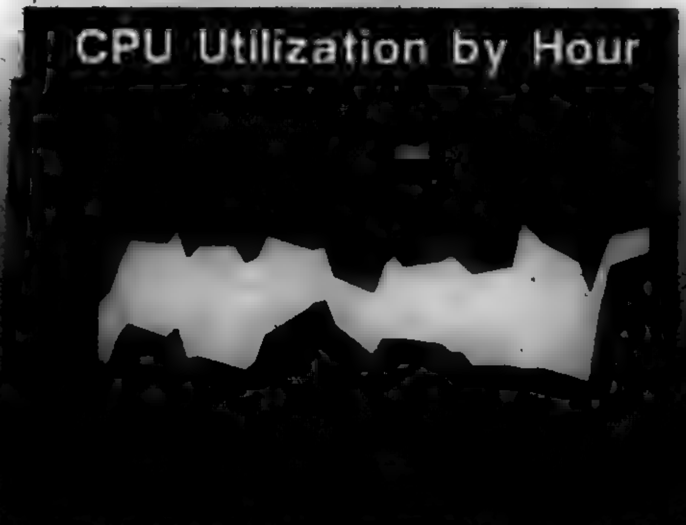

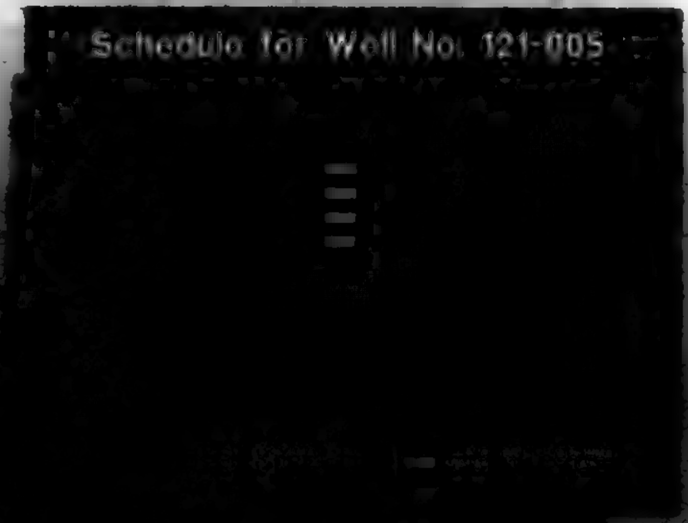

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Intel unwraps 386-based network server

Financially geared system works with Irmx to link mainframes, minis, micros

BY ED SCANNELL
CW STAFF

HILLSBORO, Ore. — Intel Corp.'s Systems Group recently introduced its first 80386-based system that Intel said it will position as a network server to be connected to mainframes, minicomputers and financial workstations.

Dubbed the Intel System 320, the system was designed to work with Irmx, Intel's real-time, multitasking operating system that has resources such as interrupt management and standard device drivers. The target markets for the System 320 include major investment banks, brokerage firms and stock exchanges, according to Joe Huseonica, general manager of Intel's integrated systems operation.

"A typical stock exchange application is a System 320 serving as a link between the mainframe via a CCITT X.25 or IBM Systems Network Architecture connection and local-area networks made up of video terminals and trader workstations," Huseonica said.

The system will reduce the need for a more expensive cable link from the mainframe to workstations, terminals and microcomputers, a company spokesman said. It offers similar connectivity for distribution needs of investment banks and brokerage firms.

The Intel System 320 is compatible with the company's Multiserver software, which connects microcomputers, terminals, minicomputers, mainframes and applications into a department-level system.

The system provides file, print, communication, network application, administration and compute services.

Users can custom-order the System 320 in a variety of configurations.

Besides Irmx and Multiserver, other options include languages and tools, storage devices and Intel's Opennet.

In volume, the Multiserver System 320 costs $15,520. The Financial System 320 has a volume price of $12,950.

> THE TARGET markets for the System 320 include major investment banks, brokerage firms and stock exchanges.

Allstate plans workstation

BY DOUGLAS BARNEY
CW STAFF

LENEXA, Kan. — Allstate Insurance Co. recently announced plans to design a managerial workstation using the Smart Software System, an integrated software package from Innovative Software, Inc. based here.

The Allstate system, initially slated for use on 1,000 new personal computers, is a custom application serving Allstate market sales managers in the firm's domestic operations.

Allstate declined to provide details of the system and refused interviews on the subject.

Basically a site license

The contract, which is essentially a site-license agreement, allows Allstate to make up to 1,000 copies of the Smart Software System.

The license could be renegotiated to allow copies for all 15,000 Allstate agents, according to Innovative Software President Michael Brown.

According to Brown, Allstate chose the system largely because of its structured programming language, which allows developers to customize the system and allows the various modules to work together.

System speaks English

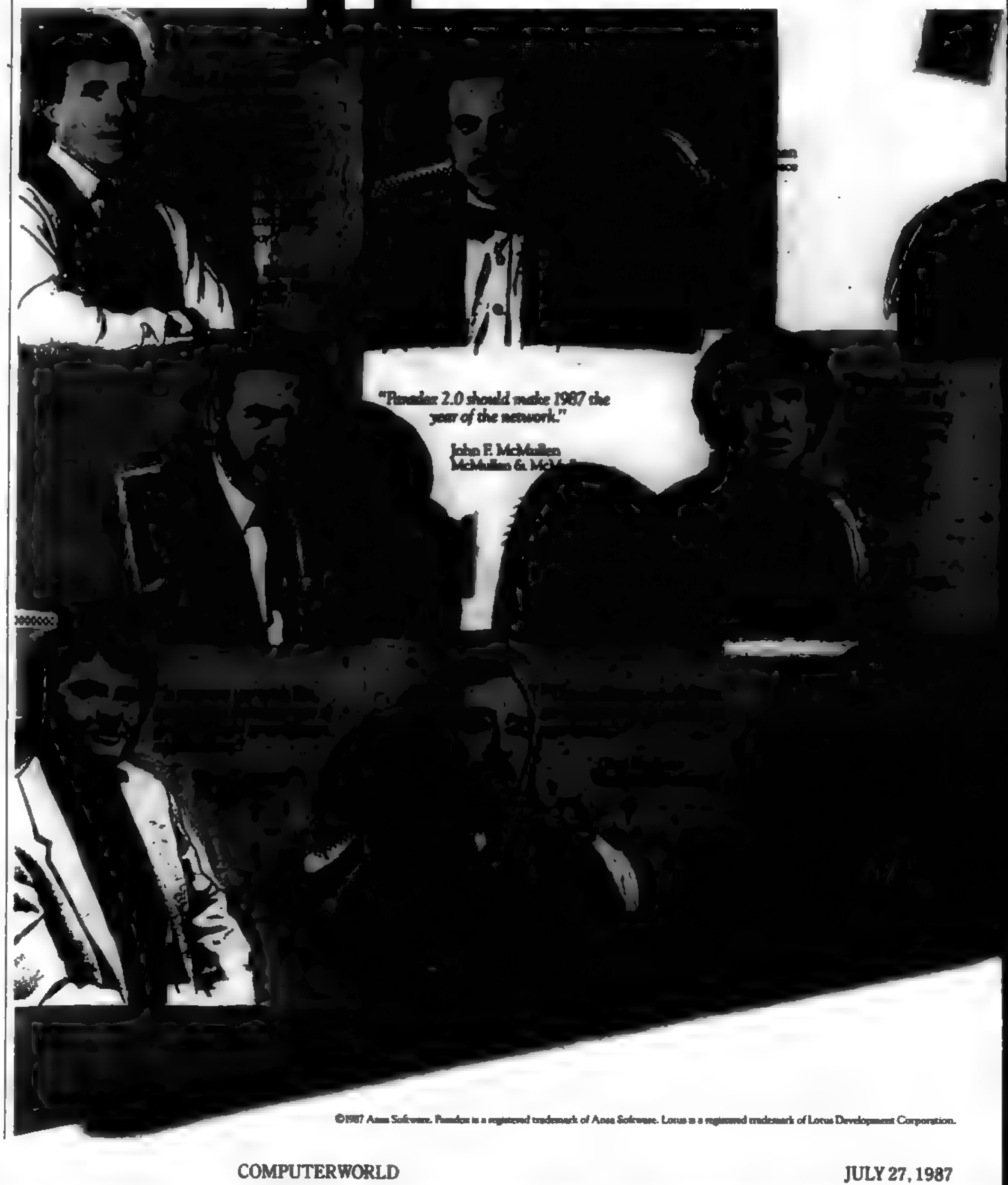
"It is a structured, procedural command language, which is English-oriented to allow people not formally trained in programming to develop rather sophisticated applications. The same applications language allows a user to call virtually every feature and function within the Smart Software System," Brown said.

Allstate is expected to use all Smart Software System modules, including spreadsheet, data base, word processing, graphics and communications.

Allstate's custom application took some three months to write and is now completed. Brown said he expects the application to be installed during the next six months.

The version of the Smart Software System to be used by Allstate runs under Microsoft Corp.'s MS-DOS and is able to run on local-area networks. Brown said he is unsure whether Allstate will be using the system in a networked environment.

How to keep up with



"Paradox 2.0 should make 1987 the year of the network."

John F. McMullen
McMullen & McM

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Deskpro 386

CONTINUED FROM PAGE 25

der the AT, "just to see what type of performance we could get out of the machine," Gonzalez says. "We identified, at that time, that we could run one or two terminals with the AT for some light applications."

When Compaq announced the Deskpro 386, Great-West bought the unit. "We tried our copy of Xenix on the 386 and put a couple of terminals on it, and we knew that we could easily add five or six terminals on this computer," Gonzalez says.

Rather than tying up all of the unit's serial ports on terminals, Gonzalez obtained an Intelliport AT-8 I/O board from Intellicom Corp. in Roswell, Ga., that attaches to one of the 16-bit slots in the Compaq computer. The board has a cable that attaches to an external box that has eight RS-232 ports. "So by using one slot, you have eight ports," he says. The board has dual-ported memory and a processing chip built into it.

The Deskpro 386 running SCO's Xenix acts as the console and allows the unit to run multiple sessions, he says. Terminals, including the company's XT and AT computers emulating Digital Equipment Corp. VT100s, are tied into the console, as are Wyse Technology 60 terminals. With the I/O card, two or three sessions are allowed per terminal, he says. The multiple sessions aid programming or development, Gonzalez adds.

"We put an external tape drive on the machine because we want it to be able to handle larger size tapes," Gonzalez says. "We designed a system for backup where we maintain multiple levels of backup — some permanent, some recyclable tapes — and we have a combination of off-site storage where the data is protected."

Currently, Great-West is using the Deskpro 386 running 16-bit code. "We're basically running it as if it were a fast 286 chip," he says. However, SCO and Informix have planned 386 support. "We're hoping for a doubling of performance" with the 386 support, Gonzalez explains. "We should be running 32-bit code in some of our systems by September. I imagine we'll be running full 32-bit code when we get the operating system."

Windows

CONTINUED FROM PAGE 25

lapping windows, Windows 1.0 simply required more power than most of the installed base of systems in late 1985 had.

IBM Personal Computer AT and compatible systems using the faster Intel 80286 microprocessor offered somewhat better performance. But there weren't all that many in use in late 1985, and the 6-MHz systems of the day still didn't have the "oomph" to do a decent job with Windows.

Also, very few systems had graphics adapters and monitors capable of adequately supporting Windows. Monochrome windows were hardly worth the bother. Then, too, not many users had printers that could be effectively used with Windows.

On top of all that, there was hardly any software to take advantage of Windows. Writing applications that make use of the Windows interface is quite different from writing for character-based environments.

Better technology

A lot has changed since late 1985, however. Faster systems based on 10- and 12-MHz versions of 80286 microprocessors — and even faster systems based on 80386 chips — are widely available. Lower cost laser printers and high-quality, 24-pin dot matrix printers make high resolution accessible to a growing number of users.

The widespread adoption of IBM's Enhanced Graphics Adapter (EGA) and compatible adapters and monitors provides a base of systems that can at least support the 640- by 350-pixel, 16-color EGA resolution.

Multiscan monitors like the NEC Corp. Multisynch and a growing number of others, combined with newer adapters like the Video-7, Inc. Vega Deluxe or the Hercules Computer Technologies, Inc. In Color Card, provide even higher resolutions.

Windows improvements

Microsoft, since late 1985, has done its own part by considerably improving the performance of Windows 1.0.

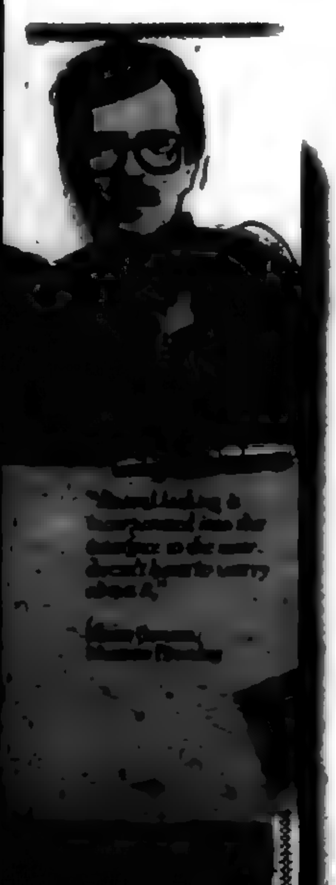
Finally, first-rate software that was designed to run using Windows is gaining considerable momentum. Micrografx, Inc., one of the pioneers in Windows applications, has added Windows Draw and Windows Chart to its initial, and very good, In-a-Vision computer-aided design package.

The most important boost to Windows, however, came with IBM's PS/2 and OS/2 announcements this spring. Not only is Windows included as an integral part of OS/2 as the Presentation Manager in the OS/2 Standard Edition Version 1.1, but also, by making the Presentation Manager a part of the Systems Application Architecture specification, IBM has effectively adopted Windows as a key part of its future standard user interface.

Next week, I'll examine the relationship between Microsoft Windows and the IBM OS/2 Presentation Manager in detail. I'll also look at the transitional role to be played by Windows Version 2.0, which will be available this fall.

Zachmann is vice-president of research at International Data Corp.

concurrent events



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Paradox 2.0, on the other hand, lets users edit, browse, query, sort and create reports in the same file at the same time. Records lock automatically, telling others the user's name, and leaving data below accessible. When revisions are made, the changes appear on all screens in real time. Or at a set interval. With all these features, Paradox helps more people get more done.

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For new applications, Paradox 2.0 is also a more powerful tool, with 48 new Paradox Application Language commands and functions, sample programs, a data entry toolkit and other helps—many to speed multiuser application development.

Eyewitness report

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ortant than computers.

DEC

CONTINUED FROM PAGE 25

see. From the standpoint of integration, as PS/2 systems become prevalent, we'll look at integrating them.

The Vaxmate and the Network Integration Package, which enables IBM PCs to function like Vaxmates, were introduced last September, but it wasn't until June that all the pieces of the puzzle were shipping. Why the delay?
There were a couple of things that contributed to the delay. One is the overall complexity. You're dealing with a network that involves not only the Vaxmate as a network PC, but we also took the task of integrating the full family of IBM PCs. That's developing hardware, part of which is the integration kit, and both client- and server-level software. That's a very complex task. Everything is doing quite well today, but it took some additional time to assure the performance and functionality of that network.

What went wrong with the optional Vaxmate expansion box that contains the hard disk drive?
We made a couple of design changes there. We changed a rev [drive] of a component, and that was basically the net of the problem.

There's some subtle changes between that drive and the previous drive. We've been shipping the expansion box in volume since February, and we didn't have any problems reported in the field with the seed units that we sent out prior to first customer ships or any of the customer ships.

It has been said that some overheating occurred because the expansion box had no fan. Has a fan been added to the design?
We fixed the problem without a fan. The volume shipments that we made in February, and through today, still do not have the fan. It's not necessary.

How many Vaxmates has DEC sold so far?
We won't quote those numbers.

Some analysts say Vaxmate sales have been sluggish. Have sales met expectations so far?
The sales have been coming right in line with our strategy and plans. On the integration side, the servers and server software have just been outstanding.

Who is the IBM Personal Computer Network Integration Package targeted for?
It's targeted for customers who have invested in IBM PCs, XTs and ATs, to make them full peers within the network so that they can protect that investment they've already made. For open desks which do not have a PC on them, we're selling the Vaxmate as the ideally designed network device for MS-DOS.

Many other AT-compatible systems are sold for a fraction of the Vaxmate's $4,065 base price, which doesn't include the hard disk drive. How have customers reacted to the price so far?
There's a bit of a mixed reaction. We're certainly selling a lot, and they're selling well. We certainly get some customer pushback on the price, but part of it is getting the customer to understand all the inherent features that are in the Vaxmate, as opposed to an inexpensive clone. There's a lot of features that you would have to go and build up and add onto a clone to make it a comparable device.

Last month, DEC brought out a Vaxstation 2000 workstation that was priced at $4,600. Will the Vaxstation systems compete against the Vaxmate at all?
No, because they're aimed at different markets. The Vaxstation is aimed at the workstation marketplace. It's there to compete with Sun Microsystems, Inc. and Apollo Computer, Inc. and the others. It's there for either a Unix or VMS type of user, while the Vaxmate is definitely aimed at the MS-DOS market.

Is there a possibility that the Vaxstations could, at some point, access MS-DOS on servers?
That's within the realm of possibility.

But they still wouldn't compete against the Vaxmate?
No.

Do you forsee any price cuts on the Vaxmate in the near future?
That's something I won't discuss at this point in time.

Are you planning to introduce an Intel Corp. 80386 version of the Vaxmate?
We won't talk about that either.

Are any of DEC's original three micros still being made and sold?
Yes. In the case of the Decmate line, we introduced a new model last December — the Decmate III Plus. Decmates are selling very well and continue to [sell well]. We're still selling Pros. In the case of the Rainbow, we announced that we are finishing up manufacturing [at] the end of this year. We will still provide software, support and everything else for all of our Rainbow customers. The Rainbow still has a lot of utility in the marketplace. With the introduction of the Vaxmate, our customers understood that that was an evolution process.

National Advanced Systems

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"The biggest boon National Advanced Systems products bring to our data center is improved availability. Our AS/XL Series mainframe is stable as a rock. Our 7380 Disk Storage Subsystems have demonstrated outstanding reliability and have exceeded our performance expectations as well. We're very pleased with National Advanced Systems." *Robert Andersen, Vice President—Information Resources, Baxter Travenol Laboratories, Inc.*

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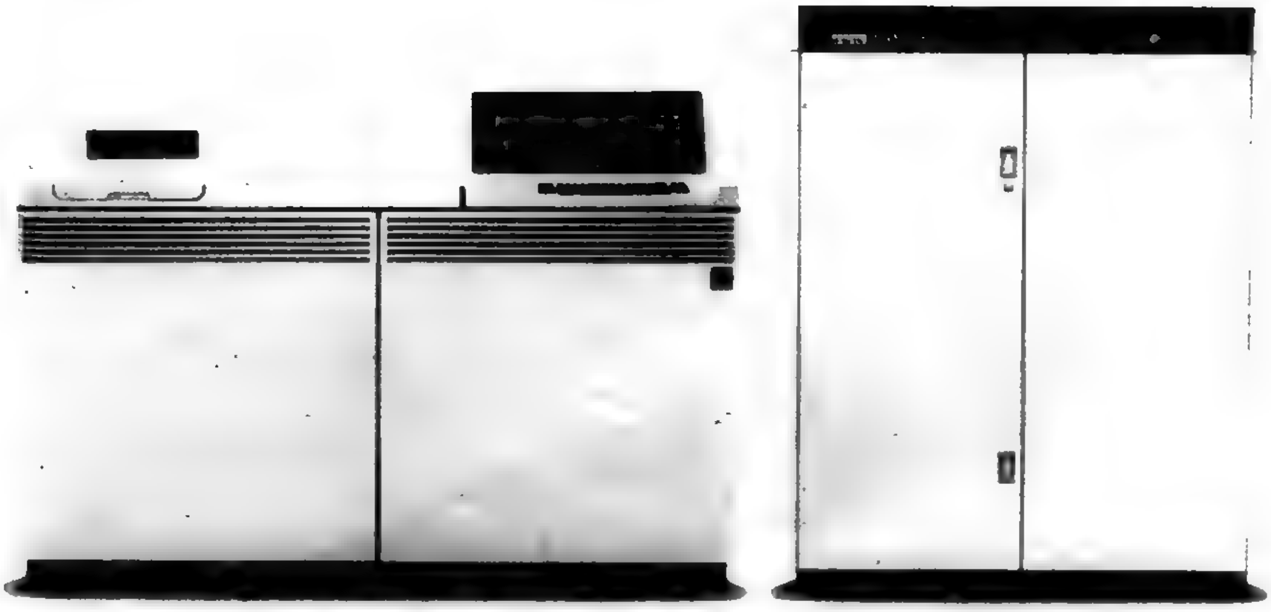

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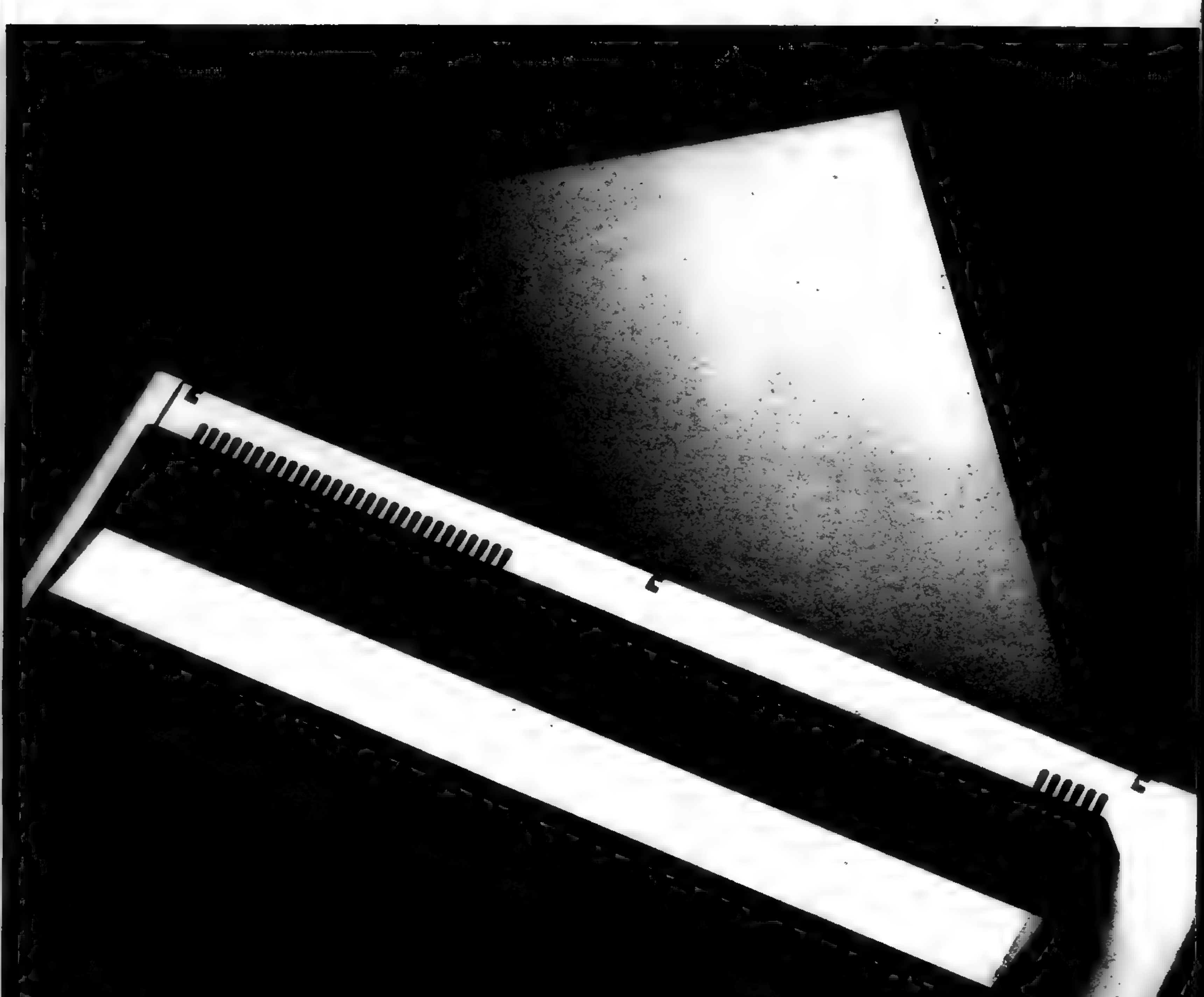

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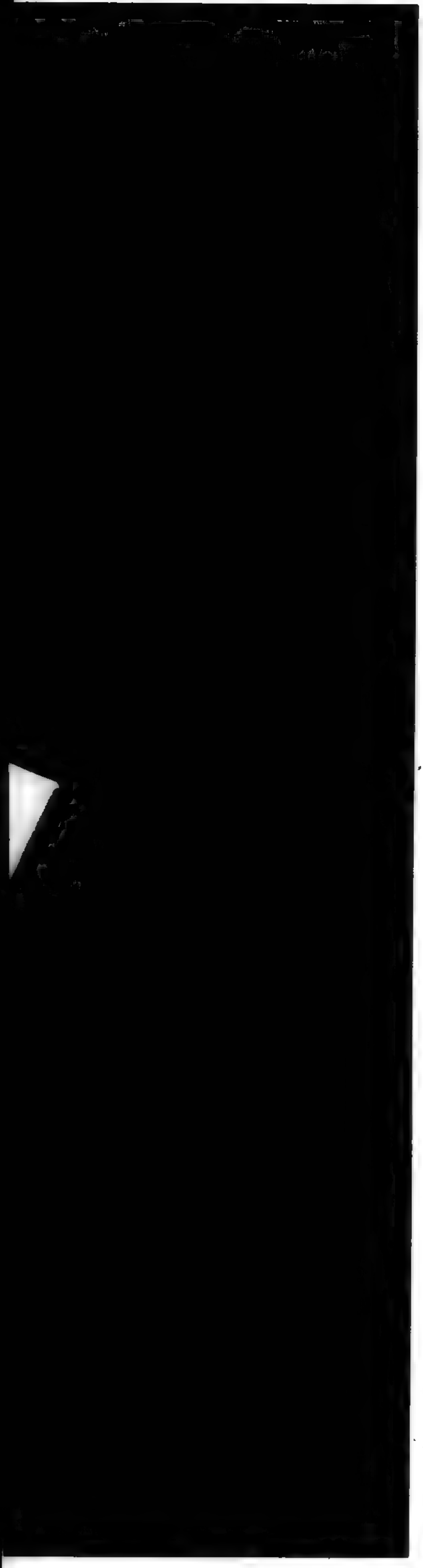

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NEW PRODUCTS

Systems

Zenith Data Systems has increased the random-access memory (RAM) and reduced the prices of its **Z-159** line of IBM Personal Computer XT-compatible microcomputers.

The Z-159 now offers 512K bytes of RAM. The Model 1, featuring a 5¼-in. floppy disk drive and Hercules Computer Technology, Inc.-compatible color graphics adapter (CGA) card, costs $1,449.

The Model 2, featuring two 5¼-in. floppy disk drives and a Hercules-compatible CGA card, costs $1,899.

The Model 3 features a 20M-byte hard disk drive, 5¼-in. floppy disk drive, Hercules-compatible CGA card and Microsoft Corp. Windows. It is priced at $2,199.

The Model 12, featuring an IBM Enhanced Graphics Adapter card and two 5¼-in. floppy disk drives, costs $1,899.

Zenith Data Systems, 1000 Milwaukee Ave., Glenview, Ill. 60025.

Software applications packages

A line of banking data bases on compact optical disks that is said to allow users to analyze, manipulate and use information contained in more than 14,000 bank-call reports has been announced by **Sheshunoff & Co.** and **Datext, Inc.**

The Commercial Banks data base combines banking information from Sheshunoff with Datext's menu-driven software and compact optical disks. It features more than 300 variables for screening call-report data to allow creation of report formats. The data base contains analyses, rankings and ratings of federally insured U.S. commercial banks for the past six years, the vendors said.

The Commercial Banks requires an IBM Personal Computer or compatible. It costs $9,500 per year.

Sheshunoff, 505 Barton Springs Road, Austin, Texas, 78704. Datext, 444 Washington St., Woburn, Mass. 01801.

Software utilities

Seemore, a screen manager for Lotus Development Corp.'s 1-2-3 said to give users a choice of compressed formats that double, triple or quadruple the number of cells displayed on the screen, has been introduced by **Personics Corp.**

Seemore offers three reduced character sizes along with the usual 1-2-3 character size, and the vendor said users can zoom in and out as needed. Seemore is also said to provide user-selectable background and foreground colors, normal or reverse video and several screen-layout options. It can produce hard-copy printouts of any compressed screen, the vendor said.

Seemore works with Lotus's 1-2-3 Release 2.0 or later on IBM Personal Computers or compatibles with a standard IBM Color Graphics Adapter, Enhanced Graphics Adapter, Video Graphics Adapter or Hercules Computer Technology, Inc. graphics adapter. Seemore is priced at $79.95.

Personics, 2352 Main St., Concord, Mass. 01742.

Software enhancements

Version 2.0 of **DBfind**, a programming tool for Ashton-Tate's Dbase programmers, has been announced by **Software Development Factory.**

DBfind is said to find real syntax errors in Dbase programs. It also generates a single- and cross-module cross reference of variables, including the type of each reference. It runs inside of Dbase and checks the number of arguments to built-in Dbase functions.

DBfind is priced at $99.

Software Development Factory, P.O. Box 1106, Hunt Valley, Md. 21030.

Data storage

Priam Corp.'s Systems Division has reduced the prices of its 40M-, 60M-, 75M-, 100M- and 230M-byte **Innerspace ID Series** family of internal disk add-in kits as well as its **Storagespace ED Series** family of desktop external add-on storage systems.

The IBM Personal Computer AT-compatible storage systems are now priced as follows: The ID40, $1,150; the ED40, $1,450; the ID60, $1,350; the ED60, $1,650; the ID75, $1,550; the ED75, $1,850; the ID100, $1,750; the ED100, $2,050; the ID230, $3,720; and the ED230, $4,020.

Priam, 20 W. Montague Expwy., San Jose, Calif. 95134.

Board-level devices

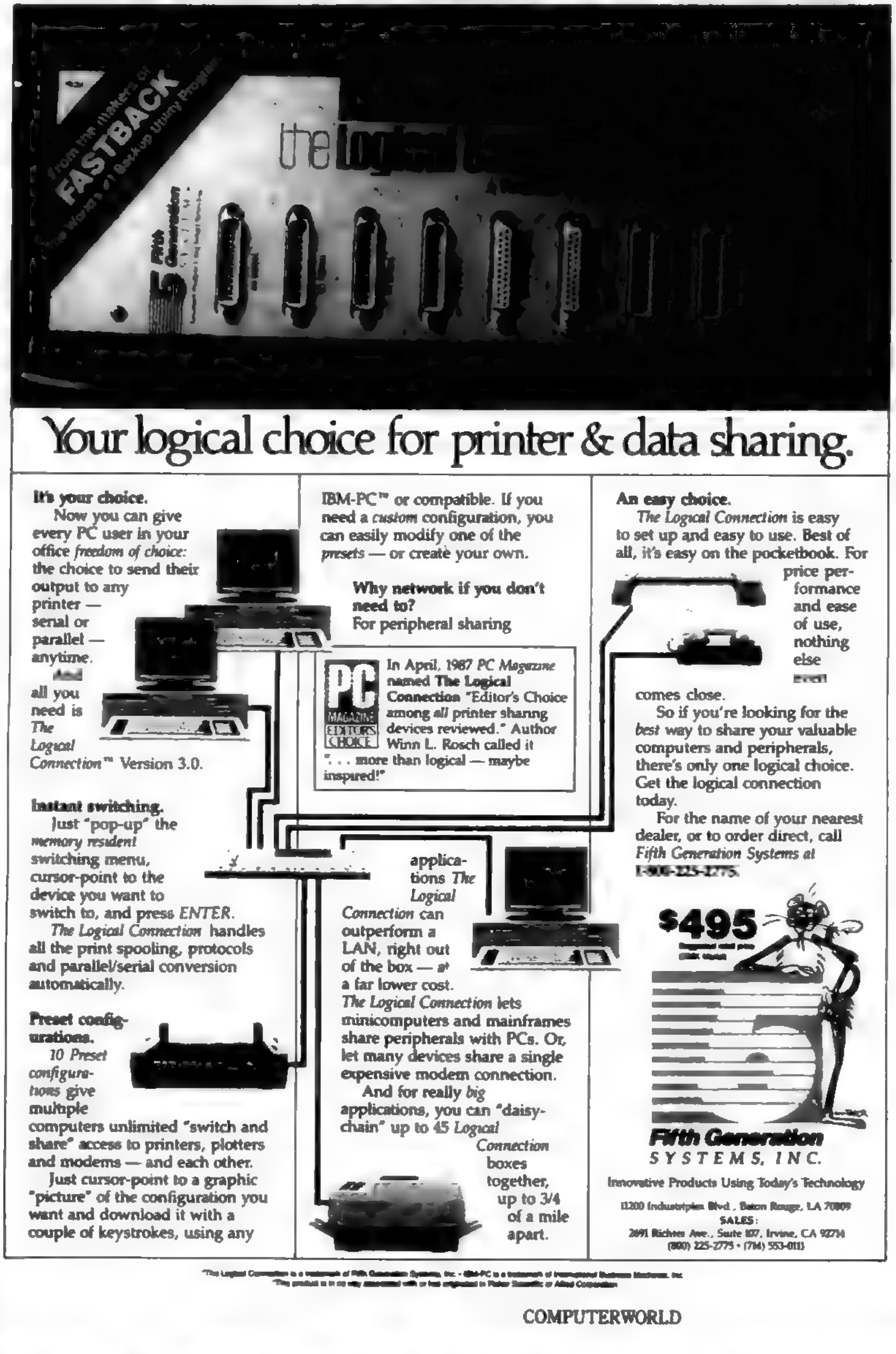
Nth Graphics Ltd. has reduced the price of its **Nth Engine** color-display controller for personal computer/computer-aided design applications.

The 640- by 480-pixel resolution Nth Engine is said to be capable of driving multisynchronous-type monitors with up to 16 colors out of a palette of 4,096. It performs zooms in about two seconds on large drawings, the vendor said.

The Nth Engine is compatible with Versacad Corp.'s Versacad and Autodesk, Inc.'s Autocad.

The Nth Engine is priced at $2,495.

Nth Graphics, 1807-C W. Braker Lane, Austin, Texas 78758.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10 Preset configurations give multiple computers unlimited "switch and share" access to printers, plotters and modems — and each other.
Just cursor-point to a graphic "picture" of the configuration you want and download it with a couple of keystrokes, using any IBM-PC™ or compatible. If you need a *custom* configuration, you can easily modify one of the *presets* — or create your own.

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In April, 1987 *PC Magazine* named **The Logical Connection** "Editor's Choice among *all* printer sharing devices reviewed." Author Winn L. Rosch called it ". . . more than logical — maybe inspired!"

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NETWORKING

DATA STREAM

Mark LaRow

T1 emphasis shifts to data

Now that many large and medium-size organizations — ranging from banking and transportation to the federal government — have designed and built backbone T1 networks, where can they expect technology to take them next? To understand where T1 processors are going, it is necessary to understand how they have developed to where they are today.

T1 networking was originally developed to provide cost-effective dedicated trunk connections between telephone company switches. It was never thought necessary that T1 systems should perform dynamic, user-initiated switching, since that was the domain of the central-office switches. It was natural, therefore, that the first sophisticated T1 processors would provide dedicated channel connections, on a static basis, between network ports. In fact, the only real difference between the first generation of T1 network processors and the original D channel banks was that the T1 processors grew out of the

Continued on page 39

Users group airs ONA wish list

Lobbies FCC, Bells for uniformity, equal access, cost-based pricing

BY MITCH BETTS
CW STAFF

WASHINGTON, D.C.— A major users group, hoping to influence the makeup of the regional Bell holding companies' Open Network Architecture (ONA) plans, recently issued a white paper that describes in detail what business users want from ONA.

The user proposal calls for national uniformity in the ONA plans, cost-based pricing and nondiscriminatory user access to the unbundled network functions provided by ONA.

Under the Third Computer Inquiry rules that created ONA, the Federal Communications Commission required the Bell companies to offer enhanced-service providers and users the ability to obtain equal access to unbundled basic elements of the local network. The Bell companies have until February 1988 to submit their ONA plans to the FCC.

In essence, ONA would unbundle the network services now provided by tariff and allow users to pick and choose those basic service elements with which they want to build their networks.

The users' ONA proposal was drafted by the Coalition of Open Network Architecture Parties (CONAP), which includes members of the Ad Hoc Telecommunications Users Committee; Boeing Computer Services Co.; CBS, Inc.; Compuserve, Inc.; Graphic Scanning; and Trintex, a videotex joint venture of IBM and Sears, Roebuck and Co.

CONAP submitted the proposal to the FCC and to each of the seven regional Bell holding companies for comment and consideration.

With only seven months left before carriers file their ONA plans, the user coalition decided

Continued on page 38

Bells' packet-switch plans misfire

BY ELISABETH HORWITT
CW STAFF

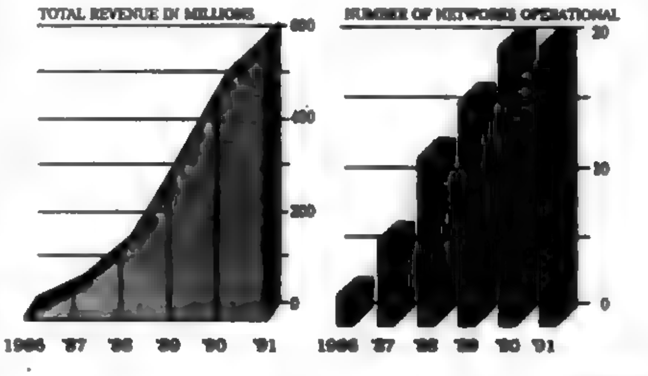
Plagued by recalcitrant regulatory bodies and tepid market response, the regional Bell holding companies are taking longer than they expected to launch successful packet-switching operations, according to a report published recently by Link Resources Corp.

Currently, only 10 to 15 local access and transport areas (LATA) have full-service packet-switching services, said Link, a New York-based market research subsidiary of International Data Corp. Local packet networks in these areas provide asynchronous-to-CCITT X.25

Continued on page 38

Local packet-switching networks taking off slowly

Customers wait for networks to be available in more areas; local carriers need more demand to cost-justify service



INFORMATION PROVIDED BY LINK RESOURCES CORP
CW CHART

Concord cuts MAP server fees

BY ROSEMARY HAMILTON
CW STAFF

MARLBORO, Mass. — Concord Communications, Inc. recently chopped prices by 30% to 40% on its terminal servers for Manufacturing Automation Protocol (MAP) networks.

"There's been lots of pressure on MAP suppliers to lower their costs," said Anthony Friscia, president of Advanced Manufacturing Research, Inc., a consulting firm in Salem, Mass. "One of the biggest criticisms in the whole Digital Equipment Corp. MAP controversy has been that Ethernet boards are significantly less expensive than MAP connections."

Concord's Token/Net Interface Module can connect up to 12 terminals or RS-232 devices as well as factory-floor devices, such as numerical controllers, over a broadband or carrierband network.

With the price cuts, Concord will be offering per-connection prices of less than $500. The 12-

Continued on page 39

Inside

- **DSC Nestar workstations boast 640K-byte memory, MS-DOS, AT-style keyboard. Page 41.**
- **Crosscomm uncrates Ethernet LAN bridge. Page 41.**

MAINFRAME

printf("Hello, ^ world\n");

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Packet switches

CONTINUED FROM PAGE 37

conversion, but not all offer inter-LATA exchange services. Link estimated that it will take two to three more years for local packet switching to be available in all major metropolitan areas of the U.S.

Long and winding road

A Bell operating company's route to X.25 service offerings involves several stages. It must file with the Federal Communications Commission for approval to offer packet-network services and then obtain waivers in order to offer asynchronous-to-X.25 conversion services and inter-LATA interconnection. Finally, the state public utility commission must give the go-ahead.

While stating that the operating companies have not offered X.25 services long enough to judge their impact on the market, the Link report predicted that demand for local packet networks during the next five years will stem primarily from interexchange carriers such as AT&T and MCI Communications Corp. and value-added network vendors such as Telenet Communications Corp.

Long-distance carriers that offer X.25 services of their own will use the Bell operating companies' packet-switching facilities to extend their own presences in different regions and to provide users with the cost-efficiencies and error-checking features of packet switching over the local loop. In turn, interexchange carriers will provide the operating companies with a way to serve national corporations whose sites extend across many LATAs.

The operating companies have been slow to form such alliances with interexchange carriers, Link reported. Interconnection between local and long-distance X.25 services has been hampered by the lack of uniformity in pricing schedules, billing procedures, network management and user-access protocols among the operating companies' local X.25 networks

Inconclusive

The regional and interexchange carriers have met since 1985 to discuss possible standards for X.25 network management, but no conclusions have been reached so far, Link stated.

The operating companies and value-added network vendors also have failed to reach a consensus on billing issues such as how to collect and apportion incoming revenue, who will collect billing information and how it will be exchanged between the local and interexchange carriers.

A national network of fully interconnected local packet networks, involving both Bell operating companies and value-added networks, will be phased in during the next five years, Link predicted.

Through 1990, the operating companies will sell their local packet-networking services to consumers primarily through data base services, interexchange carriers and other intermediaries, the report stated. By then, consumers will begin recognizing the advantages of packet-switching services over traditional leased-line connections.

ONA

CONTINUED FROM PAGE 37

it was necessary to stimulate discussion of users' needs before it was too late, according to CONAP's attorney, James S. Blaszak, of Heron, Burchette, Ruckert & Rothwell.

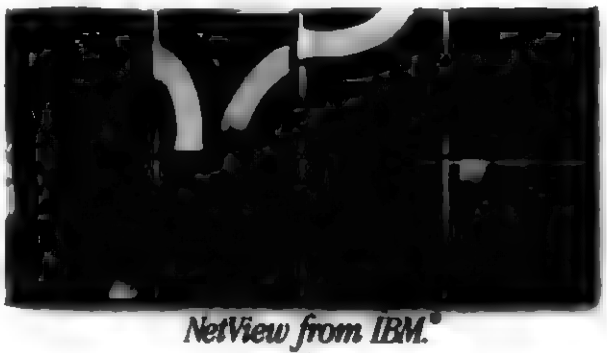
"The basic goal of any ONA plan should be to assure widespread availability of network functions that are, or should be, integral to the national common-carrier telecommunications infrastructure," the coalition said, stressing that the Bell companies should have no better access to the network functions than any other party.

"In this regard, CONAP endorses the central goal of the FCC's program, notwithstanding our serious concerns regarding the practicalities of its eventual implementation," the document said.

CONAP's proposal outlined the following basic principles that should underlie any ONA plan:

- Technical interconnection, interface and transport arrangements, as well as basic service elements, should be uniform across all local-exchange carriers.
- Access to network functions by the Bell companies, enhanced-service providers, end users and others should be neutral.
- Bell companies should offer a network-service element when there is demonstrated demand or reasonable expectation that demand will develop.
- All requests for ONA availability should be satisfied, unless the Bell company demonstrates it is too expensive or impractical at a particular central office.
- The establishment of unbundled-service elements should not affect the price or availability of bundled tariff services to end users.
- All basic-service elements should be regarded as regulated offerings, with rates based on costs.
- The natural advantage that Bell companies have in obtaining basic-service elements needed to offer enhanced services should be minimized. The Bell companies should provide others with co-location in the central office or establish "virtual co-location zones" nearby.

CONAP also provided a list of basic-service elements that businesses would find useful in their networks. They included basic subscriber access and network signaling, basic interoffice transport and call screening.



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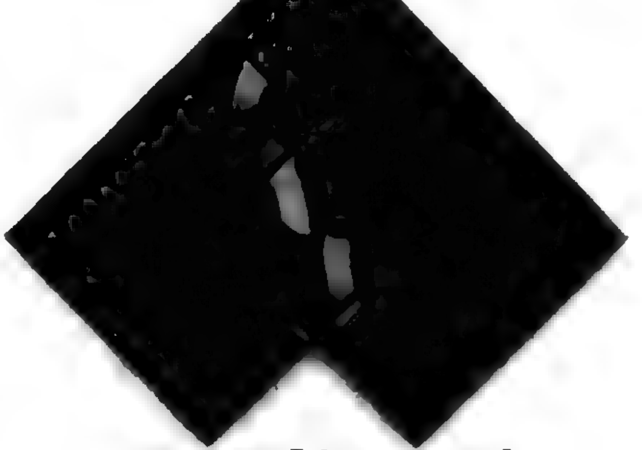

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T1

FROM PAGE 37

data world and, thus, were capable of supporting a greater variety of data rates — 300 to 1.5M bit/sec. rather than only 56K bit/sec., as with D channel banks.

The second generation of T1 processors was patterned after the tandem routing capabilities of switching statistical multiplexer networks, which was a significant advancement from the simple point-to-point or drop-and-insert routing of the first generation.

The next logical step in T1 processor development would have been to provide true statistical multiplexing in which bandwidth for both voice and data would be provided in a statistical fashion rather than in dedicated blocks. Vendors partially accomplished this goal in the current generation of T1 processors through two features variously known as "contention bandwidth" and "speech interpolation."

Contention bandwidth technology allocates the user-dedicated bandwidth only when the data or voice device requests it. Speech interpolation brings T1 processors much closer to true statistical multiplexing in that a large number of voice conversations can be statistically multiplexed with one another by taking advantage of the natural pauses in speech.

What's in store

The next logical development for T1 processors will be support of the addressing capability and true statistical nature of current packet-switching networks. In current T1 networks, end-to-end channel connections — both permanent channels and contention channels — must be defined and established by a network operator rather than by the end user. In the same way that packet switching has been replacing dedicated circuit networks, user-addressable T1 networks will replace the current generation of dedicated bandwidth processors.

Telecommunications industry watchers can expect to see a clash between the diverse technologies that represent today's private branch exchange (PBX) systems, T1 processors and packet switches for the role of the backbone network processor. Will T1 processors replace packet switches and voice switches? Will the PBX vendors develop sophisticated data handling capabilities and T1 interfaces in their products? Will packet-switching network vendors develop T1 interfaces and fast voice packet switching for their products?

I believe that we will begin seeing strategic alliances formed between companies in these diverse technologies, since no one vendor has the expertise in all of the required areas. I believe that whichever type of system becomes the best positioned to migrate users from their current private T1 networks to an Integrated Services Digital Network (ISDN) environment will become users' primary backbone network processor.

Migration to ISDN will involve the ability to allocate bandwidth dynamically and intelligently over both private T1 facilities and the range of ISDN services to which the processor is connected.

LaRow is group manager of the Wide Area Telecommunications Group at Network Strategies, Inc., a Fairfax, Va.-based consulting firm.

Concord

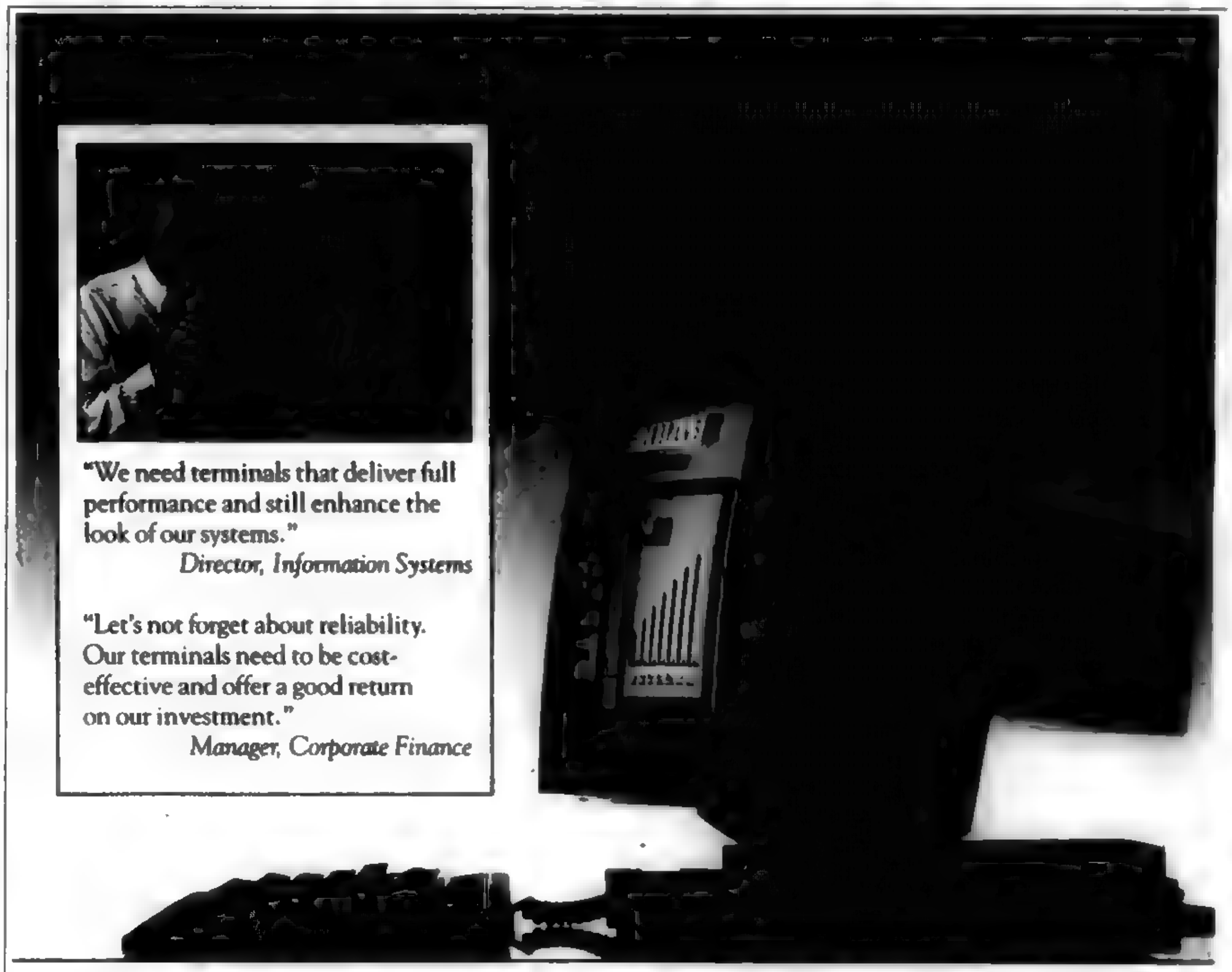
FROM PAGE 37

port module, which had been selling for $6,630, now sells for $5,250, the vendor said.

The eight- and four-port versions will cost the user more per connection. The eight-port module was cut to $3,950 from $5,635, and the four-port module, which was priced at $4,080, now costs $2,550.

"This is in response to market pressures," said Robert Nerz, manager of product marketing. "We haven't had a price cut in two years."

The Token/Net Interface Module allows users to set up point-to-point, multipoint and broadcast connections.



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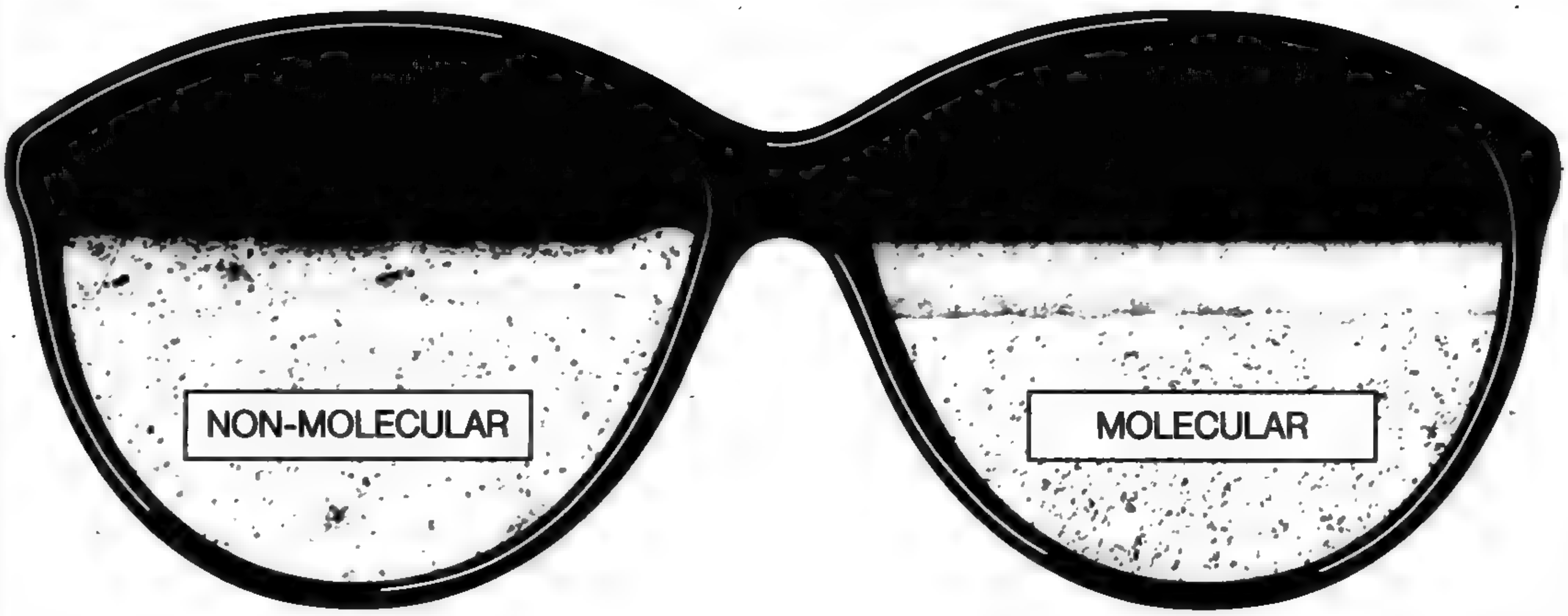

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Local-area network hardware

DSC Nestar has introduced personal computer workstation configurations featuring either an Ungermann-Bass, Inc. Arcnet or IBM Token-Ring adapter card.

The **DSC Nestar PC/AT-286** and **PC-8088-II** workstations include 640K bytes of memory, Microsoft Corp. MS-DOS, an IBM-style Personal Computer AT keyboard, provision for a math coprocessor, Arcnet network adapter cards, color or monochrome graphics adapter boards, an optional PC local-area network program and optional 14-in. IBM Enhanced Graphics Adapter monitors.

A five-slot model of the vendor's PC/AT-286 Workstation costs $1,795. The eight-slot chassis costs $1,895, and the 12-slot system costs $1,945.

A five-slot model of the PC-8088-II Workstation is priced at $995. The eight-slot version costs $1,095, and the 12-slot system costs $1,145.

DSC Nestar, 1345 Shorebird Way, Mountain View, Calif. 94043.

Local-area network software

Version 2.40 of the **Lifenet** local-area network operating system for IBM Personal Computers and compatibles has been announced by **Univation, Inc.**

Lifenet combines standard file-server software with a built-in data base server that processes index files at the network server instead of at the workstation. Other features include the use of cartridge tapes for fault-tolerant processing.

Security functions include the ability to define a specific format for system passwords.

Lifenet is priced at $1,495.

Univation, 1231 California Circle, Milpitas, Calif. 95035.

Customer-premise equipment

Two facsimile products — a portable unit and an internal card — for IBM Personal Computers have been announced by **Asher Technologies, Inc.**

The **JT Fax** products were designed to send or receive Group III facsimile transmissions. Both accept ASCII text or scanner input. Documents may be sent from the computer screen or from stored files.

Graphics formats are supported, so data can be sent to a JT Fax and output to printers like the Hewlett-Packard Co. Laserjet Plus.

The portable model attaches to the serial port on a PC via an RS-232 cable. The internal card fits in a half-height slot.

The internal JT Fax model costs $395. The portable unit costs $495.

Asher Technologies, 1009 Mansell Road, Roswell, Ga. 30090.

Links

Linkware Corp. has announced the **Linkware Mac Connection**, said to work with host-based Linkware software to provide Apple Computer, Inc. Macintosh XL, 512, 512E, Macintosh Plus and Macintosh SE users with direct access to mainframe and minicomputer files.

Mac Connection allows communication between a Macintosh and a host, between two Macintoshes and between a Macintosh and an IBM Personal Computer. Information can reportedly be transferred in Macintosh, binary or text format.

Linkware host-based software consists of application development tools, file transformation, communications and file management.

The Linkware Mac Connection is priced at $300 in single quantities.

Linkware, 128 Technology Center, Waltham, Mass. 02154.

A learning bridge device used to interconnect Ethernet local-area networks (LAN) has been announced by **Crosscomm Corp.**

The **487EE** Ethernet-to-Ethernet LAN bridge is said to be capable of passing up to 9,000 packet/sec. in either direction. It uses an Intel Corp. 80186 processor for implementing the bridge algorithms as well as serving as a host for Ethernet adapter cards. The bridge also provides the appropriate interfaces for network management.

The 487EE interconnects either thin or thick Ethernet LANs. It costs $5,400.

Crosscomm, P.O. Box 403, West Boylston, Mass. 01583.

Protocol converters

A controller card introduced by **Micom Systems, Inc.**'s Interlan division is said to allow both Microsoft Corp.'s MS-DOS and AT&T Unix System V-based IBM Personal Computers to communicate over Ethernet using a variety of networking software.

The half-card sized **NI5210** can be used in network file servers running Novell, Inc.'s Advanced Netware, Banyan Systems, Inc.'s Virtual Network System, Locus Computing Corp.'s PC-Interface, Lachman Associates, Inc.'s System V Streams TCP, Datability Software Systems, Inc.'s Remote Access Facility, Fel Computing's Mobius and Sun Microsystems, Inc.'s PC Network File System.

The NI5210-8 with 8K bytes of random-access memory (RAM) costs $395; the NI5210-16 with 16K bytes of RAM costs $425.

Micom, 155 Swanson Road, Boxboro, Mass. 01719

File servers

The **Remote Screen Processor**, said to reduce response times on IBM 3270 Systems Network Architecture and Synchronous Data Link Control communication lines by providing a screen image storage and retrieval capability, has been announced by **The Protocol Team, Inc.**

The IBM Personal Computer-hosted Remote Screen Processor allows an IMS or CICS installation to download and store static screen data. From that point on, only the dynamic part of a screen is sent, along with a retrieve directive.

The product is inserted in the communication line between the host computer and co-located controller. It can be configured to serve up to three controllers.

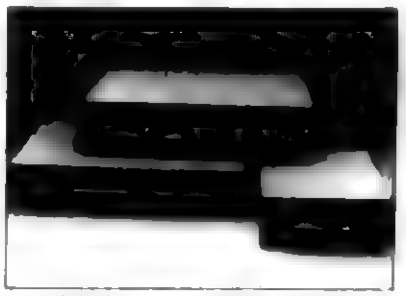
The Remote Screen Processor costs $1,500.

The Protocol Team, Suite 107, 4020 Birch St., Newport Beach, Calif. 92660.

Modems/Multiplexers

The **Omnimux 2100**, **2200** and **2300** multiplexers for fiber-optic or coaxial cable installation have been introduced by **Racal-Milgo**.

The multiplexers support eight, 16 and 32 IBM, Type A and compatible devices, respectively. They transmit data at 2.3587M bit/sec. between multiplexers and have a common addressing that allows point-to-point or multidrop configuration.



Racal-Milgo's *multiplexers*

Prices start at $995 for the Omnimux 2100 and $2,380 for the Omnimux 2300.

Racal-Milgo, 1601 N. Harrison Pkwy., Sunrise, Fla. 33323.

Diagnostic equipment

A fiber-optic cable fault locator said to use a laser to inject visible light into the cable has been introduced by **Fotec, Inc.**

The **Model S650** is a portable unit for tracing cables and finding cable breaks, areas of microbending loss and bad connectors.

It has an internal rechargeable battery that can power the laser for up to five hours of continuous operation.

The S650 is priced at $3,095.

Fotec, The Schrafft Center, Box 246, 529 Main St., Boston, Mass. 02129.

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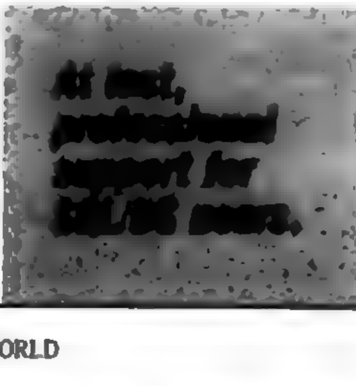
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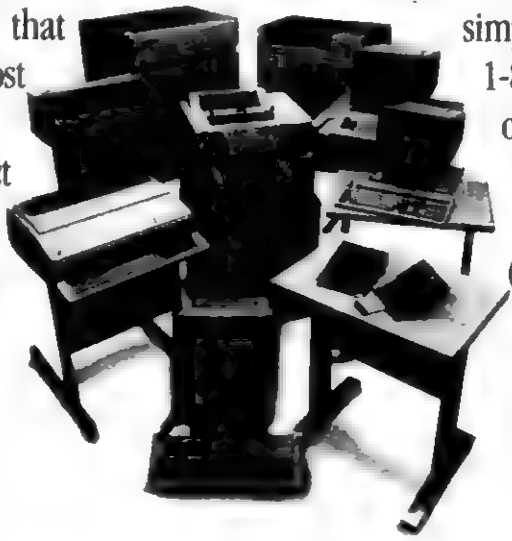

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SYSTEMS & PERIPHERALS

HARD TALK

Stanley Gibson

DEC snores, IBM scores

You hear it more and more. What began as a whisper a few months ago is turning into a full-blown roar.

Digital Equipment Corp.'s success is going to its head. The Maynard, Mass., minicomputer marvel is starting to believe its own press clippings. The result is that the fair-haired boy of the industry is getting spoiled by success and beginning to treat the computer community — much of which has been squarely in its corner — with disdain. Some had come to expect such hauteur only from its archrival, IBM.

To hear industry analysts describe two recent meetings held by DEC and IBM, the role reversal becomes shockingly clear. By all accounts, DEC bored the daylights out of the major mid-range analysts when it hosted a recent session in Glen Cove, N.Y.

"DEC did nothing but talk about IBM. They had nothing new," lamented a number of attendees. One consultant reported that DEC used figures of IBM processor performance taken from newspapers, rather than numbers it had arrived at through its own testing. Nothing exasperates consultants more than to be given a hollow sales pitch with no data to back it up. And if you can't tell them

Continued on page 47

Encore system draws applause

User hails performance, reliability of second-generation Multimax 320

BY JAMES CONNOLLY
CW STAFF

BOSTON — An early buyer of Encore Computer Corp.'s second-generation Multimax 320 is using the system to stay ahead of user demands for processing power, but he says he will not see a true test until a "thundering herd" of users arrives in September.

One of the first installations of the Multimax 320 was at Boston University's Academic Computing Center, where a 7-month-old Multimax 120 was upgraded with higher performance CPUs in June. Encore, a Marlboro, Mass.-based superminicomputer company founded by former Digital Equipment Corp. and Prime Computer, Inc. executives, announced the Multimax 120 in 1986 and the Multimax 320 in January.

"We got the upgrade at the beginning of the summer, and right now we are ahead of the students who are here for the summer. But I want to see how the performance is when the rest of the students — what we call the thundering herd — come back in the fall," reports Barry Z. Shein, manager of special projects and distributed systems at the Academic Computing Center. But while most students are away for the summer, the computing center remains active.

The center also runs DEC and Celerity Computing minicomputers and an IBM 3090 Model 200 mainframe as hosts and a variety of workstations, such as Sun Microsystems, Inc. and Apple Computer, Inc. Macintosh systems. The center primarily supports undergraduate computer science students at the 28,000-student university.

The Multimax 320 is one of four Encore systems on the university's campus. Three Multimax 120s are used by the university's College of Engineering for very large-scale integration (VLSI) design and other research.

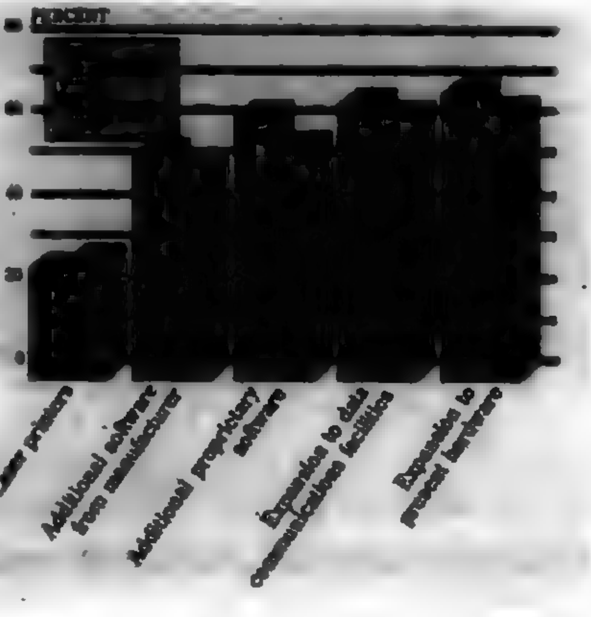
Shein chose Encore as a high-performance Unix vendor after seeing the first engineering Multimax. "It worked. It was up a lot. I liked the idea of incremen-

Continued on page 46

Data View

Acquisition planning

Communications takes a backseat to systems hardware



INFORMATION PROVIDED BY DATAPRO RESEARCH CORP
CW CHART

Prime lands Pan Am role

BY JAMES CONNOLLY
CW STAFF

INDIANAPOLIS — Prime Computer, Inc. systems will be playing a role next week when the 10th Pan American Games open here.

Prime has been designated an official sponsor for the Olympics-like quadrennial international gathering of Western Hemisphere athletes.

The company acquired the sponsorship through the donation of $2 million worth of hardware and software for use by the Pan American X/I organization's MIS group.

The MIS operation is supporting the management of 27 athletic events to be held from Aug. 7-23. The organizers have

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Emulator gases up I/O engine

BY STANLEY GIBSON
CW STAFF

SAN DIEGO — Data-Ware Development, Inc. recently announced a channel emulator capable of 4.5M byte/sec., a speed that is expected to become a standard for IBM and plug-compatible mainframes. The current channel speed is 3M byte/sec.

The Peripheral Automatic Channel Emulator (PACE) Model DW145 is expected to be particularly useful to developers of IBM plug-compatible mainframe peripherals, such as disk and tape drives, according to the vendor.

"Peripherals manufacturers can get to the market fast by using Data-Ware's channel emulator as an I/O channel substitute for an expensive IBM mainframe during engineering checkout and production tests," said Drew Sprague, a Data-Ware sales engineer.

A possible standard

Sprague said he concurs with the assessment of a number of industry observers that the faster channel speed will become a standard for printers, tape drives and disk drives.

"A lot of peripheral makers have faster speed capability built into their current products," Sprague continued, explaining that manufacturers in many

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Inside

- Force adds Unix version of supermicro. Page 50.
- HP unveils monochrome display terminal. Page 50.

High-end minis elbow out IBM iron

BY DAVID BRIGHT
CW STAFF

LOS ANGELES — The University of Southern California (USC), one of the first customers for Prime Computer, Inc.'s new high-end 6350 superminicomputer, has purchased four of the systems as the final step in converting from an IBM 3081 mainframe to a distributed Prime environment.

Among the goals when the university started its conversion efforts three years ago were reducing costs, gaining faster response time and speeding software development.

"We found that running the IBM center was becoming more and more cost-prohibitive," explains Robin Pearse, director of computing. "We weren't able to develop new systems nearly fast enough for the administration, and we seemed to be mired in the existing applications. Also, the response time with the single 3081 was becoming unacceptable, so we decided to migrate to a system where we could divide and conquer."

Having beta-tested a Prime 6350 for three months, USC says it plans to use the new systems for administrative processing. The 6350s, which Prime claims can each perform 11.8 million instructions per second (MIPS), will join seven of Prime's 9955 IIs already in place at the USC campus. The systems are linked together with Prime Net and the vendor's Ring Net token-ring method.

Prime says the 6350 can handle maximum disk storage of 50G bytes and can simultaneously support as many as 960 users. According to Prime, the 6350 can be upgraded to a 23.6-MIPS 6550 through the addition of a second processor. Although USC has been promoting a distributed environment, Pearse adds that using the more powerful new machines might enable the school to decrease the number of systems in use.

The primary software used on the machines at USC will be built around the Prime Information relational data base management system (DBMS) along with an applications generator, according to Pearse. He says he has been conducting benchmark tests that compare the 6350 with the 9955 II, and he is "pleased with the results so far." Plans call for the systems to go on-line by early fall, he says.

The systems will handle all of USC's administrative functions, including grade reports for close to 30,000 students, student recruitment and registration and the payroll for some 14,000 employees.

Continued on page 47

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Encore

CONTINUED FROM PAGE 46

tal expansion. With so many vendors, upgrade means removing a machine and bringing in another one. Here, it's like adding memory or a disk. You bring the system down, plug in the new boards and bring it back up, and the system recognizes that it has more processors and reconfigures itself," Shein says.

The manager responsible for bringing in the first Encore processors was Allan R. Thompson, associate professor of electronics, computers and system engineering at the College of Engineering.

The College of Engineering installed its first Multimax 120 in May 1986, as a supplement to a DEC VAX-11/780. "The thing we did was go for it, because the [VAX-11/780] was full and because we wanted Unix," says Thompson, who calls his Encore system "a gorgeous engine for VLSI design." He says the only significant failure for his three six-CPU systems came last July, when a CPU board burned out. He says he circumvented the failure and ran that system on four CPUs until the next morning, when Encore replaced the board in a 20-minute procedure.

Shein says the upgrade from the Multimax 120 to the Multimax 320 — including an operating system update — required only a few hours. He reports no significant reliability problem with either of the Encore models and says the relatively minor, short-lived difficulties have included a CPU board that was improperly seated and a disk failure.

The Multimax 320 is based on National Semiconductor Corp. 32332 microprocessors, while the Multimax 120 uses the older 32032 chip. The speed of the 32332, which is rated at 2 million instructions per second (MIPS), allows the university's Multimax 320 to perform 12 MIPS with six CPUs, compared with the 16 CPUs needed to provide the same power on a Multimax 120.

Shein, who says his center paid Encore standard university prices, notes that a Multimax 320 performs 12 MIPS for about $200,000, while that much power from DEC's VAX 8800 costs about $800,000. Boston University's system runs Encore's version of the University of California at Berkeley Unix 4.2.

Boston University's Multimax 320 supports 64 users at a time. However, Shein notes that an almost unlimited number of Ethernet connections can be added in increments of 16 through direct plug-in boxes on the Encore system.

A fast Unix processor

While Encore promotes itself as a parallel processor supplier, Shein says little parallel processing has been done in the computing center. "Even if they are doing it, the only way I will know is if they tell me," he reports. Instead, what users see is basically a fast Unix processor. Shein says programming for parallel systems is not yet a curriculum subject at the university, but that he hopes a few faculty members work parallel programming into their courses on a limited basis.

Shein has run one benchmark to test the Multimax 320's parallel capabilities. In that ray-trace test, Shein broke the job into 30 parts to run on 16 processors on the Multimax 120 and 12 parts to run on six Multimax 320 Advanced Processor Cards. When running on a single processor, the job took 1,400 minutes on the Multimax 120 and 650 minutes on the Multimax 320. By running the job across multiple processors, Shein brought those times down to about 100 minutes.

Meanwhile, Thompson reports that faculty members in engineering have run parallel jobs on Multimax 120s. "My own perception is that it is faster than the VAX-11/780 on a per-board basis. On the surface it should be 4½ times a 780, but my observation is that it is six times as fast," Thompson said of his own performance tests on the Multimax 120.

Thompson and Shein also laud the Encore systems for their ability to port software with few problems. Thompson notes that the only difficulties his users experienced occurred when they used what he called illegal tactics, which the Encore system detected but other Unix systems might have missed.

Pan Am role

CONTINUED FROM PAGE 46

said they expect more than 6,500 athletes from 37 nations, 500,000 spectators and 3,000 media representatives.

Applications include English and Spanish word processing, security coordination, results reporting, protocol, housing, transportation, scheduling, accounting and warehousing and distribution of equipment and clothing, Prime said.

Communications services will be provided by Ameritech, which also has been designated as an official sponsor.

Prime systems in use include two 9950-II superminicomputers and a 9655 supermini, 68 personal computers and five Performer Office Automation Workstations. Prime also donated 192 PT200 terminals and 15 printers.

The games' organisers are using Prime Information, a fourth-generation language data base management system; the Prime Escape front-end system for application development under Prime Information; the Prime Simple program developer; Prime OAS office software; and Primelink communication software for personal computers.

Prime also provided training for 250 games volunteers and tactical support through its Carmel, Ind., offices.

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Lines/Page	[illegible]	[illegible]
[illegible]	Yes	Yes
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Protocol	5225	5225

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DEC snores

CONTINUED FROM PAGE 43

about new products, why waste their time?

"Now, DEC holds these meetings based on how IBM held them in the past," says Bob Randolph, of International Data Corp.'s DEC Advisory Service. IBM actually won points over DEC in terms of frankness. Did we think we would ever see the day? In football jargon, DEC sat on the ball. But after DEC stalled, IBM scored a lightning touchdown on its next possession. Its recent consultants' roundup in Dallas was a smashing success.

"It was the most amazing user meeting I have ever been to. I was blown away," Randolph says. "The meeting was structured from a content point of view, like the old DEC meetings. It proved they [IBM] are *serious* about getting their fair share of the market."

Letting the numbers talk

In contrast to DEC's casual attitude to the performance of competing processors, consultants say, IBM has been assiduously testing all makes of computers at its Dallas data center. Its results are based in its proprietary Ramp C benchmark, and many results are not yet complete, but at least IBM had real figures to show the analysts at the roundup.

If IBM's meeting style appears to emulate that of previous DEC gatherings, it is almost certain that its mid-range strategy in general is a copy of DEC's. As Randolph expresses it: "For the last two years, IBM has been muddling around. Then along came DEC and pointed the direction. IBM watched their success and then said, 'Aha! that's the way to go. Now, how fast can we get there?' "

The tragic other side of the coin is that DEC has apparently looked longingly at IBM's traditionally high profits and said, "Aha! In order to compete, we must have those, too."

So DEC has asserted price control, slashed prices on workstations in what may be predatory pricing, brought out machines with extremely short life spans and closed the VAXBI bus.

Those who know the consultant community know that there are a few who would start a DEC cheering squad if they could. When they report bad vibes from a company they admire, it takes on special meaning.

And consultants also know they are being wooed by IBM. "IBM is trying to use the consultant community to gain ground against DEC. They pulled it off masterfully," Randolph says. But the fact is, consultants are saying that IBM is closing the mid-range gap between it and DEC.

Of course, DEC might have a trump card up its sleeve, which it could pull out at the upcoming Decworld show.

But in the latest battle for public opinion, score six points for IBM.

Gibson is a *Computerworld* senior writer

High-end minis

CONTINUED FROM PAGE 43

Another school system planning to at least partially replace an IBM machine with four Prime 6350s is the Board of Education of the School District of Philadelphia.

The board has taken delivery of a machine and will begin a two-year implementation process next month, reports Richard Schoenborn, director of the school's computer network.

Currently, the board handles administrative tasks for approximately 196,000 students manually and with an IBM 4381. The 6350s will be used in conjunction with the 4381.

Software keys selection

Schoenborn says the main reason the Prime systems were chosen was the specially designed Skools software provided by Prime value-added reseller (VAR) Keystone Information Systems, Inc. in Maple Shade, N.J. That software is written in the Prime Information relational DBMS.

Like USC, Premier Systems, Inc. — a Prime financial services VAR based in Wayne, Pa. — has been beta-testing a 6350 since April. "It does perform up to the advertised speeds," says Marketing manager David DeParle. "It will let us move into areas dominated by mainframes."

Premier has sold 17 of the systems for delivery this year, notes DeParle, and is "already quoting upgrades" to the 6550, which is scheduled for fourth-quarter availability.

Emulator

CONTINUED FROM PAGE 43

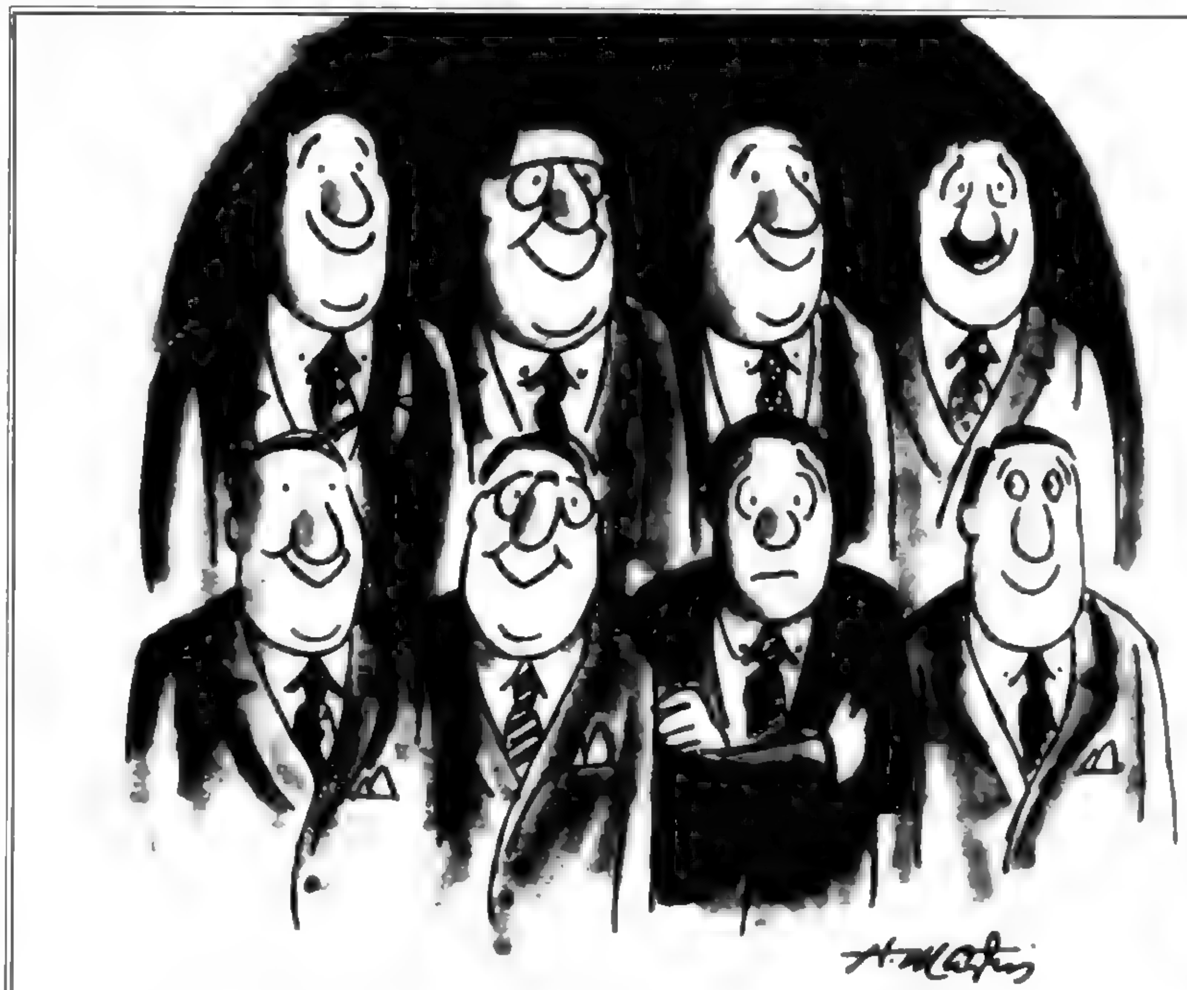
cases need only adapt current products to the new speed, rather than create new equipment.

The DW145 also provides such other emulations as IBM mainframe channel I/O operation in selector, byte multiplexer, block multiplexer and data streaming modes, Data-Ware said.

The 4.5M byte/sec. speed is an increase of 50% above Data-Ware's current PACE Model DW110, which has an I/O channel transfer rate of 3M byte/sec.

The DW110 can be upgraded to the new speed, the vendor said.

The DW145 is priced at $19,950, with delivery within 45 days after receipt of order, according to Data-Ware.



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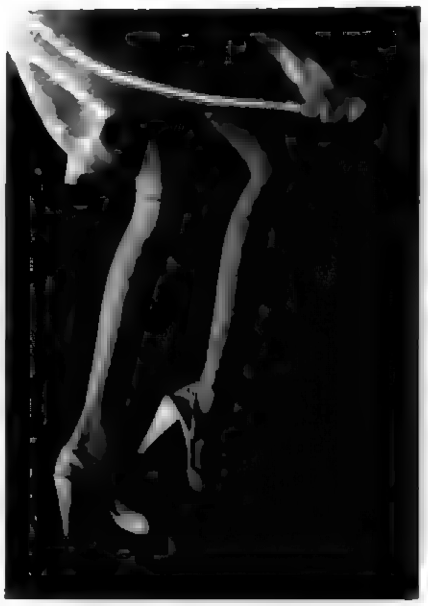

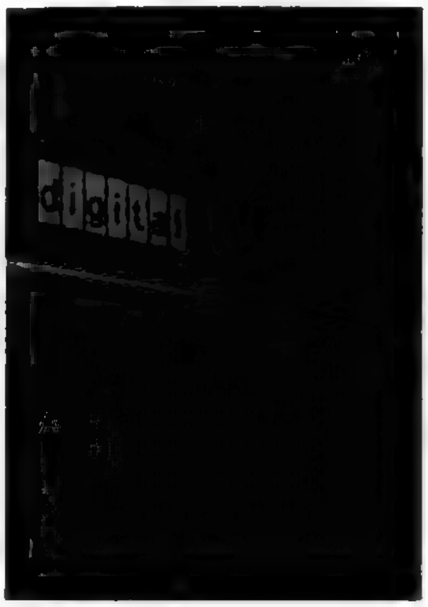

MAX FACTOR DID.

Max Factor's international operation has that vibrant glow about it. And Cullinet's Manufacturing System (CMS) software helped make it that way. The largest producer of its kind in Europe, Max Factor currently offers over 1,300 different cosmetics and fragrance items. Unit totals exceed 55 million annually. The key to success in the industry? Max Factor people believe it is keeping inventories low while at the same time maintaining a high service level on customer orders. CMS does just that. It's an advanced MRPII system that gives the 800 manufacturing and distribution personnel at the huge U.K. plant the capability to plan, control and react to real-world changes in a variety of manufacturing environments. Inventory and service objectives have become easy to attain. And the software has paid for itself in very defined terms over a short time. In the next five years, they plan to save five times their original investment. Obviously, CMS allows the best possible use of resources so that Max Factor, Ltd. just keeps looking better every day.

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As America's second largest manufacturer of hosiery for men and women, Kayser-Roth understands that support is a key component of any software solution. That's why they selected the Cullinet Manufacturing System (CMS) featuring the Implementation Workbench for Manufacturing. This package of expert-based application and sophisticated implementation tools will enable Kayser-Roth to achieve an overall integration of information among departments. Their data exchange plans extend from PC to mainframe to user tools – between headquarters, multi-site plants and warehouses. Kayser-Roth's corporate managers use the Implementation Workbench for Manufacturing to enhance their implementation efficiencies, project planning and scheduling. Access to project status data helps meet target projections. CMS also provides superior on-line user documentation, interactive training and data conversion instruments, giving Kayser-Roth a most valuable tool for achieving its goals.

DIGITAL DID.

Digital Equipment uses Cullinet software to distribute Digital products. That's one of the highest compliments they could pay. Cullinet's Distribution Management System has allowed Digital to achieve real warehousing flexibility, because the same software can be utilized at multiple sites and still be tailored to the needs of each individual one. The ability of the system to be networked nationwide has provided Digital with the interconnectivity they were looking for. It has resulted in an optimum level of performance – one that has dramatically increased inventory turnaround. And Digital feels that Cullinet's vendor performance has been equally impressive. The distribution personnel say their success is shared with Cullinet – people who have become more like colleagues than vendors. Five Distribution Management products are available to companies like Digital: Order Management, Warehouse Management, Distribution Resource Planning, Distribution Center Management and Sales Forecasting. Digital knows how important these products are. Their clients believe that "Digital has it now," and Cullinet helps keep it that way.

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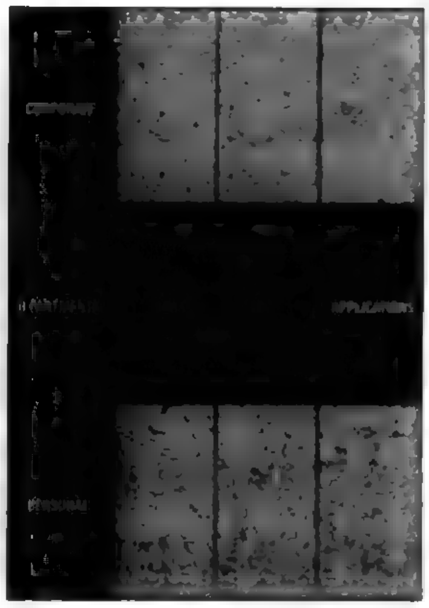

LHTEC DID.

The Light Helicopter Turbine Engine Company (LHTEC) did not exist as an entity until the U.S. Army instituted its T800 Full-Scale Engineering Development Program. T800 is the designated propulsion system for the LHX program to ultimately upgrade the Army's entire fleet of light helicopters. To accomplish that task within the Army's production competition strategy, the Garrett Turbine Engine Company of Allied Signal and the Allison Gas Turbine Division of General Motors joined resources for the Full-Scale Development (FSD) portion of the program. Even though these companies will become competitors during the production phase, FSD required they function as one, with a management process featuring fully integrated software and a state-of-the-art performance measurement control system. Cullinet's Manufacturing System (CMS) with EASYTRAK enabled easy linkage of files from cost, scheduling and technology standpoints. This project was accomplished across an 1,800-mile distance, with both partners having equal access to vital information simultaneously. And Cullinet managed to deliver up to 70% more savings in day-to-day operational costs than any competitive vendor LHTEC considered.

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NEW PRODUCTS

Processors

Force Computers, Inc. has introduced a Unix version of its VMEbus-based supermicrocomputer system.

The **Force Focus 32/Unix System 25** is a desktop-size system said to support up to eight simultaneous users. It runs under the supplied Unix System V Release 2 operating system and contains read-only memory, random-access memory, hard and floppy disk drives and tape backup.

In its minimum configuration, it employs seven VMEbus boards, with space for five more.

A 460W, switch-mode power supply is standard.

In standard configuration, the Force Focus 32/Unix System 25 is priced at $424,950.

Force Computers, 727 University Ave., Los Gatos, Calif. 95030.

Data storage

Econopac, a family of mass-storage subsystems available in 280M-, 130M- and 95M-byte capacities and designed for use with Hewlett-Packard Co. computers, has been announced by **Bering Industries**, a wholly owned subsidiary of Mountain Computer, Inc.

Econopac subsystems are said to feature an average disk-access time of 27 msec. According to the vendor, they are 100% hardware and software compatible with HP computers using CS/80 and SS/80 command sets, including the HP 9000 Series 200/300/500, HP 1000 and HP 3000 computers.

The 280M-byte Econopac Model 5028 costs $9,490; the 130M-byte Model 5013 costs $5,390; and the 95M-byte Model 5009 costs $4,190.

Bering Industries, 280 Technology Circle, Scotts Valley, Calif. 95066.

The **Interceptor/36**, a series of nine-track ½-in. tape systems for IBM System/36 computers, has been announced by **Acknowledge, Inc.**

According to the vendor, data transfer rates for the series exceed 1.5M byte/min, and tape capacities range from 43M to 180M bytes. A menu-driven software utility is included with the systems, as well as a program that allows backups to be performed automatically at user-specified times.

Prices for the Interceptor/36 models range from $11,900 to $28,900.

Acknowledge, 100 Pennsylvania Ave., Framingham, Mass. 01701.

Terminals

The **HP Industrial Touch** monochrome display terminal has been announced by **Hewlett-Packard Co.**

The terminal is said to be compatible with the HP 2392 display terminal and with Digital Equipment Corp.'s VT52 and VT100 terminals. It accommodates touch-screen, bar code and key-pad input. The monitor is mounted on a tiltable base and features an electroluminescent display.

The HP Industrial Touch provides built-in, menu-driven, mouse-oriented forms and graphics-character editors. Multisize text and fields for data entry and graphics can be combined on a single screen.

The HP Industrial Touch costs $3,300. Accessories for touch-screen input cost $450; for bar code input, the cost is $300.

Hewlett-Packard, 1820 Embarcadero Road, Palo Alto, Calif. 94303.

Printers/Plotters

The **GBT 6090MP Print Station**, a tape-to-printer system, has been introduced by **General Business Technology, Inc.**

The print station includes the vendor's 6090MP 90 page/min. nonimpact continuous-forms printer, a dual-density magnetic tape drive and a personal computer-based controller with proprietary software.

Continuous forms are printed at a rate of 90 page/min. and print resolution is 240 by 240 dot/in. Four character sets are included. A graphics option that allows printing of signatures and logos is also available.

The GBT 6090 Print Station with 800/1,600 bit/in. tape costs $109,898; with 1,600/6.25K bit/in. tape it costs $115,858. The graphics option costs $16,549.

General Business Technology, 1891 McGraw Ave., Irvine, Calif. 92714.

Power supplies

Modular Power Corp. has introduced **Upstar**, a modular uninterruptible power supply, and **Gemini**, a power distribution center for large power system users.

Upstar is made up of a series of 9- by 9- by 16-in. power modules. Each module provides 12 kVA of power. Users can start with a power system as small as 12 kVA and expand it up to 360 kVA in a single unit. Upstar includes a built-in CRT.

Gemini is said to guard computer systems against power disturbances and to provide monitoring capabilities.

Upstar is priced starting at $30,200. Gemini costs $4,945 and up.

Modular Power, 1150 Ringwood Court, San Jose, Calif. 95131.

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TPX/VM
Network Access/VM

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TPX/VM (Terminal Productivity Executive) is a full-function session manager specifically developed for users of ACF/VTAM. With TPX/VM, you can select desired applications from a full-screen menu and have simultaneous, active sessions. TPX/VM also allows easy switching from one application to another with a single command or PF key.

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Network Access/VM is an ACF/VTAM application that replaces VTAM's limited USS (Unformatted System Services) Table. It provides you with menu-driven access to all your applications while maintaining application-level security. With Network Access/VM, you can communicate with other network users with system-wide message sending.

TPX/VM and Network Access/VM work effectively in a stand-alone or integrated mode to improve the productivity of your network users and optimize resource usage. TPX and Network Access have received "rave reviews" from MVS users at over 800 sites worldwide. Now VM users can experience the same benefits.

To arrange a FREE, 30-day trial of TPX/VM or Network Access/VM, call toll-free, (800) 323-2600 or (412) 323-2600 in Pennsylvania.

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BY ROBERT ZAWACKI

As our systems become more dated and we shift our focus increasingly toward maintenance and away from development, it becomes even more important to select the right staff and, once selected, to manage it to increase productivity.

Much development work is being replaced by software purchases, and many of the "rich" jobs in systems development are becoming less rich or more narrow in scope. MIS must become creative to hold on to top staff members and keep them motivated.

A complicating factor is that MIS managers are promoted on the basis of their technical skills, not their management skills. Often, they look for job satisfaction in technical areas; for them, managing workers is a need of a lower order.

As a rule, these managers prefer to stay current in technology, saying that "tomorrow" they will get to the people problems. A typically high need for achievement, combined with a low need for social interaction, forces them away from performing the management functions that increase the motivation and productivity of programmers and analysts.

One firm that has recognized this problem is IBM. About five years ago, Dan Giles, IBM's director of MIS education in Dallas, included a course called "Motivating and Managing Computer Personnel" in his technical curriculum for MIS staff at IBM. This course is popular with IBM's MIS managers because it is the only course that treats human resource problems in a technical environment rather than in a generic business environment.

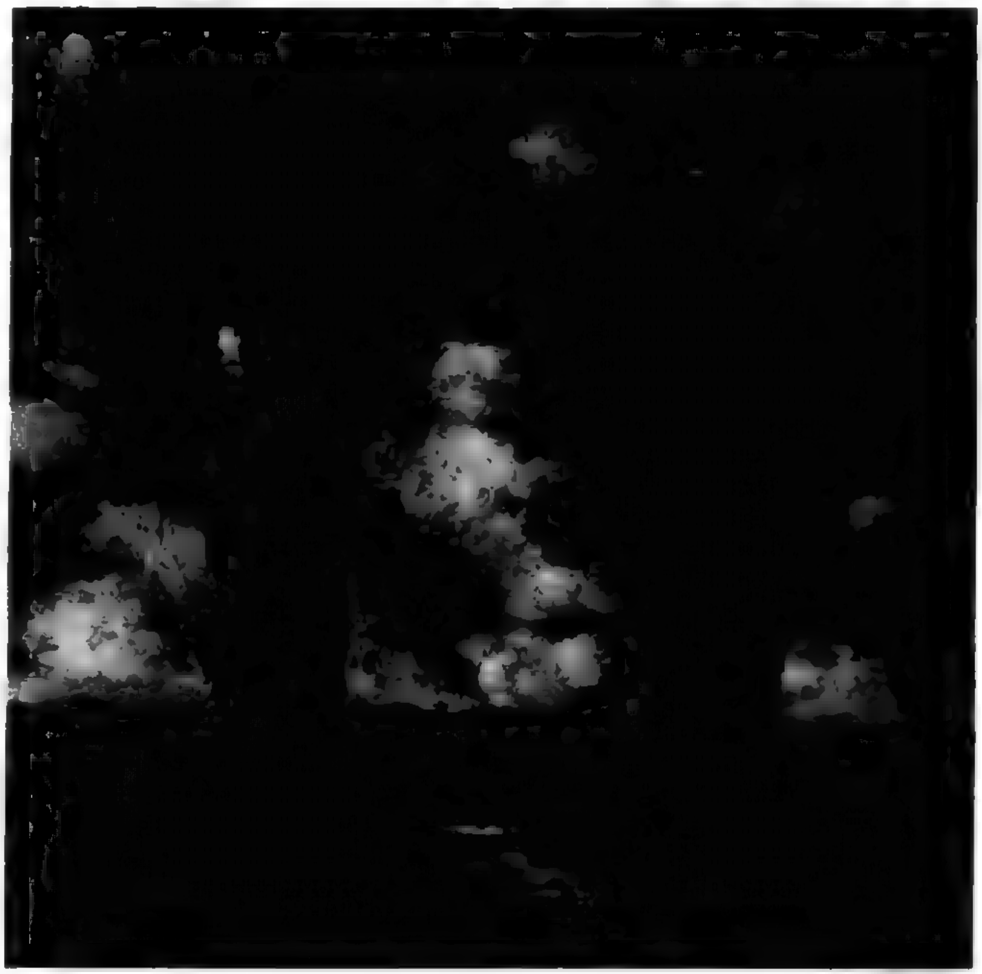
Increase motivation

From my research and consulting with various MIS organizations for the last 10 years, I have found that MIS managers can be quite successful at moving "eagles" toward higher motivation and productivity. Management courses designed for MIS managers should emphasize the characteristics of MIS personnel and then discuss the skills that are required to motivate them.

Also on the positive side, MIS managers typically respond very well to goals because of their high need to achieve. Management workshops, to be effective, must conclude with action plans that the managers implement back at the ranch. Unless the workshops are translated into meaningful skills and goals, managers go back to work only to be seduced by the daily technical crises — at the expense of implementing their new knowledge and skills.

Just what are the variables that increase the motivation and productivity on the human side of MIS? You can keep eagles on your staff by implementing any or all of the following:

- Design high-profile jobs and place in those jobs staff members who desire challenge, achievement and meaningful work.
- Set challenging yet achievable goals with specific deadlines (i.e. measurable success).
- Reward desired performance and behavior by applying intrinsic and extrinsic rewards.
- Recognize that MIS prosionals constantly evaluate



BART GOLDMAN

• **Hiring eagles is only half the battle**

• **Maintenance vs. motivation**

• **High achievers need to be stretched**

Zawacki is a professor of management and organizational behavior at the University of Colorado in Colorado Springs.

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managers' fairness.

- Apply a contingency approach to leadership. This means applying the appropriate management style to each performance-satisfaction variable: job performance, skill variety, task identity and significance, autonomy and feedback.

These variables are key to retaining motivated and productive DP professionals. The list does not explain all behavior of DP professionals but gives the MIS manager a checklist for maximizing individuals' productivity while minimizing the time he spends.

More than 50% of a DP professional's motivation and productivity stems from the matchup between the person and the job. A two-by-two matrix describes all the possible matchups in a DP organization (see chart at right). In general, the scope of the job — measured by its motivating potential score (MPS) — needs to match the staff member's need for achievement — measured by his or her growth-need strength (GNS).

Job scope ranges from high to moderate to low. Systems development is an example of a high-scope job; maintenance is a moderate-scope job; a computer operator position is a lower scope job. DP professionals perceive a job as high in challenge — high scope — if it brings a high degree of the following dimensions to the job:

Skill variety. The degree to which the job requires a variety of different activities, which in turn involve the use of a number of different skills and talents.

Task identity. The degree to which the job allows the completion of a whole and identifiable piece of work with a clearly visible outcome.

Task significance. The degree to which the job substantially affects the lives or work of other personnel — whether in the immediate MIS organization or in the external environment.

Autonomy. The amount of freedom, independence and discretion employees have in scheduling their work and in determining the procedures to be used. Goals are set, and employees are given latitude.

Feedback from the job. Specifically, the amount of information received about the worker's effectiveness.

Job fit matrix

Most of a DP professional's motivation and productivity stems from the matchup of personal needs and job scope

CW CHART: AMY J. SWANSON

Best predictor

Once the scope of the job is defined, an MIS manager should attempt to determine the matchup of the person with the job. I have found that the best predictor of job performance is an individual's need for achievement. An MIS manager cannot match every worker with the best possible job; however, he can make a real effort to reduce the number of mismatches in Cells 2 and 3 (see chart), in which a high achiever is matched with a low-scope job. High achievers — those with high GNS — express a driving need to grow, to move beyond where they are, to be constantly stimulated, to be stretched and to receive feedback and recognition.

A manager should examine the matchup throughout the interview process as well as during job rotation, when he is changing the scope of the job and when he is setting goals.

Once managers have matched people and jobs to the best of their abilities, they need to examine their own goal-setting behavior. High achievers desire autonomy; however, that autonomy must not be seen as a kind of "do your best" or laissez-faire management.

A manager can change the individual contributor's perception of the job by increasing autonomy and feedback. The degree of autonomy you permit must be based on each contributor's experience, skill and maturity. The secret is to stretch your high achievers to their fullest potential.

Challenging goals

DP professionals desire goals that are challenging yet realistic and achievable in a reasonable time frame. If the goal is set too low, they will not experience job satisfaction. If the goal is too hard or too far in the future, they become frustrated.

Goals for high achievers can be established by the MIS manager or in a joint management-by-objectives manner. Either method will produce results, but if the MIS manager has the time,

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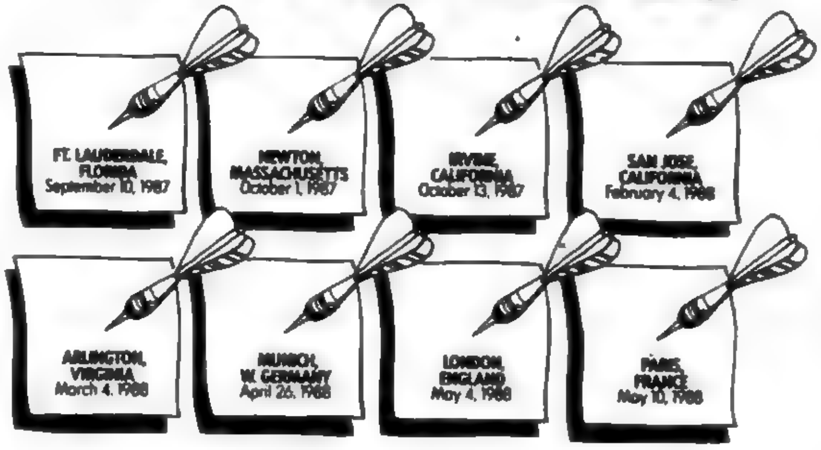
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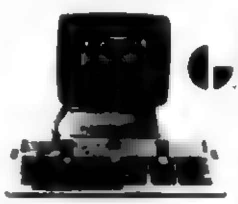

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joint goal setting will increase the quality of the goal and inspire more commitment to it.

The MIS organization at Travelers Insurance Co. recognizes the importance of goals in its training program. Frank Collins, second vice-president, and Sandra Ginnis, manager of training and development, require their managers who attend management courses to complete a "goal form," which defines training goals, the person responsible for taking action and the resources required to reach the goals.

Collins and Ginnis say that the primary shortcoming of most management training is that managers attend training sessions, approve the content and rate the courses as "good" or even "excellent" but then go back to the DP shop and soon return to old management methods. To institutionalize their MIS management course, Collins and Ginnis require all attendees to complete the goal form and discuss their stated goals with their managers within two weeks of completing a course.

Model of an effective manager

MIS managers and systems personnel rated these traits highest in their view of an ideal manager

Competency	Priority Low 1	 2	 Medium 3	 4	 5	 6	 High 7
1. Technical skills				●			
2. Feedback skills							
a. Feedback on goals							●
b. General feedback							●
3. Matching people and jobs							●
4. Sets goals and then gives autonomy							●
5. Gives staff a sense of involvement						●	
6. An effective listener and counselor						●	
7. Provides for career development						●	
8. Lets people in on the "big picture"						●	
9. Provides an effective role model					●		
10. Develops team work					●		
11. Relates rewards to performance							●
12. Is perceived as getting a "fair share" of total budget and rewards						●	
13. Is perceived as effective in working at internal and external pay equity							●
14. Negotiation and consulting skills							
a. Customers/users					●		
b. Peers and subordinates					●		

CW CHART

Management commitment

Another MIS department that rewards desired behavior is that of Prudential Property and Casualty Insurance Co. After Prudential managers attended a course on motivating computer personnel, J. Kenneth Golder and William R. Graff, both vice-presidents of MIS, met with the senior management team and the instructor to review the course content and translate it into specific action plans. They thereby demonstrated to their organization top management's commitment to ongoing training and growth.

The more programmers or systems analysts can relate rewards to desired behavior, the higher the probability that they will repeat that behavior. An MIS manager should define desired behavior and performance levels and then attempt to give rewards to high performers.

This may sound good in theory; however, my experience is that some managers want to be warm, friendly helpers and do a fair job of setting goals and deadlines, but when it comes to merit-increase time, they tend to give most or all employees equal rewards. These managers do not want to look an employee in the eye and tell him his performance is below average. But most of the time, their efforts to be evenhanded and to please everyone backfires: Each staff member perceives his reward as inequitable.

Reward checklist

The two-factor theory of intrinsic and extrinsic rewards conceived by Fred Herzberg (one of the original researchers on motivation theory in industry) still provides the best checklist for MIS managers looking to motivate their employees and reward

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them appropriately:

Maintenance factors are the extrinsic rewards, those that come from sources outside the individual. They include the following:

— Company policies and administration.
— Work conditions.
— Supervision.
— Job security.
— Pay and benefits.

Motivation factors are the intrinsic rewards; that is, those that gratify the individual from within. They include the following:

— Achievement.
— Recognition.
— Advancement of growth.
— Responsibility.
— The work itself.

Herzberg never says not to provide the maintenance factors. Firms must provide maintenance factors to the degree necessary to attract and keep eagles. Maintenance factors may be only the foundation on which to build, but it does not do any good to talk about meaningful work if the foundation is crumbling. However, in most MIS organizations, the foundation is very solid, and MIS managers can concentrate on providing staff members with recognition, opportunity for advancement and achievement. Remember, 50% to 60% of an MIS professional's performance is a result of the job's matchup with the person and its intrinsic motivation.

Eagles believe in fairness

After matching people (GNS) and jobs (MPS), setting goals and deadlines and allocating rewards, MIS managers can turn their attention to another matter: fairness. Realize first that individual staff members constantly evaluate the fairness or equity of their boss.

The research of behavior scientists indicates that workers bring input to their jobs and expect certain outcomes. Input includes experience, education, skill, aptitude, effort and commitment. Outcomes include working conditions, pay, benefits, recognition, opportunity for growth, achievement and autonomy.

Individual contributors believe the MIS manager and organization are fair if this ratio is approximately 1-to-1. If the employees' perception of this ratio is not 1-to-1, they will experience what psychologists call "cognitive dissonance" — a state of being mentally uncomfortable — and they will try to compensate. They may first seek greater challenge, recognition or reward to fit what they feel they bring to the job. If these are denied, they may adjust — that is, lower — their productivity to achieve a perceived balance, or they may resign if they believe there will be no improvement in the near future.

MIS personnel evaluate their manager's fairness subjectively by looking at the following variables:

- Latitude — the amount of autonomy the employee has.
- Pay and benefits relative to co-workers.
- Pay and benefits relative to other MIS organizations.
- Raises and promotions.
- Pace of work activity. They expect to work long hours, but they also expect management to recognize their efforts.
- Distribution of high-visibility jobs.

Five of these six variables are under direct control of the manager. The only uncontrollable factor is fairness of pay relative to other organizations. Thus, managers should encourage the personnel department to offer current comparative pay studies for people to review.

From my research with and consulting in MIS organizations, I developed a checklist of the competencies of an effective MIS manager. To validate it, I asked Tom Streett and Dick Benashski of the Hartford Insurance Group to head a team of 14 MIS managers who brainstormed the competencies of an effective MIS manager. Their list had a 90% correlation with my research and consulting. I further validated the list by asking systems personnel to comment on the behaviors of an effective manager — for example, what they want an "ideal manager" to do (see chart page 56).

This competency model shows that effective managers can possess an average level of technical skills but are expected to be above average in human (interpersonal) and management skills. Yet because most managers are promoted to management on the strength of their technical skills, something in the back of their minds is still saying, "I must stay current in the technology."

In addition, it turns out that keeping current on technological developments is what meets their high need for challenge. Performing management tasks does not meet this basic need for most technical managers because many organizations do not adequately reward good management behavior. If a corporation wants to keep MIS eagles who are motivated and productive, then senior-level management must recognise and reward the competent MIS managers. ●

SOME MANAGERS want to be warm, friendly helpers and do a fair job of setting goals and deadlines, but when it comes to merit increase time, they tend to give most or all employees the same rewards.

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David Ludlum

1706: Unite and move on

"Some of its noisiest authorities insisted on its being received, for good or for evil, in the superlative degree of comparison only."

So Charles Dickens characterized the period leading up to the French Revolution in *A Tale of Two Cities*, noting that the description also applied to his own time 80 years later.

It seems true today, too, at least concerning some of the supporters and opponents of Section 1706 of the Tax Reform Act of 1986.

Section 1706 has required many former free-lance and independent computer programmers, analysts and consultants to forfeit their independent status for federal tax purposes and be classified as employees of firms that had brokered their services.

The law has aroused an outcry from many of those independents. They suggest the legislature was prompted by anticompetitive aggression on the part of computer services firms that already work through employees and by discriminatory federal revenue raisers insensitive to the nation's need for a flexible technical work force.

Now, apparently for the first time, one party in this contro-

Continued on page 65

Rockart exhorts line to lead

Calls for MIS to play supporting role in 'Wired Society'

John F. Rockart, director of MIT's Center for Information Systems Research and author of the Critical Success Factors strategic planning method, now outspokenly advocates line managers assuming leadership of the development of information systems. Rockart kicked off the center's latest week-long summer session with an address entitled, "The Emerging Partnership Between MIS and Line Management." He recently discussed the evolution of the need for line leadership with *Computerworld* Senior Editor David Ludlum, when he noted that he generally delivers the same address under the title, "The Line Takes the Leadership."

When did you develop the notion of the partnership, and what brought that about?

I think the partnership is certainly not something I developed. That idea has been kicking around for the last few years as an expression of a need for the line's heavy involvement in the development of systems.

The phrase that is perhaps attributable to this place is the need for the line to take the leadership. That's a notion that came out of talks with several of the sponsors of this center. One most particularly, Dudley Cooke of Sun Co., has been telling his management for the last several years that he can install the equipment, but the real payoff comes from changing their organization, changing the way people are doing their jobs and making the changes only the line management can make.

I tend to take it one step further. It seems to me that no matter how good the information systems people are these days, they cannot understand fully what the strategy of a particular manager is — [not] enough to really design the key systems. In short, line management has got to understand enough about the technology to envision its use in their strategy.

MIT's John B. Rockart

What types of changes are necessary to make these systems pay off?

There is a need to change the organization; often the organization's structure, sometimes people, sometimes the way a job itself is performed and, quite often, some of the other systems — such as the accounting system or the reward system — which surround the information technology use.

Is the need for line leadership a response to a changing technological environment?

Yes, it is.

It sounds, to some extent, like this is something that should have been going on all along.

Not really. I divide the information technology world into four eras. The first era, we put in accounting systems. Information technology people could do all of that. The conceptualization was not difficult. Payrolls looked very much like one another.

As we got into the second era, however, which I call the operations era — the era of on-line technology as opposed to batch technology — we started dealing with systems in order entry and manufacturing control. And MIS, after trying to do it exactly the same way, realized they couldn't. One manufacturing control system didn't look exactly like another, and therefore we came up with the term "involvement." The line had to be involved.

In the third era, we moved to fourth-generation languages, personal computers — end-user technology — and here, some members of the line took the ball into their own hands. They said, "The hell with MIS; I'm doing my own thing with my PC." Slowly but surely, however, they learned that there needed to be a partnership. MIS had much of the data and had to supply that data. In addition, the PCs had to connect to the mainframes, and therefore the network was important. Slowly but surely, a partnership has been worked out where MIS sets standards and network configuration.

The fourth era's technology is totally different. On the surface, it looks the same. We're dealing with PCs and maxis and minis. We're working with some of the old applications for order entry and manufacturing control. The big ingredient, however, is communication technology. The technologies today allow for integration among companies and among functional organizations within a compa-

Continued on page 64

Anxieties stymie mergers

BY ADAM STONE
CW STAFF

Merged banks are finding that consolidating their technical facilities often turns out to be neither as easy nor as profitable as they expected, according to a recent study.

Cost reductions in data processing, systems development and maintenance are an important reason why banks merge, but when incompatible MIS cultures and operating philosophies get thrown together, problems will inevitably arise in the transitional process, according to a study conducted recently by The Diebold Group, Inc. in New York.

In general, mergers breed anxiety on the part of personnel who face uncertainty and possible layoffs, which tends to reduce productivity during the transitional period, the study found. Therefore, the report suggests, a rapid transition is essential for successful consolidation.

"Until you decide what you're going to do, you have a very unsettled period," said Mark Klein, vice-president at Diebold. "The longer you postpone the decision, the more difficult it's eventually going to be to do it."

Whether two banks should consolidate their existing systems or eliminate one of them should depend primarily on the banks' products and the goals of their merger, according to Klein. "People are more willing to work that way — when they believe that what's being done is

Continued on page 60

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Anxieties

FROM PAGE 59

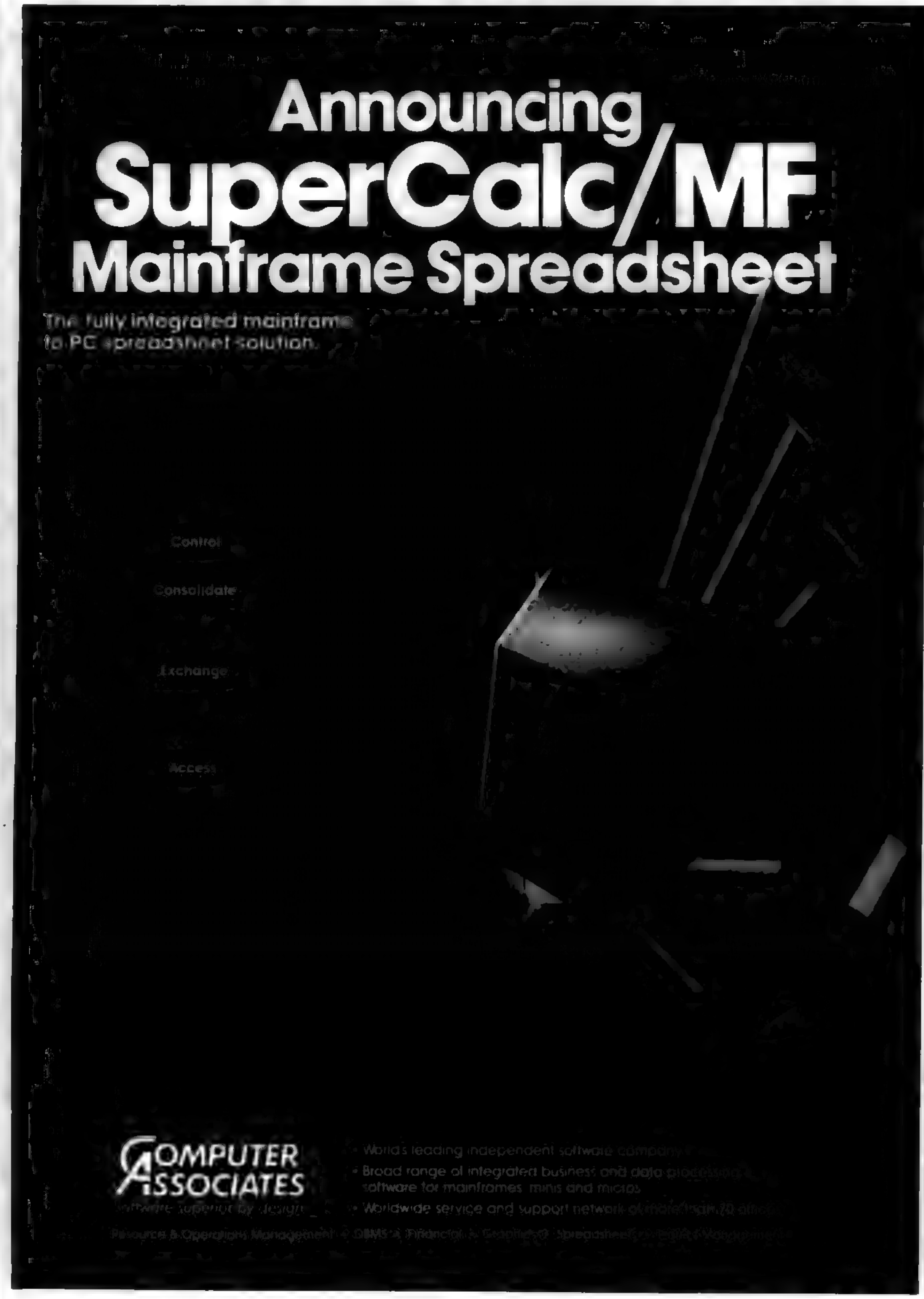
what's best for the business and not just politically motivated," he said.

According to the Diebold study, there are three key ways in which banks' efforts to consolidate operational systems and DP resources can go amiss:

- Often, the senior bank will impose its technology and philosophy on the junior bank. Klein called this "technological imperialism." What the senior bank often fails to recognize is that while it is genuinely superior in some areas, its MIS facilities may be inappropriate for achieving greater aims, Klein said.
- Sometimes, two banks of equal power both believe their way is best, which creates a win-lose atmosphere rather than aiding in working toward their mutual benefit.
- Managers will sometimes effect departmental reductions and staff eliminations that are not the most cost-effective or productive in order to avoid making more difficult choices or out of loyalty to long-standing personnel.

To consolidate their information systems, banks should assess their respective situations, base decisions on an objective analysis of benefits and learn from previous mergers, according to the Diebold study.

A recent seller's market in bank acquisitions has driven up the prices of banks and put pressure on buyers to recoup expenses, the study found.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CALENDAR

AUG. 2-8

Recognition Technologies Users Association Annual Forum: Remittance and Document Processing. San Francisco, Aug. 2-5 — Contact: Recognition Technologies Users Association, P.O. Box 2016, Manchester Center, Vt. 05255.

25th Annual Conference of the Urban and Regional Information Systems Association. Fort Lauderdale, Fla., Aug. 2-6 — Contact: URISA, 319 C St. S.E., Washington, D.C. 20003.

Resource Access Control Facility Users Conference. Anaheim, Calif., Aug. 3-7 — Contact: Vanguard Integrity Professionals, Suite 109, 1720 E. Garry St., Santa Ana, Calif. 92705.

Symposium on the Simulation of Computer Networks. Colorado Springs, Aug. 4-7 — Contact: Computer Science Department, University of Colorado, Colorado Springs, Colo. 80933.

Desktop Productivity Conference. Boston, Aug. 5-7 — Contact: The Seybold Group, Inc., Suite 100, 100 Homeland Court, San Jose, Calif. 95112.

Extending the Human Mind: Computers in Education. Eugene, Ore., Aug. 6-9 — Contact: University of Oregon Continuation Center, 1553 Moss St., Eugene, Ore. 97403.

AUG. 9-15

Spocade III CAD/CAM Conference. Coeur d'Alene, Idaho, Aug. 9-11 — Contact: Spocad, E. 502 Boone Ave., Spokane, Wash. 99258.

RDB Frontiers '87. Boston, Aug. 10-14 — Contact: The Relational Institute, Suite 106, 6489 Camden Ave., San Jose, Calif. 95120.

Macworld Expo/Boston. Boston, Aug. 11-13 — Contact: World Expositions, Mitch Hall Associates, P.O. Box 860, Westwood, Mass. 02090.

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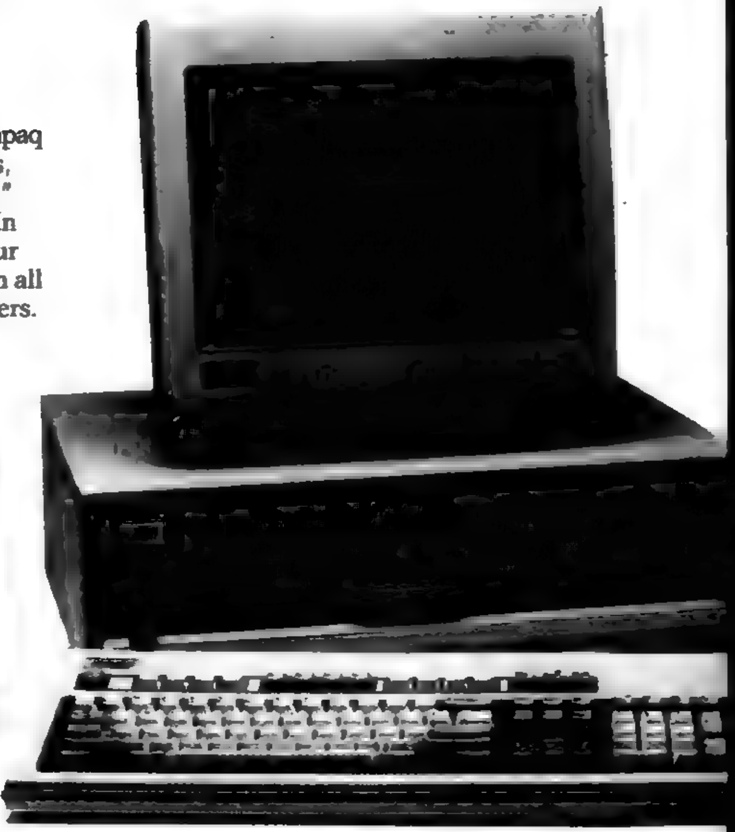

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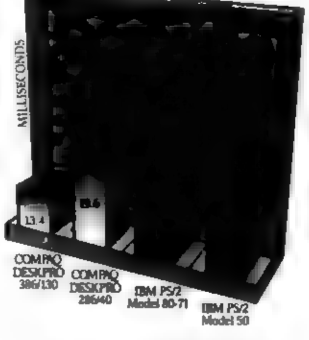

COMPAQ fixed disk drives can access data up to 2½ times faster than PS/2 drives.

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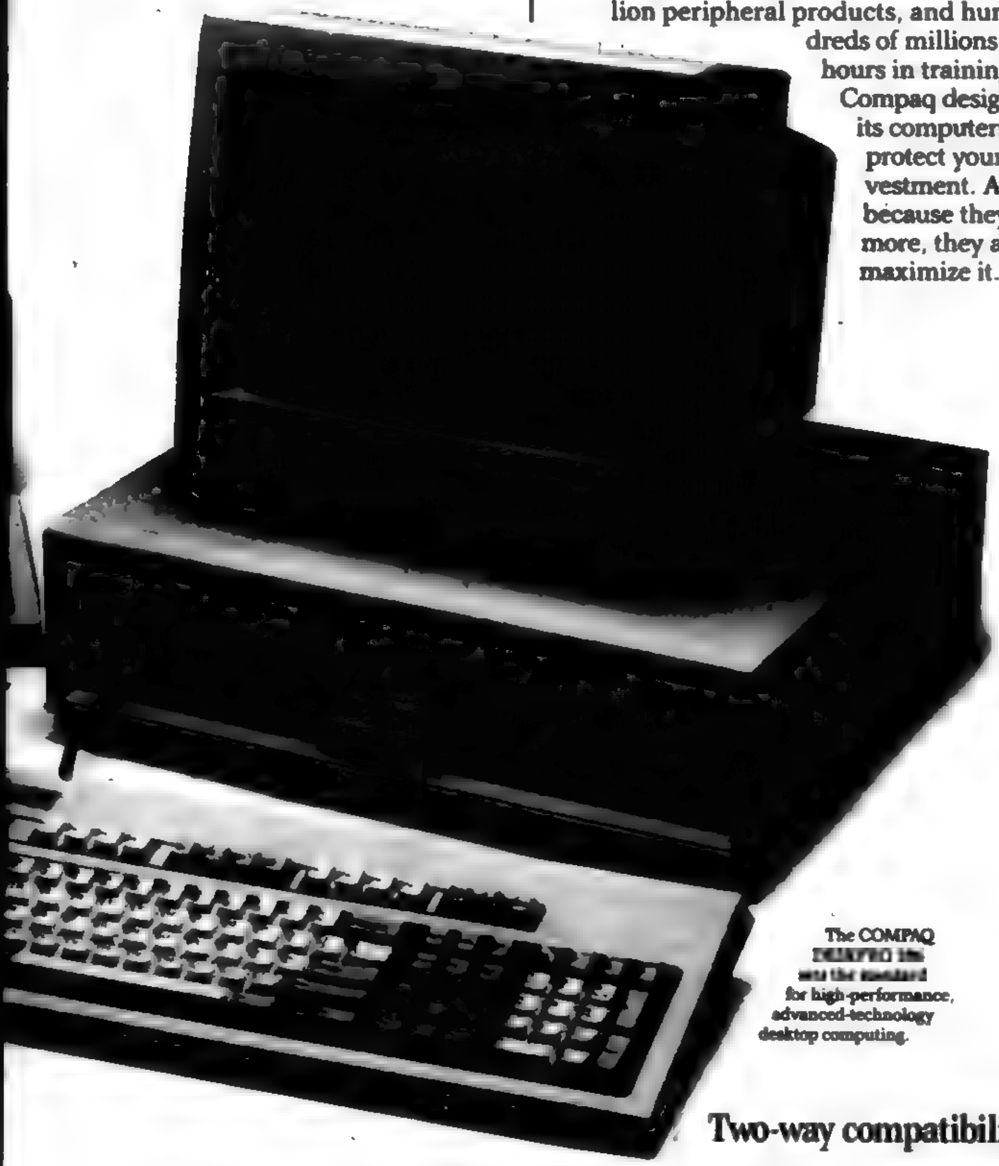
works better.



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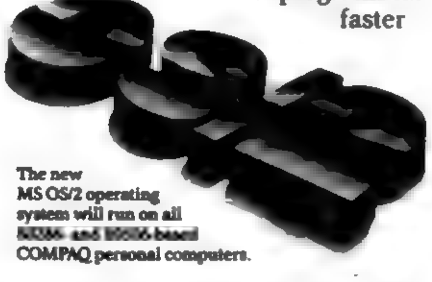

The new MS OS/2 operating system will run on all 80286- and 80386-based COMPAQ personal computers.

than other computers. All the popular programs, including Lotus® 1-2-3®, dBASE III PLUS®, Microsoft® Word, Symphony®, and Paradox®, to name just a few. Without modification.

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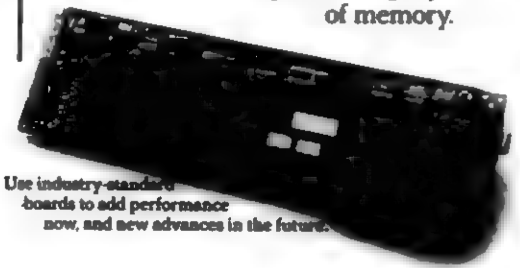

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BOOK REVIEWS

Grove offers management to the masses

One-on-One with Andy Grove: How to Manage Your Boss, Yourself and Your Coworkers
By Andrew S. Grove

Managers looking for a methodical recipe for success or a theoretical discussion of employment policies should not read this book. In *One-on One*, Andy Grove, president of Intel Corp., calls upon more than 20 years of management experience to offer quick-witted, brief responses to a potpourri of queries from bosses as well as employees.

Grove's bold style and reliance on straightforward answers challenge the lofty, more distant tone of many of the management books on the market. *One-on-One* gives the reader the feeling that he is sitting across from Grove in the company cafeteria, receiving blunt advice on office conflicts from an understanding friend.

Though Grove heads Intel, the advice he gives and the questions he addresses apply to any work environment, technical or nontechnical, and deal with problems of management and communication rather than the content of the work.

Organized in 20 short chapters, the book is a collection of advice columns from Grove's role as the "Dear Abby of the workplace" for the Knight-Ridder, Inc. newspaper syndicate. After an introduction detailing his own work experience, Grove leads each section of each chapter with general comments.

From the first chapter — entitled, "I Hate My Boss" — to the last, in which Grove advises, "Be Leery of Fads and Stereotypes," the Intel executive concentrates on clarity and honesty in dealing with management issues.

One-on-One can best be summed up with the five key principles Grove states at the end of the book: Enjoy your work, be dedicated to its substance, respect the work of others, be straight with everyone and "always, when stumped, stop and *think* your way through to *your own* answers."

Hardcover, $18.95, 235 pages, ISBN 0-399-13250-3, by G. P. Putnam's Sons, New York, N.Y.

MICHAEL SULLIVAN-TRAINOR

BOOKS IN BRIEF

The Electronic Mailbox
By Ira Meyer

An overview of electronic mail options geared to the small or medium-size organization.

Paperback, $16.95, 198 pages, ISBN 0471-62576-0, by John Wiley & Sons, Inc., New York, N.Y.

Data Communications and Distributed Networks
By Uyless Black

A solid introduction to data communications systems and networks presented without communications jargon.

Hardcover, $37, 468 pages, ISBN 0-8359-1341-4, by Prentice-Hall, Inc., Englewood Cliffs, N.J.

Advanced CICS Design Techniques, Concepts and Guidelines
By Joseph Summerville

How developing innovative designs grows from an understanding of basic CICS, including temporary storage, transient data and automatic task initiation.

Paperback, $27.95, 258 pcges, ISBN 0-442-28213-3, by Van Nostrad Reinhold, New York, N.Y.

SNA: IBM's Networking Solution
By James Martin

SNA explained — the concepts, protocols, functions and capabilities.

Hardcover, $48, 380 pages, ISBN 0-13-815143-1, by Prentice-Hall, Inc., Englewood Cliffs, N.J.

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Rockart

CONTINUED FROM PAGE 59

ny. Those integration processes require the breaking down of organizational boundaries. And those are applications of what I call the fourth era, or the Wired Society; ones which are not simple to implement, require transforming of the way we do business, transforming of the organization structure and, therefore, require line leadership.

What should firms do to establish more effective line leadership?

The issue for the head of information technology is to educate the line to its leadership responsibility.

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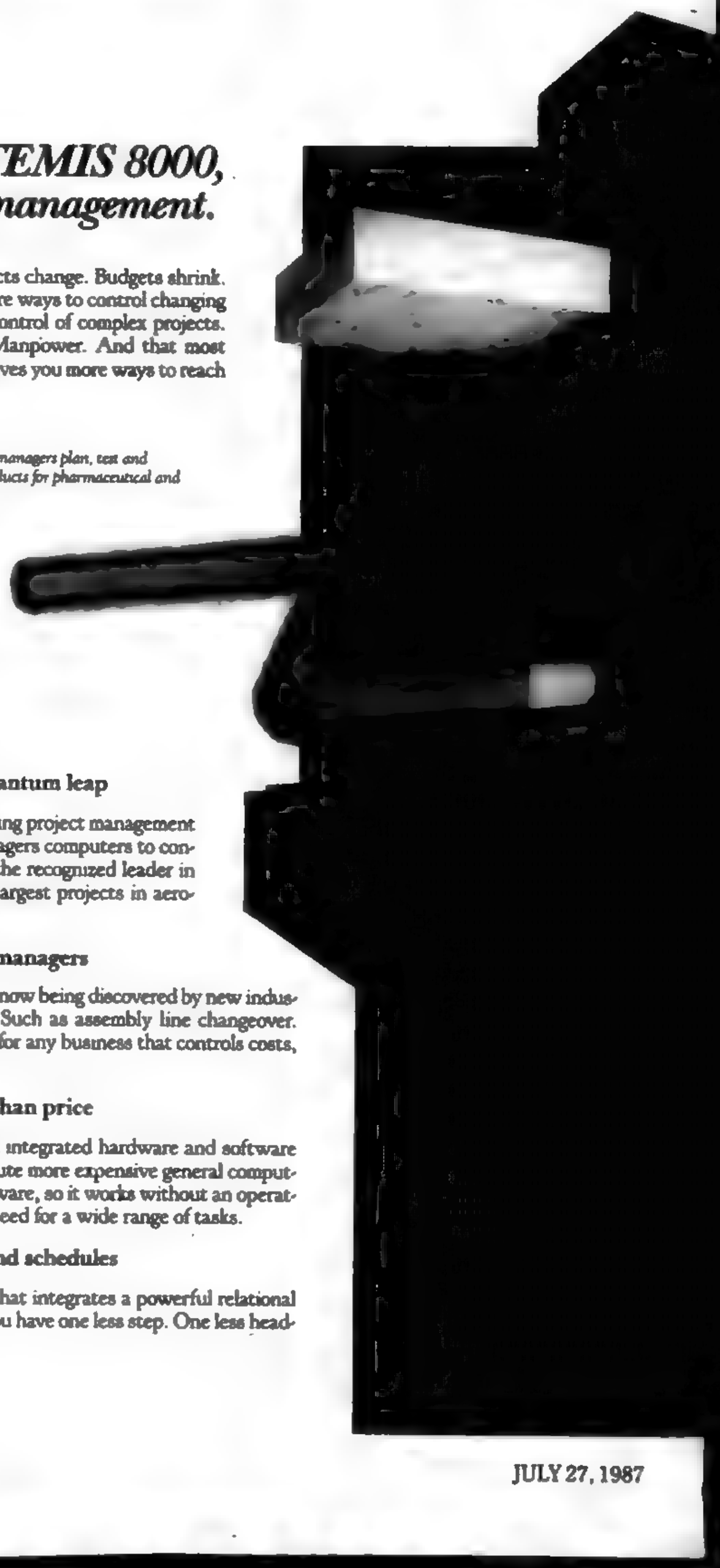


1706

CONTINUED FROM PAGE 59

versy has suggested that those on both sides get together and resolve their differences face to face. More on this in a moment. First, a bit of perspective.

With Section 1706, Congress has singled out computer professionals and other technical specialists, but only to reinstate for that group the common-law standards that the Internal Revenue Service traditionally has used to determine whether someone is an employee or an independent contractor.

The chief reason is that computer professionals have flooded the "safe harbors" that Congress lazily approved in 1978 to provide what was supposed to be a temporary removal of the common-law standards. The approval of Section 1706 was thus consistent with the widespread congressional moves against tax avoidance enacted through last year's sweeping tax reform.

Getting a perspective on Section 1706 requires looking back to the legislation that it amends and to the confusion that spawned that earlier law.

The roots of the current controversy lie in complaints voiced in the late 1970s about the IRS's inconsistent enforcement of the common-law standards for determining who is an employee and who is an independent contractor for the purposes of federal taxation.

Those complaints led Congress to pass what was intended to be a temporary, stopgap safe-harbor measure that essentially gave the benefit of the doubt in many controversies over employee status to those who wanted to file tax returns as independent contractors. That was Section 530 of the Revenue Act of 1978.

Section 530 only addressed the year 1979. It said an organization did not have to treat a person as an employee for tax purposes that year as long as it consistently did so and had a reasonable basis for doing so. A reasonable basis could be a "long-standing, recognized practice of a significant segment of the industry in which such individual was engaged."

That allowance for a long-standing practice threw the door wide open to DP professionals and consultants seeking independent status; those in most occupations lacked such a widespread tradition of independent contracting.

But there was a catch. These provisions did not apply to individuals if, for tax purposes, the organization in question treated anyone else with a similar position as an employee in 1978 or 1979.

Congress suggested it would provide a clearer and more permanent definition of independent status when it included in Section 530 a provision barring the IRS from issuing rulings on the matter before Congress enacted a subsequent law that clarified the situation.

Taken into the safe harbor

But Congress extended Section 530 indefinitely. In the meantime, hordes of computer professionals have taken advantage of the safe harbor. Proponents of Section 1706 — those arguing on behalf of the Department of the Treasury's coffers and those arguing for technical-service firms — claim that many computer professionals overstepped the bounds of the safe harbor and caused their would-be employers to do so by violating the provision requiring that the organizations treat similar positions the same way.

In addition to cutting into the take of the federal treasury, this practice piled a growing liability on the bulk of technical service firms that turned a blind eye to violations of this consistency clause. Should they be audited, these firms could be held liable for taxes that they should have been withholding, and their clients could be held liable for some of the money if the firms couldn't come up with it.

In a nutshell, Congress opened a safe harbor for likely independent contractors in 1978, a conspicuous number of computer professionals sought refuge in the harbor, and now, Congress has decided to reimpose its traditional common-law standards on those professionals.

Several bills to delay or repeal Section 1706 have been introduced to congressional committees, and scores of lawmakers can tell concerned constituents that they have signed on as co-sponsors. But these measures have gone nowhere fast in a Congress considering new taxes at a time when its budget office predicts the federal deficit may grow in 1988 and 1989.

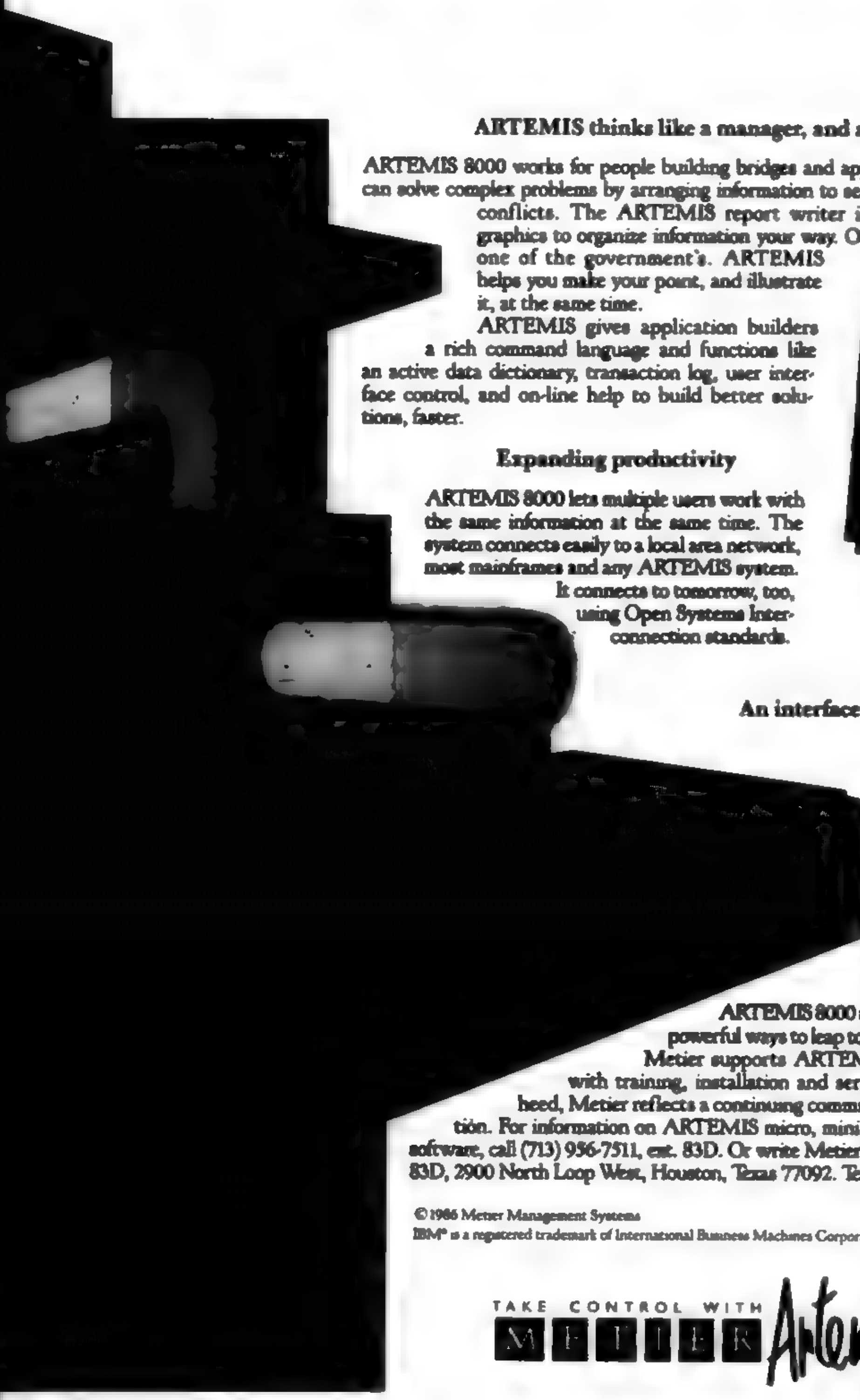
Amid this stalemate, one admitted supporter of Section 1706 has called for both sides of the controversy to get together and devise a compromise so that the industry can move ahead.

That proposal was voiced during a visit to *Computerworld* by Joel Brust, founder and recently retired president of Amtec Systems Corp. in Los Angeles, a subsidiary of the Computer Task Group, Inc. in Buffalo, N.Y. Amtec has provided technical services through both employed and contract professionals.

Brust says that current independent computer professionals who don't come close to meeting the common-law standards governing employee status should accept reclassification as employees. Meanwhile, proponents and opponents of Section 1706 should get together to resolve any gray areas arising from Section 1706 or from the common-law standards and to address any legitimate concerns regarding employee status that are peculiar to the computer and data processing industries.

Ludlum is *Computerworld's* senior editor, management.

to conclusions



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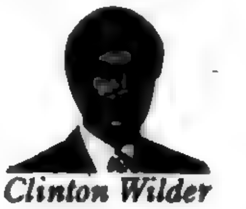


Clinton Wilder

Toshiba ban no solution

The formulation of U.S. high-tech trade policy is always a tricky business.

In attempting to protect and further U.S. economic interests, Congress and the administration must first agree on what those interests are. Then they must seek a delicate balance among diverse industry groups in a complicated world of international joint ventures, transcontinental OEM agreements and offshore product sourcing.

Even under the best circumstances, that goal is elusive. But when the process becomes overrun by protectionist fervor and a national security hysteria that must be making Ollie North proud, attainment of the objective is completely hopeless.

The current Toshiba Corp. submarine-technology affair [CW, July 6] represents the worst excesses of economic decisions being made for political reasons.

In attempting to mete out the proper punishment for Toshiba Machine Co.'s egregious offense of selling sensitive defense technology to the Soviet Union, Congress has thrown all concern for U.S. computer vendors — and users — to the wind.

'Japan-bashing'

Some members of Congress have even tried to make political hay by taking sledgehammers to Toshiba electronic products in front of television cameras, giving a whole new meaning to the term "Japan-bashing."

In the vitriolic "let's teach these guys a lesson" atmosphere that spawns such outbursts, making rational trade decisions is clearly impossible.

Computer industry spokesmen and trade groups have been given their say before Congress [CW, July 20], but there is little evidence to suggest that they will have much impact.

Obviously, some punitive action must be taken. And a strong U.S. push for stricter enforcement procedures by the Coordi-

Continued on page 74

More report quarterly upswing

Wang raises eyebrows with strong results; beat goes on for Amdahl, Apollo

BY ADAM STONE
CW STAFF

Most computer systems vendors continued to report strong second-quarter financial results last week, sparking renewed optimism that the industry has left its downturn days behind.

While Amdahl Corp., Apollo Computer, Inc., Prime Computer, Inc. and Software Publishing Corp. continued their current recoveries, Wang Laboratories, Inc. surprised the industry with its most profitable quarter in 2½ years. But some vendors, including Stratus Computer, Inc. and Electronic Data Systems Corp. (EDS), reported earnings increases far lower than their accustomed growth rates.

Just the facts

For complete earnings chart, see page 75.

In addition, significantly lower profits at Maxtor Corp. and Tandon Corp. demonstrated the current upheaval in the microcomputer peripherals industry.

Wang. The Lowell, Mass.-based minicomputer and office systems maker exceeded industry expectations with a $32 million profit, raising hopes that it can sustain a long-awaited recovery.

For its fourth fiscal quarter ended June 30, Wang reported revenue of $824 million, up 15% from the $716.8 million reported in the like quarter of 1986. Profits grew to $32 million, or 20 cents per share, up dramatically from the $800,000, or 1 cent per share, earnings report-

Continued on page 73

Intel keeps 80386 in the family

BY JAMES A. MARTIN
CW STAFF

SANTA CLARA, Calif. — After two years spent in the semiconductor industry doldrums, Intel Corp. has hit the jackpot with the 80386 microprocessor. But unlike in the heyday of earlier microprocessor generations, Intel is jealously guarding its new treasure.

Foundry relationships, or second-source agreements, are not in the plans for the 386, as they were for the firm's preceding 8088, 8086 and 80286. Intel said it intends to be the sole source of the technology with a total of four 386-dedicated manufacturing sites, the latest of which is a 600,000-sq-ft plant in New Mexico. Intel also recently said it will terminate a 1982 technology exchange agreement with Advanced Micro Devices, Inc. (AMD), in which AMD would second-source the 386.

"Why should the queen give away her jewels?" said Jack Beedle, president of In-Stat, Inc., a semiconductor research concern in Scottsdale, Ariz. "In the past, you second-sourced a product and, although you received royalties on it, you also had a lot of competition. The 386 is so critical to Intel, so why give it away?"

National Semiconductor Corp. and Motorola, Inc. have also followed that logic, refusing to second-source their 32-bit microprocessors.

Continued on page 68

CUSTOM-CHIP FORECAST

ASICs: An industry savior?

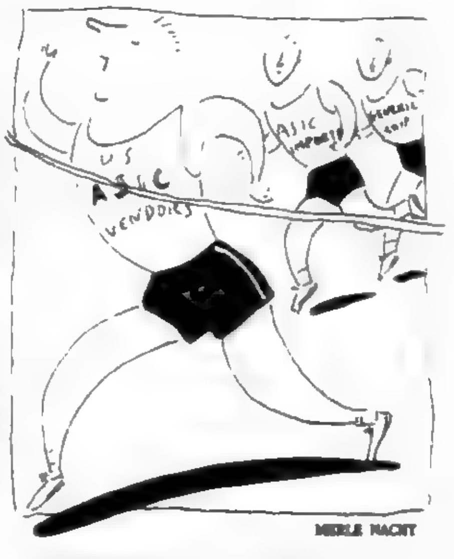
BY LAWRENCE STEVENS
SPECIAL TO CW

The U.S. semiconductor industry suffered the worst slump in its history in 1985 and part of 1986. But sales this year are expected to jump by 20%, according to market research firm Dataquest, Inc. Credit for this short-term recovery, industry observers say, must go in part to application-specific integrated circuits (ASIC), or custom chips.

At Motorola, Inc., for example, while the rest of the chip industry was floundering, ASIC production continued to grow. One reason, claims John Carey, merchandising manager for ASIC design, is that the ASIC market is less susceptible to business cycles.

"ASICs are produced for one particular

Continued on page 72



MERLE NACHT

Sevin helps Proteon at crossroads

BY PATRICIA KEEFE
CW STAFF

WESTBORO, Mass. — Following the loss of several key executives and the foundering of its marketing plan, Proteon, Inc. recently named prominent venture capital investor L. J. Sevin to the position of acting president.

"My role is to get the company pumped," said Sevin, a principal of Sevin-Rosen Management in Dallas. Sevin has temporarily relocated to Massachusetts while he works with Proteon, a manufacturer of token-ring technology.

Sevin stressed that he is very committed to privately held Proteon, which he said is experiencing healthy sales. He will assist in recruiting a new president and vice-presidents of marketing and sales and will direct strategic planning. He said it is not unusual for an investor to step in like this.

Proteon has experienced some attrition at the management and sales levels in recent months. Although Sevin denied the company has management problems, he did say some personnel had left "by mutual consent." He said he expects to hire a president by October and to ease out of the day-to-day operations by November.

Asked whether he will be redirecting Proteon's product strategy, Sevin said it is not necessary. "The industry is turning to the token ring, and the world is heading this way," he said.

L. J. Sevin

Sevin's appointment comes at a critical point in Proteon's history, according to John McCarthy of Forrester Research, Inc. in Cambridge, Mass. "They have had a heritage as a laboratory development house and now face the classic problem of how to turn that into a mainstream market focus," McCarthy said. "Their product line is confused — they have a commodity token-ring product at the low end and proprietary technology at the high end."

At the high end, Proteon recently revamped its Pronet-10 10M bit/sec. local-area network with the introduction of network management and IBM Micro Channel-compatible adapter cards. And a Proteon reseller said that the company plans to migrate its Pronet-80 80M bit/sec. token-ring network to a 100M bit/sec. version.

Beyond that, Sevin and Chair-

Continued on page 74

Intel

FROM PAGE 67

The success of the 80386 chip has once again made Intel a vital chip manufacturer. Intel has spent more than $100 million in the 386's four-year development effort, has shipped some 65,000 units in 1986 and expects to ship between 500,000 and one million this year, according to Dana Krelle, Intel's 80386 marketing manager.

The 386 is already considered the newest standard in microprocessors and is emerging as the foundation of choice for high-end microcomputers, minicomputers and workstations.

But Intel's sole-source 386 philosophy may be a double-edged sword. Krelle acknowledged that Intel will be "delinquent" in 386 deliveries for the rest of the year but predicted that the firm will meet demand in 1988.

Demand exceeding supply

"Demand is far exceeding supply because a lot of OEMs saw how successful Compaq Computer Corp. has been with its 386 machine," Krelle said. "We're putting on additional manufacturing capacity as fast as we can, but we can't turn on a dime."

In addition, Intel has reportedly been receiving cancellations on several products, including the 286, according to Michael Murphy, publisher of the "California Technology Stock Letter."

Because there are not enough 386 chips to meet current demand, an unexpected number of orders for Intel's related chips, such as math coprocessors and dynamic random-access memory chips, have been canceled in the past few months, Murphy said.

Krelle, however, disputed Murphy's assertion. "We're seeing record demands for the 286. We're shipping more than $1 million per quarter, which is more than double what we were shipping last year. There has been no decline in 386-related orders."

Murphy pointed to the Semiconductor Industry Association's recent book-to-bill ratios for June as evidence that orders have dropped.

The association reported that shipments, or billings, were 18.2% higher than the previous month, but average monthly orders for the three-month period ending in June were down 4.2%, a figure that Murphy said was unusual for the last month of a summer quarter and can be attributed largely to Intel cancellations.

Forging inroads

But Intel is making strong inroads in diversification beyond the 386, analysts said. The firm recently unveiled a series of real-time operating systems and related products for the 386 environment, expanding that chip's presence beyond microcomputers and workstations. The 82786 graphics coprocessor recently received several enhancements aimed at increasing design flexibility and speed.

In addition, the 8087 math coprocessor "should give Intel a good profit margin because it doesn't have that much competition," said Howard Dicken of DM Data, Inc., a Scottsdale research firm.

Intel is "making a real concerted move to get into the systems business," said Kimball Brown, an analyst with Dataquest, Inc. in San Jose, Calif. "They've been successful in selling to technical customers, and now they're working on selling systems directly to users."

Intel already has its eye on the future. The 80486 chip will reportedly feature a 32-bit data bus with some one million transistors, compared with the 286's 135,000 and the 386's 250,000 transistors. The 80486 is not expected to be completed until 1990.

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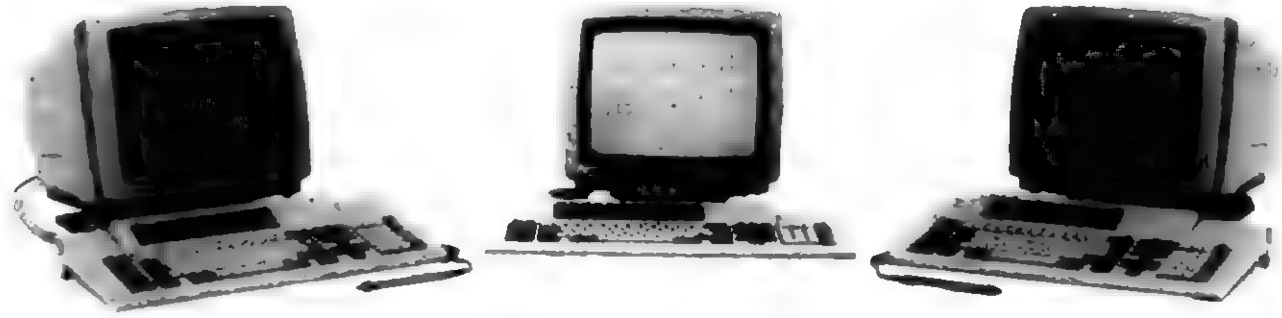

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ASICs

FROM PAGE 67

client, they have to be planned for in advance, and it is not easy to stop production," Carey says. "They are like an aircraft carrier — they can't zigzag all over the place like a PT boat."

On the rise

According to Andrew Prophet, a senior industry analyst at Dataquest, ASICs will represent 28% of all U.S. computer industry chip consumption this year, and that figure is expected to grow to around 35% by 1990.

But even though the market is now healthy, experts wonder whether ASICs will really be a vehicle for sustained growth or just a flash in the pan. While Carey says that ASICs will become an increasing part of Motorola's sales, he is not blindly optimistic about the product's long-term market potential.

Carey says that as the technology matures, many of the same problems — of marketing and tight competition — that affect other types of chips will eventually affect ASICs as well. Motorola had 5% of the general ASIC market and 18% of the high-end ASIC market in 1986, according to Dataquest.

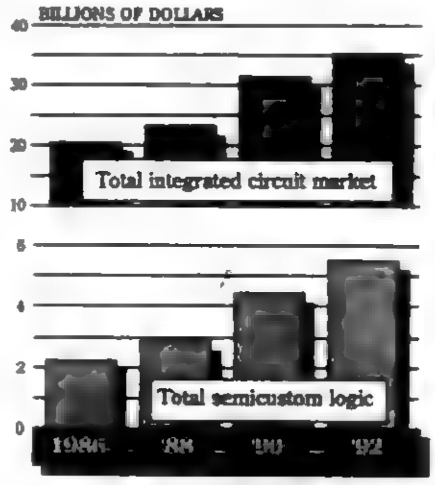
Don't look back

"Motorola may have somewhat of a lead in the market now because of its technology and the relationships it has been able to build with its customers," claims Carey, "but that doesn't mean we can stop looking over our shoulders."

One newcomer to the ASIC field is Intel Corp. According to Robert Elfant, Intel's general manager for cellular products, the ASIC market can support still more companies. "There aren't a lot of standards in the ASIC industry," Elfant says.

"There isn't a common design methodology, a common naming nomenclature, a common packaging configuration or a common testing methodology," he continues. These are all conditions, Elfant claims, that companies find attractive.

World semicustom digital integrated circuits



INFORMATION PROVIDED BY IN-STAT, INC
CW CHART

On the other hand, Bill Groves, vice-president of technology at research and consulting group In-Stat, Inc., sees ASICs as "the wave of the future," and claims that no major semiconductor company can avoid them and remain in business. Groves adds that he does not see ASICs as a magic carpet that will keep the integrated circuit industry afloat.

Groves says, "There is no reason to believe that ASICs will not eventually become almost as much of a commodity item as noncustom chips have. And if that happens, all the same problems — of diminished profits and foreign dumping — that plague the noncustom section of the industry will affect the custom section." Dataquest's Prophet adds that the low-end gate array business has already become commodity-oriented.

He sees that as a portent for the industry as a whole, and says, "On gate arrays with fewer than 3,000 gates, the cost per gate has dropped dramatically over the last year and a half, from about one cent per gate to around two-tenths of a cent now. It's already at the point where it is hard to make a profit in this low-end business."

Although U.S. companies still dominate the higher end ASIC market, the Japanese have an edge on gate arrays with lower gate counts, and some observers say the Japanese are working their way up.

Land of rising chip?

According to a recent *Wall Street Journal* survey of industry watchers, the Japanese now hold a 40% share of the worldwide $4.5 billion ASIC market, which includes both gate arrays and standard cell-design chips.

This can be compared with their 46% share in the general chip market worldwide. But in the gate array business alone, their share has jumped from 9.5% in 1980 to 33% now.

Andrew S. Rappaport, an industry analyst at Technology Research Group says, "There just isn't anything fundamental about ASICs that will keep the Japanese out of that market."

In fact, because the largest number of ASICs sold are those with smaller gate counts, the top company, according to Dataquest, is Fujitsu Ltd. with sales of $359.2 million; followed by LSI Logic Corp., $194.3 million; AT&T, $183.1 million; and NEC Corp., $151.2 million.

But even those who hold that at least some part of the ASIC business will remain a specialty, rather than a commodity, market, say they do not believe that this technology alone will provide much advantage to U.S. companies vis-a-vis Japanese competitors.

'Rude awakenings'

According to Rappaport, "This whole situation has been wrought with rude awakenings. First, people thought the Japanese didn't want this specialized business. Then we all discovered they did. Then the theory held that they would not be able to turn prototypes around fast enough. But they can get a prototype over from Japan as fast as we can get one out of Texas or California."

In addition, Rappaport says, conventional wisdom holds that ASIC was a software-oriented business, and the Japanese did not have the software to do the job. This was also incorrect, because they could buy the software if they didn't have it. Fears that the Japanese will eventually dominate the market have led some U.S. corporations to ask the government for help.

Recently, LSI Logic, National Semiconductor Corp., Advanced Micro Devices, Inc. and Intel wrote a joint letter to U.S. trade representative Clayton Yeutter, asking that ASICs be included in the U.S.-Japan trade agreement now being negotiated.

Teamwork

But Rappaport says he believes that the best hope for American companies is to use ASICs as a reason to tighten the bonds between chip maker and customer. A prime example of this is the agreement negotiated between Intel and IBM late last year.

In this agreement, IBM will provide Intel with a library of its most important chip designs as well as computer-aided design technology and production techniques, which are used by IBM to produce its own chips. In return, Intel will supply IBM with customized, proprietary chips. IBM is expected to use these ASICs to create more clone-resistant computers.

Other companies following similar paths include National Semiconductor in collaboration with Xerox Corp. and Motorola with Northern Telecom, Inc.

Running in pacts

Pacts such as these between U.S. companies might be more feasible now that the smaller number of component parts in ASICs make going overseas for inexpensive production less attractive. If you boil down a computer system components list from three or four boards and about 300 integrated circuits to an 8- by 11-inch card with three or four very large-scale integration chips that can be surface mounted, Groves says, you've lost your incentive to go overseas.

But others worry that the Japanese might be better at cementing vendor/customer relationships than U.S. firms.

Rappaport says, "The Japanese 'just-in-time' methodology has created a way of doing business that says, 'I want to be your friend. Let's explore the ways that we can work with each other.' It remains to be seen whether U.S. companies can attain that same level of cooperation."

Closing gap

At present, Japanese chip makers by and large have not been able to develop close ties with U.S. customers, but there are signs that they might be trying to create them.

"THERE ISN'T anything fundamental about ASICs that will keep the Japanese out. . . . They can get a prototype over as fast as we can get one out of Texas or California."

ANDREW S. RAPPAPORT
TECHNOLOGY RESEARCH GROUP

For example, Ricoh Co. recently opened a semiconductor design center in San Jose, Calif., to develop custom ASICs for U.S. and Canadian customers.

While the initial project only houses a modest staff of 30, Ricoh has plans to increase the staff to 150 within five years.

Nevertheless, U.S. companies are still strong in the ASIC marketplace and they are expected to remain so, at least for the short range. The question is whether they can maintain their lead into the '90s.

"There is no question that foreign companies are able to mass produce high-quality products at lower cost than U.S. firms. Instead, U.S. companies have to ask their customers, 'What kind of complex functions can we provide you? Help us to imbed that knowledge into the systems we create for you.' That is the best — and probably the only — way to create substantial barriers to foreign competition," Rappaport concludes.

Stevens is a free-lance writer based in Springfield, Mass.

A choice of two technologies

There are two basic categories of application-specific integrated circuits (ASIC): gate arrays and standard cell designs. Gate arrays are like building blocks in which the logic gates are mass produced in silicon, and the user specifies how those building blocks should be pieced together. Standard cell-design chips are custom chips with functions specified by the customer. These functions are incorporated into a very large-scale integration chip.

In a very general sense, a gate array can be compared with a modular house in which the purchaser chooses from among a number of limited options such as a finished or an unfinished attic, the style of flooring and siding material.

Standard cell design, on the other hand, is akin to having an architect design the house from scratch.

ASIC technology allows manufacturers to customize their integrated circuits for their clients. There are two main advantages of ASICs over noncustom chips. The first is that because they are customized, they ensure that a smaller component package is needed. Since manufacturers need fewer components to meet specifications, the product is less expensive to produce.

Secondly, the chips can be designed with proprietary information. This makes it more difficult for computer manufacturers to clone a competitor's product, since it does not use standard chips.

LAWRENCE STEVENS

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Test Questions

Benchmarking won't help in selecting CADD software, but there are many other measurements that can be applied. Page S4.

Line of Vision

In the future, CADD systems could transform design and drafting with real-time 3-D color animation, sound annotation, shape recognition and something resembling an aptitude for brainstorming. Page S4.

The High Road

High-performance graphics systems are helping to make visual computing into an affordable reality for business users. Page S5.

Action Shots

The ability to generate computer-driven real-time animated movies at an affordable price is not here yet, but combining vector and bit-mapped technologies may speed its arrival. Page S9.

Vendor Viewpoint

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As workstations and PCs tangle at the low end of the technical design market, vendors are seeking separation on higher ground.

CLASH PROVOKES BURST OF CHANGE

BY ALAN PALLER

STEVE [illegible]

A battle is taking shape in the low-cost technical and graphics workstation markets. The dynamic young workstation vendors, Apollo Computer, Inc. and Sun Microsystems, Inc., are being jostled and shoved by new announcements from IBM, Digital Equipment Corp. and Apple Computer, Inc. But they're fighting back.

Users see the impact of the new developments in two ways: Workstation price/performance is improving at an extraordinary rate, and choosing among products is getting tougher.

In the distant past — before 1987 — personal computers were different from workstations. PCs, which included IBM compatibles and Apple Macintoshes, were used by the masses for word processing and spreadsheet and management graphics applications. Workstations, on the other hand, were desktop computers used by the technical elite for "real work" like seismic analysis, three-dimensional modeling, technical documentation and stock market analysis.

In those days, technical professionals had good reason to shun PCs in favor of workstations. PC screens were too small. PC graphics resolution was too low. Graphics screen updating was too slow and too computer intensive. PCs could not support more than one task at a time. PC operating systems limited the size of programs that could be run. And PCs had processors that choked on computation-intensive jobs. These weaknesses were used to justify the workstations' $20,000 or more price tags.

But just as 8-bit computers turned into more powerful and capable 16-bit computers, so are PCs turning into more capable workstations. IBM's Personal System/2 Model 80, based on the Intel Corp. 80386 chip, and Apple's Macintosh II, based on the Motorola, Inc. 68020 chip, were both announced during the past year.

With these and related announcements, each of the following historical differences between PCs and workstations is fading or soon will fade away:

- **PC screen size.** Less than $1,000 will now buy a 19-in. high-resolution (80 to 100 dot/in.) monochromatic monitor.
- **PC screen resolution and speed.** Color resolution of 480 by 640 pixels is now standard, and 1,000- by 1,280-pixel boards are as common as high-capacity disk drives. The new graphics boards have independent processors that provide rapid screen updating without loading the PC processor.
- **PC multitasking.** A new version of Microsoft Corp.'s MS-DOS — OS/2 Extended Edition — is scheduled to provide multitasking by early 1988. In the meantime, most users will allow windowing technology to suffice as simulated multitasking.
- **PC memory limits.** PC memory boards of 2M and 3M bytes are now widely available. Upgraded operating systems (such as IBM's and Microsoft's OS/2s) will make that extra memory available to programs within a year.
- **PC processor power.** Intel 80386-based computers, at 16 and 20 MHz, are processors as powerful as the CPUs in most of the workstations currently on the desks of technical professionals. The Mac II processor is identical to the processors of the low-end workstations from Apollo,

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Paller is president of AUI Data Graphics, a division of Computer Associates International, Inc., and director of training for the National Computer Graphics Association.

Cost comparison

PCs vs. graphics workstations

Company	Product	Basic diskless	Basic monochrome	Intermediate color	Higher color
IBM	PS/2 Model 80	Not available	Price: $7,570; 16-MHz 80386 processor; 1M-byte RAM; 1.44M-byte floppy disk; 44M-byte hard disk; OS/2; VGA; 12 in. monochrome display; keyboard	Price: $9,050; 16-MHz 80386 processor; 80387 coprocessor; 1M-byte RAM; 1.44M-byte floppy disk; 44M-byte hard disk; 16 color, 480 by 640 VGA; 12 in. color display; audio; mouse; keyboard	Price: $11,0[illegible]; 20-MHz 80386 processor; 80387 coprocessor; 4M-byte RAM; 1.44M-byte floppy disk; 115M-byte hard disk; 12 in., 480 by 640 color display; audio; mouse; keyboard
Apple	Mac II	Price: $4,397; 16-MHz 68020 processor; 1M-byte RAM; 12 in. monochrome, 480 by 640 display; audio; mouse; keyboard	Price: $5,897; 16-MHz 68020 processor; 1M-byte RAM; 800K-byte floppy disk; 40M-byte hard disk; 12 in. monochrome, 480 by 640 display; audio; mouse; keyboard	Price: $7,044; 16-MHz 68020 processor; 68881 coprocessor; 68851 Page Memory Management Unit; 1M-byte RAM; 800K-byte floppy disk; 40M-byte hard disk; 256 color, 13 in., 480 by 640 display; audio; mouse; keyboard	Price: $10,141; 16-MHz 68020 processor; 68881 coprocessor; 68851 Page Memory Management Unit; 4M-byte RAM; 800K-byte floppy disk; 80M-byte hard disk; 256 color, 13 in., 480 by 640 display; audio; mouse; keyboard
DEC	Vaxstation 2000	Price: $4,600; 20-MHz processor, floating-point coprocessor; 4M-byte RAM; 15 in. monochrome, 1,024 by 864 display; mouse; keyboard	Price: $7,600; 20-MHz processor, floating-point coprocessor; 4M-byte RAM; 1.2M-byte floppy disk; 42M-byte hard disk; 15 in. monochrome, 1,024 by 864 display; mouse; keyboard	Price: $10,900; 20-MHz processor, floating-point coprocessor; 4M-byte RAM; 1.2M-byte floppy disk; 42M-byte hard disk; 15 in., 16 color, 1,024 by 864 display; mouse; keyboard	Price: $17,428; 20-MHz processor, floating-point coprocessor; 4M-byte RAM; 1.2M-byte floppy disk; 115M-byte hard disk; 19 in., 16 color, 1,024 by 864 display; mouse; keyboard
Apollo	Domain 3000	Price: $4,990; 12-MHz 68020 processor; 68881 coprocessor; 68851 Page Memory Management Unit; 4M-byte RAM; 1,024 by 800, 15 in. monochrome display; mouse; keyboard	Price: $8,990; 12-MHz 68020 processor; 68881 coprocessor; 4M-byte RAM; 1.2M-byte floppy disk; 72M-byte hard disk; 1,024 by 800, 15 in. monochrome display; mouse; keyboard	Price: $12,990; 12-MHz 68020 processor; 68881 coprocessor; 4M-byte RAM; 1.2M-byte floppy disk; 72M-byte hard disk; 16 color, 1,024 by 800, 15 in. display; mouse; keyboard	Price: $14,990; 12-MHz 68020 processor; 68881 coprocessor; 4M-byte RAM; 1.2M-byte floppy disk; 156M-byte hard disk; 16 color, 1,024 by 800, 15 in. display; mouse; keyboard
Sun	Sun Model 3/50 (monochrome) and 3/110 (color)	Price: $4,995; 16-MHz 68020 processor; 4M-byte RAM; 1,152 by 900, 19 in. monochrome display; mouse; keyboard	Price: $9,995; 16-MHz 68020 processor; 4M-byte RAM; ¼-in. tape; 71M-byte hard disk; 1,152 by 900, 19 in. monochrome display; mouse; keyboard	Price: $21,900; 16-MHz 68020 processor; 68881 coprocessor; 4M-byte RAM; ¼-in. tape; 71M-byte hard disk; 1,152 by 900, 256 color, 15 in. display; mouse; keyboard	See Intermediate color
HP	HP 9000 Model 318M (monochrome) and 330C (color)	Price: $7,000; 16-MHz 68020 processor; 68881 coprocessor; 4M-byte RAM; 1,024 by 768, 17 in. monochrome monitor; mouse; keyboard	Price: $10,800; 16-MHz 68020 processor; 68881 coprocessor; 4M-byte RAM; 800K-byte floppy disk; 20M-byte hard disk; 1,024 by 768, 17 in. monochrome monitor; mouse; keyboard	Price: $31,300; 16-MHz 68020 processor; 68881 coprocessor; 4M-byte RAM; 800K-byte floppy disk; 20M-byte hard disk; 64 color, 1,024 by 768, 16 in. monitor; mouse; keyboard	Price: $34,150; 16-MHz 68020 processor; 68881 coprocessor; 4M-byte RAM; ¼-in. tape; [illegible]M-byte hard disk; 64 color, 1,024 by 768, 16 in. monitor; mouse; keyboard

INFORMATION PROVIDED BY AUI DATA GRAPHICS

Clash

FROM PREVIOUS PAGE

Sun and Hewlett-Packard Co.

The net result of all these changes is that a 1987 PC system, either IBM's PS/2 Model 80 or Apple's Mac II, now offers most of the basic computing capabilities offered by the workstations of 1986. And these PC systems cost half as much as the earlier workstations.

However, equal processing power and graphics do not make two systems equal. Networking, software availability, standards, reliability and ease of use all play important roles in determining user satisfaction and, at least in terms of perception, the workstation vendors currently have an edge in these areas.

No one knows how long this advantage will persist, though, and the question is whether these companies can add enough new and important functionality to maintain differentiation in users' minds and to support the substantial price differential between workstations and PCs on an ongoing basis. If not, will vendors have to cut their prices and try to reposition themselves as higher volume producers?

Power and speed

Accurate answers to these questions are being sought by the decision makers in many companies considering large-scale acquisition of computers for their technical staffs. No company wants to acquire a workstation only to learn a few weeks later that the price of that machine has dropped by 30% or 50% or that a new model with twice the power is available at the price the company has already paid.

Chief among the forces shaping the workstation market is the demand for power. The old adage that users will fill all available computer memory and processing power is just as true for desktop computers as it was for mainframes. Additional memory, faster processors and bit-mapped high-resolution graphics are being snapped up and used by power-hungry technical professionals. Evidence of this can be found in the speed with which IBM Personal Computer AT users are shifting to Intel Corp. 80386-based computers, which are approximately 250% faster.

Most users are using the extra power simply to speed recalculations of large spreadsheets and layout of large documents. Software of the future, such as context-sensitive grammar checkers and text-based retrieval systems, will make even 386-based machines seem slow. So the demand for more powerful computers is large and growing.

> CHIEF AMONG THE forces shaping the workstation market is the demand for power. The old adage that users will fill all available computer memory and processing power is just as true for desktop computers as it was for mainframes.

Competition and manufacturing economics are also playing a major role.

While the demand for more power grows, the economics of desktop computer sales is pushing all U.S. desktop computer vendors toward more powerful machines. Korean and Taiwanese PC clones have made the low end of the market too competitive for most U.S. vendors. It costs a vendor only a few hundred dollars more to build a 386-based computer than to build an AT, and it can sell the more powerful machine for $1,000 to $3,000 more.

In addition, more powerful PCs and workstations are usually accompanied by networks containing disk and print servers that cost $20,000 to $100,000 each. Workstation vendors make the majority of their profits selling these servers and upgrading the disks and graphics boards of the workstations.

IBM, Compaq Computer Corp. and Apple, the three principal PC manufacturers in the U.S., are being pushed into the high end of the desktop market by pressure from below and pulled by profit margins available at the top.

A third major force acting on the desktop computing industry is the new demand for networking. Users are tired of relying on "Sneaker Net" (the facetious name given to the practice of donning sneakers and carrying floppy disks from one place to another). Technical staffs are demanding that pictures and words created at one workstation be freely available for review and editing at every other workstation and even on the minicomputers and mainframes in their organizations.

The last major force is an overwhelming plea for standards from large users. They want standard operating systems so they can move applications freely from one computer to another. They want standard user interfaces so they can reduce their training costs. They want standard graphics storage formats so they can transfer pictures from one machine to another. And they want standard network protocols so they can shift documents, graphics and entire jobs to wherever they are needed.

What users really want

Ask 10 users what they want in workstations, and you will get 10 different answers. Some focus on processing power, some on graphics screen size and resolution. Others talk about networking; still others ask for MS-DOS compatibility.

A comprehensive definition of user requirements can best be found by looking over the shoulders of the people preparing specifications for two of the largest workstation procurement projects currently under way: the U.S. Navy procurement and the General Motors Corp./Electronic Data Systems Corp. (EDS) specification. Each of these projects will ultimately lead to the acquisition of more than 10,000 technical workstations.

The Navy has defined the workstations that its engineers will need during the next few years in its 1,300 page "Navy CAD/CAM 2nd Acquisition Request for Information Closure Document" for technical workstations. A team of technology and requirements experts spent more than a year interviewing vendors and users to learn how far they could push the state of the art.

Several aspects of the Navy's Request for Information (RFI) document will make its contribution significant, including the addition of office automation, additions in graphics processors and definitions of levels of demand.

It provides for three tiers of workstations: one for drafting and management, another for design and numerical control programming and a third for heavy analysis in fluid dynamics and structural analysis. In defining workstations that will serve each group, the Navy has redefined the level of computing power that will be expected from workstations.

This RFI is also significant because of the volume of tools the Navy is planning to purchase. An order for thousands of workstations will mean very low prices, perhaps less than $2,000 for the 1- to 2-million instructions per second (MIPS) machines and less than $5,000 for the 4- to 5-MIPS processors. Nearly every other large buyer of workstations is monitoring the progress of the Navy procurement, confident that what the Navy buys will be available to other large purchasers at similarly advantageous prices.

The Navy specified processors ranging from 1 to 2 MIPS for drafting and management, 4 to 5 MIPS for designing and 8 to 10 MIPS for analysis. A 10-MIPS workstation is equivalent to the processing power of 10 DEC VAX-11/780 computers in a single workstation. Only five years ago, a VAX-11/780 was expected to be able to serve the needs of 20 to 40 users simultaneously.

The Navy's mix-and-match approach and high expectations in terms of mass storage and graphics processors will also force vendors to offer a comprehensive line of workstations rather than islands of capability.

For example, the RFI calls for graphics processors of two

Continued on next page

Capability comparison

PCs vs. graphics workstations

	IBM: PS/2 Model 80	Apple: MAC II	DEC: Vaxstation 2000	Apollo: Domain Series 3000	Sun: Sun 3/50 (monochrome) and Sun 3/110 (color)	HP: HP 9000 Model 318M (monochrome) and Model 330C (color)
Primary operating system	OS/2 (available in first quarter of 1988)	Macintosh/OS	VMS	Domain/IX (University of California at Berkeley's Unix 4.2 and AT&T's Unix System V)	Unix	HP-UX (Unix System V plus extensions)
Multitasking	First half of 1988	Late 1988	Yes	Yes	Yes	Yes
Windows	First half of 1988	Yes	VMS Windows	Yes	Yes	Yes
Maximum virtual memory	1G byte (OS/2)	Real memory up to 1.8G bytes	4G bytes	64M bytes	256M bytes	4G bytes
MS-DOS capabilities	Yes	Optional coprocessor	Optional network server	Yes, in software emulation	Optional coprocessor or network server	Optional coprocessor
Number of programs available for primary environment	20,000	2,500	3,500	1,700 in catalog, plus Unix	900 in catalog, plus Unix	1,116 in catalog, plus Unix
Other operating systems	Unix	A/UX with 68851 PMMU[1]	Ultrix	None	None	Rocky Mountain Basic OS and Pascal OS
Processor	Intel 80386 16 and 20 MHz	68020 16.7 MHz	78032 20 MHz	68020 12 MHz	68020 16.7 MHz	68020 16.7 MHz
Floating-point coprocessor	Intel 80387 (optional)	Motorola 68881 (standard)	DEC 78032 (standard)	68881 (standard)	68881 (optional)	68881 (standard)
Internal memory (standard/maximum)	1M or 2M/16M	1M/1.8G	4M/6M	2M/8M	4M/4M (Model 3/50) or 12M (Model 3/110)	4M/4M (Model 318) or 8M (Model 330)
Color and resolution	640 by 480, 16 colors; or 320 by 200, 256 colors	640 by 480, 256 colors	1,024 by 864, 16 colors	1,024 by 800, 16 colors, option for 256 colors	1,152 by 900, 256 colors	1,024 by 768, 64 colors
Floppy disks	1.4M, 3½ in.	800K, 3½ in.	1.2M, 5¼ in.	1.2M, 5¼ in.	None	600K, 3½ in.
Hard disks (capacity/access time)	44M/40 msec, 70M/30 msec, 115M/28 msec	20M/30 msec, 40M/30 msec, 80M/30 msec	42M/48.3 msec, 71M/30 msec, 159M/30 msec	72M to 348M/all 28 msec	70M/30 msec, 141M/23 msec	10M/75 msec, 20M/75 msec, 40M/48 msec, 82M/36 msec, 131M/36 msec, 300M/36 msec, 571M/36 msec
Internal drive slots	Two floppy, two hard	Two floppy, one hard	Two floppy or one floppy and one 44M-byte hard	One floppy and one hard	All drives external	All drives external
I/O ports	Serial, parallel, mouse	SCSI[2], dual serial, mouse, Appletalk, four-voice audio	Two serial, one Vaxcluster (Ethernet)	One serial and one network (Ethernet or token ring)	Two serial, one Ethernet	One IEEE 488 parallel, one proprietary serial, one serial, one Ethernet (and IEEE 802.3)
Expansion slots	Four 16 bit, three 32 bit	Six Nubus (8, 16 or 32 bit)	None	Seven 16 bit (PC AT), one 8 bit (PC XT)	None on Model 3/50, VMEbus on Model 3/110	None on Model 318M, VMEbus on Model 330C
Floor or desktop	Floor	Floor	Desktop	Desktop	Desktop	Desktop
Maintenance costs (per month for next day on-site service for diskless system)	Not available	Not available	$45	$73	$40	$18

[1] Page Memory Management Unit
[2] Small computer systems interface

INFORMATION PROVIDED BY ALT DATA GRAPHICS

Clash

FROM PREVIOUS PAGE

types: Type 1 requires 16 simultaneous colors, 100,000 two-dimensional vectors displayed per second and 15 million pixels filled per second. Type 2 requires 4,096 simultaneous colors, 200,000 2-D vectors per second, 150,000 3-D vectors per second and 100 million pixels filled per second. In the mass storage area, the Navy RFI calls for 100M-byte, 600M-byte and 1G-byte disks.

A strong requirement for standard office automation facilities will allow engineers to have one workstation on their desk and an easy means of putting graphics into documents.

A full chapter of the Navy RFI spells out requirements for an office toolbox that includes word processing, spreadsheet, business graphics, data base, project management and electronic mail.

The GM/EDS project differs from the Navy's because it lays out the specifications without guaranteeing to buy a fixed quantity. On the other hand, if workstation vendors want to sell to GM/EDS, they will have to meet its specifications.

The most notable segment of the GM/EDS specification is that it is trying to establish a fixed user interface "look and feel" that will be the same on every application and on every workstation, regardless of the vendor that supplies the workstation or application.

In this quest, EDS is following in the footsteps of Apple's Macintosh computer, which proved that ease-of-use was optimized when users did not have to learn new interfaces as they moved from application to application.

Ease of use is one of two user requirements that EDS discovered in extensive research on what happens after workstations are installed. The EDS researchers found that few workstation buyers focused on ease of use when purchasing their workstations, probably because they believed that ease of use was automatic when windows were available in the operating system.

> MOST WORKSTATION buyers are not new to computing. They are already using computers for important applications and are looking for better solutions.

However, when those users tried to switch from application to application, they found that software developers had defined keys and menu items so differently that learning was difficult.

EDS research findings on ease of use are echoed by Neil Kleinman, president of Pacific Technology Associates in Tarzana, Calif. Kleinman is one of a small number of consultants often retained by workstation vendors to help define user interfaces and the right mix of graphics and processing power.

Kleinman clarifies the ease-of-use requirement in a useful way. In his opinion, there are three types of workstation users: users who do many applications, such as publications, drafting, word processing and charting on a single workstation; users who dedicate their workstation to a single application requiring significant processing; and those in the middle.

The common user interface, such as the one EDS is attempting to build, is essential, according to Kleinman, but only for the first class of users. It is unnecessary for those working in dedicated situations because a single-application workstation has only one interface for the user to learn.

A second, unexpected user need was uncovered in EDS's research when users bought more than a few workstations. According to EDS project leader Dan Shubert, maintainability is often overlooked by new workstation buyers.

Maintainability has two dimensions: software and hardware. Software maintainability means distributing software updates on each workstation, managing the network files and performing other tasks required when software is distributed to remote locations. Hardware maintainability simply means making sure the machines do not break or are fixed quickly when they do.

Shubert says younger workstation vendors, like Apollo and Sun, have a lot to learn about in the areas of reliability and maintainability, although they have made great strides.

A buyer can measure a product's reliability, Shubert suggests, by comparing monthly maintenance charges with workstation prices. As the comparison table shows (see table above), there are major differences in the costs of maintenance charged by the vendors.

Familiarity

Most workstation buyers are not new to computing. They are already using computers for important applications and are looking for better solutions to their needs. In fact, their principal justification for acquiring workstations is to improve productivity by off-loading tasks from mainframes. These kinds of buyers reason that moving to workstations changes variable costs to fixed costs and improves system responsiveness.

A telling example of this requirement is found in the engineering department of a multibillion dollar company that acquired 10 Apollo workstations approximately one year ago. When asked why it chose Apollo, the company's systems manager said Apollo was the only workstation the firm could find that ran the five programs its engineers depended on to get their design and analysis work done. Those programs are MSC/Nastran from MacNeal-Schwendler Corp. and Patran from PDA Engineering, Inc. (for finite element analysis) and three Computer Associates International, Inc. products — Tell-A-Graf and Disspla (for graphics) and Tell-A-Plan (for project management).

All five programs ran successfully on the IBM computer the engineers used. The company reasoned that if it bought workstations that ran all five, the engineers would not have to learn new software or translate their projects to new software.

Since that time, Sun, DEC and HP have made the same five software packages available on their workstations so they would not be at a disadvantage when competing to sell to users of those packages.

The newest user requirement, and currently the hottest area of contention among vendors, is the demand for work

Continued on page S6

Take the measure of drafting software

BY JOEL ORR

A functional system specification, based on the needs of your applications, will help you determine which computer-aided design and drafting (CADD) systems have what it takes to meet your needs. However, there are several other important considerations that can help you narrow the field.

Is there a system that is used by most of the practitioners in your field? For example, most moldmakers use McDonnell Douglas Manufacturing System's Unigraphics; most state departments of transportation use Intergraph Corp.'s IGDS. Do not, however, select or reject a system for its popularity among your colleagues; be sure you understand whether that popularity is the result of superior performance or just superior selling.

Scientific tests indicate all of the common input devices, including digitizing pucks, joysticks, trackballs and other non-pen-like units, rate as equivalent in terms of ease of learning and ease of use. Oddly enough, however, feelings run strong in this area and prejudice abounds. The majority of engineering professionals, for instance, seem to prefer an input device that looks and feels like a pencil or a pen. Such preference for the familiar is understandable but could overshadow the superior suitability of a product with a different input device and should not be incorporated into your decision.

Compatibility problems

Compatibility with other systems within the organization, or with those of clients or vendors, is an important issue. File conversions, even those involving Gerber Systems Technology, Inc.'s Initial Graphics Exchange Specification (IGES), a neutral file standard, are cumbersome and inconvenient.

One major consumer-products manufacturer allowed a division to select and purchase systems independently and is now facing the necessity of investing tens of thousands of dollars in software, development and experimentation in order to move data between Auto-Trol Technology Corp.'s Series 7000 and Unigraphics via IGES.

Although benchmarks are traditionally an important part of the computer selection process, their value for CADD evaluation is questionable. Such timed system performance tests are not easy to design for CADD systems, and they are also expensive and time-consuming for both the prospective user and the vendor. Prospective users seldom understand their own intended use well enough to design a valid benchmark. It is particularly difficult, with interactive systems, to differentiate between the facility of the system operator and the system's capability.

Performance testing

In a benchmark, the motivation for a vendor to make a system appear better than it is cannot be ignored. Even the most honest vendor — and, sad to say, not all are honest — is subject to tremendous pressure to make its particular system look good.

One of the U.S. armed services designed a week-long benchmark for the three candidate vendors that remained at the end of a year-long CADD system selection process. The vendor that ultimately won the contract did not pass the benchmark successfully but promised to remedy its shortcomings.

Two years after the systems were installed, many of the promises are still unfulfilled. But, worse, users, disgusted with the systems, claim the extreme conditions of the benchmark do not reflect production conditions; the systems can do exotic things but do not perform well in day-to-day use.

Performance tests, which simply demonstrate the ability of a system to perform a given set of tasks without timing, serve the intended purpose at less expense. Even these should be applied only to the final one or two candidates. Do not give a completed drawing to vendors and ask them to replicate it; that is not how drafters and designers work. Instead, base the test on conditions similar to those in your engineering area.

The best approach to gauging the quality of a system is through extensive questioning of current users. Speaking to system users and managers, face to face, you can gain an appreciation of what the system is like — not what the vendor promises it will be like "real soon now." Be prepared to spend time — half a day or a day — with each of several users. This is an investment that always pays off. ●

Orr is president of Orr Associates, Inc., a computer-graphics consulting firm based in Great Falls, Va. He is a founder of the National Computer Graphics Association.

Where the boundaries blur

Design will blend with drafting, and raster images will overlay vector data

The challenge of automating engineering drawing has been met. We can draw lines, circles and splines. We can place and edit text and dimensions and otherwise make and modify engineering drawings to our heart's content — three to 10 times faster than we ever could by hand. The next step is to expand the metaphor of the engineering drawing far beyond its original use.

In tomorrow's systems, a further blending of design and drafting is likely to occur. Design and manufacturing considerations will be introduced into the design process by artificial intelligence agents — programs that "observe" the process as it takes place and offer suggestions for improvement.

While many of the more than 200 computer-aided design and drafting (CADD) companies existing today will not make it, others will rise to take their place. However, the new ones will be niche-oriented; rather than offer generic CADD systems, they will introduce systems for the design of a particular range of products.

Such programs will initially be designed for individual application areas. Subsequently, generic versions, designed to be "educated" by the user, will become available. Natural-language interfaces will enhance the interaction.

Eventually, we will probably see products for engine design and products for plastic-mold design, systems for hospital design and systems for mall design.

Speech, sound recognition

These new design systems will accept spoken input from the user. "Make a building," the user will say. "Like this?" the system will ask, displaying a simple structure — or maybe even the Taj Mahal if the system knows the user has a sense of humor and wants to be entertained. It will perceive this willingness to be entertained through the user's degree of voice tension and pattern-matching.

Many of these systems will be seamlessly linked to production systems of various sorts, such as a building system described a couple of years ago by Tim O'Connor, a Detroit engineer: Servo-controlled lasers will be connected to the CADD system and will create points in space for the building crew to use at each stage. Only the location of the lasers will have to be carefully surveyed; the laser pointers will show where everything else is to go.

Real-time 3-D color-animation capabilities will eventually become integral to all systems, even electronic design. In circuit design systems, animation will be used to respond to routing and placement queries and to explain the logic behind the system's particular choices.

Sound annotation of drawings and models will be common, and sound engineering — a technology with both the promise of enhanced communications and the threat of unwitting manipulation — will be developed to the point of being able to induce emotional states in the observer on demand. When this happens, the producer of the drawing will have almost complete control over the communication. For instance, in showing a set of proposal drawings to a prospective client, an architect could use voice annotation to get across the mood of the proposed setting as well as its visual aspect.

Shape recognition will be part of the systems. "Show me all the circular parts," the operator will say, and the system will respond by highlighting the appropriate components.

CADD systems will have a brainstorming mode in which they will generate designs based on a few criteria. The operator will then be able to select the designs to be enhanced.

> NEW DESIGN SYSTEMS will accept spoken input from the user. "Make a building," the user will say. "Like this?" the system will ask, displaying a simple structure — or maybe even the Taj Mahal.

Cost estimating will be built into many systems, along with sophisticated material selection and optimization routines. The problem with most costing routines today is that the systems do not recognize the same sorts of objects that people do. With appropriate object-recognition software, systems will identify objects, not just pieces of geometry, even when the user has not explicitly named the geometry as objects.

Out of all these features a totally new activity will emerge, one quite different from what is today called drafting or even design. This new activity will take advantage of the resources available in graphics computers for the production of geometry with associated meaning — not just lines, circles, ellipses and splines but walls, chairs, flanges, resistors and roads.

Instead of mere geometric abstraction, the full semantic implications of nouns and verbs will be understood by CADD systems. Thus, the user will be free to address the real issues of design, issues dealing with form and function.

These new systems will serve as true partners and not just mind-amplifiers. Their use will become essential, and should the world last that long, there may come a day when designers cannot conceive of working without them.

The immediate future

But for the present and the immediate future, what will today's CADD systems do in a year or two that they cannot do today? For one thing, they will overflow with context-sensitive help. Manuals will become entirely optional and will be read only by those with an unusual interest in the technical details of the system.

All the leading systems will be ported to Unix and the new DOS; in the latter environment, they will all optionally run under Microsoft Corp. Windows. There will be a number of drawing and configuration-management systems that interact with Sun Microsystems, Inc.'s Network File System, already placed by that firm in the public domain.

Within the next two years, raster data will become much more common in CADD files. Some systems currently support raster images and allow them to be overlaid on the vector information of the CADD system. The new systems will have extensive raster- and vector-editing capabilities without having to switch modes. This will make it easy to incorporate images grabbed from video sources.

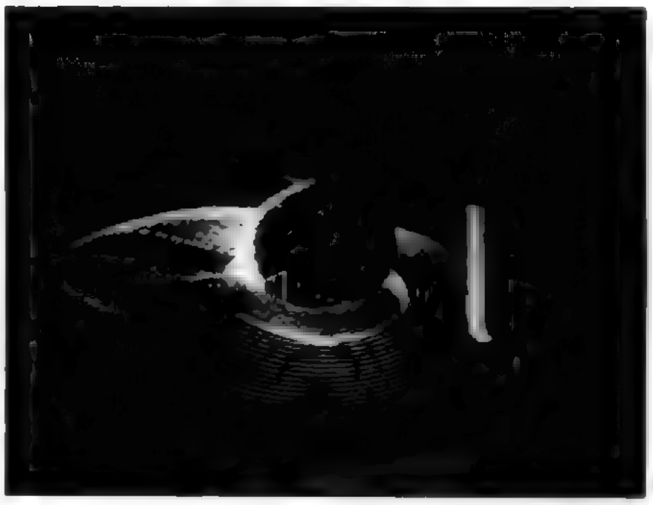
The most difficult aspect of CADD software to predict is cost. Already, systems abound that cost less than $500 and do as much as a $3,000 system. Will their progenitors survive and overrun the vendors of larger systems? Or will the more expensive systems vendors find features to offer to justify their higher cost and ultimately outsell the tiny CADD system vendors? It could go either way.

But the greatest change on the horizon for CADD software is in the assumptions about how drafters and designers work. Only when the initial dust cloud has settled will there be an understanding of what CADD software must look like to support the new ways of doing things.

JOEL ORR

The graphics zone: Workstation exploration in three dimensions

BY VICKI BROWN



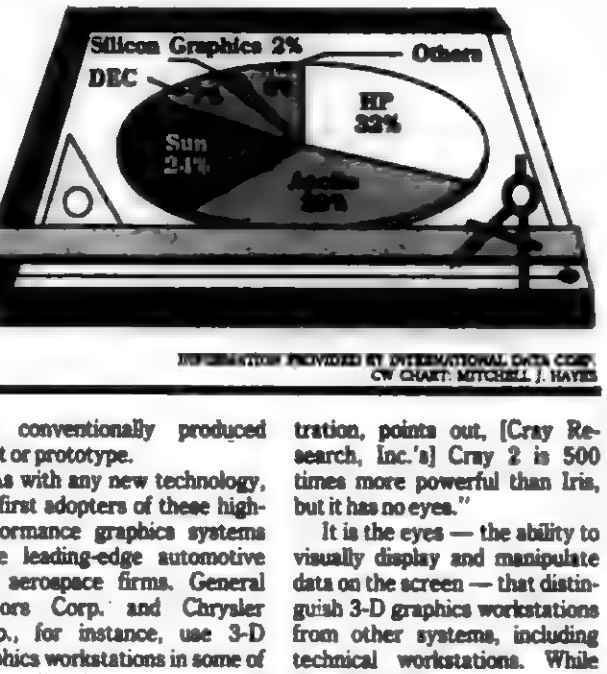
A graphic simulation of numerically controlled *tool-path generation. Image generated on a Silicon Graphics, Inc. Iris workstation using Camand software from Camax Systems, Inc.*

Just as the original Apple Computer, Inc. Macintosh changed the world of personal computing with visual icons, so are high-end three-dimensional graphics workstations dramatically altering the design world — giving product designers the artistic tools they need to be more creative, to explore their alternatives and, ultimately, to produce better and more attractive graphics products.

Designers no longer need to draw pictures or construct clay models to visualise their final products. With the help of realistically shaded three-dimensional images on high-performance graphics workstations, artists and designers can generate dozens of new models in mere minutes — compared with the days or weeks required to generate one conventionally produced draft or prototype.

Presence in the worldwide technical workstation market

1986 installed base of U.S. vendors



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CW CHART: MITCHELL J. HAYES

As with any new technology, the first adopters of these high-performance graphics systems were leading-edge automotive and aerospace firms. General Motors Corp. and Chrysler Corp., for instance, use 3-D graphics workstations in some of their styling departments to conceptualize new car shapes, interiors, colors and various feature options.

Powerful possibilities

But good news travels fast, and it did not take long for others to realize the advantages of near-real-time manipulation of computer images.

Kraft, Inc., for example, now uses Mountain View, Calif.-based Silicon Graphics, Inc.'s Iris workstations to design catsup containers that are more attractive and appealing to shoppers. And one leading advertising firm has already begun airing catchy Benson & Hedges cigarette commercials that use advanced animation techniques made possible with today's workstation graphics.

Merely providing workstations with a lot of computing power is not enough to effectively perform animation, wind tunnel simulation, molecular modeling, fluid flow or solid modeling applications.

As Tom Lasinski, workstation subsystem manager of the Numerical Aerodynamic Simulation Program at the National Aeronautics and Space Administration, points out, [Cray Research, Inc.'s] Cray 2 is 500 times more powerful than Iris, but it has no eyes."

It is the eyes — the ability to visually display and manipulate data on the screen — that distinguish 3-D graphics workstations from other systems, including technical workstations. While nearly every computer maker, from Apple and IBM to Apollo Computer, Inc. and Digital Equipment Corp., has entered the low-end (less than $20,000) technical workstation market, only three companies have ventured into the more demanding realm of visual computing.

Today's trio

Even though Apollo, based in Chelmsford, Mass., pioneered the technical workstation market five years ago, it was Silicon Graphics that came to market first with a 3-D graphics workstation.

Since Silicon Graphics' first Iris workstation was shipped in 1985, the company has installed more than 2,000 systems for a wide variety of engineering and scientific applications — from discovering crude oil and developing new pharmaceuticals to building airplanes and bringing motion-picture animations to life.

Last December, Hewlett-Packard Co. became the first company to challenge Silicon Graphics in the highly specialized 3-D graphics workstation arena with its announcement of the 9000 Model 350SRX. Apollo followed on HP's heels five months later with the DN 590 Turbo.

These three pioneer systems share several features, which essentially define the current state of the art. These include the following:

- Twenty-four color bit-planes providing an impressive 16.7 million simultaneous colors.
- A 19-in. color monitor with a minimum of one million pixels, or 1,024- by 1,024-pixel resolution.
- Double buffering and Z-buffering capabilities, enabling faster manipulation of real-time objects.
- At least one specialized graphics processor to assist the main CPU with the thousands of mathematical operations required to move vectors and polygons that represent the desired object.

With the addition of optional 3-D graphics accelerators and floating-point accelerators, workstations from all three of the vendors can manipulate graphics images at the rate of more than 5,000 polygons per second. Such a feat was inconceivable as little as five years ago and is a major step toward achieving the realistic depiction of graphics.

However, there is still a great deal of work to be done.

Even today's top 3-D workstations cannot realistically simulate a human being running in real-time, with on-the-spot calculations. A lifelike image of Michael J. Fox dashing from his apartment for a can of soda, for example, would require millions of polygons — thousands for his face alone.

Further, to approximate the world as our eyes see it, each polygon would have to be smaller than 5 by 5 pixels.

Today's system may not be fast enough to capture the pace of life, but hardware and software barriers are being broken down every day, thanks to ongoing research and development in industry and academia.

New wave of players

While Apollo, HP and Silicon Graphics develop their next-generation 3-D workstation products with the goals of speeding the number of transformations per second and the polygon fill rate, several other players are readying their own entries for the three-dimensional graphics race.

DEC is the most obvious possible vendor to next enter the market. The company is known to be working with Evans & Sutherland Computer Corp., a Salt Lake City-based interactive graphics supplier, on a 3-D graphics workstation product and is expected to introduce it by the end of the year, probably in early fall. DEC currently has the fourth-largest installed base of technical workstations (behind Apollo, HP and Sun Microsystems, Inc.) and just last month unveiled an aggressive strategy for the low end.

In IBM's case, the question is not whether a 3-D workstation will be introduced, but exactly when. Both DEC and IBM have been slow to offer competitive workstations, but of the two, IBM has the most catching up to do. The Personal System/2 Model 80 lacks floating-point capability and graphics hardware-assist, while the RT Personal Computer continues to be used more frequently as a multiuser commercial system than as a single-user stand-alone technical workstation.

Sun, one of the fastest hares in the low-end workstation race, has been the unmoving tortoise in high-end graphics contests. Just to enter this race, Sun must introduce a competitive 3-D workstation. It is a good bet, though, that the company has too much market savvy to pass up this opportunity.

Intergraph Corp., which formally entered the technical workstation arena early this year with its Fairchild Clipper chip-based Interpro 32C workstations, will apply the graphics expertise garnered from more than a decade of being a DEC OEM.

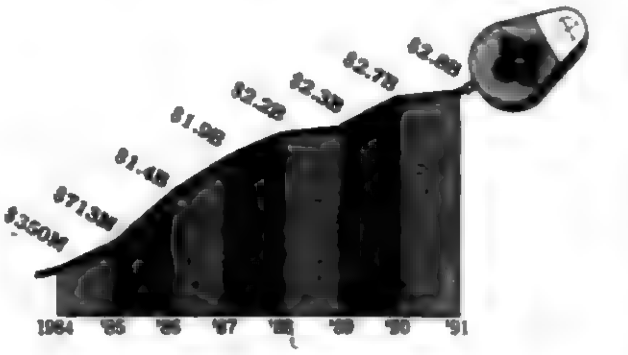
One of Intergraph's strongest suits has always been high-resolution display terminals, which includes dual-screened systems that assist in computer-aided mapping. Intergraph President Jim Meadlock has claimed that he can out-manufacture anybody, except perhaps IBM and DEC. No doubt he means it.

Late this year, Dana Computer, Inc. in Sunnyvale, Calif., and

Continued on page S11

Technical workstation marketplace

Worldwide installed base for U.S. vendors projected through 1991



INFORMATION PROVIDED BY INTERNATIONAL DATA CORP.
CW CHART: AMY J. SWANSON

Brown is program manager of technical computing research service at International Data Corp. in Framingham, Mass., and analyses CAD/CAM, technical workstations and other technical computing markets.

Clash

CONTINUED FROM PAGE S3

group networking. One observer finds this area so contentious that she calls the competition "the network wars."

Users want networking on PCs to share laser printers and data and to support E-mail. Advanced networks for workstations are asked to perform a more critical and demanding task — distributing applications so they run partially on one machine and partially on another or totally on a remote processor that has extra power available. Workstation networks can provide all the power of networked minisupercomputers to any user of a workstation attached to the same network.

Sharing processors speeds everyone's work and disputes the minicomputer and mainframe manufacturers' argument that workstations are inefficient because they may sit idle during the day or night.

A look at the leaders

The exact nature of the battle that is forming can be made clearer through a detailed comparison of the salient features of the high-end offerings from IBM and Apple and the entry-level workstations from Sun, Apollo, DEC and HP.

> WORKSTATION networks can provide all the power of networked minisupercomputers to any workstation attached to the same network.

IBM and Apple are included in this comparison to illustrate how similar their new high-end offerings are in raw power to traditional workstation offerings. The other four companies are obvious choices because they have the largest installed (or about to be installed) base, according to market reseach firm International Data Corp. (IDC) in Framingham, Mass.

Vicki Brown, IDC program manager for technical workstations, estimates that HP was the leader at the end of 1986 with 33,800 workstations installed. Apollo followed closely with 30,000. Sun was third with 24,900 (up 560% from the end of 1985), and DEC followed with 6,900. Brown projects that DEC could skyrocket to nearly 27,000 installed units by the end of this year. Many other large and small vendors, such as NCR Corp., Unisys Corp., Honeywell, Inc. and Xerox Corp., also offer technical workstations.

Despite the fact that these vendors offer performance equivalent to the leaders and, in at least Xerox's case, offer even easier to use operating environments, workstations from these companies are not considered by most large buyers of engineering workstations. Rather, the success of these vendors lies in sales to users of their own mainframe computers or, in the case of the Xerox 6085, to users of other Xerox computer-aided publishing workstations.

Table 2 (see page S2) contains much of the data most often requested by buyers of workstations. It looks at both hardware and software and provides technical specifications for each vendor's product. Table 1 (see page S3) extends the comparison to costs of basic and more powerful configurations.

These tables were constructed on the foundation laid by Amy Wohl in the April issue of *The Wohl Report on End-User Computing*, which undertook a comprehensive comparison of the Mac II and PS/2 Model 80, as well as a review of the entire new IBM line. Additional data was supplied by representatives of Apple, IBM, Sun, Apollo, DEC and HP.

The tables bring into sharp relief the major differences among the participants as well as the areas in which they have chosen to follow the same paths.

Processor: Except for IBM and DEC, all the leading vendors selected Motorola's 68020 processor. IBM used Intel's 80386, and DEC used its proprietary 78032 processor.

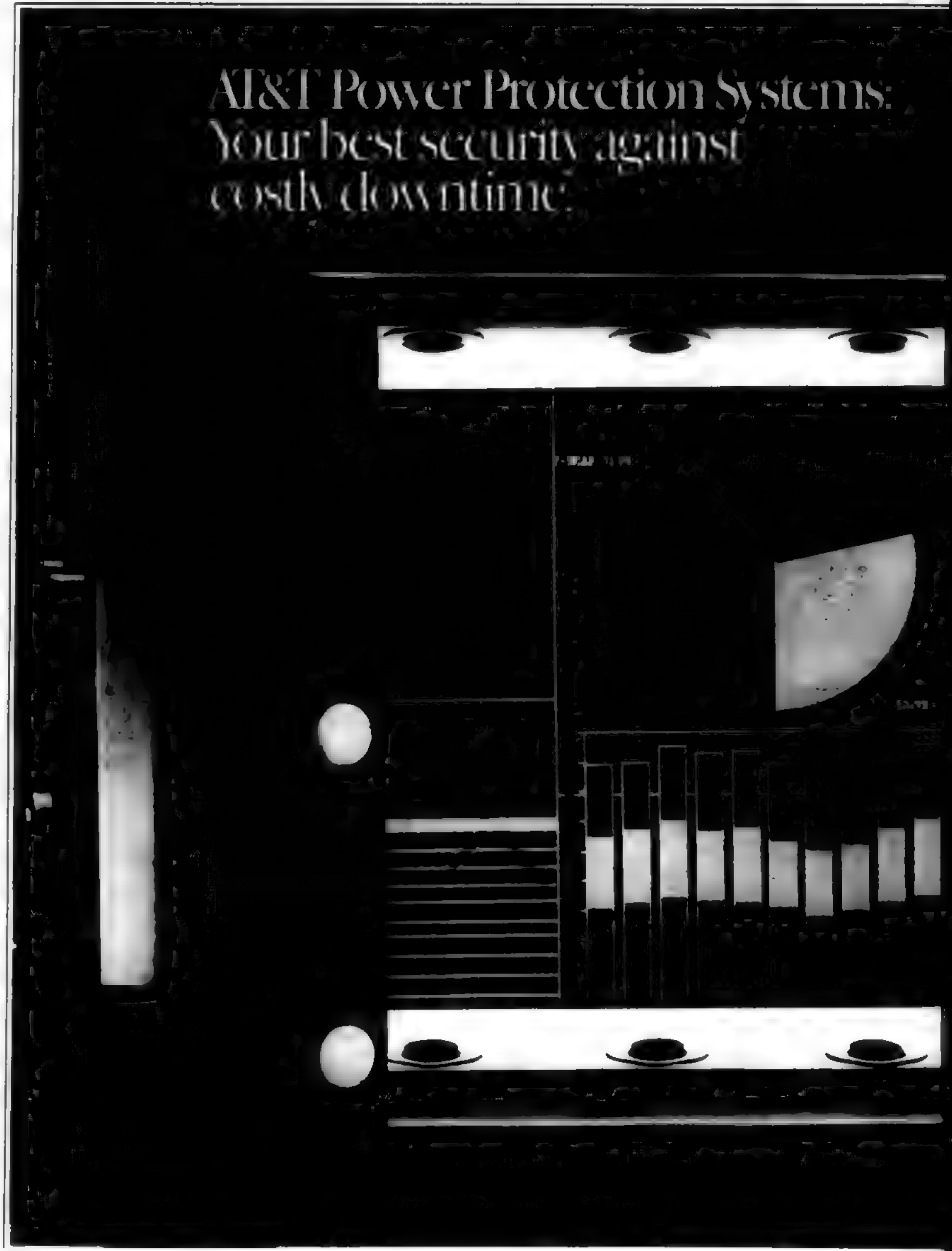
Real memory (standard and maximum): IBM and Apple offer 1M byte of random-access memory (RAM) as standard. Apollo offers 2M bytes, and DEC, HP and Sun offer 4M bytes of RAM as standard. At maximum, Sun's Model 3/50 and HP's Model 318M offer 4M bytes, while DEC can go to 6M bytes, Apollo to 8M bytes, Sun's and HP's color workstations to 12M bytes and IBM to 16M bytes. The Macintosh wins with a maximum memory of 1.5G bytes.

Floating-point coprocessors: These are standard on all except IBM and Sun, which offer them as options.

Floppy disks: Only Sun does not offer floppies. Sun users load programs from the network or from tape.

Hard disk: All vendors offer at least 80M bytes. The Mac II has the smallest capacity drives. Apollo and HP offer the largest drives, up to 348M bytes and 571M bytes, respectively. Of more importance than capacity is the access time of the drives. Each vendor offers different types of hard drives with different access times. The slowest are the smaller drives. HP's 20M-byte drive has 75-msec access. DEC and HP's 40M-byte drives offer 48-msec access. IBM's 44M-byte drive has 40-msec access. Most of the remainder are around 30 msec. Sun offers the fastest drives — 23 msec for its 141M-byte drives.

Expansion slots: IBM offers PS/2-compatible slots, whereas Apollo offers AT- and XT-compatible slots. Sun and HP



offer Motorola's VMEbus slots as an option on their color workstations but have no bus on their entry-level monochrome systems. Apple offers Nubus plus small computer systems interface ports. DEC does not offer expansion slots.

Operating system: Every vendor has a proprietary operating system. IBM will run OS/2; Mac II runs the Macintosh operating system; DEC runs VMS. Although Sun, Apollo and HP run derivatives of Unix, each of the others offers, or will soon offer, its own Unix derivative. Apollo holds a leadership position in this area, offering the University of California at Berkeley's Unix 4.2 and AT&T's Unix System V and MS-DOS without requiring a coprocessor. The others offer either optional MS-DOS coprocessor boards at approximately $2,000 to $3,000 or MS-DOS network servers that can put MS-DOS on multiple workstations.

Networking: Comparisons in this area are difficult but important. Apple offers the slowest network access (at 232K bit/sec.) through Appletalk but has just started shipping a new Ethertalk connector that runs the full 10M bit/sec. The other vendors offer Ethernet and, in several cases, token-ring as well. Apollo has the fastest network. Its 12M bit/sec. token-ring network outperforms the competition by 20%.

Number of programs: Operating system differences lead to large differences in numbers of available programs. IBM's PC-DOS wins with more than 20,000 programs, and DEC is second with 3,500. Apple offers 2,500 Mac programs; Apollo lists 1,700; HP, 1,100; and Sun, 900 in each vendor's respective catalog. But each company can also run Unix programs not listed in its catalog.

Multitasking: Each vendor, other than IBM and Apple, offers multitasking now. IBM has promised first-quarter 1988 availability for multitasking, and industry analysts say they believe Apple will also offer multitasking by late 1988.

Addressable memory: All vendors offer at least 64M bytes of virtual address space, which is more than enough for even the sloppiest programmer.

Graphics screen resolution: Sun has the greatest resolution (1,152 by 900 pixels) followed by DEC (1,024 by 864 pixels), Apollo (1,024 by 800 pixels) and HP (1,024 by 768 pixels). IBM and Apple offer 480 by 640 pixels as standard, although higher resolutions are available on optional equipment.

Colors: Sun and the Mac II provide 256 colors as standard, and HP offers 64. The other companies offer 16 colors as standard (at their highest resolution). An option to increase the number of colors to 256 and beyond is available from Apollo.

Reliability and maintainability: Using cost of maintenance as a guide, HP is the clear winner at $18 per month. DEC places second with $45 per month, and Sun is third at $49. Apollo falls last at $73 per month. These are prices for next-day on-site maintenance for diskless workstations. Similar data from the other vendors was not available.

Points of strength

Each of the vendors is preeminent in at least one area. These strengths are as follows:

IBM: The PS/2 Model 80 offers a fast processor and a large amount of real memory. However, it is IBM's name combined with the PC-DOS, or OS/2, operating system that makes IBM stand out. The 10 million users of IBM-compatible PCs will consider the Model 80 a natural upgrade to their current hardware. Further, IBM has promised transparent connectivity to other IBM computers in its OS/2 Extended Edition and through its ephemeral Systems Application Architecture's transparent movement of programs from the PS/2 to IBM's minis and mainframes. If IBM delivers on this promise, the PS/2 will appeal to many technical computer users whose data or application programs reside on IBM mainframes.

BUYING VMS workstations offers VAX users transparent integration between desktop and larger computers and, consequently, savings in training and software costs.

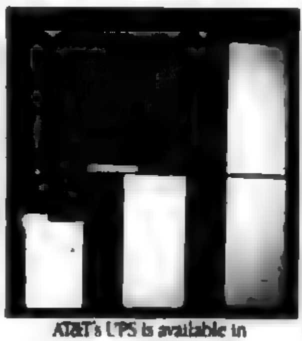
Apple: The Mac II also offers a natural upgrade path, this time for the one million current Macintosh users. But its most important characteristic is its enforced user interface that makes software extraordinarily easy to use. Users find every new program easy to learn because its interface is familiar.

The Macintosh is also responsible for having revolutionised text and graphics integration, now called desktop publishing. These capabilities are fully integrated in the Mac II.

Another Apple exclusive is Nubus. Third-party boards designed to be compatible with Nubus are automatically configured by the Macintosh operating system. Users need only plug in a compatible, a higher resolution graphics card or a compatible coprocessor, and the operating system automatically knows it is there and how to use it.

DEC: The Vaxstation 2000 is the undisputed price leader at $4,600 for a diskless workstation sporting a multitasking operating system and at least 1,000 lines of resolution.

In addition, DEC's VMS and Vaxcluster offer unique benefits to buyers of



AT&T's UPS is available in 1, 3, 5 and 10 KVA models.

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AT&T offers two product lines to combat these disturbances: the Uninterruptible Power System (UPS) and the Power Line Conditioner (PLC). Each effectively eliminates power fluctuations, including noise, transients, peaks, brownouts, and distortions. The difference being that the UPS includes a built-in battery reserve for protection against blackouts. The UPS is available in 1, 3, 5 and 10 KVA power ranges. The PLC is available in 3, 5 and 10 KVA models.

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Vaxstations. VMS is the same operating system that runs on the tens of thousands of larger VAX computers found in engineering, scientific and commercial settings throughout the world. Everyone who runs a VAX can use the Vaxstation 2000 to off-load processing and improve response time.

In fact, through the Vaxcluster networking system, the larger VAX can be a file server for diskless Vaxstations. Buying VMS workstations offers VAX users transparent integration between desktop and larger computers and, consequently, savings in training and software costs. DEC's Vaxcluster offers a network operating system that automatically shifts jobs to the most appropriate processor, thus optimizing the use of processors and speeding work.

Apollo: Apollo combines expandability — through its AT- and XT-compatible expansion slots — with the fastest network offering. Apollo's token-ring network is at least 20% (12 million bit/sec. vs. 10 million bit/sec.) faster than the Ethernet offerings favored by most of its competitors.

Apollo also offers a unique dual-ported Unix operating system that runs both University of California at Berkeley's Unix 4.2 and AT&T's Unix System V. In addition, Apollo has the only software-based MS-DOS compatibility on the Motorola, Inc. 68020 processor. The vendor also offers a standard facility that captures all text sent to any window on the screen.

Apollo's Domain Network Operating System can distribute part or all of specific tasks to multiple remote processors, even if they are not Apollo workstations.

Sun: Sun's workstations offer the highest resolution, the largest screens (19 in.) and the fastest disks.

The vendor also offers a connectivity advantage that appeals to many software developers. Sun's Network File System (NFS) architecture has been adopted by so many computer vendors that developers using Sun workstations can build distributed applications that know how to access data on a wide variety of computers. To date, more than 120 vendors, including Alliant Computer Systems Corp., Convex Computer Corp., Computer Consoles, Inc., Data General Corp., Gould, Inc., HP (under HP/IX) Silicon Graphics, Inc., Wang Laboratories, Inc., Texas Instruments, Inc. and even DEC under its Ultrix operating system, have announced compatibility with the connectivity of Sun's NFS architecture.

> "THERE will always be low-end, mid-range and high-end workstations. But today's high end will be the low end of tomorrow."
>
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> MACHOVER ASSOCIATES CORP.

HP: HP has established the largest installed base, partly because it started the color engineering workstation market eight years ago with its 9845/C workstation and partly because the corporation has long served the workstation needs of instrument control users. HP offers an operating system called Rocky Mountain Basic OS, which was designed to meet the needs of that user community.

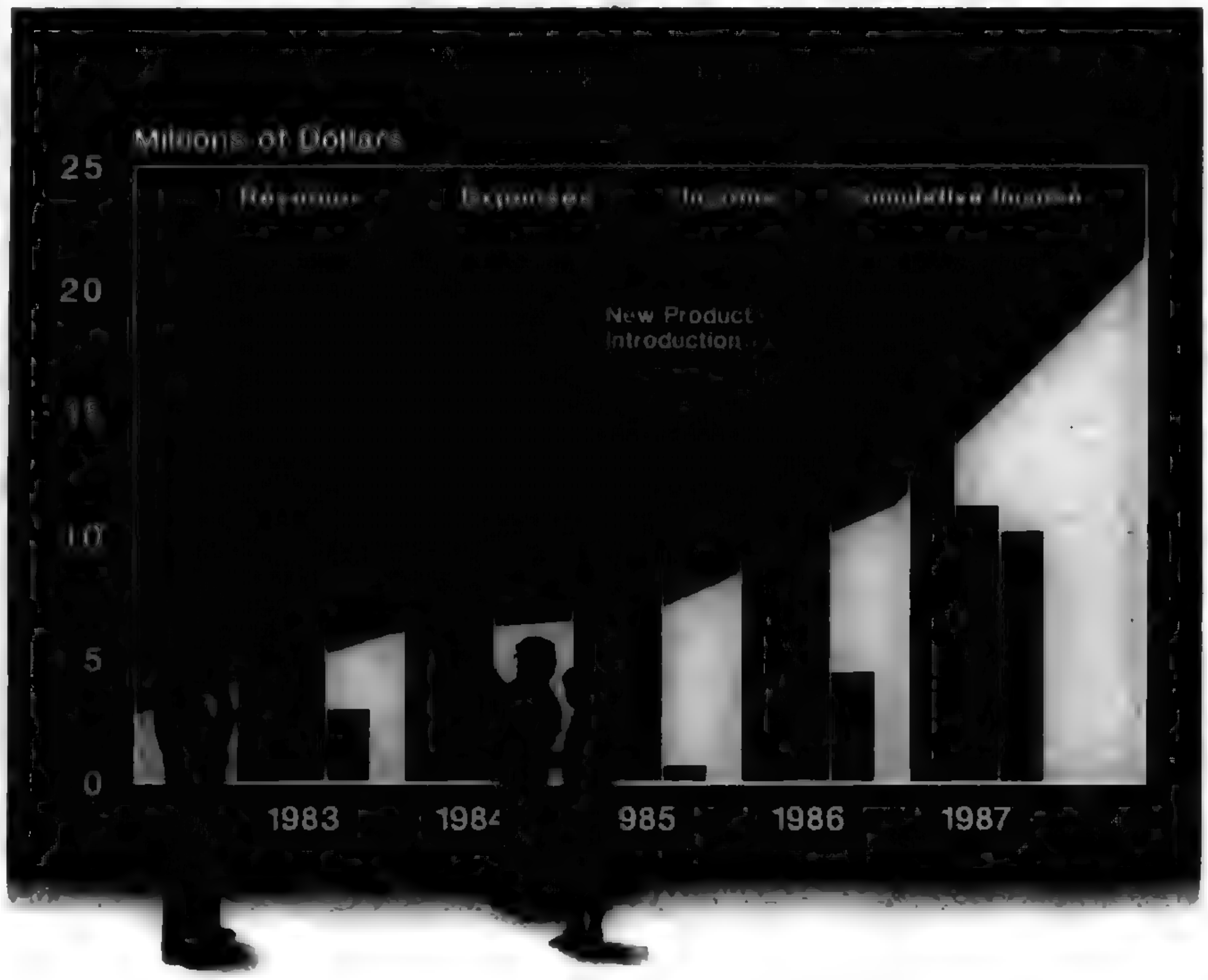
HP's workstations are bought primarily by owners of HP 3000 minicomputers. New companies are taking a closer look at HP, though, because it focuses more directly on total cost of ownership rather than simply initial capital expenditures.

HP's $18-per-month maintenance fee is 75% less than Apollo's and 60% less than DEC's charge for maintaining a comparable workstation. Lower maintenance fees generally reflect greater reliability or at least greater manufacturer confidence in the machine.

The future of workstations

What has been discussed here is what workstation vendors call the low end of the workstation market. Higher performance

Continued on page S10



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Raster graphics add life to designs

BY CHARLES P. LECHT

A major weakness in just about all of today's vector graphics systems is their inability to generate movies of their output without the use of film — that is, to create computer-driven real-time animated movies at low cost.

The majority of affordable systems employ technologies that drive displays with very slow refresh rates. Also, the methods by which pictures are created and manipulated require extensive mathematical computations per frame, so even if display refresh rates could be sped, the calculation time would make animated output impossible unless very high-cost vector-processing systems were used to perform the computation.

Beyond these two problems, there is also the storage issue. Vast memory would be needed to store the frame data. Animated movies, computer-produced and shown in real time, require the computer to display frames at speeds of at least 15 frames per second.

Bit-map solution

The solution is to mix vector graphics systems technologies with those we call bit-mapped or raster graphics on low-cost systems. Bit-mapped graphics allow the creation of photographic-quality images without the laborious computation that accompanies vector graphics images. Although there have been instances of its use within supercomputer environments, bit-mapped graphics software for less powerful systems was unavailable until this decade.

In the early 1980s, innovations in display and software technologies, as well as in logic and memory, set the stage for bit-mapped graphics breakthroughs. No longer burdened by hardware constraints, people started to create the software needed to animate photographic-quality images that were either drawn or captured with video equipment.

Picture making is at the heart of any graphics system, be it vector or bit-mapped. Bit-mapped software can aid in producing anything from simple two-dimensional pictures to beautiful three-dimensional images. Systems using this type of software (sometimes referred to as "painting systems") provide users with the electronic tools needed to capture their results on film or paper.

Today, the use of bit-mapped picture-creation systems is commonplace; science-fiction films, TV commercials, cartoons and even business presentations employ it. While the transferral process to film or videotape has been cumbersome and demanding of a certain amount of after-the-fact laboratory processing, the results achieved are as good or better than those obtained from conventionally made pictures. Recent developments in bit-mapped graphics now offer the promise that film may be avoided altogether.

Quickness and ease

Real-time computer-produced and computer-generated movies are already feasible and are getting ever better. Picture data base- encoding methods are emerging that feature increasingly lower memory usage per frame. The fact that memory requirements are dropping at the same time that larger and faster memories are becoming available means that longer film sequences, paged from disk, may be stored in random-access memory. Once there, a relatively simple program may be used to interpret frame-description parameters and flash pictures on the screen as fast or faster than we experience while watching conventional movies.

Although this is a much-simplified description of the process, movies can be produced very quickly and can be easily altered by professionals and amateurs alike. In practical terms, this means having the potential to do things like featuring beautifully rendered engineering drawings in a moving sequence that shows the results of the multiplicity of decisions that go into a product design or to create a 3-D electronic wind tunnel on a screen.

It is true that real-time movie-making systems cannot currently store, retrieve and display high-resolution million-color pictures, but they are still useful anyway. In the world of computer-produced picture making, a large (if not the largest) need is for simple images to consist of only a few colors. From weather maps to business charts to quick sketches of just about anything, it is this basic type of graphics that we encounter most often. The best painting systems

Continued on page S10

Lecht is chairman of Lecht Sciences, Inc./Japan, a Tokyo-based software think tank specializing in graphics. He is also an elected public member of the Hudson Institute and a free-lance writer on science topics.

VENDOR VIEWPOINT

Drawing distinctions among today's graphics workstations

BY PAUL BEMIS

Until recently, designers, drafters and others involved in product modeling and styling were effectively limited to wire-frame representations by the processing and graphics constraints of their computers.

Today, a new generation of system architecture and hardware technology enables users to rapidly create and display complex three-dimensional scenes. Consequently, computer graphics workstations and applications are moving in the direction of solids rendering, which is clearly a more effective and accurate approach to modeling.

With these new capabilities comes the need for a clear understanding of some of the more subtle features of high-performance graphics workstations, including the workings of the graphics pipeline, the piece of the system hardware that actually draws the images on the display.

TODAY'S SYSTEMS provide additional modeling features and benefits, including environmental lighting and material control, independent of the modeling data base.

Most of today's sophisticated solid modeling applications generate polygonal models of the geometric data to be rendered by the graphics subsystem. But simply generating polygonal models is not enough for every situation. There are differences among systems that make some more capable than others for certain tasks.

In wire-frame representation, the boundaries of the model are drawn using vectors. This is sufficient to convey geometric information about simple models, but wire-frame modeling becomes confusing once realistic data bases, such as for an automobile engine, are rendered.

Although graphics devices have been able to render these data bases as solid models for years, the performance was too slow to be practical for dynamic interaction.

The introduction of systems that allow users to interact with existing models rendered in a solid form is the next step in the evolution of graphics workstation technology.

Today's systems provide additional modeling features and benefits, including environmental lighting and material control, independent of the modeling data base.

The manner in which light strikes an object can reveal a great deal about its geometry. By simulating real-world lighting accurately, additional insight into existing polygonal data bases can be discerned. Unlike vector representation of 3-D models that have no surfaces, solid polygonal 3-D display requires properties of light to illustrate depth and promote realism.

When a model is lighted correctly, the smoothness of a curved surface can be examined as closely as the surface of your automobile after you wax it. Aircraft designers use bright spotlights to determine the smoothness of the wing and fuselage design, which are directly related to drag. Industrial designers are interested in how products look under colored fluorescent lights.

When users are able to choose among many lighting alternatives for illumination of their geometric creations, the result is realistic model representations that enable the user to investigate many alternative designs without having to physically build a model.

After considering the necessary graphics features, the potential buyer must then turn his attention to the performance issue.

Most suppliers of graphics systems talk in terms of polygons per second as a measure of the speed of their workstation. However, the speed at which polygons are created is only a small part of the story.

When comparing workstations, simple performance figures such as polygons per second, vectors per second or transforms per second, can be more misleading than specifying CPU performance with ratings such as million instructions per second or Whetstones.

How can a solid object be smoothly rotated if it takes half a second to clear the screen between each rendering? How usable is a system that renders quickly but takes minutes to load a display list from the CPU before it can start?

Beyond the creation speed, it is important to know the access time to get polygonal data into the geometry pipeline, the transform speed, the cost in compute time of each light in a scene and the overhead cost if the machine does not support lights.

Each of these parameters must be understood before one can determine if a particular application will perform well on a given workstation.

Never trust a polygon

Polygons take on many shapes and sizes, so classifying performance based exclusively on polygons per second is misleading. The term "polygon" does not constrain the number of vertices requiring computation, nor does it constrain the size.

Trade-offs must be made early in the design phase that optimize the system for solving a particular set of problems. These designs should be cognizant of the growth in complex geometry that is desired to be viewed. Today's engineering development environment is heavily influenced by the desire to rapidly display and manipulate complex 3-D polygonal models that are made up of thousands of polygons. The goal should be to display increasingly larger and more complex models.

Some vendors will mask deficiencies by claiming high speeds on polygons that best meet the constraints of their system. It is therefore important to ask about the size and number of vertices in the polygons being measured and whether the polygons in the measurement are smooth or flat shaded.

Typically, flat-shaded polygons will render faster because the render processor does not need to interpolate each pixel during draw time.

There is currently no industry standard by which the performance of graphics can be measured. Understanding the issues surrounding their performance will, however, help users find their way through the confusion to a graphics workstation that meets their particular requirements. •

Bemis is a senior product manager at Apollo Computer, Inc., and works closely with the company's research and development organization.

Mechanical/architectural design software

COMPANY	PRODUCT NAME	TYPICAL USE	UNIQUE FEATURES	TWO- OR THREE-DIMENSIONAL	TYPES OF 3-D MODELING SUPPORTED	CONFIGURATION/DRAWING MANAGEMENT SOFTWARE	INCLUDES USER PROGRAMMING LANGUAGE	PROGRAMMABLE MENUS	INTERACTION METHOD(S)	ON-SCREEN CROSS-HATCHING	IGES[1] SUPPORTED FOR INPUT, OUTPUT OR BOTH	IGES VERSION SUPPORTED	ROTATION FREE OR IN 90° INCREMENTS	DIMENSIONING: ANSI, ISO OR BOTH	AVERAGE NUMBER OF SEATS PER CPU	PRICE PER COPY
[illegible], Inc. (212) [illegible]	Space Edit	Architectural engineering, interior design	Multiple layers, walk-through mode, line removal, 2- or 3-point perspective	Both	Wire-frame, solids, shaded	Yes	No	No	Keyboard, mouse, tablet	Yes	—	3.0	Rotation free	Associative	1	$825
ACBS Graphics Systems, Inc (818) 770-9831	Facilities Management Product	Building management leasing, structural, architectural	Fully integrated data base and graphics systems	Both	Wire-frame	Yes	Yes	Yes	Keyboard, mouse, tablet	Yes	Both	2.0	Rotation free	Both with some exceptions	1 to 5	Contact vendor
Adra Systems, Inc. (617) [illegible]	Cadra-II	Mechanical design and drafting	1/10 second average response, proprietary hardware	2½-D	NA	Yes	Optional	Yes	Tablet, stylus	Yes	Both	3.0	Rotation free	Both, also JIS & BSI	1	From $14,750 (including hardware)
American Channels, Inc (617) [illegible]	DIAD	Mechanical design and drafting, solids modeling, drawing office management	Associative dimensions, diagnostic ability to incorporate complex double curved surfaces within solid model, ability to take data from parts listing and apply to drawing office management	Both	Surface, solids	Yes	Yes	Yes	Keyboard, mouse, tablet	Yes	Both	2.0	Rotation free	Both	8	From $9,000
	Applicon Bravo 3	Electro-mechanical CAD[2]/CAM[3]/CAE[4]	—	Both	Wire-frame, surface, solids	Yes	Yes	Yes	Keyboard, function keys, pen tablet	Yes	Both	3.0	Rotation free	Both	4 per Microvax II; more on larger systems	Contact vendor
Automation Technology Products, Inc. (408) [illegible]	[illegible]	CAE, CIM	Solids modeling system with specialized CIM data base supporting manufacturing and [illegible] standard	3-D	Wire-frame, surfaces, solids	Yes	Yes	Yes	Keyboard	Yes	Both	2.0 geometric entities	Rotation free	General Dimensions + Tolerances on solids	Hardware-dependent	Contact vendor
Auto-Trol Technology Corp. (800) [illegible]	Series 7000	Mechanical design and manufacturing	Integrated with relational DBMS	Both	Wire-frame, surface, solids	Optional	Yes	Yes	Keyboard, mouse, tablet, on-screen menus	Yes	Both	3.0	Rotation free	Both	1	Contact vendor
	Series 5000	Architectural Toolbox	Integrated with relational DBMS	Both	NA	Optional	Yes	Yes	Keyboard, mouse, tablet, on-screen menus	Yes	Both	3.0	Rotation free	Both	1	Contact vendor
Battelle Columbus Division (614) [illegible]	[illegible]	Mechanical CAD/CAM	Associative data base, collision detection	3-D	Wire-frame, surface, solids	No	No	Yes	Mouse with menus	Yes	Both	3.1	Rotation free	Both	1	$16,000-$25,000
Cadkey Division of Micro Control Systems (203) 647-0220	Cadkey	3-D design engineering	3-D system with open architecture programming language	3-D	Wire-frame	Yes	Yes	Yes	Keyboard, mouse, tablet, digitizer	Yes	Both	3.0	Rotation free	Both	1	$3,195
[illegible], Inc. [illegible]	[illegible]	Land surveying, mapping	Interfaces with all popular data collectors, Hewlett-Packard Co. HP 41	Both	Surface	NA	Yes	Yes, limited	Keyboard	NA	Output	3.0	Rotation free	NA	1 in a stand-alone environment, also runs on Apollo and VAX	$2,495
[illegible] Systems (317) 844-7137	3D CAD	Mechanical design	PC-based, 3-D CAD	3-D	Wire-frame, planes	No	No	No	Keyboard, mouse	No	No	NA	Rotation free	ANSI	1	$349
Camax Systems, Inc. (612) [illegible]	Camand	Manufacturing engineering	Numeric control machining, mold design, mold analysis	3-D	Surfaces	Yes	Yes	No	Keyboard, mouse, on-screen menus	Yes	Both	3.0	Rotation free	Both	1	[illegible]
Carrier Corp. (315) [illegible]	E20-II Toolkit	Computer-aided drafting for HVAC	Macros, fonts and symbols for Autocad and Versacad	2-D	NA	No	Yes	Yes	Keyboard, tablet	Yes	Both	3.0	Rotation free	NA	—	$595
[illegible] Manufacturing Co. (314) [illegible]	Tool Designers Assistant	[illegible]	[illegible]	Both	Wire-frame	No	No	No	Keyboard, mouse, tablet	No	Input	3.0, 2.0	Rotation free	NA	NA	Contact vendor
Cascade Graphics Systems, Inc (714) 474-6200	Atlas	Architectural, mechanical, electronics, chemical engineering and HVAC	—	3-D	NA	—	—	Optional	Keyboard, mouse, joystick, tablet, other	Yes				ANSI	—	$1,990
Cimlinc, Inc. (312) [illegible]	Cim CAD	2½-D design, detailing and drafting	Two-way integration, user interface customizable by user, versions available for factory floor	2½-D	NA	Optional	Yes	Yes	Keyboard, mouse	Yes	Both	—	Rotation free	Both	1	$4,495
	Cim Edit	Editing drawings into Cimlinc environment from other 2- and 3-D CAD systems	—	2½-D	NA	No	Yes	Yes	Keyboard, mouse and icons	Yes	Both	2.0	Rotation free	Both	1	$2,995
	Parametric Modeling	Parts design and drafting	Dynamic memory allocation	2½-D	NA	No	Yes	Yes	Keyboard, mouse and icons	Yes	Both	2.0	Rotation free	Both	1	$2,995
	Cim Solid	3-, 4- or 5-axis drafting	Multiple-axis drawing	3-D	Wire-frame,	No	Yes	Yes	Keyboard, mouse and icons	Yes	Both	2.0	Rotation free	Both	1	$3,495
Com-Code Associates, Inc (313) [illegible]	DP-200	Mechanical drafting	Construction lines, isometric grids	2-D	NA	No	Yes	Yes	Keyboard, mouse, tablet	Yes	Both	3.1	90-degree increments	ANSI		From $1,295
[illegible] Co. (800) [illegible]	[illegible]	Generating engineering, architectural drawings	2-D, 3-D design, drafting with capability of 40 separate layers on Mac Plus	Both	Wire-frame, solids	—	Yes	No	Mouse	Yes	Both	3.0	Rotation free	Both	1	$495
Control Data Corp. (612) [illegible]	ICEM Plus	Mechanical, electrical CAD/CAM/CAE	Applications integrated under one information management system to manage data across product life cycle	3-D	Wire-frame, surface, solids	Yes	Yes	Yes	Keyboard, mouse, tablet	Yes	Both	2.0, 3.0	Rotation free	Both	1 on a work station to 60+ on largest processor	From $6,300
[illegible] (404) [illegible]	[illegible]	3-D modeling	Interfaces with Universal Analytics' Nastran program for structural analysis, interface for APT language used for numerically controlled machining, robotics application strategy planner	Both	Wire-frame, surface, solids	Yes	Yes	Yes	Keyboard	Yes	Both	3.1	Rotation free	—	—	$3,000
Data Automation (619) 743-3334	DGS-2000	Mechanical drafting	Contains command file, curve-fitting splines, arc text	2-D	NA	Yes	Yes	Yes	Keyboard, tablet	Yes	Both	3.0	Rotation free	ANSI	1	$2,495
[illegible] Graphics (617) [illegible]	[illegible]	Facilities management	[illegible] drawings onto CPU for customer	2-D	NA	Yes	No	No	Keyboard, mouse, tablet, thumbwheels	Yes	NA	NA	Rotation free	Neither, proprietary	[illegible]	$5,000-$20,000
DPI/Systems, Inc [illegible]	Furniture Design Management System	Interior architectural planning and management		2-D	NA	—	Yes, limited	No	Keyboard, mouse	No	No	NA	Rotation free	NA	1	Contact vendor
	[illegible]	Drafting	—	2-D	NA	Yes	Yes	Yes	Keyboard, mouse	Yes	Both	3.0	Rotation free	NA	1	Contact vendor
[illegible] Intelligent Systems, Inc. [illegible]	[illegible]	CAE, AEC[5]	Integrates multiple data bases with CAD drawings, specifically specifications data, video (pictorial) images and electronic catalogs (CD-ROM)	Both	[illegible] functions	Yes	Yes	Yes	Keyboard, mouse, tablet	Yes	Both	3.0	Rotation free	Both	1	[illegible]

[1] Initial graphics exchange specification [2] Computer-aided design [3] Computer-aided manufacturing [4] Computer-aided engineering [5] Architectural engineering construction [6] Computer-aided design and drafting

The companies included in this chart responded to a recent telephone survey conducted by *Computerworld*. Further product information is available from vendors.

Clash

CONTINUED FROM PAGE S8

workstations offer features such as attached processors for accelerating complex computation and high-performance graphics processors that can display shaded 3-D solid models of objects moving in real time.

One of the most respected observers of the technical workstation market, Carl Machover, president of Machover Associates Corp., describes the future in these words: "There will always be low-end, mid-range and high-end workstations. But today's high end will be the low end of tomorrow."

Frank Casanova, product manager at Apollo, echoes that sentiment when he notes that, when IBM's PS/2 workstation capabilities catch up with Apollo's, "we will be another generation ahead."

A topic in more contention among computer industry watchers is the question of whether future workstations will be built on proprietary platforms — integrating processors from one manufacturer and other components from others — or on standard platforms from the largest, lowest cost producers, such as the Vaxstation or the IBM PS/2, with high-performance graphics boards and coprocessors added in. New graphics boards are already being shown that can write 33 million vectors in one second. At the same time, however, small, virtually unknown workstation vendors are privately demonstrating systems that boast 25 MIPS of processing power.

Many industry watchers say they feel that the low end will move toward standard platforms while the high end will remain proprietary. However, this division of approach may end when the very powerful coprocessors become available for standard platforms.

Among the most controversial issues

Continued on page S12

Raster

CONTINUED FROM PAGE S9

(those that produce ray-traced 3-D images of complicated scenes on high-resolution media) are really not needed to produce these. Besides, given the current rate of graphics evolution, the limitations on resolution and palette choice will not persist for long.

Within the next few years, we can expect to see a graphics workstation that will provide an integrated vector and bit-mapped graphics capability for the cost of a personal computer. It will be capable of providing all the color anyone could ask for and, because of its vast memory and high speed, will be capable of producing real-time animated movies of great length for output to a wide range of media.

Vector graphics systems have taken us a long way. They have given us the capacity to define an object and obtain different views of it through rotation and scaling methodologies and, in doing so, have revolutionized design and display processes for airframe manufacturers and architectural and civil engineering firms. They have benefited such diverse fields as medicine, advertising, petroleum research and the movie industry. Only when vector and bit-mapped technologies are combined, however, will we really begin to capture reality. ■

COMPANY	PRODUCT NAME	TYPICAL USE	UNIQUE FEATURES	TWO- OR THREE-DIMENSIONAL	TYPES OF 3-D MODELING SUPPORTED	CONFIGURATION/DRAWING MANAGEMENT SOFTWARE	INCLUDES USER PROGRAMMING LANGUAGE	PROGRAMMABLE MENUS	INTERACTION METHOD(S)	ON-SCREEN CROSS-HATCHING	IGES* SUPPORTED FOR INPUT, OUTPUT OR BOTH	IGES VERSION SUPPORTED	ROTATION FREE OR IN 90° INCREMENTS	DIMENSIONING: ANSI, ISO OR BOTH	AVERAGE NUMBER OF SEATS PER CPU	PRICE PER COPY
[illegible]	[illegible]	[illegible]	[illegible]	3-D	[illegible]	Yes	No	No	[illegible]	No	Both	[illegible]	[illegible]	[illegible]	1	[illegible]
[illegible] Research, Inc. (314) 421-2771	Energraphics 2.01	CAD business package	Wide-ranging business purposes	Both	Surface	Yes	No	No	Keyboard, mouse, tablet	Yes	No	NA	Rotation free	NA	NA	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	3-D	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	4	[illegible]
Super [illegible] Systems, Inc. (415) [illegible]	[illegible]	Schematic diagramming	Object-oriented data base, defined connection logic, built-in plotting	3-D	—	No	Yes	Yes	Keyboard, mouse	No	No	NA	90-degree increments	Neither	1	$1,500
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
General CAD/CAM, Inc. (818) [illegible]	[illegible]	Drawing exchange between incompatible CAD systems	Full entity intelligence maintenance	NA	NA	No	No	No	Keyboard	NA	No	NA	NA	Both	NA	$1,000- $7,500
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	—	[illegible]	[illegible]	[illegible]
[illegible], Inc. [illegible]	[illegible]	Design, specifications, management of office furniture	Furniture management, inventory	[illegible]	NA	Yes	Yes	No	Keyboard	Yes	Both	—	1-degree increments	—	1	$12,000
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Hewlett-Packard Co.	Hewlett-Packard Design Center Mechanical Engineering Series 5	Drafting, documentation	Integrated design, user interface, traditional design methodology, drafting standards, full dimensioning capability, parts and assembly capability	[illegible]	NA	—	Yes	No	Keyboard, mouse, tablet	Yes	Input	3.0	Rotation free	Both	1	[illegible]
	Hewlett-Packard Design Center Mechanical Engineering Series 10	Drafting, design	Integrated design, user interface, traditional design methodology, flexibility, customization, variational design capability, adaptive design with powerful manipulation, parts assembly structure	[illegible]	NA	—	Yes	Yes	Keyboard, mouse, tablet	Yes	Both	3.0	Rotation free	Both	1	$10,000
	Hewlett-Packard Design Center Mechanical Engineering Series 30	Modeling, design, drafting	Integrated 2-D and solid model design, user interface, traditional design methodology for creation of solid models, 3-D variational design, 3-D assemblies, state-of-the-art graphics capability	3-D	Solids	—	Yes	Yes	Keyboard, tablet	Yes	Both	3.0	Rotation free	Both	1	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	1	[illegible]
ICAM Technologies Corp. (514) [illegible]	CAM-DES	Mechanical, electrical	DFX in and out, full integration with ICAM CAM software	3-D	NA	No	Yes	No	Tablet and/or mouse	Yes	Both	3.0	Rotation free	Both	PC supports 1, VAX supports many	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Intercad Corp. (301) [illegible]	[illegible]	Technical illustration	Axonometric projection, shading, masking, vector editing, dynamic dragging	Both	Solids	Yes	Yes	Yes	Keyboard, mouse, tablet	Yes	Both	3.0	Rotation free	ANSI	1	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]	[illegible]	—	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Integrated Industrial Information, Inc. (919) 831-1383	CAD Pack	Mechanical design	Communication with IBM mainframe	[illegible]	NA	No	No	Yes	Keyboard, mouse, tablet	No	No	NA	Rotation free	Both	1	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	—	[illegible]
International Graphics Engineering Systems, Inc. (714) [illegible]	Arcad	Architectural design, facilities management	Coordinated geometry for civil engineering	Both	Wire-frame	No	No	Yes	Keyboard, tablet	Yes	Both	3.0	Rotation free	Both	4 or 5	$25,000
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	1	[illegible]
	[illegible]	[illegible]	[illegible]	3-D	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	1	[illegible]
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible] & Associates, Inc. (303) 761-[illegible]	[illegible]	Land development	Completely integrated land development system, from surveying to finished drawings	3-D	Wire-frame surface	Yes	No	No	Keyboard, tablet	No	Input	2.0	Rotation free	ANSI	[illegible]	From $32,000
[illegible]	[illegible]	[illegible]	[illegible]	3-D	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]	[illegible]	[illegible]	3-D	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	1	[illegible]

Exploration

CONTINUED FROM PAGE S5

Stellar Computer, Inc. in Newton, Mass., are both expected to introduce 20- to 30-million instructions per second workstations that have the computational performance of the minisupercomputers already on the market and more than five times the graphics capability of today's 3-D workstation leaders.

However, if the price tags of these workstations turn out to fall in the $75,000 to $100,000 price range, as both companies' founders have said they will, then Stellar and Dana could be the industry's new Apollo or Alliant Computer Systems Corp./Convex Computer Corp. in their establishment of new price/-performance levels.

Even in early outline, the next wave of 3-D workstation products clearly demonstrates an ongoing improvement of the price/performance ratio.

The graphics capability first offered on technical workstations in 1982 and 1983 for $40,000 to $50,000 is currently available on the so-called low-end systems for at least one-third the cost. In today's market, it costs less than $18,000, for instance, to purchase a fully configured Apollo Series 3000, which includes a 19-in. color monitor, 1,024- by 800-pixel resolution, a 4M-byte memory and a 155M-byte disk.

EVEN today's top 3-D workstations cannot realistically simulate a human being running in real-time, with on-the-spot calculations. A lifelike image of Michael J. Fox dashing from his apartment for a can of soda, for example, would require millions of polygons — thousands for his face alone.

Although the same economies of scale apply to future products, the performance curve is increasing much faster today than it did in the early 1980s.

Today's three-dimensional graphics workstations are priced at $60,000 to $90,000. In mid-1988, it will be possible for users to buy three-dimensional systems that will provide more than five times the graphics performance for approximately the same price. Prices for workstations that are less functional will decline sharply.

Technical improvements in graphics board sets, combined with the anticipated movement of terminal manufacturers such as Raster Technologies, Inc. into the graphics board business, means that personal computer users will soon have the ability to produce much more than business and presentation graphics on their machines.

Such hardware and graphics advances will make visual computing — the ability to graphically interpret, analyze and visualize information on a computer screen — an easily affordable reality.

More important for the long term, visual computing will enable the development of applications to meet needs that we cannot yet even begin to anticipate. ●

COMPANY	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	3-D	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	—	[illegible]	[illegible]
Mega CADD, Inc. (206) 623-6245	Design Board Professional	3-D modeling, design	Presentations, illustrations, unlimited perspective views	3-D	Wire-frame, surface, automatic hidden-line removal	No	No	No	Keyboard, mouse, tablet	Yes	No	NA	Rotation free	NA	1	$1,750
	Design Board Link	Transfer of drawings to popular drafting products	—	Both	Wire-frame, surface	No	No	No	Keyboard	No	No	NA	NA	NA	1	$395
	Design Board Illustrator	Color renderings, slide-show presentations, animation of views created in Design Board Professional	—	3-D	Wire-frame, surface	NA	No	No	Keyboard, mouse, tablet	Yes	No	NA	NA	NA	1	$95
[illegible]	[illegible]	Architectural, engineering CAD	—	Both	Wire-frame, surface	Yes	Optional	Optional	Keyboard, mouse, tablet	Yes	[illegible]	[illegible]	[illegible]	Both	1	[illegible]
Micro CAD/CAM (212) 838-7381	MGM Station	Mechanical, industrial design and drafting	Macintosh-oriented	2-D	NA	Yes	No	No	Keyboard, mouse	Yes	Both	3.0	Rotation free	Both	1	$795
[illegible]	[illegible]	General-purpose drafting, mechanical, civil, architectural	[illegible]	Both	Wire-frame, surface, solids	Yes	Yes	Yes	Keyboard, mouse, tablet, joystick	Yes	Both	3.0	Rotation free	Both	[illegible]	[illegible]
Palette Systems, Inc. (617) 273-0880	Palette	Mechanical, architectural CAD	High-productivity user interface, flexible interfacing, powerful data base, multidisciplinary, large drawings	Both	Wire-frame, surface, color shading	Yes	Yes	Yes	Keyboard, mouse, tablet	Yes	Both	3.0	Rotation free	Both	10	From $5,000
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	—	Yes	No	No	—	—	No	NA	[illegible]	Both	1	[illegible]
Prime Computer, Inc. (800) 343-2540	Prime Medusa	Design, drafting, manufacturing	Ease of use, 3-D solids from 2-D orthographics, variational geometry	Both	Solids, complete wire-frame	Yes	Yes	Yes	Keyboard, mouse, tablet, joystick	Yes	Both	3.0	Rotation free	Both, also DIN, JIS	NA	$15,500
	Prime Medusa/AEC	Design, drafting	Applications-specific integrated circuit studies in variational geometry, scheduling capabilities, topographic attributes	Both	Wire-frame, surface, solids	Yes	Yes	Yes	Keyboard, mouse, tablet, joystick, voice	Yes	Both	3.0	Rotation free	Both, also DIN, JIS, AEC, BSI	NA	$7,000
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	NA	Yes	No	No	Keyboard, mouse, tablet	Yes	Both	3.0	[illegible]	Both	1	[illegible]
	[illegible]	Solids modeling	[illegible]	[illegible]	Solids	Yes	No	No	Keyboard, mouse, tablet	[illegible]	Both	3.0	[illegible]	Both	1	From $1,[illegible]
[illegible] Systems, Inc. (800) 225-7360	Drawbase	CAD	Drawing and data base management within one product	Both	Wire-frame	Yes	Yes	Yes, limited	Keyboard, digitizing menu	Yes	No	NA	Rotation free	Both	1	$8,000
[illegible]	[illegible]	[illegible]	Solids-based	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	Keyboard, mouse, tablet	Yes	Both	[illegible]	[illegible]	Both	—	[illegible]
Supercade, Inc. (408) 970-0460	Supercade	Mechanical design and drafting	Automatic associative dimensioning, model mode and drawing mode, multiple views	3-D	Wire-frame, surface	Yes	Yes	Yes	Keyboard, mouse, tablet	Yes	Both	3.0, 3.2	Rotation free	Both	1 to 10	Contact vendor
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	NA	Yes	Yes	[illegible]	Keyboard, mouse, tablet, [illegible]	Yes	Both	[illegible]	[illegible]	Both	[illegible]	[illegible]
[illegible], Inc. (800) 231-2730	M/PE	Graphics application development and integration including CAD	User can temporarily interrupt one operation to perform another	3-D	Wire-frame, surface, solids	Yes	Yes	Yes	Keyboard, mouse, tablet, icons	Yes	Both	3.0	Rotation free	Both, also DIN, BSI	NA	$80,000
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	—	[illegible]	—	[illegible]	[illegible]
Universal Intergraphics Corp. (714) 888-3888	3-D Graphics CADD	Mechanical design and modeling, structural and architectural design and drafting	Full 3-D design, modeling, drafting, fast and flexible, with powerful programming facility	3-D	Wire-frame, surface	Yes	Yes	Yes	Keyboard, mouse, tablet	Yes	Both	3.0	Real-time rotation on all three axes at any increment	Both	1	$3,995
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	Yes	Yes	Yes	Keyboard, mouse, tablet	Yes	[illegible]	[illegible]	[illegible]	[illegible]	1	[illegible]
	[illegible]	[illegible]	[illegible]	[illegible]	NA	Yes	Yes	Yes	Keyboard, mouse, tablet	Yes	[illegible]	[illegible]	[illegible]	[illegible]	1	[illegible]
	[illegible]	[illegible]	[illegible]	[illegible]	NA	Yes	Yes	Yes	Keyboard, mouse, tablet	Yes	[illegible]	[illegible]	[illegible]	[illegible]	1	[illegible]
	[illegible]	[illegible]	[illegible]	[illegible]	NA	Yes	Yes	Yes	Keyboard, mouse, tablet	Yes	[illegible]	[illegible]	[illegible]	[illegible]	1	[illegible]
[illegible] Corp. (800) 663-1177	2D Designer	Mechanical engineering	Metric or English measurements, automatic dimensioning, up to 6-layer drawings, area and angle calculation, merge library parts to plotting sheet	2-D	NA	Yes	Yes	No	Keyboard, mouse	Yes	No	NA	90-degree increments	Automatic	1	$395
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	—	No	No	Keyboard, mouse, tablet	[illegible]	[illegible]	[illegible]	[illegible]	NA	1	[illegible]
Weber Systems, Inc. (414) 783-6181	Prompt Plus CAD/CAM	Mechanical CAD for numerically controlled equipment	Drafting, tool cutting integrated, fully NC capable	3-D	Wire-frame surface	Yes	Yes	No	Keyboard, mouse, tablet	Yes	Both	Most recent version	Rotation free	Both	1	$35,000

Clash

FROM PAGE S10

facing the workstation market is whether IBM's and Microsoft's OS/2 will displace Unix as the operating system of choice among technical workstations.

OS/2's predecessor, MS-DOS, was inferior to Unix in two critical areas: It could not support programs of more than 640K bytes, and it could not support multitasking. But OS/2 will reportedly remove both of these handicaps and will bring to workstations all the desktop productivity tools created for the huge installed base of IBM PCs and compatibles.

Every Unix vendor's version of that operating system varies slightly from the others'. "Unix has to pull itself together to unify," EDS's Shubert says. Right now, each workstation vendor has a stake in differentiating its Unix version from that of its competitors, but if Unix fails to become one standard, developers of desktop productivity tools may shun it in favor of OS/2. If that happens, the days of Unix leadership on workstations may be numbered.

Software decides

In the final analysis, the winners and losers in the workstation market will be selected by software vendors. If the right software is not available for a workstation, no user will buy the equipment.

But what will be even more crucial to the workstation market is the fact that when a software developer selects one workstation over another, that vendor's choice may affect the dynamics of the market for years to come.

For example, Tom Brugerre, president of Mentor Graphics Corp., was influential in making Apollo successful by deciding to develop his computer-aided engineering software to run on Apollo computers and then by reselling those computers to his customers. At one time, Mentor accounted for 35% of all Apollo sales.

If software vendors ever decide to abandon Unix in favor of OS/2 and VMS, a dozen Unix-based workstation manufacturers may face troubled times. The only thing that would keep these software vendors in business would be the add-on sales to users of software that worked exclusively on their machines.

Power on every desk

Even if a shakeout does occur among workstation manufacturers, momentum toward less expensive and more powerful workstations will be continued by the high-performance add-on board manufacturers.

Furthermore, the capabilities now targeted only toward technical professionals will become the basic capabilities on workstations for the professional and managerial worker.

By 1990, the low-end desktop computer will offer 2 to 4 MIPS of processing power to run more sophisticated editing and data retrieval programs. It will offer a large 1,000- by 1,200-pixel screen to make complete documents readable on the screen.

There will be 3M to 6M bytes of RAM available, 100M bytes of mass storage (and/or access to a file server), network connections and a windowing, multitasking operating system.

And all these capabilities will be there for the asking for less than $6,000. ●

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Upswing

CONTINUED FROM PAGE 67

ed a year earlier.

The latest was Wang's best quarterly net income performance since earning 40 cents per share in the quarter ended Dec. 31, 1984. Since then, the firm has endured three quarterly losses, three quarters yielding earnings of 5 cents per share or less and three quarters of modest profits between 12 and 16 cents per share.

Analysts speculated that Wang has overcome its most troubled times and that its future prospects are good. "We can forecast that within a year or two, they'll be doing better," said Jay P. Stevens of Dean Witter Reynolds, Inc.

Because of heavy losses in the first two quarters, however, Wang reported a loss of $70.7 million, or 44 cents a share, for the fiscal year.

Some analysts expressed concern that the company needs to develop more exciting products and improve on existing products.

Product revenue grew only 11% from the like quarter last year, while revenue from services and rentals swelled 26% since that time. "You'd like something more positive to look forward to in the product line," said P. Martin Ressinger at Duff & Phelps, Inc. in Chicago.

Wang reported that its Intecom telecommunications equipment subsidiary achieved break-even performance for the first time during this quarter.

Prime. Natick, Mass.-based Prime reported net earnings slightly above industry expectations for the quarter. Earnings were $15.7 million, or 32 cents a share, up 37% from the like quarter last year. Revenue rose 12% to $236 million.

Analysts said that Prime's revenue was in line with expectations, while earnings were slightly better than expected as a result of increased gross margins Prime attributed to high demand for its new high-end 6350 CPU. Prime is looking for acquisitions in the computer-aided design and manufacturing market, according to Myron Kerstetter, an analyst at the Gartner Group, Inc.

Amdahl. The Sunnyvale, Calif.-based mainframe vendor reported a better quarter than expected, primarily because of sales of new products, analysts said.

Net income for the second quarter ended June 26 was $30.9 million, or 60 cents per share, up from $2.7 million, or 6 cents a share, in last year's comparable quarter. Revenue was $341 million, compared with $209.3 million in last year's second quarter. Analysts attributed the massive profit increase to high margins on new products, especially the 5890 Model 300 and disk drives.

This is the first time in recent history that Amdahl's margins have been higher than IBM's, analysts said.

Unisys Corp. Analysts said Unisys seems to be succeeding in its plans to cut expenses, but they gave mixed opinions about the company's long-term growth prospects. The company reported net income for the second quarter of $121.2 million, or 62 cents a share, on revenue of $2.3 billion.

"It's not clear whether there have been any real benefits on the revenue side" as a result of the Burroughs Corp. and Sperry Corp. merger, said William Milton Jr. of Brown Brothers Harriman & Co. in New York. "Can Unisys grow its revenue faster than Burroughs and Sperry would have been able to do individually? I don't think so, but it's too early to tell."

Cost savings for fiscal 1987 are expected to be about $300 million, according to George Podrasky Jr. of Duff & Phelps. An operating margin of 11% in the quarter shows that cost cutting has been effective to date, Milton said. The company also reported a debt-to-capital ratio below 35%, compared with a ratio of 39% at the end of the first quarter and 55% at the time of the Burroughs-Sperry merger.

Unisys expects a strong fourth quarter, following a traditionally slower third quarter, Chairman and Chief Executive Officer W. Michael Blumenthal said in a prepared statement.

Apollo. The Chelmsford, Mass.-based workstation maker reported its fifth consecutive quarter of increased sales and earnings.

Sales for the second quarter ended July 4 totaled $132 million, up 50% from the $88.3 million reported in the like quarter of 1986. Apollo's sales have increased 50% or more from year-earlier levels in each of the past four quarters.

Net income for the period was $7.6 million, or 21 cents per share, a jump of 630% from income of $1.04 million, or 3 cents a share, in the second quarter of 1986. The company's steady growth is in line with industry expectations, with product revenue accounting for 47% of sales, according to John Rutledge, an analyst at Dillon, Read & Co.

But analysts said they believe that Apollo's growth has not come at the expense of its closest competitor, Sun Microsystems, Inc., but that it stems from a period of industrywide growth. In fact, Rutledge noted, Sun is growing twice as fast as Apollo.

Separately, Apollo promoted Roland Pampel to the position of president and chief operating officer. Pampel was previously senior vice-president of technology, manufacturing and marketing. Thomas A. Vanderslice, formerly president, remains chairman and CEO.

Stratus. The Marlboro, Mass.-based fault-tolerant systems maker reported lower than expected profits for the quarter on sales that were slightly higher than expected.

Continued on page 75

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Toshiba ban

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nating Committee on Multilateral Export Controls, the international body that is supposed to prevent such offenses as Toshiba's, is clearly in order. If any good can come out of this mess, perhaps it will be that the committee will finally listen to the critics who have called for stricter controls for years.

But Congress taking matters into its own hands by attempting to legislate an outright ban on the sale of all Toshiba products in the U.S. is not the right answer. That action will mean higher prices for U.S. computer users, who will be forced, for example, to pay the price for Apple Computer, Inc. having to find a new source for some of its printers. It will cost American jobs, not only at Toshiba America, Inc.'s plants but also at companies that resell or distribute Toshiba products. And potentially most damaging of all, it could easily touch off the full-scale trade war whose specter has haunted U.S.-Japan relations for most of this decade.

Some members of Congress seem to feel that because we have caught Toshiba red-handed, we now hold all the cards. That is very dangerous thinking.

If we have learned anything from our staggering trade deficits with the Japanese, it is that Japanese corporations, working closely with their government, can identify and achieve their common goals in international competition. Their idea of free enterprise is much more cooperative among themselves than in the U.S. — which taught them the concept.

> SOME MEMBERS of Congress seem to feel that because we have caught Toshiba red-handed, we now hold all the cards. That is very dangerous thinking.

Thus, banning Toshiba from exporting to the U.S. invites Japanese retaliatory measures, whether officially sanctioned or not. Imagine the devastating consequences for Amdahl Corp. users, for example, if other Japanese companies chose to punish their U.S. OEMs for the U.S. government's treatment of Toshiba. The thought may be farfetched, but it demonstrates that the current U.S. economy, especially the computer industry, does not benefit from decisions made in a cold-war us-vs.-them mentality.

The current call in Congress is: "Hit Toshiba where it hurts — in the pocketbook." If that is going to be the blind approach to trade policy, U.S. companies and those that use their products are going to feel some pain as well.

Wilder is *Computerworld's* senior editor, computer industry.

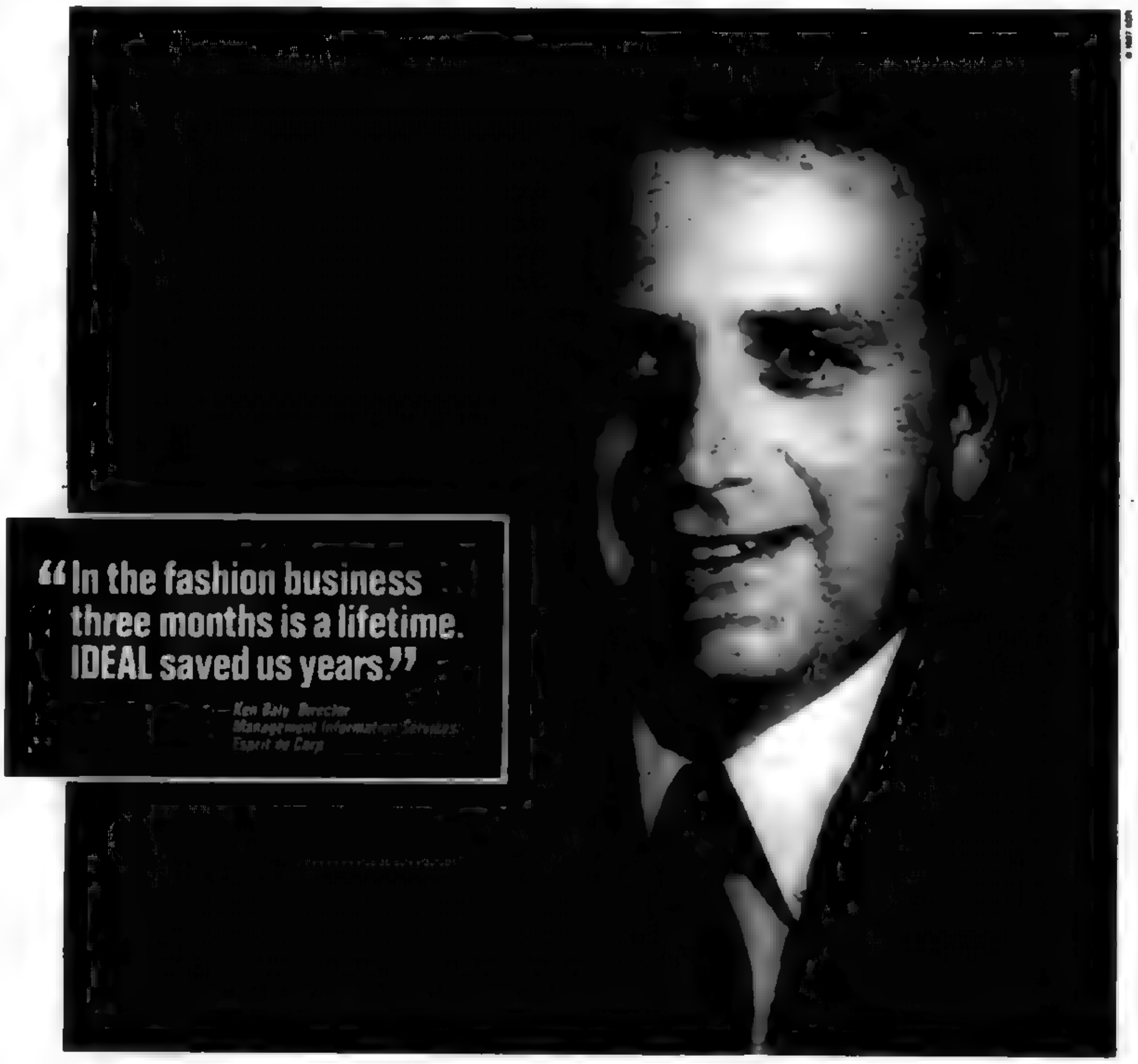
Proteon

CONTINUED FROM PAGE 67

man Howard Salwen declined to discuss future product directions, but they did say Proteon is beta-testing Texas Instruments, Inc.'s IEEE 802.2-compatible software, which will provide full IBM interoperability, including Advanced Program-to-Program Communications and 3270 communcications, Salwen said. "TI's software is targeted at a special market where if you can't do everything that IBM is doing, then you can't compete there," he added. Proteon will support IBM's 16M-bit Token-Ring and Microsoft Corp.'s MS OS/2 LAN Manager only if its users demand it, Salwen said.

The vendor is also taking a "wait-and-see" attitude on IBM's Netview. "IBM has seven Netview products, and they are all different. The only thing the same is the seven letters," Salwen said.

In addition, Proteon is revamping its distribution, moving away from distributors and focusing more heavily on resellers and systems integrators that are closer to the end user, a spokeswoman said. Half of Proteon's sales come through indirect distribution channels.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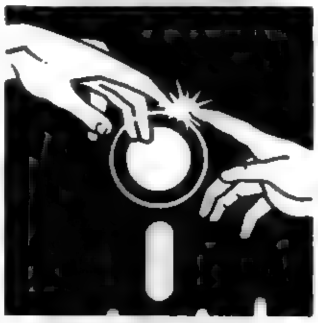

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Upswing

FROM PAGE 73

Sales were $42.7 million, up 42% from $30.1 million reported in last year's second quarter. Net income, however, came in only 19% higher, at $3.8 million, compared with $3.2 million reported last year.

OEM sales to IBM and Ing C. Olivetti & Co. made up about 30% of the company's business for the quarter, its highest OEM revenue percentage to date. The lower gross margins on OEM sales and the higher costs incurred by the company in expectation of more direct-sales volume account for the disappointing profit growth, analysts said.

Lotus Development Corp. The Cambridge, Mass., microcomputer software vendor had a strong quarter, with the firm's efforts to diversify beginning to pay off. Sales rose 42% to $94 million, and net income rose 38% from the previous year's quarter to $16.3 million, or 66 cents per share.

Despite a reported record quarter for the firm's flagship product, 1-2-3, other products are gaining a larger share of Lotus revenue.

Sales of products in the firm's Information Services Division, which include compact disk/read-only memory products and on-line data, were up from last year's quarter, although Lotus declined to break out the division's results.

International sales were also strong, moving from 24% of revenue for the previous year's quarter to 28%. Sales of Lotus's Symphony software were up some 15% from the previous year's quarter.

But Lotus said sales of Jazz for the Apple Computer, Inc. Macintosh are still lagging. "Jazz didn't do well and hasn't for a while," Yeomans said.

Software Publishing. The Mountain View, Calif., microcomputer software house continued to rebound from its record downturn of 1986. The firm reported revenue for the third quarter ended June 30 of $8.3 million, up 81% from $4.6 million reported in the like quarter last year.

Net income was $881,000, or 11 cents per share, compared with a net loss of $737,000, or 10 cents per share, in the year-earlier period.

Texas Instruments, Inc. TI reported a healthy quarter, as expected, with revenue up 10% from the like quarter of 1986.

TI announced revenue for the second quarter ended June 30 of $1.37 billion, up from $1.24 billion in the like quarter of 1986. Net profit was $62 million, or 73 cents a share, up from $12.3 million, or 12 cents a share, in last year's second quarter.

Profit from operations was $51 million, compared with $28 million in 1986. Overall profit for the quarter included pretax royalties of $29 million from the settlement of patent litigation with seven Japanese chip makers and from extraordinary credits from tax-loss carryforwards.

TI's semiconductor business operated profitably for the quarter, in contrast with last year's second-quarter loss.

TI's data systems profit declined because of the transition to new computer and peripherals products, a TI spokesman said.

EDS. The Dallas-based General Motors Corp. subsidiary saw its second-quarter revenue growth plunge to 1%, and most analysts said they believe the balance of this year will be the same or worse. EDS's earnings growth of 15% was better but far below its growth rates for the past several years.

EDS reported profits of $72 million, or 59 cents per share, on revenue of $1:08 billion. Year-earlier earnings were $62.7 million, or 51 cents per share, on revenue of $1.07 billion.

Senior Editors Clinton Wilder and Douglas Barney contributed to this story.

1987 second-quarter earnings

A rising industry tide lifts Wang, Prime, Amdahl and Apollo; Stratus's growth slows

Company	*Net income April-June (millions of dollars)*	*Percent change from 1986*	*Revenue April-June (millions of dollars)*	*Percent change from 1986*
Amdahl	30.9	+1,044	341	+62.8
Apollo	7.6	+630	132.2	+50
Computer Consoles, Inc.[1]	0.9	—	35.8	+8
Computer Task Group, Inc.	2.1	-7	41	+16
Maxtor	1.7	-69.5	50.9	+50
Northern Telecom, Inc.	73	+26	1.25B	+17
Prime	15.7	+37	236	+12
Software Publishing[2]	0.9	—	8.3	+81
Stratus	3.8	+18.7	42.7	+42
Tandon	1.1	-15	41.1	+16
TI	62	+82	1.37B	+10
Wang	32	+3,900	824	+15

[1] Reported loss of $886,000 in 1986

[2] Reported loss of $737,000 in 1986

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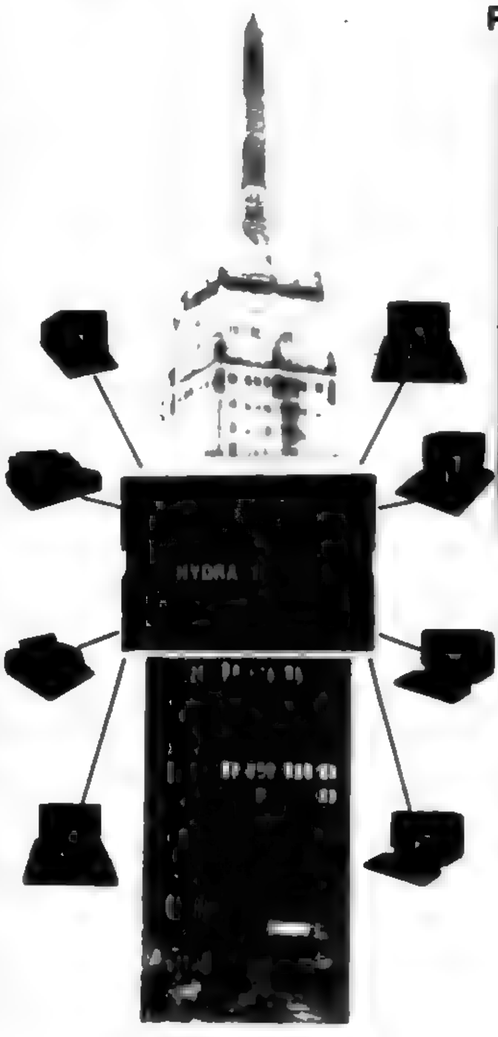

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EMPLOYMENT TODAY

Sizing up the right career fit

Large shops offer technology, but small ones provide instant recognition

BY CONNIE WINKLER
SPECIAL TO CW

MIS professionals searching for their next position often look to the large, well-known companies. Though the prominence of these companies conveys a certain amount of prestige, small companies can offer unique opportunities that will greatly enhance career development.

"Many professionals join small companies to avoid the drone syndrome," says Jesse Castillo, a principal at Technology Strategy, Inc. in Cambridge, Mass. "In a large company, it is easy to get lost — to come into the office at 9 a.m. and leave at 5 p.m., with people not really noticing you are there. You do not directly impact the bottom line. At a small company, almost everything you do affects the company. If you put in extra hours, you have an impact. The results are seen immediately."

The person who functions best in the small company environment must necessarily be self-motivated, ambitious, independent and, above all, must possess a lot of common sense, Castillo adds.

Another difference between small and large organizations is that large companies are often in a better position to train inexperienced employees.

Bigger may be better

"Many DP professionals fresh out of college go to work for medium and large companies, which may be the most appropriate and mutually beneficial course," says Charles Fountain, MIS manager for the Boston Consulting Group in Boston. "Opportunities in large companies are formal and structured, with job descriptions and defined areas of work."

Recent graduates can put their textbook skills to work immediately and then grow into more demanding assignments, becoming familiar with the business as a whole.

"In a small organization with 10 or fewer in data processing, we want someone to come in and do something right away. We don't have the support to assign new employees to be tutored by a team of four to six experienced professionals," Fountain says.

One of the reasons large shops are so attractive is that they usually use state-of-the-art hardware and software and programming aids, says Louis LaPierre, a DP consultant with the recruiting firm of Romac & Associates in Portland, Maine.

Additionally, the large, well-funded shops usually emphasize training and provide in-house instructors to keep employees aware of new developments.

Tendency to typecast

The downside of the big firm is that employees are more likely to be typecast. For example, once someone is identified as a financial systems expert, they will always be assigned to financial projects. However, large companies are currently trying to change this stereotyping by posting jobs throughout the company.

WHILE being exposed to different projects in a large company usually involves title changes and pay increases, in a small company, such extra effort is simply viewed by the employer as doing your job.

"If you are in the financial systems group at one of those companies that allows you to transfer to another department, you will have to go through the formal channels, and there are no guarantees," LaPierre says. "It depends on the company."

At a small company, employees will more likely become involved in a variety of projects. "You will get maximum exposure in a small amount of time to a lot of systems. You learn a lot," LaPierre adds.

But the opportunity to work on a variety of projects is not always as attractive as it sounds. While being exposed to different projects in a large company usually involves title changes and pay increases, in a small company, such extra effort is simply viewed by the employer as doing your job.

"If growth, titles and promotions are what you are looking for, work for a large company," Fountain says.

But typically, the "fast-track" jobs in large companies are in large cities, even though the companies also rely on departments located in small communities.

Large companies also offer significant benefits packages, says Steven Martin, DP employment specialist at the Advanced Systems Division of Northrop Corp. in Pico Rivera, Calif. "Northrop has multidiversified projects; not all our eggs are in one basket," Martin says. "If you are talented, there's room for you to move."

At the large defense contractor, which employs about 40,000 people, fringe benefits reach the sublime; the firm offers everything from van pools and education reimbursements to a Bible club and martial arts, Martin says.

Life in a tiny shop

DP shops cannot get much smaller than the one that supports Cathedral City, Calif. Michelle Johnson, information systems specialist, is the sole DP professional, doing everything from applications development to changing printer paper on the Hewlett-Packard Co. HP 3000 system. Johnson says she welcomes the responsibility: "It's all me; they rely on me for everything. That's nice."

Trained as a programmer and previously assigned to the city's accounting office, Johnson says she also enjoys the camaraderie the DP position provides. "There's more of a sense of oneness. I know everyone I work with," she says. "I like the personal side."

Sometimes, because Johnson is the only computer professional, it is difficult and time consuming to explain the DP needs to other city officials, who give the final approvals. But that difficulty is improving as city officials become more familiar with the systems' capabilities.

Winkler is a free-lance writer based in New York. Her latest book, *Careers in High Tech*, was published this spring by Simon & Schuster, Inc.'s Prentice-Hall Press.

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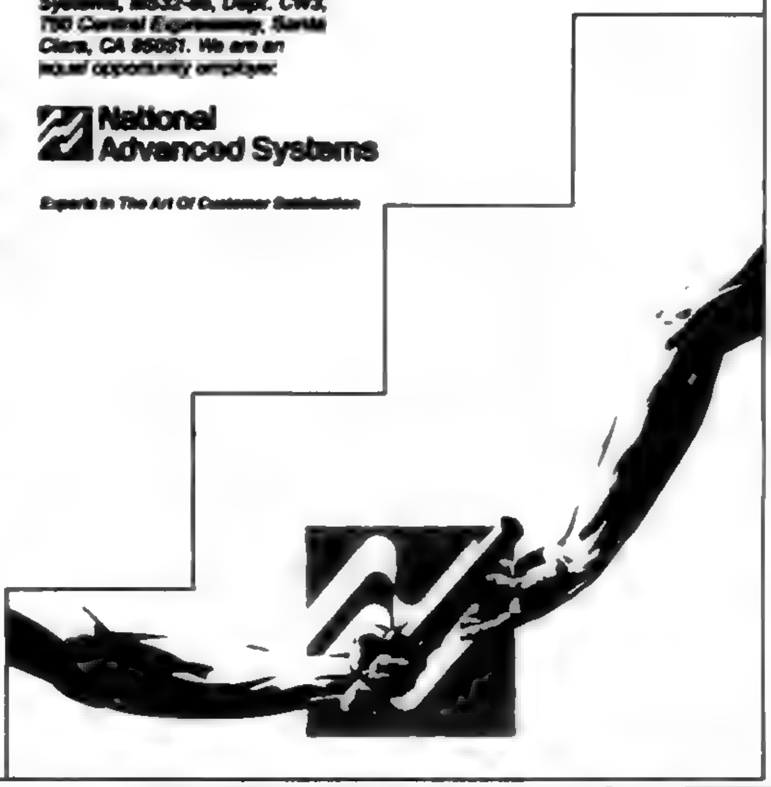

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Interested candidates please send two copies of resume to: James McCarthy, MIT Personnel Office, (E19-239), 400 Main Street, Cambridge, MA 02139 – Refer to job #887-327.

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Research Scientist

Research in automated reasoning technology applied to expert design, control, and surveillance problems. Devise representation scheme for conceptual design of flight control hardware. Perform knowledge acquisition for reliability analysis. Implement expert analysis tool in Lisp and logic programming.

Requires Masters degree in Computer Science or Electrical Engineering. Requires 24 semester credits graduate level coursework in artificial intelligence (AI), and AI architectures and hardware. AI programming languages LISP, PROLOG and OPS5 expert systems, and distributed or parallel language implementations. Salary $3,000.00 per month.

Submit resumes to Ms. Sara Springmeyer, #7-145, Minnesota Department of Jobs and Training, 690 American Center Bldg, 150 E. Kellogg Blvd., St. Paul, MN 55101

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CSIRO – AUSTRALIA

RESEARCH STAFF

PROGRAM LEADERS – COMPUTER NETWORKING
– SOFTWARE ENGINEERING
PROJECT LEADER – GRAPHICS TECHNIQUES

$A36,421-$A64,206

DIVISION OF INFORMATION TECHNOLOGY
LABORATORIES IN CANBERRA, MELBOURNE AND SYDNEY

THE DIVISION. The Division of Information Technology has recently formed laboratories in Sydney, Melbourne and Canberra supporting collaborative research and development programs in the following fields

- Computer networking
- Software engineering and related hardware
- Information management
- Image processing and graphics

Within several of these programs there are now vacancies for the senior scientists and engineers needed to lead in the following areas of research:

ADVANCED GRAPHICS TECHNIQUES (SRS/PRS)

Reference No. A4634

GENERAL: The Centre for Spatial Information Systems in Canberra is conducting research in the areas of databases, spatial inferencing, image processing and graphics.

The project on advanced graphics techniques is concentrating on the representation, manipulation and display of three-dimensional and time varying data. Current activities include terrain modelling and human kinetics analysis.

Activities planned involve the development of techniques for interpreting scientific and engineering data on advanced graphics workstations such as APOLLO DN580.

DUTIES: To develop and direct research in the area of advanced graphics techniques, with special emphasis on interactive techniques for interpreting scientific and engineering data.

QUALIFICATIONS: Applicants should possess a PhD degree or equivalent qualifications in a computer discipline. Extensive research experience with computer graphics and related areas, particularly with techniques for 3-D modelling, scene synthesis and computer animation is essential.

Experience with complex modelling programs in an applications discipline (e.g. quantum chemistry, plasma physics, civil engineering) is desirable.

LOCATION: The appointee will be based at the Division's Centre for Spatial Information Systems in Canberra.

COMPUTER NETWORKING (PRS/SPRS/CRS)

Reference No. A4635

GENERAL: The Computer Networking Group based in Melbourne, with some activity in Sydney, is conducting research into networking infrastructures which include the Australian Academic Research environment, two experimental networks in Sydney and Melbourne, an OSI demonstration environment, and novel distribution mechanisms for Unix news via a satellite.

Open Systems Interconnection is another major research interest of the group, with participation in the setting of standards both locally and internationally as a major focus of the program. The research also includes analysis of communications standards using formal techniques and product development of prototype implementations.

New methods of data transmission and modes of information management and display are to be included in an extension of the existing research program.

DUTIES: The appointee will be responsible for the following functions:

- To direct research at both laboratories in all aspects of computer networking and to identify further network related research within the developing objectives of the Division.
- To manage the Melbourne Laboratory (which is dedicated to networking projects) with the support of a local complement of administrative staff.
- To manage the networking research projects within the Sydney Laboratory and at those other sites where we collaborate with other institutions.

QUALIFICATIONS: Applicants should possess a PhD degree or equivalent qualifications in a computer networking discipline. Experience in the management and conduct of research and implementation of projects with computer networks and their components of at least 10 years duration.

LOCATION: The appointee will be based at the Division's laboratory in Carlton, Melbourne.

SOFTWARE ENGINEERING AND RELATED HARDWARE (PRS/SPRS/CRS)

Reference No. A4636

GENERAL: The Software Engineering and Related Hardware Group based in Sydney with some activity in Melbourne is conducting research into aspects of Fifth Generation computing, both hardware and software.

Major research areas include:

Parallel Systems Architecture: the development of a data flow computer in collaboration with the Royal Melbourne Institute of Technology, including hardware, systems software, and a number of end-use applications.

Software Engineering of Expert Systems: the application of software engineering methods to artificial intelligence applications, particularly expert systems. Techniques employed include relational databases, data dictionary and formal specifications (the Z language). Application is to two major second generation expert systems.

Content-Addressable Memory: Development of an inexpensive hardware content-addressable memory and its applications to a number of areas, including Prolog clause indexing, expert systems, and intelligent front end to data-base system.

DUTIES: The appointee will be responsible for the following functions:

- To direct research in the above areas in collaboration with a number of other organisations, including tertiary institutions, research laboratories, and industry.
- To identify and exploit further opportunities for strategic or tactical research in these and related areas, especially with industry.
- To provide, or supervise the provision of, consulting services to other CSIRO Divisions and other organisations in the architecture and procurement of major artificial intelligence applications.
- To supervise the staff of the group, numbering about 10 professionals.

QUALIFICATIONS: A PhD degree or equivalent proof of research excellence in a computing or related discipline. Demonstrated research experience in artificial intelligence or related fifth generation technology. Experience with the development and management of sizeable software projects delivered to an end user and used in practice. Experience with software engineering technology. Demonstrated facility in productively coordinating loosely structured collaborative research.

Experience with relational database design and an ability to work closely with digital systems engineers is desirable.

LOCATION: The appointee will be based at the Division's Headquarters in North Ryde, Sydney.

CONDITIONS: Appointments will be for an indefinite term. However, applications will be considered from individuals interested in negotiating a term appointment. Applications should state the candidate's preference. Australian Government Superannuation benefits are available. To facilitate collaboration with the industrial and academic communities, provision will be made for secondments in both directions.

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Applicants for senior posts should also be able to offer a distinguished record of research accomplishments and give evidence of research leadership ability of a high order. Appointment at the Senior Principal Research Scientist or Chief Research Scientist levels requires the appointee to have an international reputation.

MORE INFORMATION: Prospective applicants are invited to telephone Dr G.E. Thomas, telephone no. (02) 887 9307, for further information. Mr R.D. Lipscomb, telephone no. (02) 887 9365, can also provide a copy of the detailed job description and selection criteria for each position.

APPLICATIONS: Stating relevant personal particulars, including details of qualifications and experience, the names of at least two referees and quoting the relevant reference number(s) should be directed to:

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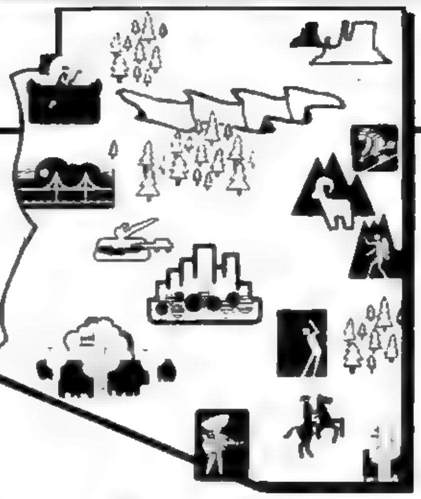

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Master's degree preferred. Bachelor's degree in Computer Science or Information Systems required. COBOL systems design and management skills necessary. Hardware: DEC 11/780-VMS O/S and DEC 11/70 RSTS/E/O/S. Preference may be given to applicants with relevant prior experience. Ability to maintain an effective working relationship with other employees required. College serves five county area. Nestled in the foothills of the Smokey Mountains. Cleveland is located in Tennessee Valley population approximately 60,000. College headcount 3,000 students. Water sports, hiking, camping, backpacking available in the vicinity and nearby mountainous national forests and wilderness area. Skiing available in mountains approximately 2 hours away. For further information and complete list of duties contact Personnel Office, Cleveland State Community College, PO Box 3570, Cleveland, TN 37320-3570. Or phone 615-472-7141. Applications utilizing Cleveland State Community College application forms must be received on or before August 17, 1987. Equal Opportunity Employer M/F

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John P. Bertsch is President of Bertsch & Company Advertising, Inc., a full service recruitment advertising agency headquartered in New York, with offices in Boston, MA and Irvine, CA. John is often asked by his clients to recruit data processing professionals and where to run their ads.

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Reference #DP-7-87

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Completion of supplemental qualifications questionnaire is required. City application and supplemental questionnaire forms must be received by 5:00 August 7th, 1987. City of Alexandria, VA. City Hall, Personnel Office, Room 2500, 301 King Street, Alexandria, VA 22314 (703) 838-4422

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SYSTEMS	MIPS (Millions of Instructions Processed Per Second)	MEGABYTES	SYSTEMS	MIPS (Millions of Instructions Processed Per Second)	MEGABYTES
•9373-20	0.5	4 to 16	3033-UP	5.0	4 to 24
•9375-40	0.5	8 to 16	4381-14	6.8	16 to 32
4331 2	0.5	1 to 4	3083BX	6.8	8 to 32
S 38-300	0.58	6 to 8	•3090-120E	7.5	32 to 128
S 38-400	0.75	6 to 8	†4381-24	7.8	16 to 64
4341 1	0.88	2 to 4	3083JX	8.8	8 to 32
S 38-600	0.98	8 to 16	3090-150	9.2	32 to 64
S 38 700	1.1	16 to 32	3081D	10.0	16 to 32
•9375-60	1.2	8 to 16	•3090-150E	10.0	32 to 64
4381 11	1.4	4 to 16	3081 GX	11.9	16 to 64
4361-5	1.45	2 to 12	3090-180	15.4	32 to 64
4341-2	1.5	2 to 16	3081KX	15.5	16 to 64
4341-12	1.65	2 to 16	•3090-180E	17.8	32 to 64
†4381-21	1.9	8 to 16	3090-200	27.7	64 to 128
4381-1	2.1	4 to 16	3084QX	28.7	32 to 128
•9377-90	2.5	8 to 16	•3090-200E	31.9	64 to 128
4381-2	2.7	4 to 32	•3090-300E	44.3	64 to 128
4381-12	2.7	8 to 32	3090-400	50.0	128 to 256
†4381 22	3.2	16 to 32	•3090-400E	56.0	128 to 256
4381 13	3.6	8 to 32	•3090-600E	76.0	128 to 256
3083EX	4.4	8 to 32			
4381-3	4.5	8 to 32			
†4381-23	4.7	16 to 64			

• First installation 1987
† First installation 1st Qtr 1988

AMDAHL

SYSTEMS	MIPS	MEGABYTES
5840	8.4	16 to 128
5850	11.6	16 to 128
5860	14.0	16 to 128
5867	22.0	24 to 128
5868	22.0	32 to 256
5870	26.6	32 to 128
5880	28.6	32 to 256
•5890-190E	22	64 to 256
•5890-200E	31	64 to 256
•5890-300E	40	64 to 256
•5890-400E	58	128 to 512
•5890-600E	67	128 to 512

NATIONAL ADVANCED SYSTEMS

SYSTEMS	MIPS	MEGABYTES
AS 9060	11	16 to 64
AS XL-50	15	32 to 64
AS 9070	16	16 to 64
AS 9080	20	16 to 64
AS XL-40	28	64 to 256
AS XL-60	50	64 to 256
•AS XL 90	67	128 to 512
•AS XL-100	80	128 to 512

The above information is intended as a guideline for computer users on relative computer systems instruction cycle times. All data have been derived from published documentation and represent reasonable estimates of average MIPS ratings. However, Randolph is not responsible for the accuracy of the MIPS data. Cycle times will vary based on hardware software configurations and system manufacturers continually modify computer models as design improvements in hardware and software area.

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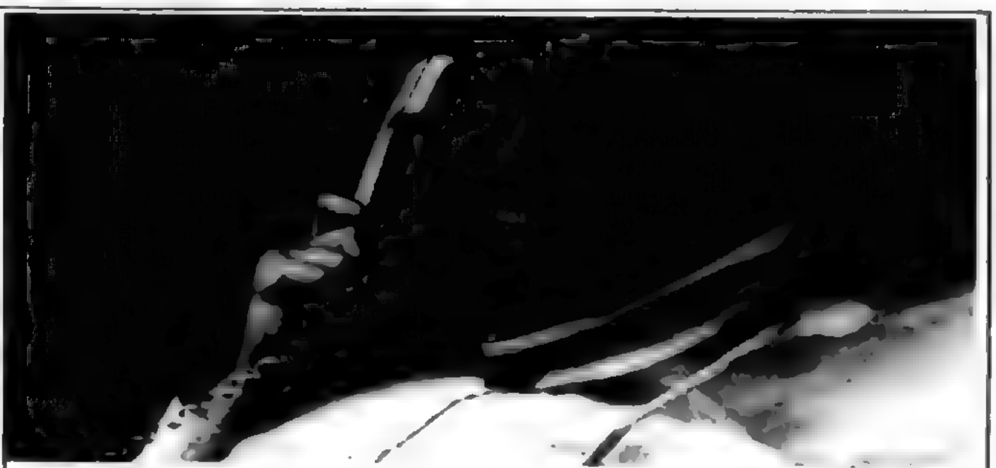

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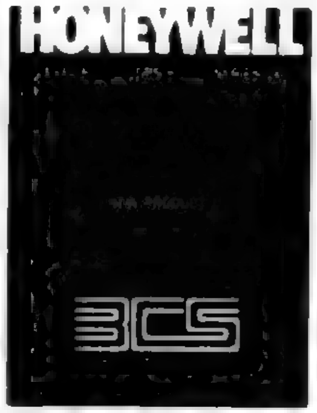

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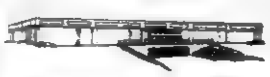

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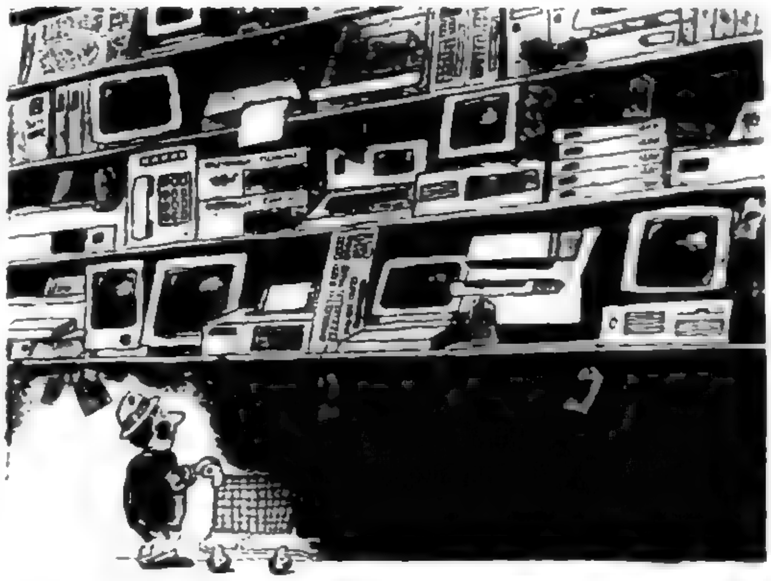

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Aug. 31	DBMS for Micros & Small Systems	Aug. 14
Sept. 14	DB2 Market	Aug. 28
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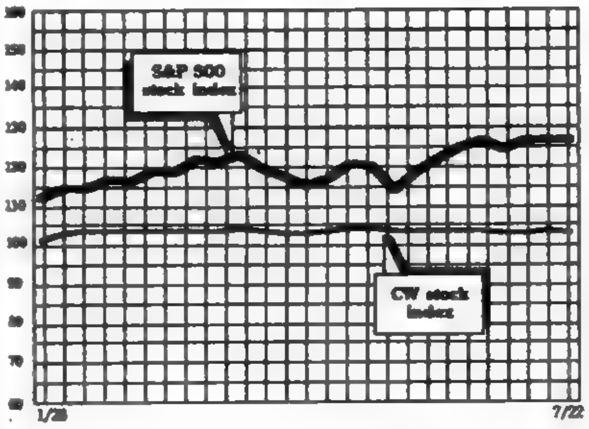

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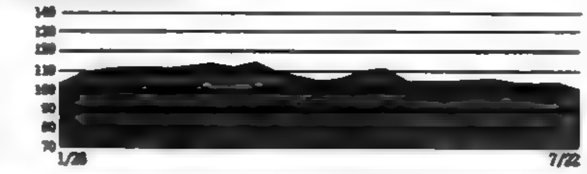

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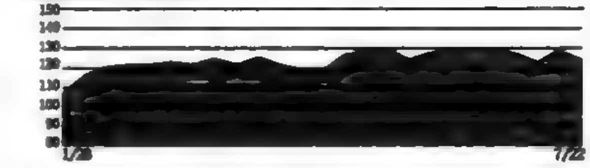

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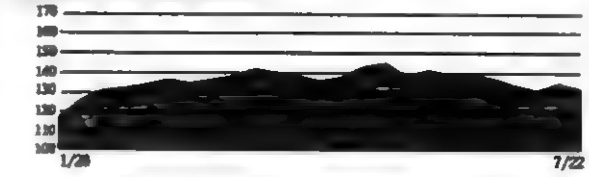

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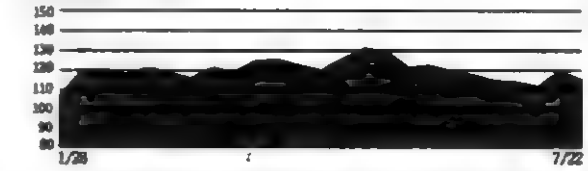

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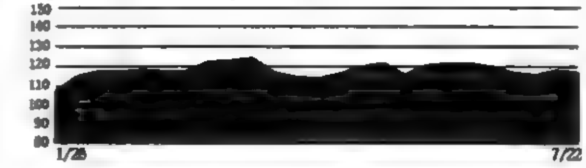

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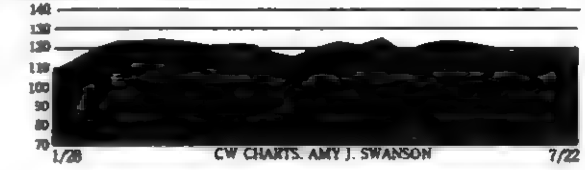

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N	AMERICAN INFO TECHS CORP	101	77	83.00	-0.9	-1.0
Q	ANDREW CORP	19	14	15.00	+0.0	+0.0
Q	ARTEL COMM CORP	5	2	2.88	-0.1	-4.2
N	AT&T	32	22	30.63	+0.4	+1.2
Q	AVANT GARDE COMP INC	7	3	2.75	-0.4	-12.0
Q	AVANTEK INC	19	13	14.00	+0.0	+0.0
N	AYDIN CORP	38	18	32.75	-0.8	-2.2
N	BELL ATLANTIC CORP	77	62	65.50	+0.0	+0.0
N	BELLSOUTH CORP	46	35	37.00	-1.0	-2.6
Q	BRIDGE COMMUNICATION	27	11	21.00	-2.1	-9.2
Q	COMPRESSION LABS INC	13	4	4.88	-0.1	-2.5
O	COMPUTER NETWORK TECH	8	4	4.31	+0.5	+13.1
O	CONTEL CORP	35	27	32.50	-0.4	-1.1
Q	DATA SWITCH CORP	9	5	6.50	-0.3	-3.7
Q	DIGITAL COMM ASSOC	48	17	34.50	-0.8	-2.1
Q	DYNATECH CORP	44	27	29.75	-0.8	-2.5
Q	EQUATORIAL COMM CO	6	2	3.25	-0.1	-3.7
Q	GANDALF TECHNOLOGIES	11	5	8.25	+0.0	+0.0
Q	GENERAL DATACOMM INDS	14	8	8.25	-0.6	-7.0
N	GTE CORP	43	34	38.38	+0.1	+0.3
Q	INFOTRON SYS CORP	13	7	8.50	-1.0	-10.5
N	ITT CORP	66	47	62.00	+0.0	+0.0
N	M A COM INC	16	12	14.88	+0.6	+4.4
Q	MCI COMMUNICATIONS CORP	10	5	7.50	-0.3	-3.2
Q	MICOM SYS INC	18	10	10.38	-1.4	-11.7
Q	NETWORK SYS CORP	19	9	10.25	+0.1	+1.2
N	NORTHERN TELECOM LTD	24	14	21.63	-0.9	-3.9
Q	NOVELL INC	27	9	19.25	-1.8	-8.3
N	NYNEX CORP	73	58	66.50	+0.3	+0.4
N	PACIFIC TELESIS GROUP	31	23	25.25	-0.3	-1.0
N	PARADYNE CORP	8	4	6.88	-0.1	-1.8
A	PENRIL CORP	6	4	4.63	-0.1	-2.6
N	PLESSEY PLC	41	24	34.13	-2.8	-7.5
N	SCIENTIFIC ATLANTA INC	20	9	16.88	-1.8	-9.4
N	SOUTHWESTERN BELL CORP	41	33	35.00	-0.6	-1.8
Q	3 COM CORP	24	9	16.50	-1.4	-7.7
N	TIMEPLEX INC	41	14	31.63	+0.4	+1.2
Q	UNGERMANN BASS INC	16	7	11.63	-2.0	-14.7
N	U S WEST INC	62	48	48.75	-1.3	-2.5

Computer Systems

EXCH		PRICE 52-WEEK RANGE (1)		CLOSE JULY 22 1987	WEEK NET CHNGE	WEEK PCT CHNGE
Q	ALLIANT COMPUTER SYS	37	16	20.25	-1.0	-4.7
Q	ALPHA MICROSYSTEMS	7	3	5.13	+0.1	+1.2
Q	ALTOS COMPUTER SYS	17	10	12.50	+0.0	+0.0
A	AMDAHL CORP	42	17	38.75	-3.3	-8.1
Q	APOLLO COMPUTER INC	25	9	19.00	-0.8	-3.8
Q	APPLE COMPUTER INC	48	18	42.50	-1.5	-3.4
N	BOLT BERANEK & NEWMAN	60	37	38.25	-1.0	-2.5
Q	BRITTON LEE INC	5	3	2.63	-0.1	-4.5
N	COMPAQ COMPUTER CORP	51	12	46.63	-0.4	-0.8
Q	COMPUTER AUTOMATION INC	17	7	12.50	+1.0	+8.7
A	COMPUTER CONSOLES INC	12	7	8.38	-0.9	-9.5
Q	CONCURRENT COMP CORP	19	11	18.25	+0.0	+0.0
N	CONTROL DATA CORP DEL	35	20	28.50	-0.4	-1.3
Q	CONVERGENT TECH	12	4	7.25	-0.4	-4.9
Q	CONVEX COMPUTER CORP	22	8	14.75	-1.0	-6.3
N	CRAY RESH INC	136	69	97.50	-5.0	-4.9
Q	DAISY SYS CORP	13	8	7.75	-0.1	-1.6
N	DATA GEN CORP	38	25	29.88	-1.5	-4.8
N	DATAPOINT CORP	9	4	6.25	-0.1	-2.0
N	DIGITAL EQUIP CORP	175	94	158.50	-7.1	-4.3
N	FLOATING POINT SYS INC	21	8	11.00	-0.3	-2.2
N	GOULD INC	22	16	20.38	+0.5	+2.5
N	HARRIS CORP DEL	43	27	34.75	+0.3	+0.7
N	HEWLETT PACKARD CO	67	37	59.88	-2.6	-4.4
N	HONEYWELL INC	88	58	83.38	-2.3	-2.6
N	IBM	170	116	161.38	-6.6	-3.9
Q	INFORMATION INTL INC	17	13	14.50	+0.3	+1.8
Q	IPL SYS INC	3	2	3.25	+0.0	+0.0
Q	MASS COMPUTER CORP	10	5	8.25	-0.8	-8.3
N	MATSUSHITA ELEC INDL LTD	189	78	147.25	+1.3	+0.9
Q	MEGADATA CORP	7	2	5.25	-0.3	-4.5
Q	MENTOR GRAPHICS CORP	34	11	28.38	-0.1	-0.4
N	NBI INC	14	8	12.88	-0.5	-3.7
N	NCR CORP	80	42	75.75	-2.1	-2.7
N	PRIME COMPUTER INC	30	16	26.00	-2.3	-8.0
Q	PYRAMID TECHNOLOGY	12	4	8.25	-0.8	-8.3
Q	STRATUS COMPUTER	41	18	26.50	-6.5	-19.7
Q	SUN MICROSYSTEM INC	46	11	36.13	-1.9	-4.9
Q	SYMBOLICS INC	8	4	3.88	+0.0	+0.0
N	TANDEM COMPUTERS INC	38	16	28.50	-2.5	-8.1
N	TANDY CORP	56	31	43.88	-1.6	-3.6
N	ULTIMATE CORP	30	13	27.25	-1.9	-6.4
N	UNISYS CORP	132	64	126.50	-3.4	-2.6
A	WANG LABS INC	19	11	16.25	-0.1	-0.8

Software & DP Services

EXCH		PRICE 52-WEEK RANGE (1)		CLOSE JULY 22 1987	WEEK NET CHNGE	WEEK PCT CHNGE
Q	ADVANCED COMP TECH	6	3	3.63	+0.0	+0.0
N	ADVANCED SYS INC	25	12	23.25	-0.3	-1.1
N	AGS COMPUTERS INC	22	8	16.63	-0.9	-5.0
Q	AMERICAN MGMT SYS INC	19	7	16.00	+1.4	+9.4
Q	AMERICAN SOFTWARE INC	22	7	15.88	+0.6	+4.1
N	ANACOMP INC	10	3	9.00	-0.5	-5.3
Q	ANALYSTS INTL CORP	9	3	7.75	-1.0	-11.4
Q	ASHTON TATE	30	10	24.75	-1.5	-5.7
Q	ASK COMPUTER SYS INC	17	9	13.38	-0.5	-3.6
Q	AUTODESK INC	285	8	22.00	-0.3	-1.1
N	AUTO DATA PROCESSING	51	29	46.75	1.8	-3.6
Q	BOOLE & BABBAGE INC	11	4	11.00	+0.3	+2.3
N	COMPUTER ASSOC INTL INC	29	10	23.88	-0.8	-3.0
Q	COMPUTER HORIZONS CORP	15	10	14.00	+0.9	+6.7
N	COMPUTER SCIENCES CORP	61	30	51.88	-3.4	-6.1
N	COMPUTER TASK GROUP INC	18	11	12.50	-0.8	-5.7
Q	COMSHARE INC	28	11	24.50	+1.0	+4.3
N	CULLINET SOFTWARE INC	13	6	12.00	+0.0	+0.0
Q	CYCARE SYS INC	13	7	8.38	-0.3	-2.9
Q	DUQUESNE SYS INC	33	12	16.00	-2.4	-12.9
Q	ENDATA INC	12	5	9.88	-1.9	-16.0
N	GENERAL MTRS (CLS E)	45	24	42.00	-0.1	-0.3
Q	HOGAN SYS INC	17	9	11.00	1.8	-13.7
Q	INFORMIX CORP	23	7	19.75	+0.5	+2.6
Q	INTELLICORP INC	11	4	7.75	+0.0	+0.0
Q	KEANE INC	10	5	7.75	-0.3	-3.1
Q	LOTUS DEV CORP	37	9	31.50	+1.3	+4.1
Q	MANAGEMENT SCI AMER	21	11	12.38	+0.0	+0.0
Q	MICRO PRO INTL CORP	8	2	5.81	+0.5	+9.4
Q	MICROSOFT CORP	128	26	100.00	-2.3	-2.2
Q	NATIONAL DATA CORP	27	17	25.00	+1.3	+5.3
Q	ON LINE SOFTWARE INTL INC	20	6	16.63	-1.3	7.0
Q	ORACLE SYS CORP	30	7	21.50	-2.3	-9.5
N	PANSOPHIC SYS INC	23	12	19.00	-1.8	-8.4
Q	POLICY MGMT SYS CORP	30	15	24.75	+0.0	+0.0
Q	PROGRAMMING & SYS INC	13	8	11.50	+1.0	+9.5
Q	REYNOLDS & REYNOLDS CO	42	27	33.00	+0.0	+0.0
Q	SEI CORP	18	8	16.75	-0.3	-1.5
Q	SHARED MED SYS CORP	53	23	28.00	+0.1	+0.4
Q	SOFTWARE AG SYSTEMS INC	20	10	13.25	-1.0	-7.0
Q	SOFTWARE PUBG CORP	17	5	8.13	-0.4	-4.4
A	STERLING SOFTWARE INC	19	9	10.13	-1.1	-10.0
Q	SUNGARD DATA SYS INC	21	10	18.25	+0.3	+1.4
Q	SYSTEMATICS INC	30	14	26.25	+0.8	+2.9
N	UCCEL CORP	45	19	38.75	-0.8	-1.9
N	URS CORP	21	13	18.25	-0.3	-1.4
Q	VM SOFTWARE INC	45	15	17.00	-1.5	-8.1

Semiconductors

EXCH		PRICE 52-WEEK RANGE (1)		CLOSE JULY 22 1987	WEEK NET CHNGE	WEEK PCT CHNGE
N	ADV MICRO DEVICES INC	28	13	16.88	-0.8	-4.9
N	ANALOG DEVICES INC	24	14	21.25	+0.0	+0.0
Q	ANALOGIC CORP	13	10	11.88	-0.1	-1.0
Q	INTEL CORP	61	16	48.50	-1.8	-3.6
Q	LSI LOGIC CORP	17	8	10.00	-0.9	-8.0
Q	MONOLITHIC MEMORIES INC	19	10	14.25	-0.9	-5.8
N	MOTOROLA INC	64	34	55.13	-2.3	3.9
N	NATL SEMICONDUCTOR	17	8	13.13	-0.9	-6.3
N	TEXAS INSTRS INC	68	34	60.50	-2.6	-4.2
A	WESTERN DIGITAL CORP	33	11	27.75	+1.3	+4.7

Peripherals

EXCH		PRICE 52-WEEK RANGE (1)		CLOSE JULY 22 1987	WEEK NET CHNGE	WEEK PCT CHNGE
N	AM INTL INC	9	5	7.13	+0.3	+3.6
Q	AST RESH INC	23	11	14.75	+1.5	+11.3
Q	AUTO TROL TECH CORP	9	3	6.50	+0.5	+8.3
Q	BANCTEC INC	16	6	12.50	-0.9	-6.5
Q	CIPHER DATA PRODS INC	18	9	10.25	-0.5	-4.7
A	COGNITRONICS CORP	5	2	3.88	-0.4	-8.8
N	COMPUGRAPHIC CORP	24	16	23.25	+0.0	+0.0
N	COMPUTERVISION CORP	23	11	15.00	-0.6	-4.0
N	CONRAC CORP	30	12	27.25	+0.0	+0.0
A	DATAPRODUCTS CORP	16	10	11.13	+0.4	+3.5
A	DATARAM CORP	10	7	7.25	-0.1	-1.7
N	DECISION INDS CORP	13	7	12.50	+0.9	+7.5
N	EASTMAN KODAK CO	92	52	88.75	-1.0	-1.1
Q	E M C CORP MASS	34	11	31.50	+2.8	+9.6
Q	EMULEX CORP	10	6	7.63	-0.6	-7.6
Q	EVANS & SUTHERLAND	40	20	30.50	-2.0	-6.2
Q	ICOT CORP	13	5	6.38	-0.1	-1.9
Q	INTERLEAF INC	20	8	16.88	+0.5	+3.1
Q	IOMEGA CORP	12	2	3.13	+0.0	+0.0
Q	LEE DATA CORP	10	5	5.00	-0.1	-2.4
Q	MASSTOR SYS CORP	6	2	5.75	+1.2	+26.0
Q	MAXTOR CORP	34	12	15.88	-2.1	-11.8
Q	MICROPOLIS CORP	44	14	35.63	-3.4	-8.7
Q	MINISCRIBE CORP	18	5	13.13	-1.4	-9.5
N	MINNESOTA MNG & MFG CO	73	50	68.75	-1.1	-1.6
A	MSI DATA CORP	18	10	17.13	+0.3	+1.5
Q	PRIAM CORP	6	2	3.63	-0.5	-12.1
Q	PRINTRONIX INC	14	10	12.50	+0.1	+1.0
N	QMS INC	20	11	19.00	+0.8	+4.1
Q	QUANTUM CORP	35	15	16.00	-1.8	-9.9
Q	RAMTEK CORP	6	4	5.00	-0.3	-4.8
N	RECOGNITION EQUIP INC	27	10	18.88	-1.1	-5.6
Q	REXON INC	14	5	9.00	-0.9	-8.9
Q	SCAN TRON CORP	17	11	12.50	+0.3	+2.0
Q	SEAGATE TECHNOLOGY	46	11	28.63	-3.1	-9.8
N	STORAGE TECH CORP	5	2	3.63	+0.1	+3.8
Q	TANDON CORP	7	2	5.25	+0.0	+0.0
A	TEC INC	7	3	5.13	-0.1	-2.4
N	TEKTRONIX INC	43	28	37.88	-0.3	-0.7
Q	TELEVIDEO SYS INC	3	2	2.50	+0.0	+0.0
N	TELEX CORP	102	53	67.25	-2.5	-3.6
Q	WYSE TECH	35	13	30.25	+2.3	+8.0
N	XEROX CORP	81	51	72.50	-3.0	-4.0
Q	XIDEX CORP	20	11	12.88	+0.4	+3.0

Leasing Companies

EXCH		PRICE 52-WEEK RANGE (1)		CLOSE JULY 22 1987	WEEK NET CHNGE	WEEK PCT CHNGE
N	COMDISCO INC	33	15	29.00	-1.0	-3.3
N	CONTINENTAL INFO SYS	14	7	11.25	-0.4	-3.2
Q	PHOENIX AMERN INC	8	3	4.63	-0.1	-2.6
Q	SELECTERM INC	7	5	6.00	+0.8	+14.3
N	U S LEASING INTL	53	38	50.50	-1.1	-2.2

EXCH: N—NEW YORK; A—AMERICAN; Q—NATIONAL;
O—OVER-THE-COUNTER; S—SPLIT

O-T-C PRICES ARE BID PRICES AS OF 3 P.M. OR LAST BID
(1) TO NEAREST DOLLAR

Fickle market

DG issues rise in face of layoffs; DEC drops despite earnings

The vicissitudes of stock market reaction to corporate news were put in sharp focus last week by the movements of Digital Equipment Corp. and Data General Corp.

After DEC announced another record-breaking quarter on Wednesday, its stock plunged 6½ points to 158½. But DG, after announcing a $65.1 million loss and a 950-employee layoff, rose ¾ of a point in Thursday's trading to 30⅝.

Market watchers attributed DEC's drop to some of its profit growth coming from a lower tax rate, while others speculated that DEC's industry-leading growth may be nearing the end of its cycle.

But DEC said its business shows no sign of slowing down.

The stock bounced back Thursday, rising 2⅜ points to 160⅞ in heavy trading. Mark Steinkrauss, DEC's director of investor relations, said the stock experienced strong buying early in the trading session by European and Japanese money managers.

DG's rise stemmed from analysts' mostly positive reactions to DG's layoffs and closings, which the company said will improve profitability in fiscal 1988.

CLINTON WILDER

Mixed quarter for software

BY CLINTON WILDER and ADAM STONE
CW STAFF

The second-quarter financial reports of three major software vendors last week showed mixed results. While Microsoft Corp. and Computer Associates International, Inc. continued to post growth rates that are the envy of the industry, Management Science America, Inc. (MSA) reported a $1 million loss because of the continued red ink at its recently acquired Ireland subsidiary, Real-Time Systems (RTS).

Atlanta-based MSA said RTS, acquired last summer, will have higher than anticipated losses for the year, which will reduce MSA's earnings potential. However, MSA President William Graves said in an interview that the rest of the company's business is "pretty much on target" for the year. MSA traditionally earns most of its profit in the fourth quarter.

MSA reported a loss of $1 million, or 6 cents per share, on revenue that grew 26% from year-earlier levels to $60.1 million. MSA earned $5.9 million, or 33 cents per share, a year ago.

European market

RTS, which sells IBM System/36 and 38 software to the European manufacturing market, lost an estimated $7 million in the first two quarters, according to Paine Webber, Inc. analyst Robert Therrien. "If it weren't for RTS, they would have made money," Therrien said. "I think they didn't know exactly what they were getting when they bought it."

Graves said MSA has seen the end of the pause in sales activity that it experienced while integrating its Comserv, Inc. acquisition and reorganizing the MSA sales force along industry lines.

Computer Associates reported record results for its first fiscal quarter, with sales of $89.1 million, up 78% from the same period last year.

Net income for the quarter was $4.1 million, nearly double the $2.3 million figure reported in last year's first quarter.

The results do not reflect the results of the company's announced merger with Uccel Corp., scheduled for shareholder approval in mid-August.

Sales were helped by the company's announcement in April that it would switch from site licensing to licensing by CPU, according to analyst Terence Quinn of E. F. Hutton & Co. In anticipation of the switch, companies planning large purchases sped up their schedules in order to buy at the by-site cost, Quinn said.

Microsoft reported a strong quarter and year, with annual revenue up 75% from 1986.

The company reported revenue for the fourth quarter ended June 30 of $99.8 million, up 61% from $62 million in the like quarter of 1986.

Checked momentum

Microsoft could have performed even better, analysts said, but its momentum was checked by an industrywide slowdown in microcomputer sales.

Profit was $17.3 million, or 62 cents per share, up 67% from last year's fourth quarter.

Revenue for the fiscal year was $345.9 million, up 75% from $197.5 million last year. As reported, net income was $71.9 million, or $2.60 a share.

Tailspin

FROM PAGE 1

the credibility issue to customers, and that hurts the marketing," said Stephen Dube of Shearson Lehman Brothers, Inc. "The lack of any revenue progress is clearly a disappointment compared to the industry."

In an interview, DG President Edson deCastro admitted DG's efforts to penetrate the Fortune 1,000 market have hurt the company. "In the early 1980s, we got distracted by large end-user sales and let a number of our OEMs and value-added resellers [VAR] down," he said. "Lately, we have found that very large companies are more comfortable doing business with very large companies. We will reduce our efforts to sell to the largest and concentrate on companies closer to our size — $500 million to $2.5 billion."

Patricia Seybold, a Boston-based office automation consultant to many large corporate users, said DG's CEO office system is rarely considered in corporate buying decisions. "No one asks me about DG systems anymore," she said. "How many large suppliers are you going to accommodate in your buying decisions? There are IBM and DEC and probably Wang for office systems because of their large word processing base. Most large companies don't have a large commitment to DG."

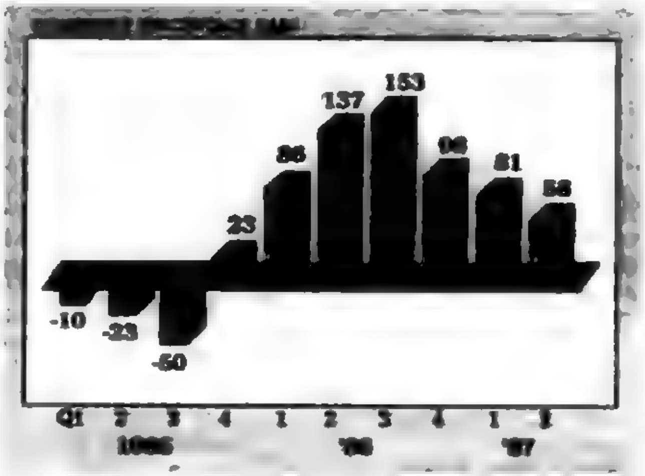
CEO stalled

Seybold noted that CEO seemed to be gaining momentum two years ago when DG made major sales to E. F. Hutton & Co. and to the U.S. government, but the product lost the momentum and never recovered.

DG has also been plagued by several key management defections in the past two years, including those of Robert C. Miller, senior vice-president of information systems; David Chapman, senior vice-president of manufacturing; Kenneth Jaeggi, vice-president and chief financial officer; Clifford Bream, vice-president of distribution; James Pitts, vice-president and controller; Howard Haythornthwaite, vice-president of Asia/Pacific manufacturing; Charles Boesenberg, vice-president of European operations; and Frank Pinto, division director of marketing support.

Sustained energy

DEC continues its almost two-year string of improved quarterly profits in year-earlier comparisons



INFORMATION PROVIDED BY DIGITAL EQUIPMENT CORP
CW CHART

"DG is becoming as tightly centralized as Wang used to be, and that's a dangerous sign," Seybold said. "I've been told it's impossible for product managers to get commitments that stick, and even a $1,000 seminar fee has to be approved at the top. That really undermines morale and creates a highly politicized situation."

"They have to refocus their position in a certain series of vertical markets," added John McCarthy, research manager for Forrester Research, Inc. in Cambridge, Mass. "They might be able to hang on, but not as a full-range supplier. If I were a user, I would certainly be rethinking my commitment to that company."

DG, founded by deCastro, a former DEC engineer, is among the youngest of the full-service systems vendors. Although the company pulled ahead of DEC in the early 1980s on the advanced supermini technology chronicled in the Pulitzer Prize-winning book *The Soul of a New Machine*, DG never developed the installed base among corporate MIS departments that its predecessors had.

"The curse is that they were a newer company and therefore a smaller company," said John Rutledge of Dillon Read & Co. "The industry is now maturing, and there is not enough room for as many vendors. They're getting squeezed out."

DG said it will lay off employees primarily in manufacturing, administrative and field engineering positions, but a spokesman said the firm will try to increase its sales force by 15% in the coming year.

'Too many levels'

DeCastro said the current round of cost-cutting is more specifically focused on centralizing operations than the cuts of the past two years. "We just plain ended up with too many levels of management and bureaucracy," he said. All but a handful of the job cuts will take place in the U.S. at DG locations in Massachusetts, New Hampshire and Colorado. The company will close administrative facilities in Hooksett, N.H., and Denver and a field engineering office in Milford, Mass.

In sharp contrast to DG, Maynard, Mass.-based DEC continued to fly high. Fourth-quarter earnings grew 58% to $377.2 million, or $2.85 per share, while sales jumped 23% to $2.67 billion. For the year, DEC's revenue soared over the $9 billion mark to $9.39 billion, up 24% from fiscal 1986. Profits grew 84% to $1.14 billion, or $8.53 per share.

Although DEC benefited considerably in the quarter from a more favorable tax rate, analysts said they feel the company remains well positioned for continued growth.

"The much-heralded IBM mid-range threat won't be in place for another 12 months or so," said Dube of Shearson Lehman. "There is little that will happen to derail DEC's locomotive speed."

Senior writer David Bright and intern Adam Stone contributed to this report.

3Com, Bridge plan merger

BY CLINTON WILDER
CW STAFF

SANTA CLARA, Calif. — 3Com Corp. announced late Friday that it will attempt another acquisition, this time a merger with fellow local-area network (LAN) maker Bridge Communications, Inc. in Mountain View, Calif.

Under terms of the agreement, Bridge would become a wholly owned subsidiary of 3Com. The combined company will retain the 3Com name.

Bridge President William Carrico will become president and chief operating officer of 3Com and jointly form an office of the chief executive with 3Com Chief Executive Officer L. William Krause.

3Com founder Robert Metcalfe will continue in his current position as senior vice-president of technology.

The merger involves a stock swap in which each outstanding share of Bridge will be exchanged for 1.4 shares of 3Com stock, resulting in Bridge shareholders owning 42% of the merged company. Based on Friday's closing stock price, the market value of Bridge was approximately $195 million.

3Com has seen three major acquisition attempts fall through in recent years.

CDC, Cray financial results slip

MINNEAPOLIS — Despite the general computer industry trend toward improved financial performance, both Control Data Corp. and Cray Research, Inc. reported disappointing second-quarter results last week.

CDC, after its brief return to profitability in the first quarter, reported a loss of $5.5 million, or 14 cents per share, on revenue that fell 5% from year-earlier levels to $785.9 million.

The company cited several factors for the deficit and reiterated its prediction of last month that full-year results would fall short of original expectations.

In the year-earlier quarter, CDC reported a loss of $7.8 million, or 20 cents per share.

Cray Research, proving the volatility of its supercomputer business, reported its slowest quarter in more than two years.

The company's earnings fell 56% from a year earlier to $19.6 million, or 64 cents per share, while sales declined 31% to $124.9 million.

Court clears CIS's buy-out of CMI

Sale by holding companies would create second largest third-party lessor

BY CLINTON WILDER
CW STAFF

BIRMINGHAM, Ala. — A state court last week upheld the proposed buy-out of computer leasing firm CMI Corp. by Continental Information Systems Corp. (CIS), paving the way for a giant lessor that will dwarf all but one of its third-party leasing competitors.

Almost two months after CMI executives filed suit to block the takeover [CW, June 1], 10th Judicial Circuit Judge Jack Carl ruled that CMI's two holding companies could sell 100% of CMI's stock to Syracuse, N.Y.-based CIS. The total purchase price should be approximately $50 million, and CIS Chairman Harry Goetzmann Jr. said the acquisition will be completed within 30 days.

The merger will create a firm with annual revenue of approximately $650 million, second only to Comdisco, Inc. in the independent computer leasing industry.

'Ready to move'

"We're ready to move in," Goetzmann said. He declined comment on any of his company's plans for CMI until the stock purchase is completed.

Goetzmann had said earlier that the combined company would retain the CIS name and have about 900 employees.

The CMI management group that has opposed the deal, led by Chairman Edward Cherney, filed an appeal to last week's decision in the Alabama Supreme Court.

"CMI is very disappointed in the decision," a spokesman said.

No delay

Goetzmann said the appeal was expected and that its filing will not delay the acquisition process.

Cherney's group had filed suit against Bloomfield Hills, Mich.-based CMI's two parent companies — Torchmark Corp. in Birmingham and Stephens, Inc., which is based in Little Rock, Ark.

Torchmark and Stephens, both financial services firms, controlled 70% of CMI's equity, whereas CMI management controlled a total of 30%.

Some observers said they have wondered about possible consequences of the CIS takeover for computer lessees who chose CMI over CIS in competitive bid situations.

But most corporate users who lease mainframe computers and peripherals believe competitive bidding has thrived despite the ongoing consolidation that is occurring in the leasing industry, according to a recent series of *Computerworld* interviews [CW, July 6].

Lee Data, Olivetti form joint 3270 venture

BY ADAM STONE
CW STAFF

MINNEAPOLIS — Lee Data Corp. announced last week that it has signed an agreement with Ing. C. Olivetti & Co. to form joint-venture companies to market a combination of Lee Data and Olivetti products for the IBM 3270 market in countries outside the U.S and Italy.

Analysts speculated that this move indicates Olivetti's growing interest in the 3270 market. "Clearly, they want to be more involved," said Clinton Morrison, an analyst at Dain Bosworth, Inc. "Now they have an equity interest in these products — it's not just another product line."

For Lee Data, access to Olivetti's technology "fills in voids in their product line that they could not fill on their own," according to Gary Smaby, an analyst at Piper, Jaffray & Hopwood, Inc. "Lee Data is a small enough company that they just don't have the resources to stand on the leading edge" of personal computer, workstation, local-area network and printer technology, Smaby said. "Olivetti can do a lot for them."

> "MAYBE they're testing the waters for something more serious."
>
> CLINTON MORRISON
> DAIN BOSWORTH, INC.

Olivetti continues to market Lee Data products in Italy under the Olivetti name, in continuation of an OEM agreement the firms began in 1982. This most recent agreement may augur an even closer relationship, analysts said.

"Maybe they're testing the waters for something a little more serious down the line," Morrison said. "This relationship is definitely heating up, and clearly, there's a good fit between the two companies."

The companies are also said to be planning a joint venture to market the same product line in West Germany, and plans are in the works for similar projects in France, Spain, Canada and Australia.

According to the agreement, Olivetti will buy 51% of Lee Data International Ltd., a wholly owned subsidiary of Lee Data based in England. Revenue from the joint venture will be consolidated into Olivetti's financial statements; net income will be divided between the two companies by ownership percentage.

The joint venture is expected to begin within the next several months.

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INSIDE LINES

Which of these things doesn't belong? In an announcement slated for Aug. 3 in New York, Tandy is expected to enhance its product line with several pieces of hardware. Usually knowledgeable sources claim the firm will add an Intel 80386 microcomputer, configurable as a server; an Intel 80286 machine that may be positioned to run Microsoft's Xenix as a small-scale, multiuser system; a laser printer; a Microsoft MS-DOS-based laptop; and a low-end machine. But a Tandy executive says one of the elements predicted by the sources is not set for release at announcement time.

This is expert control. Lapine Technology, a Milpitas, Calif., maker of low-capacity 3½-in. hard disk drives, has laid off all but a handful of staff members, shrinking from a one-time high of about 92 employees to less than 10. Lapine's problems stem from disagreements with Kyocera International of Japan, Lapine's sole manufacturing source for its hard-disk products. Because of the rise of the yen, Kyocera's Japanese manufacturing plant has reportedly been unable to make Lapine's disk drives at a reasonable cost and has cut down the supply.

How quickly they forget. Former highflier Iomega recently cut prices by 25% on its 8-in. Bernoulli box storage subsystems and laid off all workers involved with that product. Meanwhile, the company says it is developing a 3½-in. storage system for microcomputers for release in late 1988. In addition, a rewritable optical disk drive system is being researched at the firm's Boulder, Colo., facility.

Not on my account. While reserves for foreign loan losses stole the spotlight, the $1.14 billion net loss reported by beleaguered Bank America last week also included a $25 million charge for problems with a computer system for tracking customers' pension and benefit plans. The system, named Masternet, went on-line in March and cost $20 million. The charge, which is in addition to that cost, arises chiefly from troubles producing and delivering statements to customers, according to bank spokesman Jack Houseman. No customer data was lost, he said.

Reach out and touch someone. In a move to reach out to telecommunications managers and stress the interdependence of computer hardware with communications, Guide International is considering holding a joint meeting with the Rolm Users Group in July 1988 in Chicago, according to Guide President John Nack, who was in Boston last week for the 68th Guide meeting.

Catch-22. Reports that DEC will introduce a CMOS Microvax system running at 2.5 MIPS or faster by September are countered by one analyst who says DEC fears cannibalizing the lower end of its VAX 8000 series. "DEC wants the Microvax II to run out of gas pretty soon, so users will move up to an 8250," maintains Dataquest analyst Kimball Brown. A key reason is that DEC makes a much better profit on the VAX 8000 line. But DEC has a tricky solution to the problem of overlapping performance ranges, says International Data Corp.'s Bob Randolph. DEC will bring out a 3.5- to 4-MIPS Microvax chip but will "crank it down to about 1.5 MIPS" for the Microvax III's September debut, Randolph says. That way, DEC would lessen the overlap problem but still be able to boost performance later if necessary.

Dbest of Dfall? A knowledgeable source laid out Ashton-Tate's product plans for the next nine months, which include a new version of Dbase, Dbase IV, planned for a Comdex/Fall '87 announcement. Dbase IV, which runs under the existing MS-DOS environment, includes an enhanced version of the Dbase language, better performance and a rudimentary version of SQL, which is on the "periphery of the product and not yet fully integrated," the source said. Dbase IV will also feature a developers' tool kit, which contains code for commonly used routines. Ashton-Tate will also boost Framework, the firm's integrated package. Because Framework serves many users as a low-level data base engine, the firm said it will embed a subset of SQL. Framework III will ship early next year. Ashton-Tate is also at work on a graphics product to compete directly with Lotus's Freelance Plus.

AFTER AUGUST 7 THERE'LL BE NO MORE COMMUNICATIONS.

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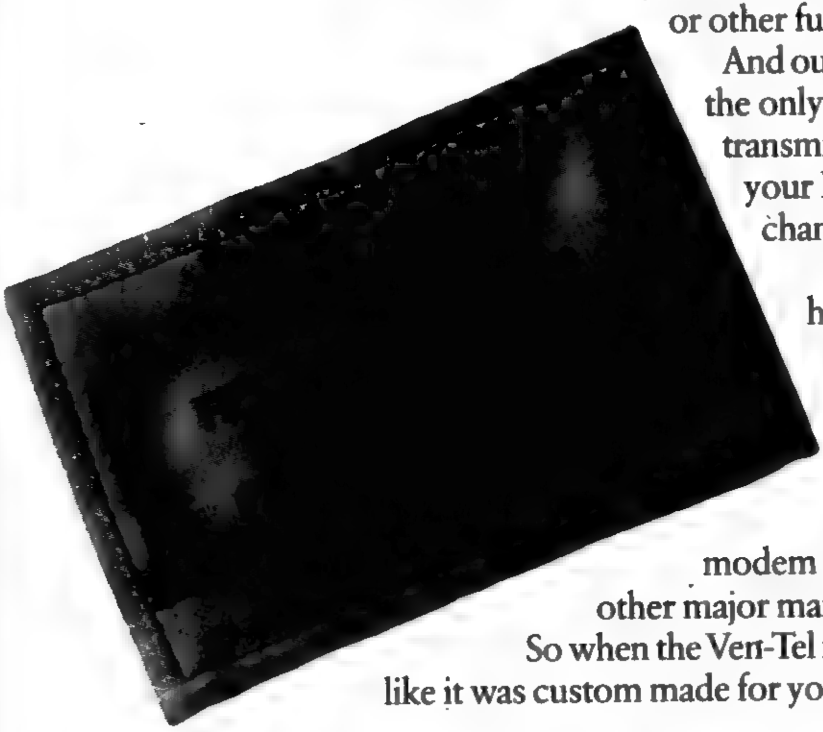

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COMPUTERWORLD

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Static RAM distinguishes new Cray supercomputers from older models. Page 8.

Apple products to shine this week and next at desktop conferences. Page 80.

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Junior PS/2 to be cast in net role

Wide target for compact Model 25 includes LANs, links to System/36, 38

BY DOUGLAS BARNEY
CW STAFF

NEW YORK — IBM will broaden its Personal System/2 microcomputer line tomorrow with the announcement of the Model 25, a low-end machine with a built-in monitor aimed at corporate networked environments and priced from $1,350.

While the long-anticipated system is targeted largely at the education and casual-user markets, the small-footprint machine was also designed to operate in local-area network environments and with IBM System/36 and 38 host processors.

According to IBM documents obtained by *Computerworld*, the Intel Corp. 8086-based model provides "network solutions when configured in a program and data sharing environment." An IBM official, however, declined to comment on the machine, which is scheduled to be announced at a press conference here.

Distinguishing displays

Two versions of the Model 25, distinguished by monochrome and color displays, will be available at the time of announcement and cost $1,350 and $1,750, respectively, according to the documents.

The 8-MHz zero-wait state 8086 machine, which has only two expansion slots and cannot be purchased with a hard disk drive, is the most limited of the PS/2 family.

Despite the Model 25's limitations, users contacted last week said they approve of the IBM strategy of selling low-cost machines intended for network use.

The $1,350 Model 25-001 comes with a built-in 12-in. monochrome analog display, one

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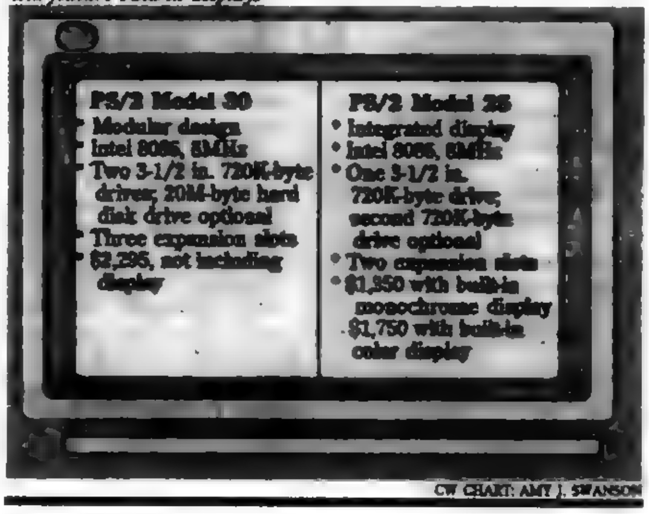
Shooting low

Specifications from IBM documents indicate new PS/2 Model 25 will be functionally similar to, but less expandable than, the Model 30 and will feature built-in displays



PS/2 Model 30
- Modular design
- Intel 8086, 8MHz
- Two 3-1/2 in. 720K-byte drives; 20M-byte hard disk drive optional
- Three expansion slots
- $2,295, not including display

PS/2 Model 25
- Integrated display
- Intel 8086, 8MHz
- One 3-1/2 in. 720K-byte drive; second 720K-byte drive optional
- Two expansion slots
- $1,350 with built-in monochrome display
- $1,750 with built-in color display

CW CHART: AMY J. SWANSON

AT&T bids for bigger T1 prize

BY ELISABETH HORWITT
CW STAFF

BASKING RIDGE, N.J. — Accelerating its drive into the private wideband networking arena, AT&T last week announced a T1 switch and a network management system that can communicate with its Accunet services.

The company also announced a bit-compression multiplexer designed to enable a T1 link to support twice the normal number of 64K bit/sec. channels.

The introduction of the Dataphone II 745 Acculink multiplexer will help AT&T catch up with — but not surpass — leading T1 vendors such as Network Equipment Technologies Corp. and Timeplex, Inc., according to Peter Bernstein, a senior research analyst at Probe Research, Inc. in New York.

Several companies offer switches with several times the 745's capacity of up to 16 T1 lines, and many provide interfaces with AT&T's Accunet services.

AT&T hopes, however, to leverage its dual role as carrier and equipment vendor to provide customers with a more compre-

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Race is on to speed up twisted-pair

BY PATRICIA KEEFE
CW STAFF

Major networking vendors are racing to be first to market with what many observers consider a technological breakthrough: 10M bit/sec. Ethernet running over unshielded twisted-pair, or standard telephone, wiring.

Beta-test users of one vendor's high-speed Ethernet product last week enthusiastically endorsed the technology, which they said is cost-effective and operates virtually error-free.

Leading the pack of networking companies pursuing the new technology are 3Com Corp. in Santa Clara, Calif., and Synoptics, Inc. in Mountain View, Calif. Both firms have announced fourth-quarter delivery dates and are winding down their beta testing of separate efforts to port high-speed Ethernet to inexpensive and somewhat unstable telephone wiring.

Competitors, including AT&T, Hewlett-Packard Co., Digital Equipment Corp. and Ungermann-Bass, Inc., are said to be working on similar projects. AT&T is reportedly readying a 10M bit/sec. version of its Starlan to run over its Premises Distribution System cabling. 3Com said Nynex Corp. is considering using its system.

Running high-speed Ethernet over unshielded twisted-pair wire is expected to have a significant impact on users, particularly those located in major cities in older buildings already stuffed to capacity with cabling.

Many of these users, who have patched and repatched a tangled mass of transmission

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HP: Color me ink-jet

BY JEFFRY BEELER
CW STAFF

PALO ALTO, Calif. — Undercutting the price of pen plotters and offering faster output than color dot matrix printers, Hewlett-Packard Co. is scheduled to introduce today a color ink-jet device priced at less than $1,400.

The Paintjet thermal ink-jet printer is said to produce a page of presentation-quality color graphics in four minutes.

Using an enhanced version of the same basic technology as HP's existing Thinkjet printer, the color graphics Paintjet device can print up to 180 dot/in., according to Robert Borden, product line manager for the vendor's San Diego division.

The Paintjet can use plain paper or a specially coated HP-supplied paper. The fast-drying HP paper, which costs 6 cents per sheet, controls dot size and circularity, resulting in color output that is more vivid than on plain paper, according to Borden.

Although Paintjet's resolution is only half the maximum dot density of Epson America, Inc.'s LQ-2500 color dot matrix printer and is inferior in output quality to high-priced pen plotters, its graphics are "highly acceptable" for most personal printer applications, according to one HP user who has seen the product.

"My own gut feeling is that by

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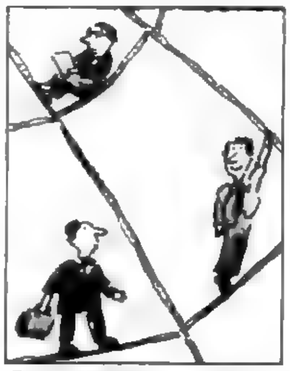

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Editor's note

Microsoft Corp. last week disputed a July 27 *Computerworld* report that a Microsoft official confirmed the company's plans to ship the Presentation Manager component of its MS OS/2 operating system during the first half of 1988. Microsoft denied that the official, Paul Sribhibhadh, had confirmed such plans.

This issue arose from a series of communications problems that occurred during preparation of the story. CW attempted to confirm with Sribhibhadh reports by reliable sources close to Microsoft that the Presentation Manager would ship by the second quarter of 1988.

Sribhibhadh last week said that, in the interview, he confirmed a second-quarter shipping date for a Microsoft Unix/Xenix merge product and discussed the firm's plans for "Presentation Manager-style" interfaces. He said he did not comment on plans for the MS OS/2 Presentation Manager and was not aware of those plans.

The CW reporter's notes and recollections from the interview differ from those of Sribhibhadh and indicate that the confirmation referred directly to the MS OS/2 product. This information was supported by a reliable source close to IBM, who said the second-quarter date was "on target with IBM's internal scheduling."

However, a review of the reporter's notes indicated a quote used in the story was incomplete, and omitted information indicating Sribhibhadh may have been referring to Presentation Manager-style interfaces and not the Presentation Manager's ship date.

CW attempted to contact both Microsoft and its public relations agency for further comment on the story before it went to press. Microsoft did not return a reporter's call because of an internal communications error, according to Steve Ballmer, vice-president of Microsoft's Systems Software Division. He said the public relations agency has no record of a call from a CW reporter.

"We have not announced a date for the Presentation Manager's availability," Ballmer said last week. "I have not set in my mind a date for that availability. We are committed to letting people know in the fourth quarter what that date will be."

Burst pipe soaks CPUs

BY DAVID A. LUDLUM
CW STAFF

NEW YORK — A burst water pipe above the data center at the Wall Street headquarters of Goldman, Sachs & Co. destroyed millions of dollars worth of IBM mainframes, soaked computer tapes and downed systems for two workdays.

The cast-iron pipe directly above the IBM equipment on the ninth floor of the building at 85 Wall Street cracked before the start of work on the morning of Thursday, July 23, spilling water as far as four floors below, sources said.

The burst pipe showered the IBM processors with soggy ceiling tiles, according to one source who saw the damage. "Everything was covered with the stuff, like mud," said the source, who requested anonymity.

Several mainframes that were ruined were replaced by IBM shortly after the water was cleared, and all the firm's systems were put back in operation the following weekend, according to Fred Krimendahl, the partner in charge of operations at Goldman Sachs.

Millions of dollars worth of ruined computer equipment was covered by insurance, said Krimendahl, who declined to provide a dollar figure for the damage or to identify the models involved.

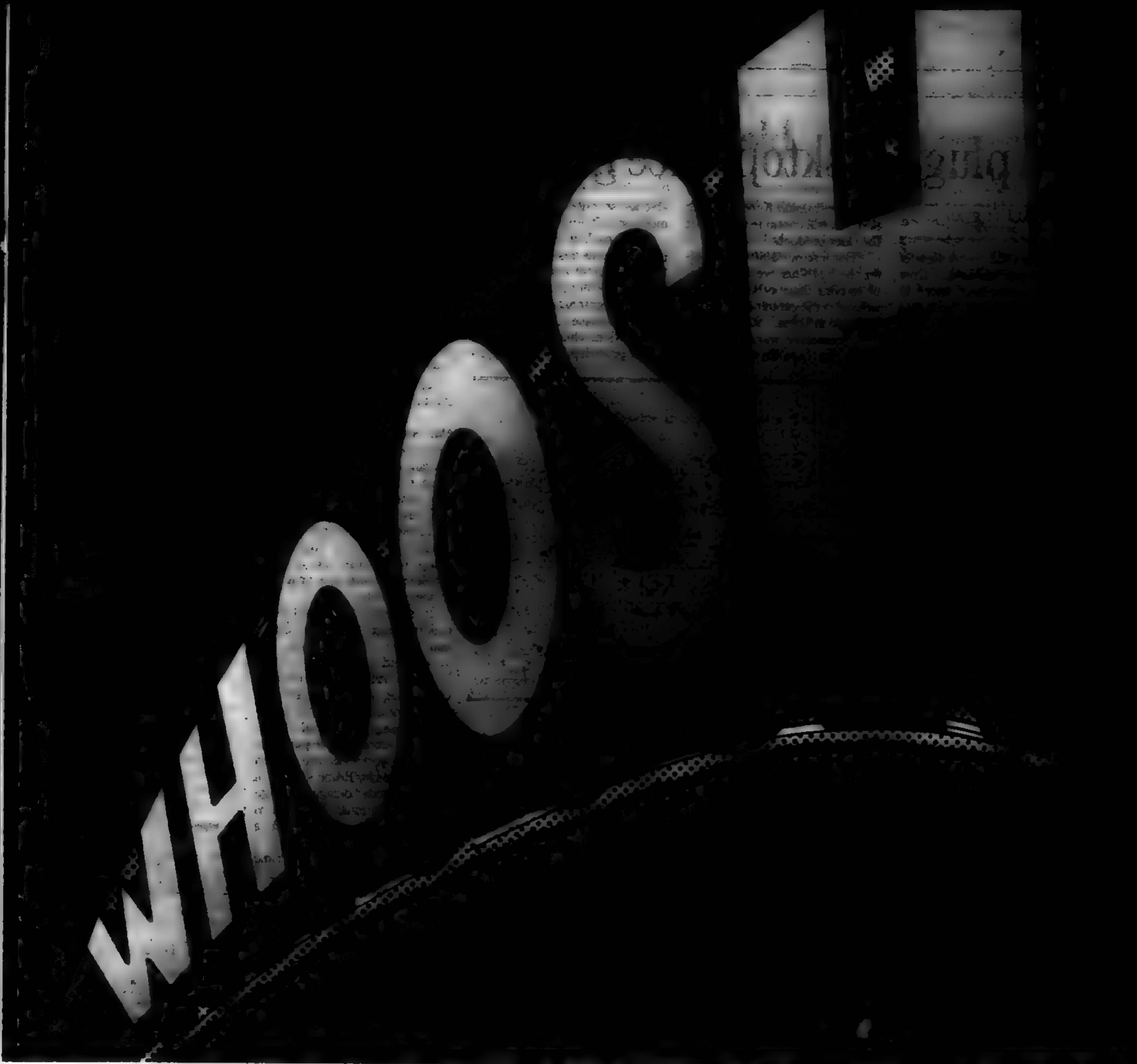
Goldman Sachs is currently converting its production systems from Unisys Corp. to IBM processors. The incident affected the firm's entire IBM environment, including production and test systems.

Modest interruptions

The water pipe burst after much of Thursday night's production work had been completed and caused only modest interruptions to business, according to Krimendahl. The incident delayed some confirmations of orders and reports for employees, he said.

A number of tapes were soaked and had to be cleaned and dried, Krimendahl said. Those tapes that were destroyed were for systems in development, and replacement involved only a few days work, he said.

The water inflicted less severe damage to Unisys peripherals and to two Wang Laboratories, Inc. systems located farther away from the pipe. The vendors of that equipment also provided replacements, and another Wall Street firm loaned Goldman Sachs some equipment.



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Sun plugs desktop price gap

BY ALAN J. RYAN
CW STAFF

ANAHEIM, Calif. — A slew of product announcements from Sun Microsystems, Inc. in Mountain View, Calif., including a line of desktop graphics workstations, highlighted last week's Siggraph '87 show here.

The company's Sun-3/60 series reportedly gives users access to high-end workstation features such as 3 million instructions per second (MIPS) performance, memory expansion options and 8-bit color-display capabilities.

The system will sell for $9,900 in its color version and $7,900 for the monochrome version, according to Andreas Bechtolsheim, vice-president of technology and one of the founders of Sun.

Continued support

While the MIPS rating and clock speed are higher on the 3/60 than on the Sun-3/110, 3/140 and 3/160 workstations, company spokeswoman Karen Roback said Sun will continue to support the older products.

"Because our 3/60 doesn't offer the VMEbus, we will continue to offer those other products as long as the customer is still interested in them," Roback said. "If a customer wants VMEbus expansion capability, then the 3/110 or 3/140 would be the model or workstation he would want to purchase."

Roback said that while she suspects the 3/60 sales will slow the sales of the 3/110 and 3/140, the company currently has no plans to stop production of those models.

Bechtolsheim said the 3/60 desktop line offers 4M bytes of main memory, expandable to 24M bytes; a 20-MHz Motorola, Inc. MC68020 CPU; a 32-bit, 20-MHz MC68881 floating-point coprocessor; two RS-423 serial ports; and a small computer systems interface port for linking mass-storage devices and autoselectable standard or thin Ethernet interfaces. Also available are storage options and five monitor configurations.

One Los Angeles-based computer systems designer said that for the price of a personal computer with Unix and added memory and graphics boards, he could purchase the Sun color workstation, while also retaining a clear growth path extending up to 10 MIPS.

The workstations can function as stand-alone systems, small file servers or diskless nodes in a distributed computing environment, sharing file and printer resources, the company said.

Sun also announced last week its CXP line of graphics workstations with graphics acceleration that add two- and three-dimensional graphics capability to the company's workstations.

Shadier deal

The high-end CXP models reportedly provide greater shading performance and increased 3-D vector performance than previous systems, the company claimed. The product line includes the Sun-4/260CXP, the Sun-3/260CXP and the Sun-3/160CXP, and each model includes new graphics acceleration hardware and software.

Prices range from $32,900 to $95,500.

Announced to complement the CXP line were TAAC-1 application and graphics accelerator systems.

The TAAC-1 reportedly allows Sun workstations to be used in new application areas, including imaging, high-end visualization and simulation.

Mix and match

Developed by Sun's High-End Graphics/Accelerator Projects team, which was formerly Trancept Systems, Inc. in Raleigh, N.C., the applications and graphics accelerator systems combine attributes of array processors, image processors and graphics accelerators into one programmable product.

It is priced at $25,000 when ordered as an option for Sun-3 and Sun-4 workstations, the vendor said.

In another announcement concerning the workstation vendor, Prime Computer, Inc. in Natick, Mass., announced it has signed a contract to purchase Sun-3/60 workstations from Sun as platforms for Prime's family of computer-aided design and engineering solutions. The pact is valued at $75 million over a three-year period.

Under the agreement, Prime has ported its Prime Medusa 2-D and 3-D mechanical design and drafting software to the 3/60 workstations and will sell the software and hardware combination as a single package called the WS3600. According to Bob Fischer, president and CEO of Prime's CAD/CAM & Engineering/Scientific Group, the WS3600 will be priced in the $40,000 range.

Expanded horizon

Sun's 3/60 series fills in the company's line with more expandability options

	[illegible]	[illegible]	3/110	3/140	[illegible]	[illegible]	[illegible]
Processor	MC68020	MC68020	MC68020	MC68020	MC68020	MC68020	MB86900
[illegible]	15	[illegible]	16.67	16.67	16.67	[illegible]	[illegible]
MIPS*	1.5	3	2	2	2	4	10
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Disk capacity (in bytes)	71M to 282M	71M to 282M	71M to 282M	71M to 282M	71M to 1.2G	141M to 1.2G	280M to 1.2G
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

*Million instructions per second

INFORMATION PROVIDED BY SUN MICROSYSTEMS INC.
CW CHART

Siggraph hosts product parade

BY ALAN J. RYAN
CW STAFF

ANAHEIM, Calif. — Product introductions, upgrades and additions marked last week's Siggraph '87 conference and exhibition here.

According to show coordinators, there were 27,800 attendees and 271 .exhibitors as of Wednesday.

New products included a series of high-performance display controllers designed for use in VMEbus-based systems, displayed by Metheus Corp. in Hillsboro, Ore. The four models cover a range of resolution and bit-plane options, the firm said.

The series uses Metheus's very large-scale integration graphics components, including the Graphics Processing Unit, a single-chip general-purpose processor optimized for graphics and rated at 4 million instructions per second (MIPS), and the Memory Control Unit, which controls raster memory and carries out low-level graphics tasks. Deliveries are scheduled to start in September, and prices range from $2,495 to $3,995.

Ramtek Corp. in Santa Clara, Calif., announced its Ramtek 4322 high-performance color graphics processor and video display. The system features 1,280- by 1,024-pixel screen resolution and displays up to 256 screen colors from a palette of 4,096. The desktop unit is designed to function with several host computers. The single-unit list price is $8,995.

Control Data Corp. introduced four high-performance three-dimensional graphics workstations, including two reduced instruction set computer-based 10-Dhrystone MIPS workstations. The St. Paul, Minn.-based company said pricing ranges from $25,545 to $84,900. CDC's Integrated Manufacturing Group announced its Sabre series of high-performance, high-capacity 8-in. disk drives, including a 750M-byte Sabre IV.

Mercury Computer Systems, Inc. in Lowell, Mass., introduced its MC3200 series single-board, high-speed coprocessor family for the IBM Personal Computer AT and compatible computers, including Apollo Computer, Inc. 3000 and 4000 series workstations. The microsupercomputer is a 10-MIPS processor that executes computation-intensive vector and scalar operations at speeds of up to 20 million floating-point operations per second, the company said.

According to Mercury's district sales manager Paul Barr, the unit is Fortran- and C-driven and fits into a single slot on the AT or compatible. It is scheduled to begin shipping this month in volume, and prices will range from $6,000 to $16,000. The AT-compatible configuration draws 15W from the host bus.

Austin, Texas-based Nova Graphics International Corp. announced its NovaCGI, a firmware-based computer graphics interface that reportedly fully conforms to ANSI and ISO standards. The interface is designed to facilitate device independence and software transportability in the development of graphics applications, according to Jerome Candelari, national sales director.

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Plenty of room for micros in CAD/CAM field

BY ALAN J. RYAN
CW STAFF

ANAHEIM, Calif. — Users and vendors at the Siggraph '87 show here last week said there is room in the computer-aided design and manufacturing (CAD/CAM) field for both graphics workstations and personal computers with graphics capabilities.

As the price gap closes between low-end workstations and personal computers, users seeking workstation capability have a choice. But the workstation manufacturers say PCs have not taken any of their market.

Prime Computer, Inc. is expecting a 15% growth in its workstation sales area this year, according to Robert Fischer, president and chief executive officer of the company's CAD/CAM & Engineering/Scientific Group in Milford, Mass. "At this stage, we're expecting to do reasonably well this year, and next year should be even stronger," he said.

Not closing eyes

However, the workstation vendors are not closing their eyes to the increasing use of personal computers as workstations. "PCs play an important role in the technical environment. We know that," said Frank Casanova, a senior product manager at Chelmsford, Mass.-based Apollo Computer, Inc. But, he said, even PCs based on Intel Corp.'s 80386 chip lack graphics performance, networking capabilities and engineering applications software.

Additionally, PCs often need added memory boards and graphics boards to give them the power of a low-end workstation.

Benefits with the PC include the capability for personal computing and the use of the unit as a workstation.

User Kathy Wallace, a programmer at Lockheed Missiles & Space Co. in Palo Alto, Calif., said that for the money she had to spend on a workstation, a Tektronix, Inc. terminal was appealing. "But for the same money, I can get an IBM Personal Computer AT and software with Tektronix emulation," she said. "We can use the personal computer both as a workstation and for personal computing."

Wallace said that her division of Lockheed Corp. has a Digital Equipment Corp. VAX 8600. "We may buy a workstation to run off of the VAX or buy a DEC Microvax and a personal computer to work with it," she said.

Most conference attendees agreed that the choice of personal computer vs. workstation depends on the application that will be used on it.

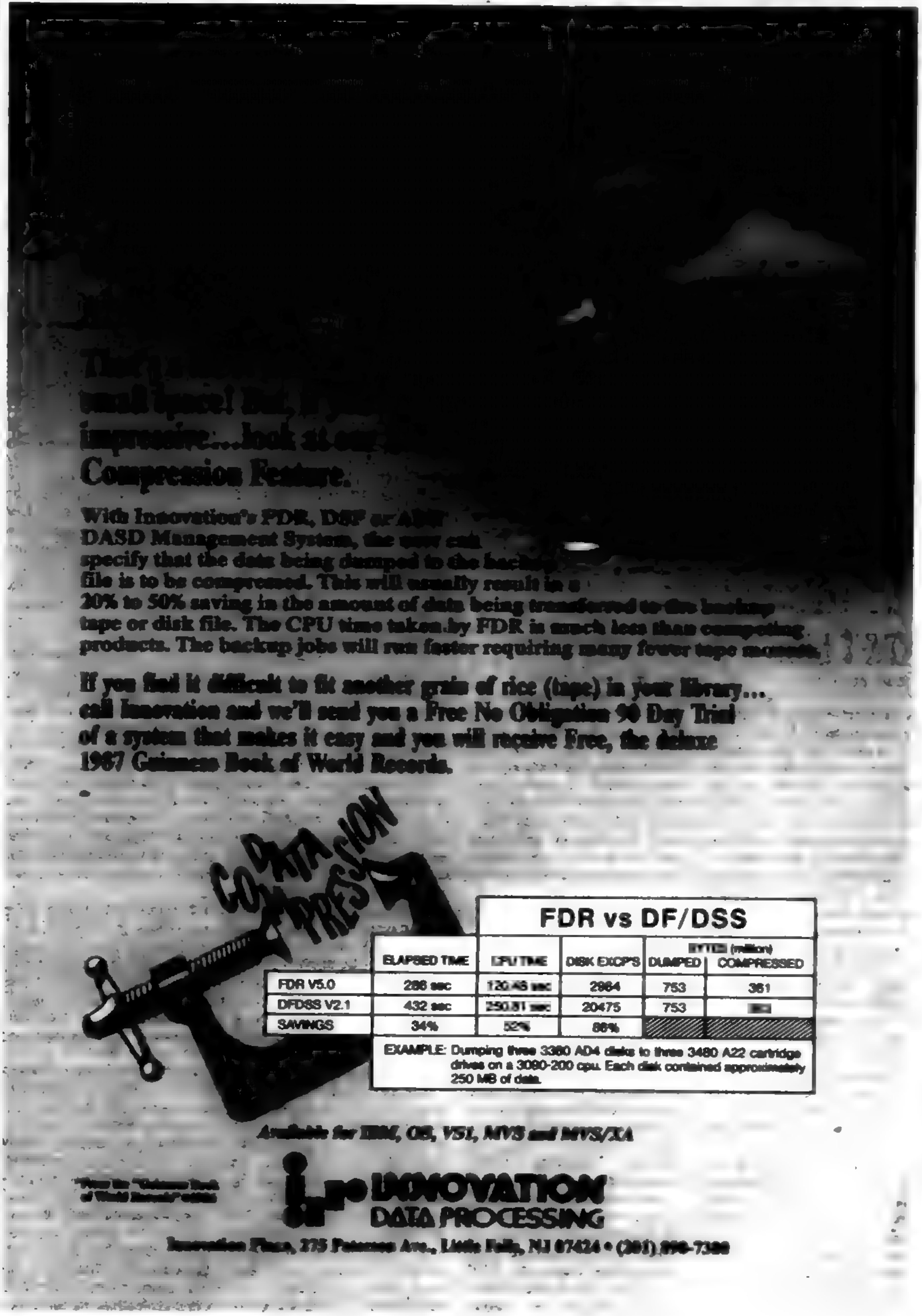
Sandra Tasca, owner of Computer-Aided Photographs in San Marino, Calif., said she currently uses Autodesk, Inc.'s Autocad on an AT-compatible computer. "For my applications, the PC is powerful enough, but I'm not doing any three-dimensional work or shading. Both of those applications require much more power," she said.

Various studies have indicated that growth in the CAD/CAM tool market will be flat this year but may begin a gradual climb again next year. However, vendors polled at the show agreed that as the price of the workstation declines, more unit sales are needed to maintain the same dollar volume in sales.

CORRECTIONS

Because of a mechanical problem at the printer, pages 25-72 of the July 27 issue were incorrectly bound under the cover of the Spotlight pullout section in about half of the pressrun.

Tandon Corp.'s third fiscal quarter financial results [CW, July 27] reflected net income of $5.6 million, or 10 cents per share. The profit compared with a year-earlier loss of $20.3 million, or 39 cents per share. Third-quarter revenue was $81.8 million, a 58% increase over year-earlier sales of $51.8 million.



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				DUMPED	COMPRESSED
FDR V5.0	286 sec	120.45 sec	2964	753	361
DFDSS V2.1	432 sec	250.81 sec	20475	753	[illegible]
SAVINGS	34%	52%	86%	▨	▨

EXAMPLE: Dumping three 3380 AD4 disks to three 3480 A22 cartridge drives on a 3090-200 cpu. Each disk contained approximately 250 MB of data.

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Current users upbeat on DG outlook, but lost market share has taken toll

BY CLINTON WILDER
and DAVID BRIGHT
CW STAFF

Although current users of Data General Corp. computers are mostly optimistic about DG's ability to return to profitability and long-term stability, many former DG users and OEM customers have already switched their business to Digital Equipment Corp.

Interviews with members of the user and OEM communities confirmed the widely held view that part of DG's current financial malaise can be traced to market share lost to DEC in the past two years. But customers and Wall Street analysts generally said they believe DG's cost cutting and refocusing on OEMs and smaller user accounts is the right strategy for a financial turnaround.

Although most of its minicomputer rivals recently reported strong second quarters, Westboro, Mass.-based DG posted a $65.1 million loss and announced its third major layoff in two years.

Too good to fail

"I think they have too good a product base and too good a customer franchise to go under," said Bernard Weinstein, first vice-president of information systems and telecommunications at E. F. Hutton & Co. in New York, which runs many DG systems, including the high-end MV/20000. "What you're talking about here is a cyclical situation. People were writing their obituary a few years ago, too."

The recent strong quarterly performance of Wang Laboratories, Inc., another minicomputer maker that had been mired in a two-year slump, made some DG users hopeful for their vendor's turnaround.

"We're going to stand pat," said John O'Rourke, assistant DP director at the New York office of Chicago-based Washington National Insurance Co. "It's a little frightening, but I know people who were involved with Wang, and they didn't budge at all because they were happy with the products. DG has always provided good support, and I don't see any dependability problems with future products."

Users were reassured about DG's commitment to research and development spending as the firm moved to slash costs in administrative and manufacturing areas. DG President Edson deCastro emphasized in a recent interview that the company will continue to increase R&D outlays.

"I like their strategy of sinking an awful lot of money into development," said Barry Graff, a former DG employee who is now DP manager at Thomas A. Greene & Co., a New York-based insurance firm.

DEC's current boom has been the opposite of DG's financial woes. Some DG users, who requested anonymity, confirmed that they are converting to DEC VAX systems, although they stressed that DG's financial status was not a factor in the decision. One information systems manager cited the advantages of DEC's Decnet in linking nationwide offices to hub locations.

DG has also experienced defections to DEC among its mainstay OEM customers. According to deCastro, DG is now attempting to return to its core OEM business after its generally failed attempt to become a major force in Fortune 1,000 accounts.

"They've lost sight of that business," said Dick McCormick, marketing manager of Placentia, Calif.-based Intelligent Computer Integration, Inc., a vendor of hardware enhancement products for DG OEM customers. "They went after end users and found they were competing with their OEM customers," he added.

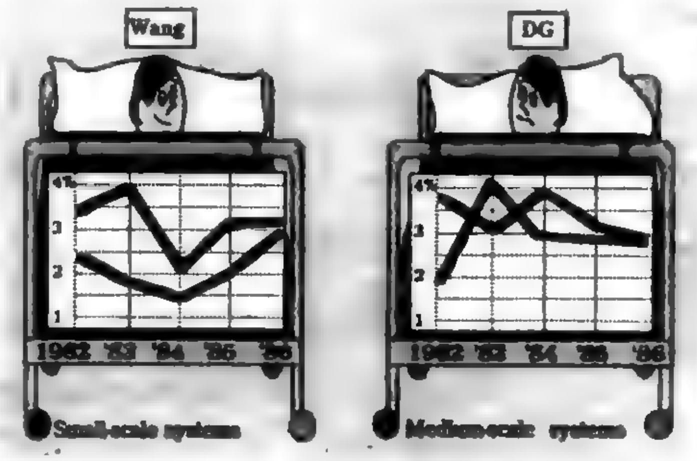
"Many of the value-added resellers have complained about a lack of support," said Wendell Watson, editor of *Database Monthly*, a DG users' magazine in Austin, Texas. "DG seems to be refocusing on OEMs and VARs and on the smaller user companies that used to be their bread and butter. Most users who I have talked to are confident that they will survive and be in for the long haul."

Others close to the company, however, remain skeptical. Doug Kaye, president of Rational Data Systems, a Corta Madera, Calif., vendor of DG communications software, said DG continues to lag in forming partnerships with niche experts.

"DG feels it has more market clout than it really does, hanging onto the not-invented-here syndrome," he said. "They started as a small company in a smaller industry, but there is no way DG or anyone else can provide everything today. The business has outgrown Data General."

Vital statistics

Comparison of worldwide market share in small and medium systems indicates Wang is showing improvement while DG continues to slip



INFORMATION PROVIDED BY INTERNATIONAL DATA CORP.
CW CHART: AMY J. SWANSON

AT&T bids

FROM PAGE 1

hensive networking system, according to Jeffrey Akers, a product manager with the company. "There is no difference between our devices' interface and the others', but we feel we have better capabilities of offering any combination of public, private or hybrid services," Akers said.

A key element of this strategy is the Dataphone II Acculink Network Management System, the first of several offerings that will increase corporate customers' control of both private and carrier-based networking facilities, the company claimed.

Future releases will converge AT&T's private and carrier-based network management systems, giving users the same ability to control and diagnose their public networks as they now have with their private networks, Akers said.

For example, AT&T is currently working on a dynamic version of its Customer Controlled Reconfiguration (CCR) offering, which would allow users to do real-time reallocation of bandwidth on their Accunet links. It takes AT&T up to 15 minutes to respond to a reallocation request via the existing CCR service.

In February Richard Snowden, director of AT&T's Concept Development Center, told *Computerworld* that dynamic CCR could be made available sometime in early 1988. But Akers would not comment because AT&T is now actively working toward a dynamic CCR tariff, and Federal Communications Commission regulations prohibit further talk of possible introduction dates, he said.

Lingering questions

TRW, Inc. is likely to pick NET or Timeplex over AT&T as its primary vendor for a planned private T1 network that will interface with the corporation's existing Accunet links. "We have questions as to whether AT&T can deliver the network management and control features it promises and whether its products can really leverage Accunet capabilities such as the future dynamic version of CCR," said Kenneth Jankowski, TRW's manager of network services.

One reason for this concern, he said, is the fact that AT&T did not develop the 745 multiplexer internally but is reselling a box developed by Tellabs, Inc. TRW purchased from AT&T a different T1 multiplexer developed by Tellabs and has found AT&T unable to service the box adequately, Jankowski said.

The Acculink Network Management Service software runs on an AT&T 3B2/400 minicomputer. It performs loop testing and other diagnostics for AT&T's Dataphone line of data service units and leased-line modems, generates statistical reports and routing tables and sets up and initializes T1 multiplexers, Akers said. AT&T has not ruled out the possibility of interfacing its network management system with IBM's Netview and Netview/PC products. But Akers said, "Right now, I don't see enough hardware and customers actually using those products to tell us what the true advantages of doing that are."

'Still a follower'

The announcement of the Dataphone II 745 Acculink puts AT&T on more equal footing with NET and Timeplex, Probe Research's Bernstein said. "It was a move AT&T had to make," he noted. "The bulk of customers are becoming T1 backboned, so AT&T had to have a legitimate product line." However, Bernstein emphasized, "AT&T is still a follower, not a leader" in the T1 equipment market.

AT&T also announced the BCM 32000 Solitaire Multiplexer, which uses bit compression to allow a T1 link to support twice the usual number of 64K bit/sec. channels. The Solitaire conforms to the Adaptive Differential Pulse Code Modulation industry bit-compression standard. The product is available now and is priced at $6,500, approximately 60% less than AT&T's current bit-compression multiplexer, the firm said.

The Dataphone II 745 Acculink multiplexer is scheduled to be generally available by mid-September, priced between $10,000 and $68,000, depending on configuration.

The Acculink Network Management System, priced at $49,000, will be generally available in October or November, the company said.

Honeywell Bull squeaks out $1.8M profit in first quarter

MINNEAPOLIS — Honeywell Bull, Inc. last week announced a $1.8 million profit in its first quarter of operations as a joint venture of Honeywell, Inc., Compagnie des Machines Bull and NEC Corp.

Honeywell Bull reported revenue of $508.2 million for the three months ended June 28. It said the operations now constituting Honeywell Bull had revenue of $424 million under their former parent companies in the first quarter of the year.

In a statement, President and Chief Executive Officer Jerome J. Meyer said the firm had strong revenue internationally, but would be concentrating on "improving long-term performance in the domestic market."

Honeywell Bull announced separately that it has reorganized several divisions along domestic or international rather than functional lines. U.S. marketing, planning, sales and service organizations will report to Executive Vice-President John C. Butler. Domestic marketing and planning had previously been grouped with overseas sales and marketing.

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Junior PS/2

FROM PAGE 1

720K-byte 3½-in. floppy disk drive and 512K bytes of random-access memory. Dealer cost for this unit will reportedly be as low as $810. A second floppy disk drive will sell for $170.

The $1,750 Model 25-004 differs from the monochrome unit only by the inclusion of a 12-in. color analog monitor. Dealer cost will be as low as $1,050.

The color monitor takes advantage of the Multiple Color Graphics Adapter, a high-resolution graphics mode introduced with the PS/2 Model 30.

Just the ticket

For one user, an inexpensive IBM Personal Computer may be just the ticket.

"We really see a need to network, but it can be so expensive that we can't justify it. If they [IBM] come up with an inexpensive machine that works with the Token-Ring and runs our applications, such as Lotus Development Corp.'s 1-2-3, we would be very interested," said Paul H. D'Anna, senior staff computer systems analyst for Mobil Corp. in New Orleans.

D'Anna said he would not be deterred by the machine's lack of a hard disk. "As a station on a network, you use very little hard disk. You pull all the data into memory. We could have a large data base on a server, and the Model 25 could use the data," D'Anna said.

The Model 25 is a totally new design for IBM. Unlike other models within the PS/2 line, which have a separate monitor, CPU and keyboard, the Model 25 houses the monitor and the CPU within the same chassis. Unlike the PS/2 Models 50, 60 and 80, the Model 25 does not use the Micro Channel, a new bus architecture that is incompatible with IBM's previous line of PCs.

With many dealers willing to cut margins to boost sales, store prices of the machines should be highly aggressive. Dealers have slashed prices of the Model 30 from its $1,695 list price to less than $1,200.

Portability featured

The machine, which weighs 28 pounds in its monochrome configuration, was designed to be easily moved and offers a carrying case as an option.

In addition, the machine has a small footprint and is approximately 12 in. wide, 15 in. tall and 14 in. deep. This form factor makes the machine similar in size to Apple Computer, Inc.'s Macintosh.

Standard features on the Model 25 include an asynchronous communications adapter, a socket for an Intel 8087-2 math coprocessor, a parallel printer port, a serial port, a pointing-device port and an expansion riser with two slots: one full-length and one three-quarters the size.

To boost the positioning of the machine as a network product, the Model 25 is compatible with a slew of IBM network cards, including the PC Network Adapter and the Token-Ring network. The Model 25 also supports various System/36- and 38-oriented communications software products, including IBM's PC Support/36 and PC Support/38.

More than 50 business software packages, including Lotus's 1-2-3 and Novell, Inc.'s Advanced Netware network operating system, will reportedly be available for the Model 25 in the 3½-in. medium.

In addition to being configured for network uses, the Model 25 is said to be adequate for the lower tier of computer users within corporations, who primarily do word processing or use the machines only occasionally. Low-end Intel 8088 and 8086 machines, such as Tandy Corp.'s Model 1000 line and the Leading Edge Products, Inc. Model D, have made some strides in this market.

"If you are talking about a machine where all that is needed is word processing, that is a good market," said a large user familiar with the Model 25. The source added that if the Model 25 receives discounts as steep as those on the Model 30, it would appeal to a large number of users.

Cost-effective power

For one large corporate user, low-end machines already play a key role by providing computing power in a cost-effective manner. "For people less computer literate, we are using Tandy 1000s. It is very adequate for those applications where the use is occasional and largely oriented toward word processing," said a vice-president in a Fortune 500 company.

This user has also moved toward tying inexpensive machines into LANs.

On account of its industry-standard processor and older bus architecture, the Model 25 should be a highly compatible machine.

IBM literature claims the machine is compatible with the PS/2 Model 30, the older IBM PC and PC XT at the BIOS level and "most hardware interfaces."

Chicago rings in AT&T long-distance switch

BY JEAN S. BOZMAN
CW STAFF

CHICAGO — Cap'n Crunch did it. An 800-number promotional advertisement for the breakfast cereal caused the Chicago 7 long-distance 4ESS switch here to reach its capacity of 700,000 calls per hour in late 1985. It was then that AT&T decided that the 1976-vintage switch would need help, but it was just last weekend that AT&T brought a new switch, Chicago 9, on-line.

Together, the two switches will be able to handle 6.85 million calls per day. They are the only switches that handle long-distance phone calls into and out of downtown Chicago. But the Chicago 7, the first 4ESS installed in the world, will continue to carry the greatest burden, chugging along at 5.1 million calls per day.

"The Chicago 7 kept outperforming the engineers' estimates of its capacity," reported Michael F. Kelly Jr., who supervises Chicago 7 operations. "But when it hit 717,000 calls an hour on Thanksgiving weekend of 1985, we decided we would need to have a new switch."

AT&T spokesmen said that the extra capacity was required by the demand for new services, such as AT&T Megacom, a large-volume calling service with call-management features, teleconferencing and 800- and 900-number services. At first, Chicago 9 will be performing at a fraction of its capacity, which matches the Chicago 7's limit of 700,000 calls per hour.

Technology has greatly changed the design of AT&T's long-distance 4ESS switches. The Chicago 9 switch is housed on one-third of a floor in one of AT&T's downtown Chicago buildings. By contrast, the Chicago 7 is housed in two full floors of the same building. The new machine uses plastic panels and silicon chips to do what the older machine does largely with hard-wired circuits. As a result, the cooling requirements for the new switch are far less than those for the Chicago 7, which has in the past heated its floor space to 90 degrees or more. The Chicago 9 was assembled in eight months, while the Chicago 7 took two years to construct.

The two switches are fully redundant in the event that one breaks down. Special acid-driven plastic batteries called Bellcells could drive the switches for up to three hours, while auxiliary diesel generators could run them indefinitely in case of a Chicago power failure. The added capacity should carry Chicago's business district for years to come, if past experience — barring cereal promotions — is any indication. Since January 1976, the Chicago 7 has switched an estimated seven billion long-distance calls.

Cray revamps supers, goes with static RAM

BY JAMES CONNOLLY
CW STAFF

MINNEAPOLIS — Cray Research, Inc. last week revamped its Cray-2 line of supercomputers with memory technology designed to help users with memory-intensive applications such as those dealing with fluid and gas dynamics.

Cray, which claimed an installed base of eight of the Cray-2 systems introduced in 1985, also predicted four more installations by the end of this year. Cray replaced two Cray-2 models with three systems. The new models utilize static random-access memory (RAM), which the company said provides an average throughput gain of 25% in comparison with models using dynamic RAM.

According to a Cray spokesman, the static RAM chips feature an access time of 55 nsec, while dynamic RAM chips have an access time of 120 nsec. Static RAM chips maintain a constant flow of electricity to provide for faster operations than dynamic RAM chips, which must be refreshed repeatedly.

The static RAM chips were designed to reduce memory contention, which the spokesman said can mean a 40% throughput advantage for memory-intensive applications running on a Cray-2S with 1G byte of static RAM, compared with a Cray-2 with 2G bytes of dynamic RAM.

Analyst Gary Smaby, managing director of technology research for Minneapolis brokerage house Piper, Jaffray & Hopwood, Inc., said, "From a user perspective, [a group] like NASA has to be delighted with this. They are so memory-hungry that they will take all of the memory they can get."

Smaby noted that the lack of a field upgrade from the original Cray-2s to the Cray-2S models is unlikely to upset existing Cray-2 users, because Cray made its plans known almost a year ago. He also said Cray is likely to offer its best customers other benefits if those customers are unable to take advantage of the static RAM technology immediately.

Analyst Marcia Brooks of Framingham, Mass.-based market research firm International Data Corp. added that Cray's moves may be a result of the company's desire to improve its overall price/performance ratio. "They obviously are beginning to meet some pretty serious competition from other sources," she said, noting that minisupercomputer vendors and parallel system makers have not directly impacted the Cray-2 market, but that Cray's traditional customers are starting to recognize that alternatives exist.

In introducing three models for delivery in early 1988, Cray discontinued the dynamic RAM-based Cray-2/4-128 and Cray-2/2-128, which use four and two CPUs, respectively, and feature 128M words or 1G byte of memory. Cray replaced those versions with static RAM models and added the Cray-2S/2-64 with 64M words of memory. The Cray-2S/4-128 costs $17.5 million, the Cray-2S/2-128 costs $15.5 million and the Cray-2S/2-64 costs $12 million.

The one remaining dynamic RAM model, the Cray-2/4-256, which previously was the high-end system, was reduced from $17 million to $15.5 million.

With an average performance gain of 25%, the peak rating for a Cray-2S reportedly is 2.2 million floating-point operations per second (MFLOPS), compared with 1.8 MFLOPS for the earlier models.

Cray also announced on-line tape support for Cray-2 systems through the Cray Tape Controller, which allows direct connection of 32 IBM 3480 devices.

In addition, the company cut prices by up to 20% for its SSD solid-state storage devices.

Static lineup

Cray's new 2S model systems join forces with the older Cray-2/4

	Processors	Memory capacity (in bytes)	Memory type	Price
Cray-2S/4-128	4	1G	Static RAM*	$17.5M
Cray-2S/2-128	2	1G	Static RAM	$15.5M
Cray-2S/2-64	2	512M	Static RAM	$12M
Cray-2/4-256	4	2G	Dynamic RAM	$15.5M

*Random-access memory

CW CHART

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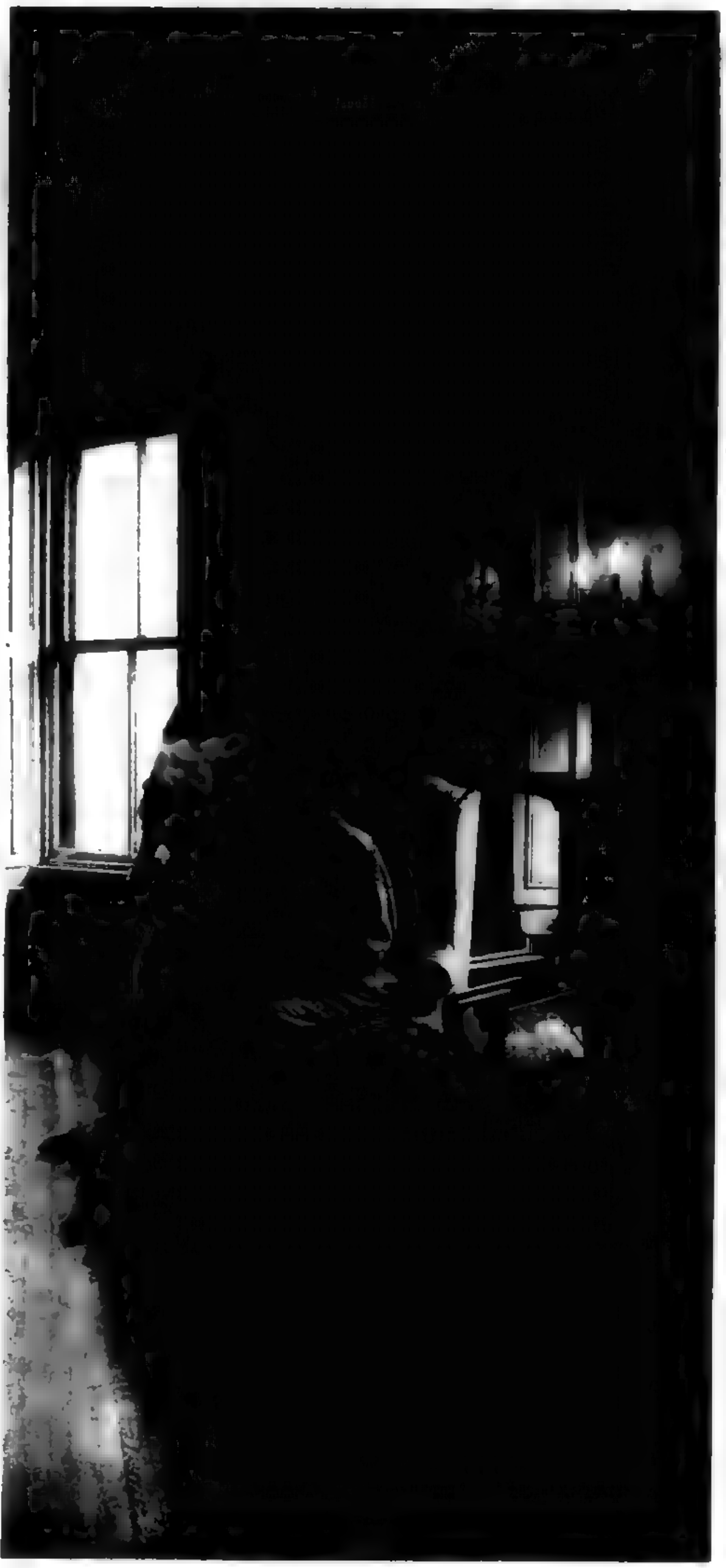

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Feds name CFO to clear system disarray

BY MITCH BETTS
CW STAFF

WASHINGTON, D.C. — The U.S. government's executive branch, which has been widely criticized for inadequate and incompatible financial management systems, recently appointed a chief financial officer to clean up the mess.

The government's first CFO, Gerald R. Riso, is expected to "bring the best of contemporary technology and practice to federal financial operations," according to James C. Miller III, director of the Office of Management and Budget (OMB).

Riso, associate director of the OMB for management, will oversee an ambitious reform program to consolidate 124 existing financial systems into a single governmentwide information system and to modernize antiquated accounting systems, the OMB announced.

According to testimony at hearings of the Senate Governmental Affairs Committee, there are at least 400 different accounting systems in the executive branch, and no two systems are exactly the same.

"We also know that many of these systems are broken, that some are incapable of producing reliable, consistent information," said Sen. John Glenn (D-Ohio), chairman of the committee. "We cannot tell, for example, what the impact of Gramm-Rudman-Hollings [budget-cutting legislation] has been because agencies do not use the same definitions of programmatic or administrative cost."

Government auditors found that "we have lost millions in public funds because of inadequate fund control, poor collection systems, costly custom-built upgrade efforts and missing data," Glenn said.

"Billions of dollars are being spent on uncoordinated efforts to upgrade accounting and financial management systems, but these efforts have routinely failed to meet their objectives," testified Charles A. Bowsher, head of the U.S. General Accounting Office.

Bowsher also expressed concern "about our continued reliance on antiquated systems that do not provide the information required for effective management" of federal programs and budgets.

Crosses party lines

The idea of establishing the CFO position for the federal government has bipartisan support, but Glenn and Bowsher argued that the CFO should be an executive in the U.S. Department of the Treasury, not at the OMB.

They asserted that the OMB has not dedicated enough staff or resources to financial oversight, is plagued by frequent management turnover and lacks clout among Cabinet departments. But OMB officials said the OMB has plenty of clout because it controls agency budgets.

The appointment of the CFO was announced July 23, one day after Sens. Glenn and William V. Roth Jr. (R-Del.) introduced a bill that would have established the CFO post at the Treasury Department.

Riso has held several management positions in the federal government, most recently as assistant secretary of the U.S. Department of Interior for Policy, Budget and Administration.

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Imagen hat in Postscript ring

BY JAMES A. MARTIN
CW STAFF

SANTA CLARA, Calif. — Imagen Corp. last week said it plans to offer compatibility with Adobe Systems, Inc.'s Postscript page-description language for its existing line of laser printers.

Through a software upgrade scheduled for release in March 1988, the company's Imageserver XP laser printers will be able to print Postscript files and support Imagen's proprietary page- and document-description languages, the vendor said.

Imagen is offering Postscript compatibility with its own version of the Postscript printer control driver. "Our market has been crying out for Postscript compatibility," said Frank Lassman, vice-president of marketing and sales. "Postscript, because it has become a language standard, is in the public domain. We also didn't need to license the Adobe driver; we made our own."

All 35 Postscript fonts are scheduled to be supported through the use of both Imagen's proprietary fonts and font outlines licensed from foundries such as Linotype Corp.

Postscript compatibility — as opposed to direct licensing from Adobe — is becoming more common among laser printer companies that prefer to skip the royalty payments and the licensing waiting period, according to Ed Wong, an electronics publishing analyst at Dataquest, Inc. in San Jose, Calif. The quality of Postscript-compatible font reproduction, however, can vary from vendor to vendor.

Pricing for the Postscript compatibility software has not been announced.

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	Sacramento	Aug 13
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	Orlando	Jul 15
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TRBA

Computer Associates' size worries some

Critics say better support not compatible with growth; acquired customers see improvement

BY ALAN ALPER

ORLANDO, Fla. — Computer Associates International, Inc.'s dramatic growth through acquisition is seen as a mixed blessing by many of its customers, who remain unconvinced that the firm can improve its spotty service-and-support track record while absorbing a larger installed base.

For many users at the company's second annual users conference here last week, service and support were primary issues. Almost two months ago, Computer Associates disclosed its intention to acquire archrival Uccel Corp., which would create the industry's largest independent software vendor [CW, June 8].

"It's definitely going to be tougher for them to support a larger amount of customers," noted Mile Pallone, manager of product control for American Express Co.'s Traveler's Cheque division in Salt Lake City.

Computer Associates should not acquire any more companies until it better supports what it already owns, said Don Dameron, a data center manager at Eastern Michigan University in Ypsilanti, Mich. "With all the users they've acquired, they haven't proven they can support them yet," he added.

But some customers who Computer Associates inherited from the small companies it acquired, such as Value Software, Inc. and Johnson Systems, Inc., are convinced that Computer Associates' level of support is vastly superior to what they were accustomed to.

Computer Associates' "support has surpassed the support of many of the companies it acquired," said Mike Landolt, a programmer/analyst with Abbott Laboratories in Abbott Park, Ill.

Computer Associates executives at the users conference said they could not discuss the ramifications of the Uccel purchase because of an ongoing investigation by the U.S. Department of Justice, which must approve the acquisition. Computer Associates said it still expects the acquisition to be completed by the middle of this month.

Attaining the personal touch

Customers of both Computer Associates and Uccel said that if the acquisition goes through, perhaps the most important thing Computer Associates would gain from its Dallas competitor is Uccel's superior service and support methodology. Uccel is noted for being responsive to user needs and providing a more personal touch than its competitors, users have said.

Kevin Jones, assistant vice-president of data processing for Eastern States Bank Association, a credit card processing firm in Lake Success, N.Y., is a customer of both Computer Associates and Uccel. While Jones lauds Uccel's responsiveness to his problems, he remains unconvinced of Computer Associates' claimed improvement in customer support and service.

"They're not very responsive to our problems," he said of Computer Associates. "We have to make multiple phone calls to get things resolved."

One of the problems with Computer Associates' support and service, claimed Jerry Powell, data center manager at Burroughs Wellcome Co. in Greensville, N.C., is that many of its service and support staff are not qualified to do the job. Powell said Burroughs Wellcome has dealt with an array of faces, and each service call has become a tutorial in the firm's data center environment. He said he believes Computer Associates is not providing its service and support staff with the incentive to stay with the firm.

David Tory, senior vice-president of planning, said Computer Associates has made tremendous strides in improving support and service, but customers' expectations always exceed vendor capabilities. "The problem is that the company is growing so rapidly and has broadened its product line and customer base so quickly," Tory said. "It's a relative thing; it's something we're constantly trying to improve."

Tory pointed to CA-Unicenter — its full complement of data center software products and services — as an example of the firm's expanded effort to meet its customers' support needs.

The company is creating a data base containing customer profiles of all CA-Unicenter users. It provides Computer Associates' service staff with a listing of each user's computing environment, software products installed and release level, among other things.

As product sophistication and integrated functionality increase, Computer Associates will lean more heavily on automated tools and services to better support its customers, Tory said. "It will not replace manual services," he said. "We will also add consulting services, training and education, which will aid in the use of our products."

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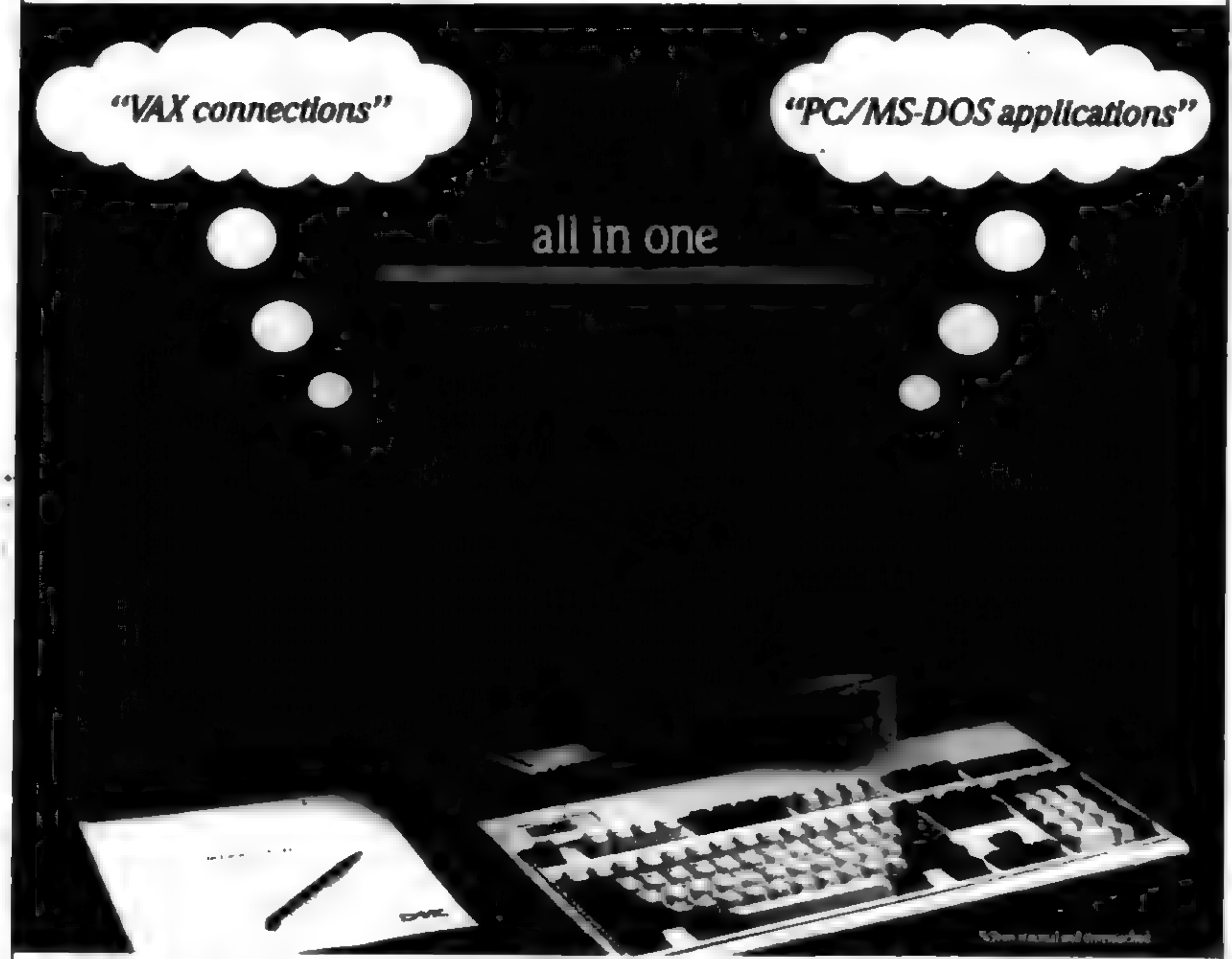

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Computer Associates adds to data center tools

BY ALAN ALPER
CW STAFF

ORLANDO, Fla. — Computer Associates International, Inc. last week introduced an automated console-management tool and a package to manage multiple sessions under VTAM.

During its users conference here, the Garden City, N.Y., firm unveiled CA-Opera, which is said to use expert systems technology to help computer operators handle the massive number of exception messages transmitted by large-scale MVS-based IBM mainframes. The product was co-developed with Baxter Travenol Laboratories, Inc.

Current IBM 3080, 3090 and compatible mainframes transmit exception messages at a rate of four to six messages per second longer, which is humanly impossible for computer operators to handle, said Bill Buer, CA-Opera product manager. With previous mainframe generations, operators would receive a message every 30 seconds, he said.

Operators' input aids design

CA-Opera aids operators by filtering out the messages that are noncritical, providing advice on those that are critical and, in some cases, implementing fixes without operator intervention, Buer said. Computer Associates developed the product by interviewing Baxter Travenol operators and subsequently used the pharmaceuticals firm's McGraw Park, Ill., data center as a test environment. Baxter Travenol funded the project.

"With the starter knowledge base that we provide, about 20% to 30% of the console messages an operator sees are eliminated," Buer said. Customers can add to and customize the starter knowledge base depending on the requirements of their individual shops, Buer noted.

Currently shipping, CA-Opera lists for $17,700. The product competes with a variety of other console-management products, including Uccel Corp.'s Operator.

Computer Associates' multiple VTAM session manager, called CA-VMAN, provides additional security for companies that want to better control user access to particular applications on their IBM MVS-based mainframes via VTAM, noted Mike Bunting, CA-VMAN product manager.

With CA-VMAN, users log on to their systems and must go through the session manager to access VTAM. They then go into a security system, such as the vendor's CA-Top Secret, to get their application.

CA-VMAN was developed using a shell created by Unisoftware, Inc. in Maple Shade, N.J. It will compete with Duquesne Systems, Inc.'s TPX and Cincom Systems, Inc.'s Netmaster, Bunting said. Priced at $12,600, CA-VMAN is already shipping, he added.

Sequent stalls Symmetry arrival

BY STANLEY GIBSON
CW STAFF

Sequent Computer Systems, Inc. will ship its Symmetry parallel processing system two months late, and a crucial cache system will not be available until five months after initial shipments, the company said last week.

The Symmetry system is based on multiple Intel Corp. 80386 microprocessors and was announced in May for September delivery. "The copy-back cache is not ready," said Casey Powell, president of the Beaverton, Ore., company. Machines shipped in November will not have the feature, which will be added in April 1988, he said.

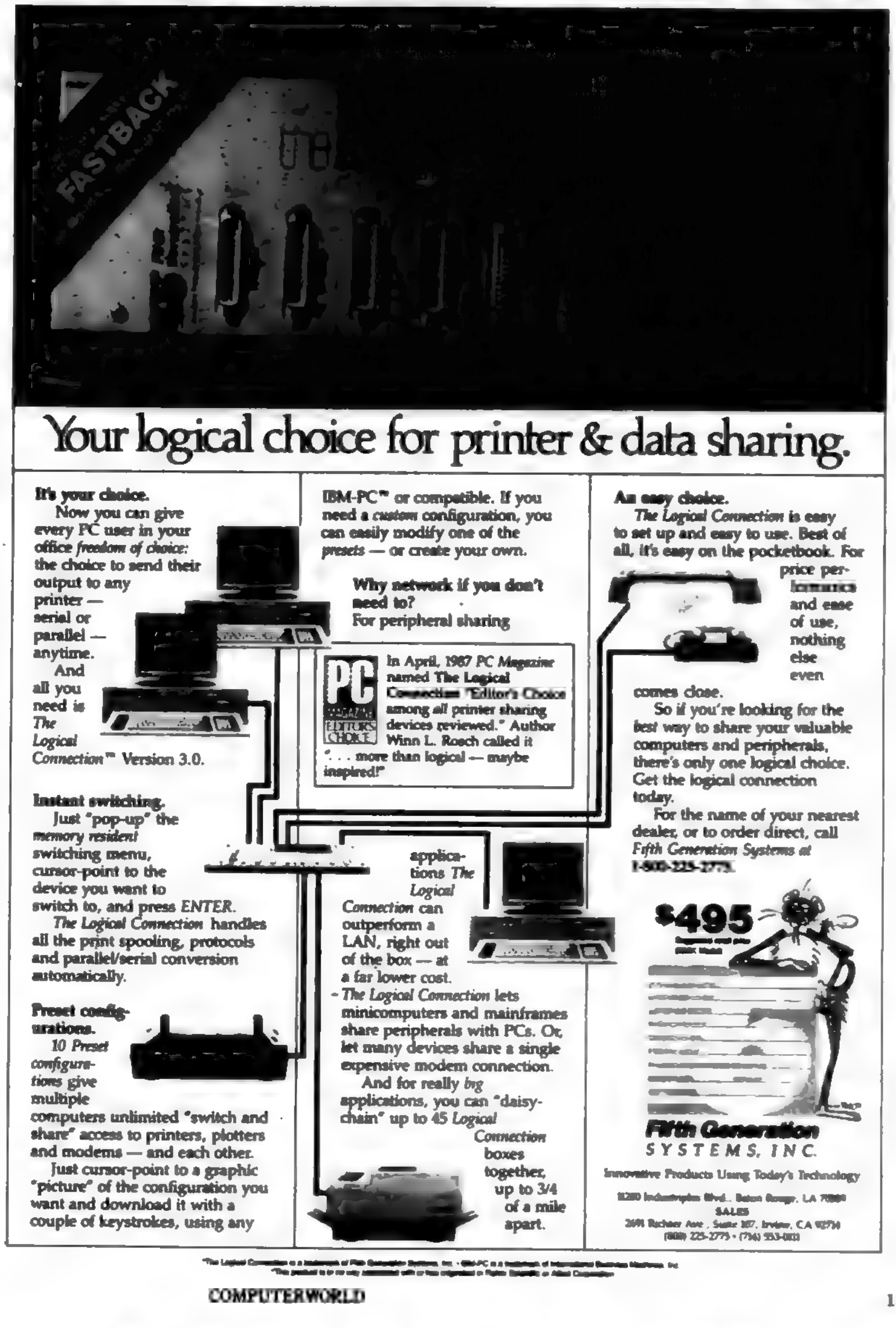
The cache feature is responsible for enabling the 80386 chips to perform at 4 million instructions per second (MIPS). Without the feature, chips in the system can perform at only 3 MIPS, Powell said. In addition, the maximum-size CPU can include only 10 processors, instead of the previously projected maximum of 30 processors.

However, Powell said the delay will not affect the number of systems shipped. He explained that the company will ship no more than 10 Symmetry systems before April, even though he claimed to have no shortage of orders. He said the price of the system will remain the same and will not be reduced or billed in two parts to correspond with the scheduled upgrade.

"That is one of the advantages of Sequent's architecture — that it can be upgraded," offered Jeff Canin, an analyst at Hambrecht & Quist, Inc. "I don't look at it as a setback. No other competitor has an installed base as large as theirs."

"The risk in 'fessing to this [delay] is that people will say we've got problems," Powell said. But he added that it was better to make such an announcement than to risk customer disaffection if the computer could not perform properly.

Looking ahead, Powell said Sequent is considering using the National Semiconductor Corp. 32532 processor in future systems, which reportedly will be able to perform at 8 to 10 MIPS and may be announced in the fourth quarter.



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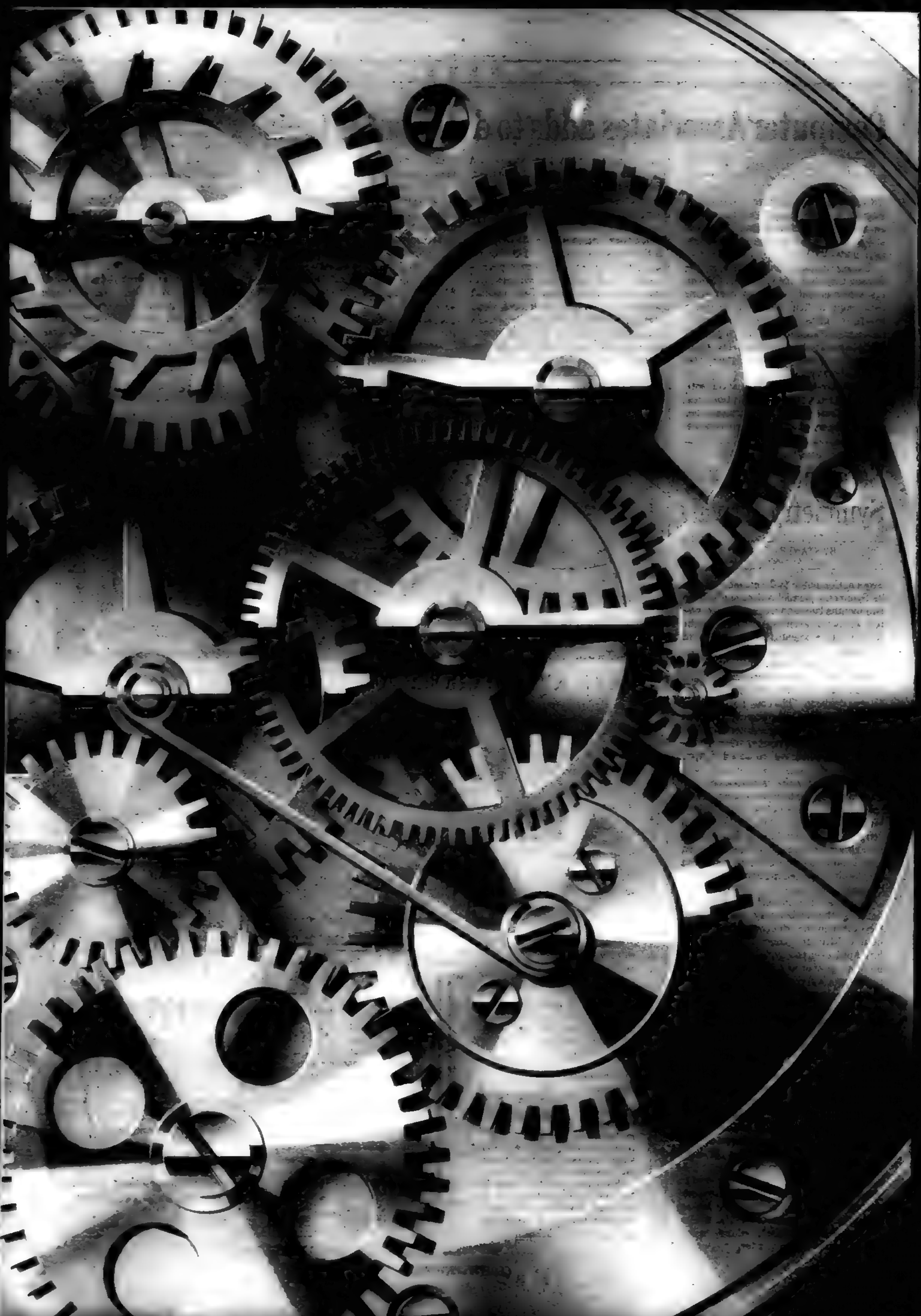

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MAP gassed up and rolling

GM showcases pilot shop; full-scale use predicted by early '90s

BY JEAN S. BOZMAN
CW STAFF

PONTIAC, Mich. — Demonstrating the fruits of its seven-year involvement with the Manufacturing Automation Protocol (MAP), General Motors Corp. last week showcased its pilot automated production facilities and detailed plans for full-scale implementation.

Three of GM's plants have been using MAP 2.1 since December and are relying exclusively on MAP as the basis of broadband 10M bit/sec. backbone networks.

Plants here and in Oshawa, Ontario, were gutted in 1985 to be reconfigured for the automated system, while a new Fort Wayne, Ind., plant was designed to accommodate MAP.

"This is the first large-scale, plantwide productive installation of MAP 2.1," said Ernest Vahala, director of manufacturing engineering operations for GM's Truck & Bus Group. GM said it now plans to implement MAP in 30 U.S. plants during the next two years and in all of the company's 165 manufacturing facilities worldwide by the early 1990s.

Trade-offs along the way

There have been some trade-offs along the way, according to Vahala and Frank Palopoli, plant manager of the Pontiac East site. One important trade-off is that testing conditions prevent the Pontiac East plant from running at three full shifts.

The plant currently produces 432 trucks per day in a single shift. It plans to expand soon to two shifts, for an 800-truck capacity, but will not add a third shift for some time. "We need the third shift to check that everything in the system is working correctly," Palopoli said last week.

Another important lesson learned during the MAP conversion is that the broadband network that broadcasts MAP data at 10M bit/sec. has to be fine-tuned and carefully maintained. "Our task was not just justifying MAP," Vahala said. "It was justifying the integration of the whole plant.

"We have found that our broadband implementation is extremely flexible and a beautiful way to go but that you need to have a maintenance program to run along with it," Vahala said.

Nuts and bolts of the operation

Driving the automated systems at the Pontiac East plant are four clustered Digital Equipment Corp. VAX 8600s, which direct 25 Hewlett-Packard Co. cell controllers throughout the 2.4 million-sq-ft plant. The cell controllers are based on HP 1000 Model A900 computers, said Paul Hansen, a business development manager from HP's Data Systems Division.

Down-line there are 800 devices, including 350 programmable logic controllers and 143 robots for welding and painting.

GM engineers specified the tasks for each cell controller and work area, but it was systems engineers from Electronic Data Systems Corp. (EDS), a GM subsidiary, who acted as systems integrators, combining the DEC, HP and controller equipment. GM spokesmen said more than 100 EDS systems engineers and 40 additional engineers from GM Hughes Electronics were involved in the project.

Key MAP element

One key element of the integration was provided by Industrial Networking, Inc. in Santa Clara, Calif., a joint venture formed between Ungermann-Bass, Inc. and General Electric Co. The Industrial Networking boxes handle the physical level of MAP.

In addition, Industrial Networking wrote an interface to MAP called MAP Application Software, which acts as a buffer between the customer's application and the MAP 2.1 software.

When MAP 3.0 becomes available next June, the MAP Application Software interface will allow the GM plants to change over seamlessly from MAP 2.1 to MAP 3.0, according to Joe Schoendorf, president of Industrial Networking.

MAP 'overhyped' until now

Until recently, MAP has been overplayed, Schoendorf said.

"The expectations about MAP were way too high, and it was overhyped. Now, we have several real examples of MAP at work in a real-time factory environment, and we can say that MAP 2.1 is real," Schoendorf said.

The road to MAP has been a long one, GM executives conceded.

"Pontiac East demonstrates the results of a GM MAP task force formed seven years ago to identify a communications standard for multivendor communications in a high-volume factory environment," said Charles Katko, vice-president and group executive of the Truck & Bus Group.

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NAS joins Sun to co-develop Unix system

BY ROSEMARY HAMILTON
CW STAFF

SANTA CLARA, Calif. — With its eye on the scientific and engineering market, National Advanced Systems Corp. (NAS) struck a deal last week to jointly develop a version of Sun Microsystems, Inc.'s Unix-based operating system for the NAS line of IBM plug-compatible mainframes.

NAS and Sun will tailor the SunOS operating system to the mainframe environment, as well as the Sun Network File System and other communications software, the companies said.

The new operating system is not expected to be available until 1989 at the earliest. While no specific release date was given, Mary Ahrens, NAS's director of strategic alliances, said the development "will take some time — at least 18 months to two years."

While SunOS will be redesigned for the mainframe environment, it will be able to run existing third-party applications designed for the current Sun operating system, both companies said.

NAS has been constructing plans for months to boost its standing in the technical computing market. Currently, 15% to 20% of its installed base is in engineering environments, according to Ahrens.

Earlier this year, the company established an engineering and scientific group, which is based in Atlanta. According to industry analyst Robert Djurdjevic, NAS will continue to "build relationships with companies that already have a presence in this market." Djurdjevic, who is president of Annex Research, said NAS has identified 60 companies that "it may try to work something with."

Expending Sun's reach

Meanwhile, the agreement will also expand the Sun environment to the mainframe arena. "This allows us to gain exposure in marketplaces that aren't currently available to us," said a Sun spokeswoman. "NAS is strong in vertical markets, like hospitals."

The Sun operating system will provide NAS with a Unix offering that can run as a native operating system on its plug-compatibles. Currently, both the IBM Unix offering, IX/370, and the Amdahl Corp. offering, UTS, can run on NAS hardware, but they must run as guests under the IBM VM operating system.

"When you run under VM, there's a lot more overhead, so the performance is just not as good as you get in native mode," Ahrens said.

When forming its plans for a Unix offering, NAS reviewed the options of developing one itself or teaming up with another vendor, Ahrens said. An NAS development effort was ruled out because it would have taken "at least twice if not three times as long" as the Sun project, Ahrens said.

Other currently available Unix offerings were reviewed in addition to SunOS, she added. However, NAS decided they "took a proprietary approach," Ahrens said.

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ADR repeals Adroit sale

Forms new division to breathe life back into system

BY ALAN ALPER
CW STAFF

PRINCETON, N.J. — Applied Data Research, Inc. (ADR) last week disclosed it has decided not to sell its computer-based training system, Adroit, and instead has formed a separate division to handle product sales, marketing and development activities.

Earlier this year, ADR placed Adroit on the block because it said the system did not fit into its product line of programming languages, programmer productivity tools and relational data base management systems [CW, March 30]. Adroit, an interactive training system that operates on IBM Personal Computers and compatibles, has an installed base of about 125, ADR said.

Since deciding to sell Adroit, ADR has witnessed an increased demand for computer-based training services, noted Martin Goetz, an ADR founder and senior vice-president who heads the Adroit division. "As computer automation filters down through the organization, there is a continuous need for training," Goetz said. "Large companies just don't have time for continuous one-on-ones."

Revenue boost saved Adroit

Goetz also noted that since ADR's business has improved — first-half revenue this year was up 30% — the company reexamined Adroit and believed it could afford to make an additional investment in it. "We're a big user of Adroit, and we expect [parent company] Ameritech will also be, so we had a vested interest in it," Goetz added.

ADR considered two serious offers for the product but deemed both unacceptable, Goetz noted. "If another company thought it could make [Adroit] successful, we figured, 'Why couldn't ADR?' " he explained.

A dedicated sales force will enable ADR to better focus its sales efforts on the marketplace, he said. A separate sales force is also needed because ADR's primary products are sold directly to MIS management, while education products at many large corporations are sold to training departments, Goetz said.

The company has hired James Giller, a former Mathematica Products Group and BIS Banking Systems, Inc. senior sales manager, to head Adroit's initial three-member sales force. The firm's 100-plus sales force is being asked to help generate leads, Goetz noted.

New release in beta testing

ADR said it has invested $2 million in research and development on Adroit during the last few years, some of which has gone toward developing a new release that it said will be available later in the quarter.

Currently in beta testing, the new release extends Adroit's stand-alone capabilities into what the firm calls mainframe concurrency training, Goetz said. With the new release, developers can use Adroit to create PC-help and tutorial systems around live mainframe applications that can run without further modification.

"A user can go into an application as if he's on an [IBM] 3270 terminal, and if there is a problem jump into an on-line interactive help facility," Goetz said.

Under the new release, Adroit's videodisk, touch-sensitive screen, synthetic speech and graphics/video overlay capabilities will support IBM's Infowindow environment, Goetz added.

Harris broadens Unix lineup with office-bound supermini

BY JAMES CONNOLLY
CW STAFF

FORT LAUDERDALE, Fla. — Harris Corp.'s Computer Systems Division filled out the middle of its Unix-based general-purpose processor line last week with the introduction of an office-environment superminicomputer.

The HCX-5 is part of Harris's 3-year-old CX line of systems, which are intended to expand Harris's market from the real-time, technical computing field into areas such as office automation and data base management.

Harris director of product marketing Rick Maule, compared the HCX-5 with the middle of Digital Equipment Corp.'s VAX 8000 family, noting that Harris's financial stability and experience in computer systems make it competitive with DEC. At the same time, he pitted the HCX-5 against superminicomputers made by younger price/performance leaders such as Pyramid Technology Corp.

Maule said the HCX-5, which uses proprietary 32-bit microprocessors, is a scaled-down version of Harris's high-end HCX-9. The HCX-9 requires industrial-type power supplies rather than the standard office power and air-conditioning used by the HCX-5.

Maule differentiated the HCX-5 from the next lower CX model, the MCX-5 supermicrocomputer, in terms of CPU power and I/O capabilities. He said the MCX-5 was designed to support fewer than 32 interactive users working on a casual basis. In a similar environment, the HCX-5 superminicomputer supports 64 to 128 users, he said. According to Harris, the HCX-5 is likely to be used as a departmental system or server while the HCX-9 is used as a host.

The company rated the HCX-5 at 5 million instructions per second (MIPS). The HCX-9 is rated at 8 MIPS, and the MCX-5 performs at 3.6 MIPS.

The HCX-5 is built around Harris's enhanced version of the VMEbus with a burst rate of 40M byte/sec. and a continuous throughput of more than 23M byte/sec., according to Maule. The system features a cycle time of 100 nsec, a virtual address space of 4G bytes and a physical memory of up to 32M bytes. It runs the Harris HCX/UX dual-universe operating system supporting AT&T's Unix System V, Release 2 and the University of California at Berkeley Unix 4.2.

A basic system costs $124,500 and includes an eight-slot VMEbus, 4M bytes of memory and a console processor with CRT.

Convex halves cost of memory, cuts system prices more than 20%

BY STANLEY GIBSON
CW STAFF

RICHARDSON, Texas — Convex Computer Corp. is slated to announce today price cuts on systems and memory for its 64-bit minisupercomputers.

Base system prices will be reduced by more than 20%, and memory prices will be slashed by more than 50%, the company said.

A base C1 XP1 system, which formerly sold for $475,000, will be priced at $320,000. The C1 XL system, which had sold for $375,000, will be reduced to $240,000, Convex said. The base configuration includes the CPU, 16M bytes of memory and an I/O processor.

Convex said memory prices will be reduced from $4,000 to $1,750 per megabyte. The new prices take effect immediately, the vendor said.

Cuts foreshadow future plans?

"It's not a surprise," said Jeff Canin, an industry analyst with Hambrecht & Quist, Inc. in San Francisco. Canin speculated that Convex is paving the way for a new generation of machines to be announced later this year.

The processors, which Canin said may be called the C2 line, could offer twice the processing power and a tightly coupled architecture. He added that the processors' clock speed could be 40 to 50 nsec and said the processors' could offer multitasking.

Canin suggested that Convex's goal is to keep its prices below $1 million on the new machines. To do so, he said, the company will have to reduce prices on its current products.

'Good marketing'

"It's good marketing, with Digital Equipment Corp., Hewlett-Packard Co. and others increasing their price-performance in minicomputers and looking at parallel processing," said Julian Menear, an analyst with the Pershing Division of Donaldson, Lufkin & Jenrette, Inc. in New York.

Menear said it is likely that Alliant Computer Systems Corp., which makes a parallel processing system, will also cut prices.

He speculated that that would not happen until up to six months from now.

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EDITORIAL

After the fall

In *Julius Caesar*, Shakespeare noted that the good that people do in their lives is often interred with the body.

With the sudden death of Commerce Secretary Malcolm Baldrige, let us hope the bard's vision does not materialize.

In his 6½ years of steering the Department of Commerce, Baldrige set a course governed largely by reason, pragmaticism and justice. The persuasiveness of his doctrines even moved a philosophically entrenched president — his boss — to a more moderate view on international trade, even as the hawks in the Department of Defense tried to peck holes in his policies.

Through all this, the computer industry has benefited greatly. As the Computer and Business Equipment Manufacturers Association noted in a public statement, Baldrige was a vital figure for the information technology industry, justly seen as one of the most effective secretaries of commerce in recent decades.

Among his more notable achievements, Baldrige bucked the fervent antiprotectionist policy of the Reagan administration in coming to the aid of the crippled semiconductor industry. He successfully argued for stiff enforcement of trade accords that would punish the Japanese for dumping chips in the U.S. market. He ardently opposed the acquisition of Fairchild Semiconductor Corp.'s chip business by Fujitsu Ltd.

Today, the semiconductor firms are nursing themselves back to health, but not by hiding behind unreasonable protectionist measures.

Baldrige was no less controversial in his fight with the Defense Department to liberalize technology export policies. Let us hope his passing does not revitalize the efforts of myopic generals whose desired trade sanctions serve only to strengthen foreign competitors at the expense of U.S. vendors, while doing nothing to improve our national defense.

Let us hope instead that, in the waning months of the Reagan administration, the president will honor the good that Baldrige brought to the trade scene. His successor must think globally in terms of the high-tech business, realizing that the final product likely includes components from several different producers in several different countries on different continents. Thus, tariff sanctions should be a last resort only.

Invest in human resources. If the government continues to shun support for public education, our information age society will suffer irrepairable damage as we move toward the 21st century.

Demilitarize scientific research and stop concentrating so much government-funded research and development on military applications. A nation's security is based on military power and a strong economy.

Reject the myth that services will be an adequate replacement for a manufacturing-based economy. On the contrary, these two segments are finely interwoven and depend on one another. If computer-aided manufacturing is a possible panacea for our manufacturing ills, then let's support its proliferation.

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LETTERS TO THE EDITOR

Only just begun

Because the two articles on MIS education [CW, June 15 and June 22] portrayed the field as being in decline, I would like to point out that it is, in fact, in such an early developmental stage that current educational programs have primarily been patched together from already existing ones. Rather than being in decline, MIS education has not yet reached the point at which it has many programs that are specifically designed to meet the needs of the field.

For the last 25 years that I have been in the information systems business, we have realized that the best preparation for people who are going to have an impact is a balanced combination of business and technical education. However, most educational programs are either primarily business-related with a modest information systems major or primarily information systems with a little bit of business.

At the University of Pittsburgh, we have a new MBA-MS "double-degree" program that emanated from an IBM grant and provides balance between business and information systems material *and* significant quantities of both so that a double-degree graduate is a full-fledged MBA and a trained information systems practitioner.

We have finally "bitten the bullet" on the required dual education, rather than trying to cram both types of material into a single, already-overcrowded degree program. We have done this with a lot of input from business people and on the basis that they find these students attractive and will hire them.

Now that firms are beginning to realize they can manage information resources only by having a chief information officer who has a balanced business-information systems education, the time has come for us to do what we have known is needed all along. We are doing this with the help of the IBM grant, with funds and technology from other sources and with help from forward-looking Pittsburgh-based corporations. We believe other schools that can pull together the required support are, and will be, providing this too.

William R. King
Professor of
Business Administration
University of Pittsburgh
Pittsburgh

This week in history

Aug. 1, 1977
Mountains of sludge, up to eight feet of water and virtually nonexistent communications hamper rescue workers in Johnstown, Pa., who struggle to save computer equipment and installations recently damaged by a flood. "Some of the installations don't even exist anymore," says a distressed IBM spokeswoman.

Aug. 2, 1982
Fifteen percent of current American manufacturing workers could lose their jobs by the end of the decade because of electronics technology, a congressional study reports. The study says that industrial robots could eliminate three million jobs in the near future and seven million by 2000.

Misses the mark

I question the emphasis placed on developing personal computer security policies in your "Microcomputer security" Spotlight [CW, July 13].

While it is a good sign that organizations are becoming aware of the need to protect information stored in PCs, a special PC security policy tacked on to a mainframe security policy probably misses the mark.

As a consultant and former director of information security for a large multinational corporation, I cast my vote for organizational policies that establish control requirements for information assets, no matter where they are stored or processed.

An effective organizational information security policy spells out protection requirements based on the value and/or sensitivity of data.

Protection techniques will vary as information moves from file cabinet to PC to mainframe but must satisfy control requirements approved by corporate management.

Personal computer security policies, in contrast, are generally developed and promulgated by the information systems department and spell out specific procedures or security products to be utilized.

While corporate information security policies require a higher level development and approval process, the end result is continuity of protection throughout the life cycle of information and elimination of the need to develop new policies as technology evolves.

Cheryl W. Helsing
President
Cheryl W. Helsing, Inc.
San Francisco

The contra dance of moral behavior

JOHN KIRKLEY

We haven't had such good daytime television since the Joseph McCarthy hearings. Any program that can outdraw America's favorite soaps must have a lot going for it — pathos, drama, conflict, suspense, glamour, greed, patriotism and glimpses into the inner workings of the mysterious world of covert operations. Added to this steamy brew are generous dashes of that heady seasoning, LCS (lying, cheating and stealing).

Even more, the Iran-Contra hearings have sharpened our awareness of the semantic gymnastics that highly placed officials will perform to justify actions that appear to violate the most fundamental legal and ethical standards of this country.

One of the concepts that has surfaced at the hearings, articulated most ably by Rear Adm. John Poindexter, is that of "deniability." Put rather crassly, the concept goes something like this: If, in your professional capacity, you do something that may be unethical, immoral, illegal or perhaps just in bad taste, you don't let your supervisor know it. Then if you screw up, you have given your supervisor the gift of deniability.

Lie, cheat and steal

If you add the concept of deniability to the other major message emanating from the hearings — that it is all right to lie, cheat and steal in the name of freedom and righteousness — you have powerful behavioral guidelines that reverse what most of us have been brought up to regard as moral and ethical. Hearty doses of Orwellian doublespeak have been beamed live to an enthralled audience.

All in all, these are illuminating times, particularly if you apply lessons learned in one arena, such as the Iran-Contra hearings, to events in other areas. For example, right in the middle of the Contragate hearings, there are reports that the Federal Bureau of Investigation is considering a controversial proposal. The advisory board to the FBI's National Crime Information Center (NCIC) has recommended a major expansion of the NCIC's capabilities.

The NCIC 2000 plan calls for the creation of new data bases to help nab criminals, which advances in connectivity and networking are making feasible. Among the recommendations is the use of the NCIC to track the movements of foreign spies, terrorists or the subjects of criminal investigations. The board also wants to add misdemeanors and juvenile crimes to the files. The board did reject the idea of putting the NCIC on-line to private data bases such as telephone records, credit bureaus and airline passenger lists.

Naturally, these recommendations generated considerable flack. The American Civil Liberties Union pointed out the abuses such an enhanced NCIC could engender. The FBI retorted that the board recommendations would be reviewed by the top levels of the FBI, including the acting director, before any decision is made.

But what happens if the individuals using this tool adopt the same set of ethical and moral guidelines articulated by Poindexter and Lt. Col. Oliver North? North's willingness to mislead Congress and destroy critical documents — in other words, to lie, cheat and steal in the name of patriotism — accorded him the status of hero with much of the American public. Giant stacks of yellow telegrams, carried daily into court by his wife Betsy, intimidated the committee and attested to wide public acceptance of his behavior.

As high-level FBI officers continue their war on crime, should they be denied the same flexibility of action that North, Poindexter, former National Security Adviser Robert McFarlane and all the rest were accorded?

And what about the concept of deniability? Isn't it all right for well-intentioned members of the FBI to keep operations involving gross violations of civil liberties and personal freedom from their superiors, members of Congress, other overseeing bodies and even the president? We also have to ask: Have we forgotten what J. Edgar Hoover became in the last decades of his tenure?

We cannot succumb to the topsy-turvy moral and ethical standards being voiced by those government officials we watched day after day. If we do, the NCIC and the other systems of surveillance we are developing with the help of computer and communications technologies could lead us into a totalitarianism far worse than we could imagine. Our misguided attempts to defend our freedoms may lead to our own imprisonment.

Kirkley, a former editor of *Datamation* magazine, is an industry consultant currently acting as editorial adviser to Patricia Seybold's Office Systems Group. He is based in South Nyack, N.Y.

Victim of a nonevent (again)

Numbers, names and nice invitations do not an announcement make

AMY WOHL

Have you been to any good nonevents lately?

A nonevent often masquerades as a press announcement or a consultant's briefing. All the requirements seem to be in place: a major vendor's name, nice invitations, promised senior executives and a spiffy location in New York, Boston or "somewhere in the Silicon Valley."

You decide to attend. You go. All your friends and colleagues are there. The senior executives get up and speak. They even answer questions.

However, nothing seems to have been announced — no new products or corporate strategies, no significant pricing or distribution changes, no delays or speedups in product deliveries.

What is happening here? You have just been the targeted victim of a nonevent.

Nonevents occur because a vendor is unhappy with the volume or direction of comment the company, its strategies or products are getting. Usually, this dissatisfaction is with the press, but sometimes it is with the analyst and consultant community.

Nonevents are particularly annoying when the targeted press/analyst/consultant attendee feels he has been doing a good, hardworking job of explaining something complicated to the market, and the vendor believes it is a terrible job — largely because the company doesn't like the way its product or strategy is being perceived or interpreted.

I call this the luck of the draw. Sometimes, we all agree on what is happening, and all we have to do is accurately report it. Other times, we don't agree. In that case, there are the following ways to proceed:

- We can agree to disagree. The vendor gets the short end of this stick and knows it. We get to write and tell our version (with full access to our publications and our speaking platforms, to say nothing of our consulting recommendations). The vendor gets to complain about it from whatever forum the company chooses.
- The company tells us where it thinks we're wrong and asks for correct coverage. This approach works fine if we're convinced, but often we're not and with good reason. Just because a vendor thinks its unnecessary new widget is a real barn-burner doesn't make it one.
- The vendor tries to fake the press/analyst/consultant community into thinking it has something new to say (what the company has already said, suitably repackaged), hoping for fresh, new coverage with more attention paid to what the vendor thinks is the "right" point of view. Enter the nonevent.

PETER KUPER

Nonevents of note

Recent nonevents of note include IBM's briefing of the press/analyst/consultant community on the success of the Personal System/2 product deliveries. I doubt there was any member of the community who failed to note the numbers presented, of which there were plenty. But analysts tend to place their own interpretation on numbers.

For instance, big backlogs are significant in the short run if they include lots of orders from many different companies and less significant if they include lots of long-term business, a good amount of inventory or a few very large orders that tend to distort everything.

Several large computer retailers have noted that one reason for the big PS/2 backlog is the need for IBM Personal Computer retailers who have not been classified as "advanced" to order great numbers of PS/2 Model 30s in order to qualify. This situation has not only enlarged the backlog (IBM is clearly faced with more orders than product right now), it has also created an immediate discounting of this product because dealers are ordering more Model 30s than can be supported by their customer demand.

In this case, IBM achieved the desired result: lots of front-page news on how well the PS/2 is doing, lots of attention on the size of the backlog and not much attention to a thoughtful analysis of what exactly is going on.

Another good example of a nonevent is the recent Compaq/Microsoft/Ashton-Tate/Lotus et. al. briefing in New York. The ostensible reason for this nonevent was the press and customer confusion between PS/2 and OS/2.

I wasn't confused before the meeting, and I don't think most of the other attendees were either, but none of us could afford to miss a meeting that had so many chief executive officers at the front of the room.

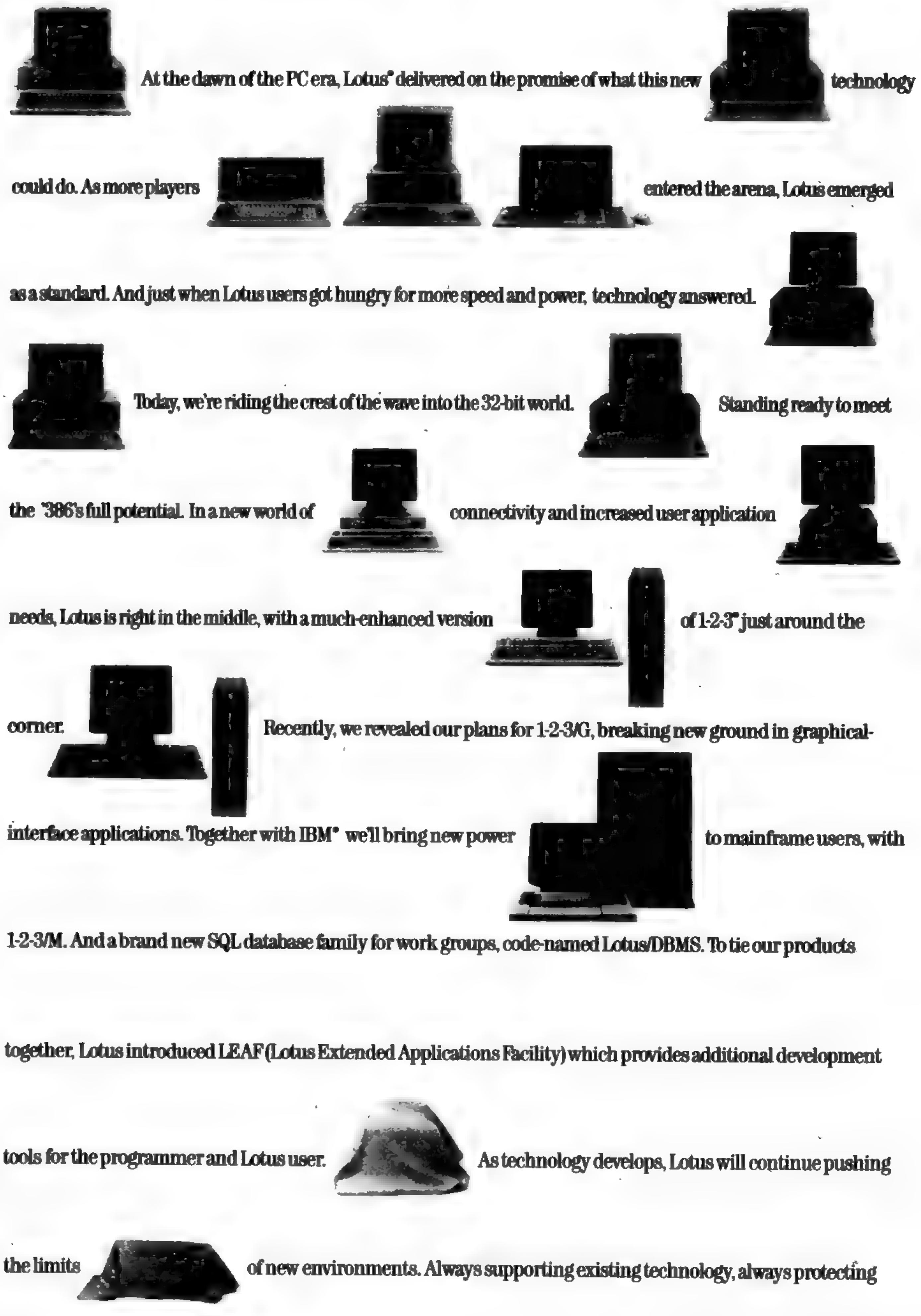
The real reason for this event, I suppose, was an opportunity for Compaq Computer Corp. to tell us how well it was doing (we knew already), plus a little advance solidarity on the part of major personal computer software developers in case it turns out that the OS/2 Extended Edition is more threatening to third-party software developers than some of us think it will be.

The interesting issue at this and other nonevents is that many of us may be entirely, or nearly entirely, in agreement with what has been said — we just don't think it deserves major additional coverage.

Press coverage is not infinite. If we write, comment, analyze or speak one more time about something we all know, we aren't writing, commenting and so on about something else, possibly something that is more important.

Perhaps vendors need to remember the story about the boy who cried wolf. If companies keep asking for coverage for nonevents, we may not hear the need for coverage for their real events above the din.

Wohl is president of Wohl Associates in Bala Cynwyd, Pa., and editor of "The Wohl Report on End-User Computing" newsletter.



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SOFTWARE & SERVICES

SOFT TALK

Daniel R. O'Connell

Look beyond transparency

As a consultant in the area of data base management systems, I have become increasingly concerned with the performance and quality of the data base transparency software offered by many vendors.

It is unfortunate that many corporations are basing their decisions to replace existing data base systems on the belief that this software will allow a quick and easy migration.

After studying various types of transparency software offered by several vendors, it is clear that many of these products work poorly at best and, at worst, can cause severe disruption to an organization.

The purpose of this software is to allow an organization to implement a new data base system while allowing the existing data base programs to run in an emulation mode.

Many vendors are now offering software to allow for the emulation of IBM's DL/1, VSAM, Cincom Systems, Inc.'s Total and Cullinet Software, Inc.'s IDMS. I feel the problems involved with this software are twofold.

First, in order to emulate another software product, the emulation software must be many times more complex than the original product.

Continued on page 22

TRW wards off data intruders

Proprietary expert system protects 133 million consumer credit records

BY ALAN J. RYAN
CW STAFF

ORANGE, Calif. — Protecting a data base that encompasses the detailed credit history of 133 million consumers is not a task every computer security officer longs to do.

TRW, Inc.'s Information Services Division operates and markets a mammoth computerised consumer credit reporting service, called Credit Data, which receives between 400,000 and 450,000 calls daily from subscribing banks, retailers, credit card companies, finance companies, savings and loan institutions and travel and entertainment card granters.

To combat any possible unauthorised access attempts to the more than 100G-byte data base, TRW recently developed an expert system it calls Discovery.

The Discovery system reportedly recognises unauthorised access attempts to the data base before traditional security methods can. "The primary need for the Discovery system was to find out if anybody was [gaining unauthorized] access to the system and in what volume," explained Bill Tener, director of operational and regulatory compliance at TRW.

Tener said that without a monitoring system in place, the chances of discovering unauthorised access were slim.

'Expect to catch' abusers

TRW knows there are potential abusers of its system, said B. K. Richard, project director for Discovery and director of advanced technology for the Information Systems Group, "and we expect to catch them with Discovery."

To date, no illicit activities have been detected by Discovery, which has been up since mid-March.

But Tener and Richard said those findings are not a good indicator of what they expect to see. Tener said that during the six-month testing of the system's prototype, in which Discovery was tested in parallel with actual cases being pursued by TRW investigators, "Discovery actually gave us more data than my investigators had initiated."

Discovery found that a hacker and a private investigator were invading the credit file without authorisation.

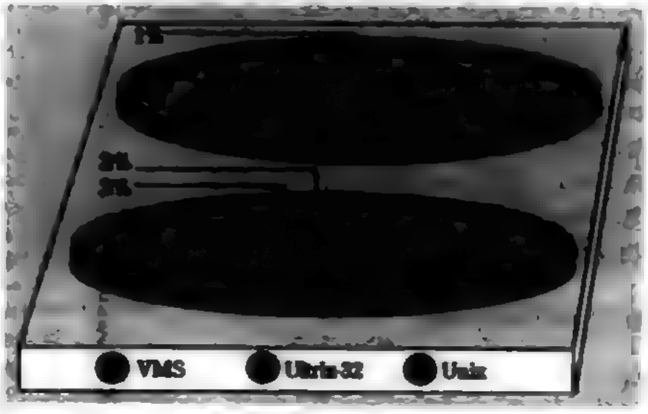
The developers of Discovery leveraged the artificial intelligence technology developed by parent company TRW's electronics and defense sector for the defense industry and applied

Continued on page 25

Data View

Primary operating systems on the VAX-11/700s and 8800s

VMS dominates on both machines, but Unix outstrips Digital Equipment Corp.'s Ultrix on the 11/700s



INFORMATION PROVIDED BY COMPUTER INTELLIGENCE
CW CHART

Ideal steps back to Cobol

BY ALAN ALPER
CW STAFF

FORT LEE, N.J. — On-Line Software International, Inc. recently unveiled a cross compiler to translate commercial transaction-processing code written in Applied Data Research, Inc.'s (ADR) Ideal fourth-generation language into IBM-standard Cobol.

The compiler is the first in an expected series of products marketed under the name Crosscode, which will be targeted at recompiling fourth-generation language code into Cobol, the

Continued on page 25

Apollo eyes standard interface

CHELMSFORD, Mass. — Apollo Computer, Inc. plans to offer a tool kit this fall that will allow software developers to create user interfaces that will run on a variety of hardware platforms, company representatives said last week.

Open Dialogue is based on the windowing system from MIT known as X Windows. Earlier this year, a number of technical workstation vendors, including Apollo, announced their support of X Windows as an international windowing standard.

The tool kit was designed to run in a Unix environment, including the Unix versions offered by the major workstation vendors. By basing Open Dialogue on X Windows, it will be portable to these various environments, Apollo said.

Positioned to set standard

Apollo said it intends to license Open Dialogue source code to developers and other hardware vendors in an effort to make the tool kit an industry-standard user interface environment. It will sell for $2,500 for a single license, the vendor said.

Apollo is expected to offer two versions of Open Dialogue

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Inside

- Tandem to offer Ada on its NonStop line. Page 15.
- Computer Associates interface ties Supercalc/MF to DB2. Page 25.
- Blueline Software enables VM session management on single terminal. Page 27.

Spotlight

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Transparency

CONTINUED FROM PAGE 21

REMEMBER that even if the transparency software performs at a satisfactory level, the organization must now maintain expertise in both the old data base software and the new data base software.

In the past, emulation was successful for small software applications in which the scope of a product was quite simple. However, in today's data base environment, the emulation of another's data base product requires complex layers of software to act as a bridge between the two products. It is the communication between the software layers that results in high overhead and slow response time.

Second, emulation requires an intimate technical knowledge of another vendor's software product. It is my opinion that most vendors do not possess this knowledge. Therefore, the emulation software does not provide full compatibility with the existing programs.

In testing such software, several users report that problems encountered within programs running under emulation occur at some of the most basic levels. One user tells of her frustration about how she argued with a technical representative about what a "Path Call" was in DL/1.

Converting a data base system is a major effort that must be thoroughly planned and researched. Many major systems will need to be redesigned, and numerous modifications to programs and data structures will be required.

Before an organization considers such software, it should investigate the following aspects:

- Ask for references. Find out who is using this software and call or visit them.
- Discuss and clarify the scope of the transparency software with the technical representatives of the vendor and with known users of the software.

If the transparency is for DL/1, for example, determine how the software performs with logical relationships, secondary indexes, hierarchical direct-access method (HDAM) organizations with user-supplied randomizing routines, hierarchical indexed direct-access method-to-HDAM relationships, Path Calls and the like. Many of these software products will function only in the most trivial cases.

- Ask for the software on a trial basis, install it and perform a complete and thorough test. Include in the test the handling of abnormal ending conditions. Stress-test the software in an on-line environment. Many of these products have terrible response times on account of the layers of software involved.
- Have a clear understanding of the vendor's support for the transparency software. Many vendors provide excellent support for their DBMSs. However, it is sometimes difficult to locate anyone at a vendor's support center with knowledge of the transparency software. Support may sometimes take days or weeks.
- Remember that even if the transparency software performs at a satisfactory level, the organization must now maintain expertise in both the old data base software and the new data base software.

For example, if DL/1 is replaced by the transparency software, an organization must still maintain the programs running under the DL/1 emulation as though DL/1 still existed in the user environment.

Another consideration is the difficulty in finding experienced and knowledgeable people. It is a difficult task finding people with experience in even one data base system, let alone two.

The need for many organizations to migrate their old DBMSs to new, more powerful systems cannot be denied. It is unfortunate, however, that in their attempt to sell products, many vendors mislead organizations as to the scope and capabilities of the transparency software they offer.

O'Connell is an assistant professor of computer science at the State University of New York at Fredonia and a consultant on data base software.

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Apollo

CONTINUED FROM PAGE 21

— one for its own hardware and one for the Digital Equipment Corp. Vaxstation/GPX series — when it initially releases the product.

In early 1988, Apollo will offer the product for Sun Microsystems, Inc. hardware and the IBM RT Personal Computer, a company spokesman said.

With Open Dialogue, developers can design user interfaces that are separate from the actual applications. As a result, the interfaces can be customized to a particular user's needs with a minimum amount of code rewriting, Apollo said.

A company spokesman said the product is also aimed at large user sites that typically write their own application software in addition to using off-the-shelf packages.

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Ada OK'd for Tandem line

Firm to offer language, compiler for Nonstop series

BY JEFFRY BEELER
CW STAFF

CUPERTINO, Calif. — Tandem Computers, Inc. recently announced that it plans to offer the Ada programming language and associated programming tools for its Nonstop series of computers late this year.

Tandem said it has successfully tested an Ada compiler for compliance to federal standards.

The tests performed by the U.S. Department of Defense's Ada Joint Program Office have validated the Tandem compiler as conforming to both the ANSI/MIL-STD-1815A and ISO/8652-1987 standards, according to Richard Vnuk, Tandem's manager of languages and tools.

Language requirement

The Defense Department mandates the structured development language for mission-critical systems projects. Ada is also widely used in government agencies such as the National Aeronautics and Space Administration, where "many contracts specify the language as a requirement," Vnuk said.

In addition to the Ada language and a compiler, Tandem said it will provide an Ada library manager, a binder and a symbolic debugger.

The Tandem Ada language, which the vendor said runs on all the Nonstop systems, supports programs that have up to 4M bytes of instruction code. It can also manipulate up to 128M bytes of data per single process within a Nonstop system, Tandem said.

Available by year's end

The Tandem Ada language is scheduled to become available for shipment during the fourth quarter.

Tandem Ada for the Nonstop VLX, TXP and Nonstop II systems is priced at $20,900 with a monthly license fee of $800.

A license for the Tandem Nonstop EXT and CLX systems is $10,475 per system, and the monthly license fee is $400.

TRW

CONTINUED FROM PAGE 21

that technology to its commercial business at the Information Services Division. Because of the enormity of the credit data base, the development of the system was a top priority, Tener and Richard said.

System educates itself

Discovery is a self-educating system that continually updates and refines itself. Housed on an IBM 3090 Model 400 mainframe, it examines subscriber inquiry patterns and determines irregularities through pattern recognition.

For example, one TRW subscriber may call TRW's consumer credit data base to access information on a potential customer. The subscriber always uses the initial of the customer's spouse when he calls. Discovery knows this, so when a call comes in using the subscriber's entry code but omits the spouse's initial, Discovery will note that this inquiry should be investigated.

If the system detects any questionable activity, it alerts the division's security investigators. Since Discovery is a batch process, the alert would not come until the end of the workday. "In theory, it could be hooked up to be an operational, real-time kind of auditing tool," Richard said, "but current implementation at this point is strictly batch."

Investigators continue probe

To pursue an intruder, TRW investigators would be called in. "They would have a few better leads [than they would conducting the investigation manually] because of the amount of data the program can sift through," Tener said.

Investigators would then contact the subscriber to determine if improper access had been used. "At that point, the investigators can either put traps or traces on our phone line to determine the number coming in, or get a court order to put one on the phone line being investigated," Tener added.

To protect a file that had been accessed illegitimately, Tener said TRW would change the file's password, "unless law enforcement would want us to keep that code on" to help detect the perpetrator.

The TRW officials said that this type of protection system gives them an edge in the credit information industry by enhancing the company's ability to protect private information and discourage people from abusing the system.

Host Supercalc linked to DB2

ANDOVER, Mass. — Computer Associates International, Inc. recently produced an interface to link its mainframe spreadsheet, Supercalc/MF, to IBM's DB2 data base.

Computer Associates said Supercalc/MF-DB2 should provide access to data in IBM mainframe DB2 files from within Supercalc/MF and was designed to function in the IBM MVS operating environment.

The Supercalc/MF-DB2 interface is scheduled to be available this month.

The format of the DB2 interface is a fill-in-the-blank full screen by which users may designate the fields to be loaded, the vendor said.

The interface is said to support password security for the protection of sensitive DB2 data. Supercalc/MF-DB2 security features include user-defined protection at the record, field and value-within-field levels.

Supercalc/MF was formerly called CA-Megacalc. According to the vendor, the name change reflects the success of Supercalc4, Computer Associates' microcomputer spreadsheet.

Supercalc/MF prices range from $9,600 to $44,000.

Ideal

CONTINUED FROM PAGE 21

firm said.

While recompiling from fourth-generation language to third-generation language code may seem like a step backward, there are many good reasons to do so, noted Irwin Konopolsky, assistant vice-president at On-Line. Using Cobol to run applications developed with a fourth-generation language like Ideal will speed runtimes by up to 10 times and make more efficient use of computer resources, he noted.

"Using a fourth-generation language may increase programmer productivity — which is fine for developers — but the problem arises when you try to run the application," he said. "Most fourth-generation languages are not as efficient when running applications; response time is slow, and sometimes they use too many computer resources."

Crosscode also allows programmers to use familiar Cobol techniques to maintain code, he said. This speeds maintenance, particularly of large applications.

Portability is another issue, Konopolsky said. Using Crosscode, a company may only need to have a copy of a fourth-generation language in its development shop and recompile applications so they can run on machines at other locations.

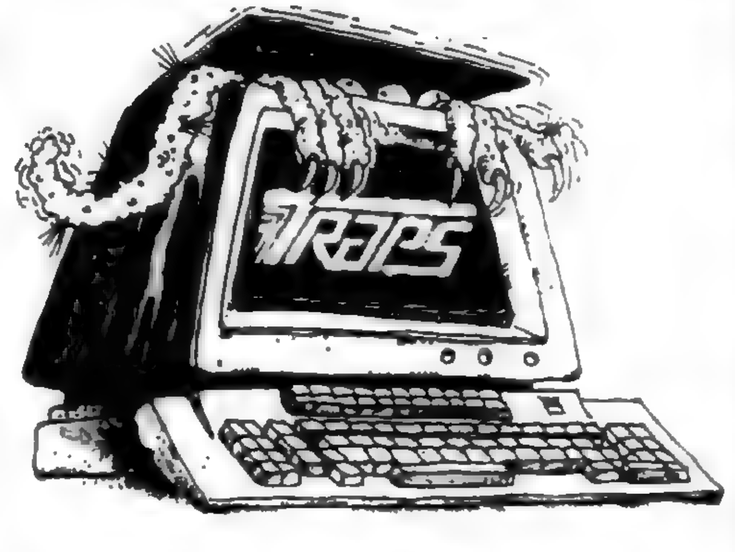
'That cozy feeling'

"Some companies also like that cosy feeling of staying with something that is a strategic IBM product," he added. "Ideal is not a strategic IBM product, while Cobol and CICS are."

Crosscode was developed by Fourcross, Inc., a San Francisco software developer that On-Line purchased last year. It carries a license fee of $60,000, but the vendor is offering it for $40,000 until Aug. 31.

Konopolsky said On-Line has not yet signed any customers for the product, although a half-dozen companies have asked On-Line to convert applications submitted on tape to demonstrate the product's performance.

An ADR spokesman said the firm is not worried about the impact of Crosscode on Ideal. "We've been aware of the product for a year," he said. "No one is clamoring for it." ADR's approach to application development is to continue to enhance Ideal and provide additional productivity tools. "We think that's the right way to go, rather than keep customers in Cobol," he concluded.



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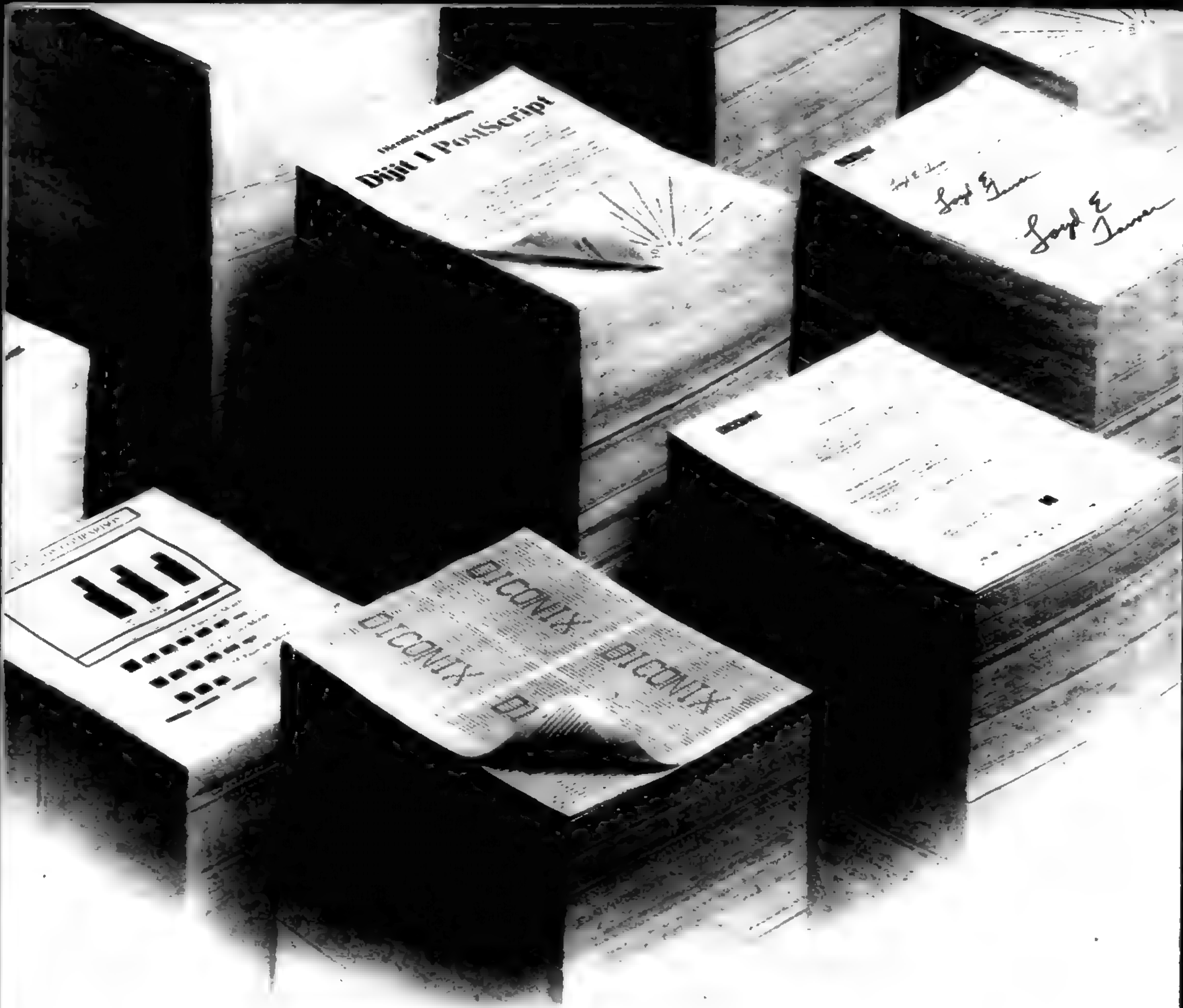

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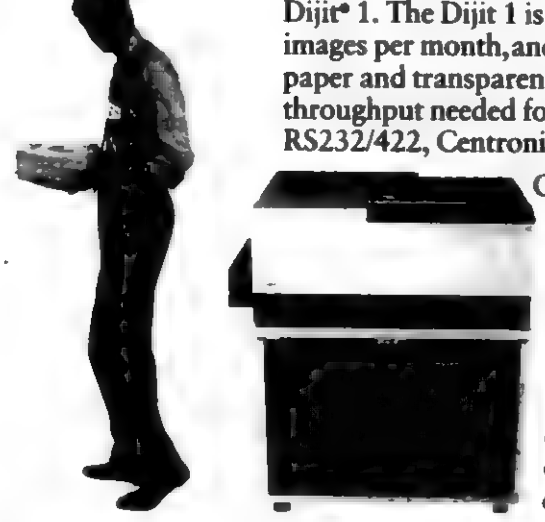

NEW PRODUCTS

Systems software

A software package introduced by **California Software Products, Inc.** is said to provide transport of IBM System/36 RPG-II applications to personal computers.

The software, called the **Automated Conversion System**, was designed for use with the vendor's Baby/36 software, which emulates the operating environment of System/36 computers on PCs. It operates in conjunction with IBM 5250 terminal-emulation packages or 8- to 5¼-in. diskette conversion products.

One program system runs on the System/36 and prepares source and procedure members of transport. The other system runs on the PC and converts the characters from EBCDIC to ASCII and compiles all source code.

The Automated Conversion System costs $750.

California Software Products, 525 N. Cabrillo Park Drive, Santa Ana, Calif. 92701.

Multiterm Version 4, a VM terminal session manager, has been announced by **Blueline Software, Inc.**

Multiterm is said to allow a user to log on and run many VM sessions simultaneously from a single physical terminal. Version 4 offers an automatic feature that gives users access to all sessions with a single logon.

Multiterm interfaces with security products that require user IDs and passwords. It also reserves one or more predefined dial-up addresses.

Multiterm Version 4 provides direct access to CICS applications running in VM guest machines. It also permits users to send and receive communications between sessions, terminals and guest machines.

A Multiterm Version 4 site license costs $9,775.

Blueline Software, Suite 340, 1500 S. Lilac Drive, Minneapolis, Minn. 55416.

Software said to provide mainframe distribution and backup of personal computer software and data in IBM MVS and VM/CMS installations has been announced by **Applied Software, Inc.**

Designed to distribute site-licensed software, **Host Storage & Retrieval** (HSR) provides an electronic warehouse and distribution center. PC users can display available software and select packages for downloading.

In addition to mainframe backup of PC data, features include import and export mainframe utilities for file transfer to and from the personal computers and data security features.

HSR may be installed with IBM's MVS/TSO, VTAM or VM/CMS. Asynchronous communications are supported. It costs from $8,000.

Applied Software, Suite 250, 840 U.S. Highway #1, N. Palm Beach, Fla. 33408.

Applications packages

Computervision Corp. has introduced **Tech Pubs II**, software packages designed to help users of its Caddstation family of 32-bit engineering workstations document their work.

Tech Pubs II applications currently available include a package for engineering notebook and a package for technical documentation. Engineering notebook documentation allows an engineer to document calculations, analysis, research and other activities. The technical documentor software features integrated text and the vendor's Cadds 4X graphics in addition to multitasking windowing capabilities and custom design of layout and typography.

The engineering notebook module costs $2,500. The technical documentor module costs $7,000.

Computervision, 100 Crosby Drive, Bedford, Mass. 01730.

A new release of the **Autograph** multiuser business presentation graphics application designed for Unix systems has been announced by **Fischer Information Corp.**

Autograph Version 2.69 runs on either character-mode or bit-mapped terminals. It features a direct interface to Quadratron Systems, Inc.'s Q-Office and R Systems, Inc.'s R Office word processing programs, allowing users to merge charts and graphs into the body of their documents. The Autograph release also supports merging with Unix test editors.

Version 2.69 includes support for floating decimal points.

Version 2.69 costs between $495 and $9,995, depending on machine classification.

Fischer Information, 10250 Chester Road, Cincinnati, Ohio 45215.

Utilities

Evans Griffiths & Hart, Inc. has enhanced its **Vselect** machine-language record extractor for Digital Equipment Corp. VAX/VMS environments.

Vselect Version V4.0 is said to handle record management system (RMS) fixed-record-length sequential, relative and indexed files.

Vselect employs user-specified selection criteria to extract records from input files into an output file, optionally modifying the output record by deleting, inserting, rearranging or conditionally copying

Continued on page 28

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Continued from page 27

input files.

Features of Version V4.0 include input file support for RMS Prologue-3 indexed files, pointer files and variable-length RMS relative files. Signed and unsigned quad-word integers are also supported.

A single CPU license for Vselect costs $1,500.

Evans Griffiths & Hart, 55 Waltham St., Lexington, Mass. 02173

Hexpose II, an enhanced version of the Hexpose screen-oriented file editor that allows the user to view and modify files in both ASCII and hexidecimal, has been introduced by **Specialized Systems Consultants, Inc.**

Hexpose II can patch object modules, examine word processing files, repair damaged file systems and verify the results of I/O operations, the vendor said. Enhancements include the ability to send the current screen to the print spooler, the ability to spool entire files in ASCII and hexidecimal to the print spooler and the ability to specify two files to display simultaneously from the command line.

Hexpose II is available in binary form for Unix systems for $75. Source code costs $300.

Specialized Systems Consultants, P.O. Box 55549, Seattle, Wash. 98155.

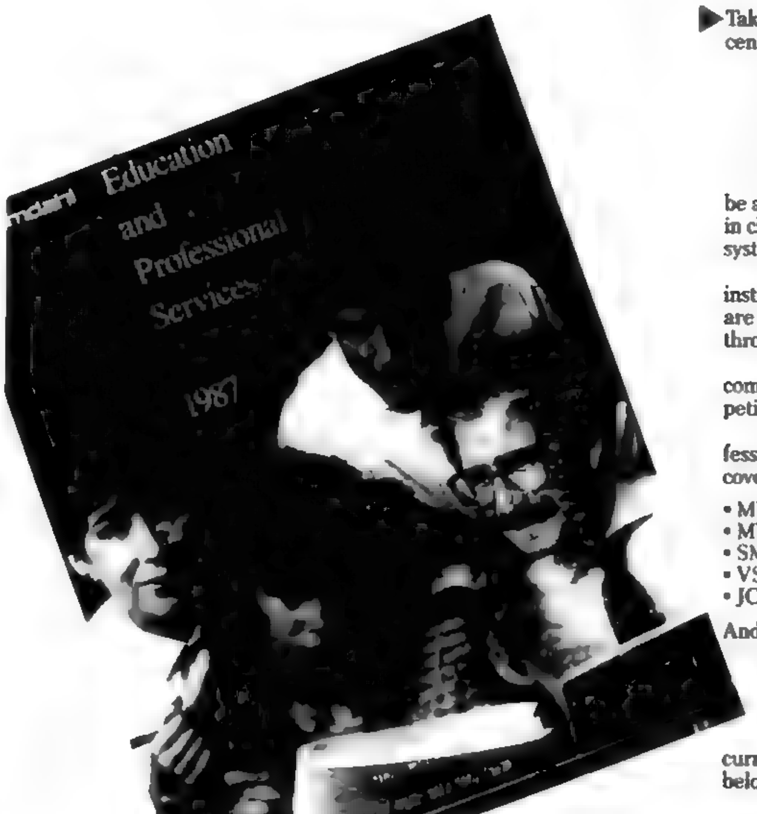
Outlook Software, Inc. has introduced the **Outlook Menu Design System** for the IBM System/38, a utility said to allow users to customize all the menus within the Outlook Modeling System, the Outlook Report Writer and a user's own in-house applications.

According to the vendor, options from each of the other Outlook utilities, as well as a user's own programs, can be customized on separate menus or integrated together. The system allows end users to create their own menus in the format of their choice.

The product comes with complete Help text and a user manual. It contains security considerations, allowing the designer to secure both entire menus or specific options within a menu.

The Outlook Menu Design System is priced at $950.

Outlook Software, Suite 313, 825 N. Cass Ave., Westmont, Ill. 60195.



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On-Line Software International, Inc. has ported its **Omnilink/36** file transfer link software package and its **Executrieve/36** information retrieval system to the IBM System/36 Personal Computer 5364.

Omnilink/36 allows bidirectional data transfer between the System/36 PC 5364 and an IBM Personal Computer or compatible. It features English commands, arithmetic processing and multiple-file access, which lets PC users download data from the host system.

Executrieve/36 is an ad hoc query, graphics and reporting tool that uses English statements to allow users to select and sort information and design reports.

Omnilink/36 costs $700. Executrieve costs $950.

On-Line Software, Fort Lee Executive Park, Two Executive Drive, Fort Lee, N.J. 07024.

Intel Scientific Computers, a division of Intel Corp., has introduced the **VAST-2** Fortran vectorizer for the IPSC-VX vector-concurrent computer system.

Developed by Pacific Sierra Research, VAST-2 is said to accept standard Fortran 77 applications and vectorize the code, including IF loops, to reveal low-level parallelism, which can then be exploited by each node.

The ISPC-VX system is a large-scale parallel computer containing up to 64 vector processing nodes.

The VAST-2 vectorizer is priced at $10,000.

Intel Scientific Computers, 15201 N.W. Greenbrier Pkwy., Beaverton, Ore. 97006.

Two software utility packages designed for use on the IBM System/38 minicomputer have been announced by **GT Software.**

The **Utility Trilogy Version 2.0** is said to produce file and program cross-reference listings, disk-utilization reports and network-configuration reports. New features include the ability to produce network-management reports by line number with all attached control units and devices as well as a workstation control-unit report with attached devices sorted by unit address.

The **Magnetic W2 Reporting** package is said to meet federal requirements for W2 reporting on tape or diskette.

Each of the packages costs $500.

GT Software, P.O. Box 10054, Atlanta, Ga. 30319.

Services

An **assembler language conversion system**, designed to convert assembler language source code to Cobol source code, has been announced by **Belcastro Computer Services**.

The converter is said to handle both batch and on-line source code and also convert ISAM files to VSAM files.

The conversion is done at the Belcastro Data Center, using an IBM 4361 mainframe operating under VM/CMS.

The company uses 1,600 bit/in. tape as its mode of transfer to receive programs to be converted.

All converted programs are compiled with an OS compiler.

The cost of converting and compiling the source code is $1.15 per line of assembler code and $75 per program.

Belcastro Computer Services, 120 Millcreek Road, Niles, Ohio 44446.

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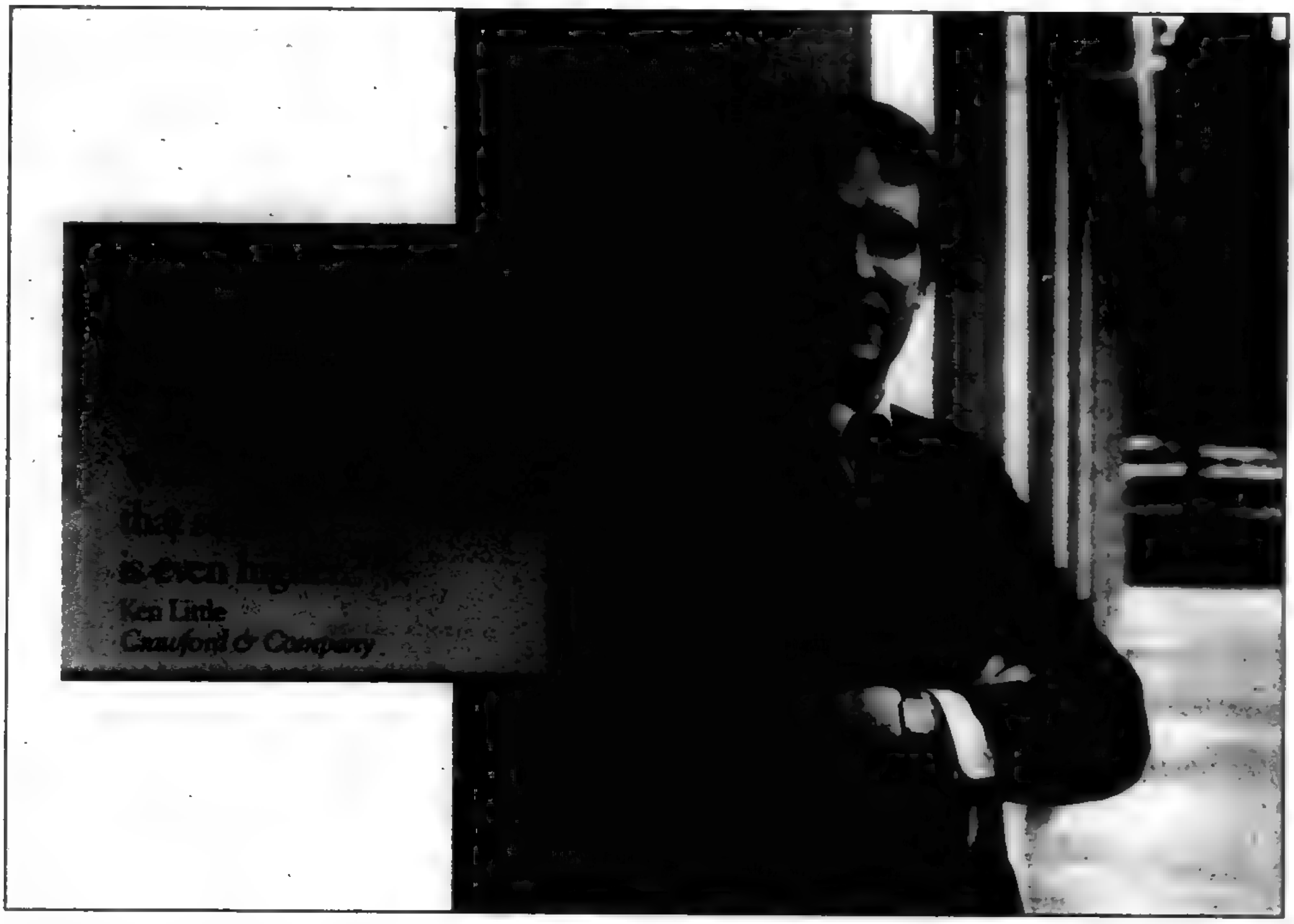

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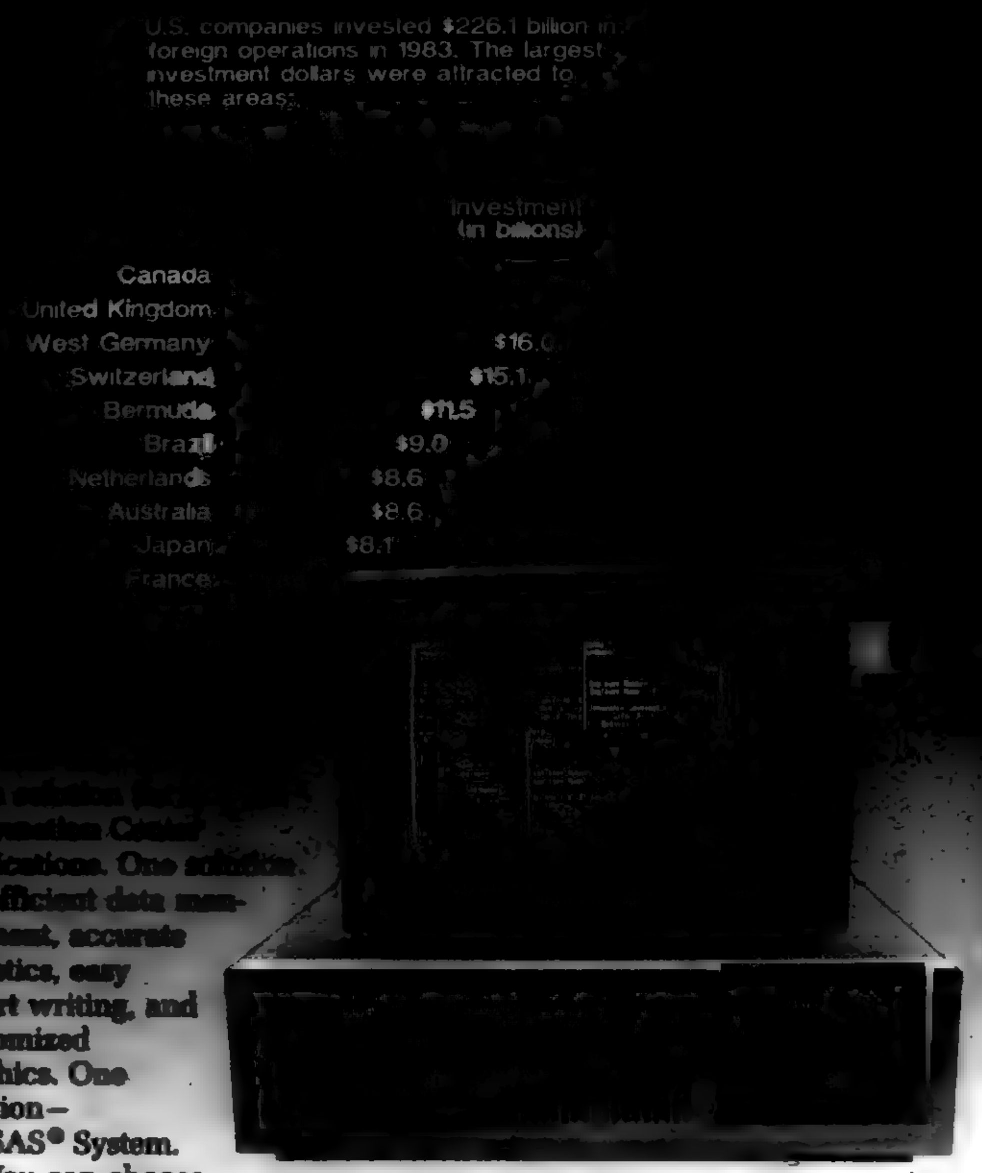

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MICROCOMPUTING

SMALL TALK

William Zachmann

IBM looking into Windows

IBM's inclusion of Microsoft Corp.'s OS/2 Presentation Manager graphical interface in its Systems Application Architecture (SAA) adds up to a decisive endorsement of Microsoft's Windows by the biggest and most influential player in the industry.

While the road to the OS/2 Presentation Manager has not been easy, one positive outcome has been the creation of Windows Release 2.0. This product, to be released this fall, mimics the interface of the Presentation Manager and is aimed at bridging the gap between the original Windows and the Presentation Manager.

The evolution of Windows 1.0 into the OS/2 Standard Edition Version 1.1 Presentation Manager involved changes that affect both the graphical user interface and IBM's Application Program Interface (API) for Windows applications. Windows 2.0 will play a key role in this evolution.

Microsoft's original intention was that its MS-DOS 5.0

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Dbase norm sought

Group targets language spanning vendor lines

BY DOUGLAS BARNEY
CW STAFF

If the Datandards Working Committee has its way, there will be a standard programming language that is integral to both Ashton-Tate's Dbase and a broad range of compatible data bases, compilers and tools.

The goal of the committee is to develop a standard language that will allow applications written in one Dbase-compatible package to run on any other. "From the programmer's point of view, there are dozens of small syntactical differences. They can be very minor, but we are talking source code here," said Marty Rinehart, chairman of the committee and president of Wallsoft Systems, Inc., a Dbase tools vendor.

The committee, which recently met for the first time, is composed of most major suppliers of Dbase-compatible data bases and compilers, including Nantucket, Inc., Fox Software, Inc. and Wordtech Corp. C. Wayne Ratliff, the former Ashton-Tate chief scientist who is currently developing a data base product to be marketed by Migent Software, Inc., is also a member. Ashton-Tate is cur-

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Data View

PC and compatibles shipments

Vendors' shares of 1986 U.S. market

INFORMATION PROVIDED BY INTERNATIONAL DATA CORP.
CW CHART: AMY J. SWANSON

HP exec strives to meet 386, PS/2 challenges

With the exception of IBM, Hewlett-Packard Co. has sold more personal computers than any other large systems supplier, according to a leading research firm. Many of those approximately one million office and technical PCs have been sold to HP's existing customer base for integration with its HP 3000 minicomputers and other systems.

Robert Puette

But now, with an increasingly competitive market and the advent of IBM's Personal System/2, HP faces new challenges.

Robert Puette, general manager of HP's Personal Office Computer Business Unit, recently spoke with *Computerworld* senior writer David Bright about the company's long-term microcomputer strategy.

Is HP developing an Intel Corp. 80386-based version of the its Vectra IBM Personal Computer AT compatible? If so, when might it be introduced?

Yes, 386s are in the cards. I can't say what the timing is going to be right now, but it's not far off.

What do the introduction of the PS/2 and IBM's attempt to set a new personal computer standard mean to HP?

It reinforces a lot of things that Hewlett-Packard wanted and has been heading toward. Not only did they support the next version of [Microsoft Corp.'s] MS-DOS, MS-DOS 3.3, but they also supported [IBM's] OS/2.

Windows. We committed to Windows with Microsoft about two years ago, at a time when IBM was just announcing Topview. We're kind of glad to see that they've finally abandoned that and are going to be supporting Windows. In fact, we're writing a pretty big portion of the next version of Windows in conjunction with Microsoft.

Enhanced video — VGA [IBM's Video Graphics Array]. Basically, we've been pushing like crazy in the video world as well, and we're kind of glad to see them set some standards with VGA. The good news is it helped to set a few [standards]. The bad news is it was a little different from some of the things we were doing. So we're getting

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Inside

- Micropro International steps up effort to gain lost market share with product updates, releases. Page 32.
- An 18 page/min desktop laser printer debuts from Fo-[illegible] America. Page 32.

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The Micro Focus Software Development Kit allows you to start writing applications for OS/2 now in protect mode using DOS.

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Micropro makes push for upgrades

BY DOUGLAS BARNEY
CW STAFF

SAN RAFAEL, Calif. — In an effort to reverse its declining market share that resulted from its paucity of serious product updates, Micropro International Corp. is planning to aggressively update its products and to launch several products related to word processing.

Micropro, which offered its first product in 1978 and once dominated the microcomputer word processing market, has shipped some three million packages worldwide.

But because Micropro's Wordstar received few enhancements, many users began to defect to more modern packages, such as Microsoft Corp.'s Word, Ashton-Tate's Multimate and Wordperfect Corp.'s Wordperfect. Sales for the firm peaked at $66 million in fiscal 1984 but then dipped to $38 million in fiscal 1986.

In order to enhance Wordstar as quickly as possible and reverse its staid image, Micropro recently bought Newword from New Star Software, Inc., a firm founded by two former Micropro employees intent on enhancing Wordstar.

Newword, which had been marketed by New Star, was renamed Wordstar Professional Release 4 and reintroduced in February. Micropro shipped some 100,000 packages in the first 100 days of availability.

New revenue sources

Now the firm said it hopes to continue its rebound by further leveraging its installed base and reaping revenue from both product upgrades and new packages.

While declining to provide many details, company President Leon Williams laid out a series of products and upgrades that are scheduled to be released during the next nine months.

One enhancement that has already been announced is Wordstar CP/M Edition Release 4. This package, aimed at users who still use CP/M-based machines, contains enhancements to the firm's original package for CP/M and is available as an upgrade for $89.

For the mainstream market, Micropro is slated to announce a desktop publishing package at Comdex/Fall '87. The package is being developed in conjunction with Island Graphics Corp.

The firm also plans to release a graphics product early next year to provide "sophisticated manipulation of graphic objects, images and pixels," according to product literature.

As part of its strategy, Micropro said it will release Wordstar Professional Release 5 later this year.

Micropro has 250 employees and $29 million in cash.

HP exec

FROM PAGE 31

that tweaked up, but it's not going to take too long.

The last thing was the 3½-in. floppy support. The best thing I can say there is, *finally.* We've been trying to pursue 3½-in. floppies since time immemorial.

What about a PS/2-compatible machine?
[IBM's] Micro Channel is a different internal architecture. If that becomes a standard, then we will certainly pursue that.

But part of our PC strategy is to pursue the standards that develop in the industry and to add value on top of them.

We don't think that the Micro Channel is just going to instantaneously replace the AT structure.

So whatever we do, it's going to be a bipolar kind of a thing.

Will the Vectra PCs run Microsoft's MS OS/2?
We're certainly committed to the ongoing support of MS-DOS. I put OS/2 into that category. We haven't publicly stated how, what and when, but if you're going to play in the business, you're going to have to play with OS/2.

How does HP's Personal Productivity Center compare with Digital Equipment Corp.'s All-In-1 office environment?
I believe DEC's [All-In-1] is much more host-based. I think we've done a better job of developing the products that run on the PC, like the mail product, the graphics product.

We have a capability for the PCs to transparently access printers on the 3000 [minicomputer] and at the same time utilize a 3000 disk while you're sitting at a PC. You just call it "disk B" instead of "disk A, B or C," and presto, you've got a huge disk.

If you really compare us with DEC in PC integration, feature for feature, we might have a competitive advantage.

What part will networking play in future HP personal computers?
We are very focused on integrating our PCs together with our commercial-based minicomputer systems, which fundamentally are the 3000 family. We're equally pursuing integrating the PC in the technical computer world, which means integrating with our HP-UX [Unix] operating system.

Are diskless workstations with built-in networking capability a possible part of that scenario?
Absolutely. As we get the [local-area network] connections and performance increases, I think we're going to see a lot of those.

Is HP's strategy to provide PC capability to its existing minicomputer base, or is it more open, which means that HP would be competing against not just IBM, but Compaq Computer Corp. and all the different clones?
I do not like to see the competitors' PCs in the HP environment. We've got to do a better job of integration, but we first have to have a very competitive product on a stand-alone basis. And that says we're going to compete in the outside world as well. There's no question about that.

As HP's PCs become more powerful, how will they be positioned against the company's workstations?
We're going to have multiple ways of approaching the problem at the low end. Sun Microsystems, Inc. has dropped its prices dramatically. DEC has gotten lower with its proprietary architectures. And at the same time, you're going to have just a plethora of 386s, very powerful kinds of engines, out there running things like OS/2. I think court's out.

The answer in the office, in the commercial world, is going to be Intel [processors] with MS-DOS and OS/2. The question is, what's going to happen in the technical world? What's the role of OS/2 in some of these powerful industry standard processors going to be, vis-a-vis the [Motorola, Inc.] 68000 and Unix for the low-end workstations? I don't know what the answer to that is going to be.

Frankly, I think that OS/2 and some of these powerful industry-standard processors are going to have a very good shot at that. And if they do, they're going to change that technical workstation marketplace, which is very hot right now. That's going to become a little messy.

HP's 110 Portable includes Lotus Development Corp.'s 1-2-3 and MS-DOS in silicon. Will HP expand on that concept, or does micro software change too fast to make that feasible?
We think that's an interesting concept. We get a lot of requests for those kind of things. I can't tell you what we're going to announce, but I wouldn't preclude that.

Windows

FROM PAGE 31

Windows Presentation Manager (now called the OS/2 Presentation Manager) would be strictly upwardly compatible with Windows 1.0 applications. It didn't work out that way.

An important factor involved requirements from IBM. Circumstantial evidence strongly suggests that IBM initially did not plan to use Windows to provide the graphical user interface for the Personal System/2 and for SAA.

I am reasonably sure that IBM initially planned to build an IBM proprietary graphical interface for the PS/2. Somewhere along the way, however, IBM abandoned its efforts to build such an interface. Presumably, some combination of problems (or simply costs) of internal development led to a reconsideration of Microsoft's Windows as the basis for the Presentation Manager. Even so, in order to sell IBM on Windows, Microsoft had to adapt the original plans to meet IBM's requirements, including changing the user interface and the API.

Regarding the API, it was an IBM requirement that Presentation Manager applications could be written in Cobol and Fortran. But Windows' original design did not accommodate the antiquated and cumbersome linkage conventions of these older languages. Significant changes to the Windows API were therefore required, and strict API compatibility with Windows 1.0 was sacrificed.

IBM's requirements also dictated changes to the user interface. For the Presentation Manager to be included in SAA, it had to work in ways that could be supported on IBM terminals that did not have, for example, a CTRL key or a keyboard scan that could detect the simultaneous depression of two keys.

Making those changes, however, was a sacrifice Microsoft was willing to make to gain IBM's acceptance of Windows as the basis for the OS/2 Presentation Manager.

Once it was clear that the API had to be changed, Microsoft then took advantage of the opportunity to incorporate other API improvements that Windows software developers had requested. The OS/2 Presentation Manager API now contains more powerful and flexible graphics primitives than those originally built into Windows.

Microsoft Windows 2.0 also incorporates the changes to the user interface, while maintaining upward compatibility with the Windows 1.0 API. It includes additional API calls that support elements of the user interface and ease the transition to the Presentation Manager.

The Presentation Manager, which is unlikely to be available to end users before this time next year, affects the second part of the transition by incorporating a new API that is not compatible with the original Windows API. It will be released by IBM as part of OS/2 Standard Edition Version 1.1.

What all this means for users is that Windows 2.0, running on top of MS-DOS 3.0 and higher, will offer the first opportunity to gain experience with the OS/2 Presentation Manager user interface. It thereby offers the first opportunity to use a key element of SAA.

In fact, with Windows 2.0, Microsoft will start to deliver SAA capabilities well before IBM is able to do so.

Zachmann is vice-president of research at International Data Corp.

Dbase norm

FROM PAGE 31

rently involved with the committee only as an observer.

Industry sources said they believe that Ashton-Tate intends to maintain its market share by controlling the Dbase language, which it was the first to offer. Some committee members threaten Ashton-Tate's market share by optimizing the language for specific uses.

But others said anything that entrenches Dbase as the dominant data base language — including standardization — may help protect Ashton-Tate from the onslaught of competitive products from Microsoft Corp., IBM, Lotus Development Corp. and Oracle Corp. It is still unclear if these vendors will implement a version of the Dbase language within their products.

A host of compilers and compatible packages have emerged in response to Dbase users' demands for added features and performance. For some, the extensions to Dbase have served users well, and a standard would deter progress. For others, however, standardization and compatibility allow users to make better buying decisions.

For many committee vendors, a standard language would provide a marketing boost. "The language vendors will be able to say, 'We have standard Dbase with the following extensions.' It makes it easy for people to switch to another implementation of Dbase," Rinehart said.

While the committee apparently hopes to standardise Dbase, Ashton-Tate will maintain responsibility for pushing the language forward. "Whatever Dbase comes out of Ashton-Tate goes a long way toward becoming a standard," Rinehart added.

NEW PRODUCTS

Systems

An IBM-compatible line of personal computers has been announced by **Delta Computer Corp.**

The line includes the **Delta A**, an Intel Corp. 80286-based IBM Personal Computer AT-compatible complete with a 12-in. flat-screen monochrome monitor, a set of integrated software applications, monochrome graphics adapter card and documentation.

The **Delta TX** is an Intel 8088-2-based computer. It is said to be IBM PC XT-compatible with 640K bytes of random-access memory, two 5¼-in. disk drives, six full-size expansion slots, the application software packages and a Hercules Computer Technology, Inc.-compatible monochrome graphics card.

Delta A costs $1,995. Delta TX costs $1,095 with a monochrome monitor, $1,395 with a color monitor and $1,595 for a 20M-byte hard drive system.

Delta Computer, P.O. Box 809, 260 Forbes Blvd., Mansfield, Mass. 02048.

Software utilities

A collection of symbols and artistic images designed for use with Microsoft Corp.'s Windows has been introduced by **Micrografx, Inc.**

CAD Clipart Version 1.0 contains more than 1,000 images. The images are compatible with Aldus Corp.'s Pagemaker; Micrografx's Windows Draw, Windows Graph and Inavision; Microsoft's Windows Write and Notepad; and Palantir Software, Inc.'s Filer data base program. The object-based images can be output at the maximum resolution of the device used.

CAD Clipart Version 1.0, including a directory with tips for using clip art, costs $99.95.

Micrografx, 1820 N. Greenville Ave., Richardson, Texas 75081.

Software enhancements

IMRS, Inc. has released a local-area network-ready version of its **Micro Control** personal computer-based financial information system.

Micro Control 3.0 includes file sharing and locking capabilities, administrative controls, password protection, multiple security levels and audit trails. Account capacity has been expanded to 4,000 accounts and 99 categories of data.

Micro Control is priced from $80,000 to $120,000.

IMRS, 1033 Washington Blvd., Stamford, Conn. 06902.

Data storage

Tecmar, Inc., a subsidiary of Rexon, Inc., has expanded its **Qualitytape** family of ¼-in. cartridge tape systems.

Four tape systems with capacities ranging from 40M to 90M bytes have been added to the line, as well as Tecmar's QTOS software and standard and minidata cartridge media. The QTOS software includes direct track-seek features. It supports multiple-tape backup and is said to be compatible with local-area networks from vendors such as Novell, Inc. and IBM.

All Qualitytape subsystems are offered in both internal half-height and external portable configurations. Prices range from $795 to $2,495.

Tecmar, 625 Cochran Road, Solon, Ohio 44139.

Printers/Plotters/ Peripherals

A desktop laser printer said to operate at 18 page/min at 300 dot/in. resolution has been announced by **Fujitsu America, Inc.**'s Computer Products Group.

The **M3727MA** printer was designed to print 25,000 sheets per month. It features two 250-sheet cassettes and emulates Epson America, Inc.'s FX80, Diablo Systems, Inc.'s 630 and Hewlett-Packard Co.'s Laserjet Plus. It comes standard with 1M byte of random-access memory, expandable to 2M bytes. Standard host interfaces include RS-232 and Centronics Data Computer Corp. parallel.

The M3727MA laser printer is priced at $7,950.

Fujitsu America, 3055 Orchard Drive, San Jose, Calif. 95134.

Board-level devices

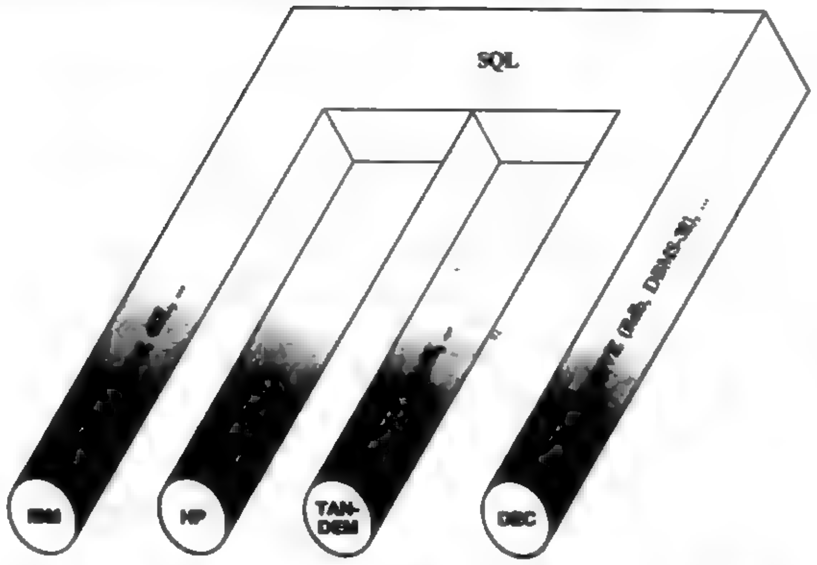
Three video display adapter controller boards for IBM Personal Computers and compatibles have been announced by **Paradise Systems, Inc.**

The **Autoswitch Monochrome EGA Card** allows users to run IBM Enhanced Graphics Adapter (EGA) color software on monochrome monitors. The card replaces 16 colors with 16 shades of gray, green or amber. It supports the Hercules Computer Technology, Inc. Monochrome, Monochrome Display Adapter (MDA) and IBM Color Graphics Adapter (CGA) standards.

The **Basic EGA Card** displays applications in EGA, Hercules Monochrome, CGA and MDA resolution without automatic switching.

The Monochrome EGA Card and the Basic EGA Card cost $249 each.

Paradise Systems, 217 E. Grand Ave., South San Francisco, Calif. 94080.



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NETWORKING

DATA STREAM

Patricia Keefe

Unkinking cable wars

There's so much hubbub crisscrossing the networking community these days regarding what constitutes the perfect transmission medium. Its attributes are said to include low cost, accessibility, flexibility and resilience in the face of noise and other distortions. Feeding those discussions are the advent of proprietary cabling systems and the current trend toward moving high-speed networks over to unshielded twisted-pair wiring.

Invariably, one subset of this discussion will address whether users really care about or want to know about cabling choices. Indeed, many vendors, consultants and analysts subscribe to the notion that users do not. Nothing could be further from the truth. Users care all right — plenty. Cabling can be pretty expensive, especially if it is discovered later that the installed wiring won't work with a second, different network or private-branch exchange system.

An informal discussion earlier this year with attendees at a

Continued on page 40

More big players bet on TCP/IP

Vendors rush to connect PC LANs, host-based corporate systems

BY ELISABETH HORWITT
CW STAFF

ANALYSIS

The proposed merger of 3Com Corp. and Bridge Communications, Inc. [CW, July 27] swells the ranks of local-area network (LAN) vendors that perceive interconnectivity of IBM Personal Computer-based LANs and host-based corporate communications systems as the new hot spot in networking.

Many of these LAN companies offer Transmission Control Protocol/Internet Protocol (TCP/IP) as an interim solution that may be replaced by a mature Open Systems Interconnect (OSI) standard.

Bridge archrival Ungermann-Bass, Inc. in Santa Clara, Calif., already provides a link between the IBM PC network environment and TCP/IP that incorporates the TCP/IP-IBM Netbios interface standard developed at a Monterey, Calif., TCP/IP workshop held earlier this year. Ungermann-Bass also has announced plans to migrate its network boards to OSI.

This summer, Micom-Interlan, Inc. has unveiled a product strategy revolving around interconnectivity; Sytek, Inc. plans to follow suit.

Micom-Interlan, which has languished in parent company

Continued on page 40

Survey: DEC still can't topple SNA

BY ELISABETH HORWITT
CW STAFF

Despite industry consensus that Digital Equipment Corp. has led competitors — including IBM — in networking capabilities during the past two years, Decnet has failed to oust IBM's Systems Network Architecture (SNA) as the primary networking backbone system in many Fortune 1,000 corporations, according to a recent survey.

Of the 150 Fortune 1,000 companies surveyed, only 23% had installed Decnet, while 78% had installed SNA (see chart below), said Forrester Research, Inc., a market research firm based in Cambridge, Mass. Only 16% of those surveyed cited DEC as their primary data network vendor, while 73% cited IBM, the survey found.

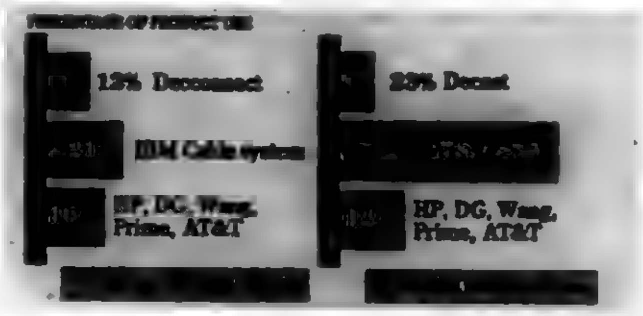
"We were surprised to see so few Decnets," Forrester President George Colony said.

IBM also appears to be creeping up on DEC in the local-area network arena, the survey found. Of the companies surveyed, 33% said they had installed Ethernet, which supports a variety of other networking systems in addition to Decnet. IBM's Token-Ring had been installed in 22% of the surveyed companies. Data General Corp., Hewlett-Packard Co., Wang Laboratories, Inc., Prime Computer, Inc. and AT&T networks

Continued on page 40

DEC's Fortune 1,000 network penetration

IBM's SNA wins out as backbone system for most companies



INFORMATION PROVIDED BY FORRESTER RESEARCH, INC.
CW CHART

Station monitors large nets

BY PATRICIA KEEFE
CW STAFF

MOUNTAIN VIEW, Calif. — Bridge Communications, Inc. last week announced network management for large-scale Transmission Control Protocol/Internet Protocol (TCP/IP) networks, along with an internetwork bridge said to support a mix of T1 and other point-to-point links.

The NCS/2 Network Control Server is an integrated network management workstation that allows centralized control and monitoring of devices attached to TCP/IP-based Ethernet or Bridge 5M-bit broadband networks, the vendor said. It provides features critical to the administration of large networks, Bridge claimed, including logging of all network activity on a system audit trail, monitoring of

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Inside

- Boston Software program exchanges information between disparate applications. Page 40.
- Gateway Communications cuts price of G/Net adapter card. Page 41.
- Datacopy's Jetfax provides PCs with data communications, image network features. Page 41.

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Program links disparate applications

BY DAVID BRIGHT
CW STAFF

SHERBORN, Mass. — Boston Software Systems, Inc. recently unveiled a package said to eliminate the need to rekey data by exchanging information between disparate applications on personal computers, minicomputers and mainframes.

The Boston Access program resides on an IBM Personal Computer and is a sophisticated macro, not a file transfer program, said company President Sara McNeil. The package works with vertical applications, many of which do not conform to popular file transfer formats.

"There are some programs which will put files in [Lotus Development Corp.] and other formats. This is for those situations where you don't have that capability," McNeil said.

Before using the program, users must build custom interfaces with the program's scripting language.

Information exchange

The $99 program accomplishes the transfers by reading data directly from the screen buffers of one application and inserting the data into the keyboard buffers of another. Transfers can be made in batch mode without operator intervention. The program exchanges data between programs running on an IBM PC or between a PC application and an application accessed through terminal emulation, according to the vendor.

A hospital beta-test site is currently using Boston Access to coordinate the flow of information between a custom IBM PC application and an application on an IBM 4300 mainframe. The microcomputer program analyzes data for patient billing, while demographic and other information is kept on the mainframe. Information must be exchanged between the two programs on a regular basis. "Before, they were rekeying that information in," McNeil said.

For $550, the firm also offers Boston Access Plus, which includes advanced terminal emulation and the ability to read files.

Survey

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had been installed in 17% of the companies surveyed.

"I had almost written Token-Ring off," Colony said, "but IBM has fixed a lot of the problems and failures, like boards dropping tokens." In the future, he said, firms are likely to install Token-Ring, Ethernet or AT&T's Starlan, building gateways to connect network architectures when necessary.

In order to continue its growth and success in networking and computing, DEC must provide greater connectivity to both SNA and other computing environments, such as AT&T's Unix System V and Microsoft Corp.'s MS OS/2, Colony said.

DEC's support of the Open Systems Interconnect (OSI) standard, coupled with IBM's commitment to provide gateways between SNA and OSI, will mean that "SNA and Decnet come together under OSI," Colony said. However, IBM's Netview will become an effective competitive weapon against DEC, Colony predicted.

"DEC told me that they would have a distributed network management system in which [DEC] VAXs would suck network alerts out of Netview. About 40 Fortune 1,000 companies we talked to [apart from the survey] thought that was a bad idea," Colony said.

In the area of premises wiring, the survey found that Decconnect had been installed in only 12% of the companies surveyed, while 21% of these firms had implemented IBM's Cabling System (see chart page 35).

TCP/IP

FROM PAGE 35

Micom Systems, Inc.'s shadow since its acquisition in 1985, has devoted a large percentage of its research and development budget to this area in hopes of regaining lost market presence.

Sytek, which struggled all last year to replace revenue from a discontinued OEM deal with IBM, hopes an expanded share of the interconnectivity market will help it regain profitability.

Micom-Interlan seeks to form a bridge between its older line of Ethernet controllers for large systems such as Digital Equipment Corp. hosts and various LAN environments designed to link workstations within small task groups, company President Michael Barker said. Micom-Interlan is positioning its TCP/IP — and in the future, its OSI products — as the solution for corporations that want to interconnect incompatible LANs within their work groups.

With this in mind, the Micom subsidiary has been porting its TCP/IP device drivers to a variety of computer buses — including IBM's Micro Channel — and to additional network environments, such as AT&T's Starlan. The company has aggressively sought joint development agreements that will implement its products on popular systems.

For example, Micom-Interlan recently staked a claim in the AT&T Unix System V, Release 3 connectivity market by embedding its TCP kernel into Interactive Systems, Inc.'s AT&T-certified implementation of that operating system on the Intel Corp. 80386 processor. As a result, Micom-Interlan's TCP/IP devices will work with all Unix System V, Release 3 software products based on Interactive Systems' offering — including an integrated Xenix-Unix System V, Release 3 system being developed by Interactive Systems and Xenix developer Microsoft Corp.

The PC LAN industry has been a special target for the Micom subsidiary. In September, Novell, Inc. is expected to offer a TCP/IP gateway for its Netware developed by Micom-Interlan. Micom-Interlan has a similar arrangement with Banyan Systems, Inc. 3Com's merger with Bridge, however, has pretty much decided whose TCP/IP products it will be using.

Sytek, meanwhile, plans later this summer to unveil a baseband TCP/IP Ethernet product line as a low-cost way for users to link workstations to its existing broadband terminal-to-host network, the System 2000, said Sytek President George Klaus.

"Our analysis showed that the System 2000 only targeted 6% of the total U.S. network market for very large installations," Klaus said. By adding a baseband Ethernet product, Sytek can address a niche that forms 26% to 28% of the interconnectivity market, he added.

Initially, Sytek plans to market its baseband products to its existing broadband customers, Klaus said. The two types of networks can work together as one system, called Globalnet. "We're technically not doing anything unique in baseband TCP/IP, but we think we provide unique ways of hooking baseband networks to a high-speed broadband backbone," he said.

Workstation

FROM PAGE 35

key network parameters in real-time, multiwindowing and graphical data analysis to determine network trends and problems. The NCS/2 software runs as an application under Sun Microsystems, Inc.'s Unix.

Based on Sun's Sun-3 graphics workstation, the NCS/2 supports up to 4,000 Bridge servers on networks featuring from 1,000 to 16,000 users. One of two models of the NCS/2 is the NCS/2-140, which is based on the 16-MHz 32-bit Motorola, Inc. 68020-based Sun-3/140 CPU. It offers a 140M-byte drive, 2 million instructions per second (MIPS) and support for up to 2,000 Bridge servers. A turnkey unit costs $45,000.

The second model, the NCS/2-260, is based on the 25-MHz 32-bit 68020-based Sun-3/260 CPU and offers a 280M-byte drive, 4 MIPS and support for up to 4,000 Bridge ervers. A turnkey unit costs $85,000.

Bridge's Internetwork Bridge/3 is a data link-level product said to create a single, logical Ethernet unit that can transmit data between networks running any higher level protocols. It supports up to eight lines and the use of multiple synchronous-interface types and costs $10,500 with one T1 card.

Cable wars

FROM PAGE 35

regional meeting of the New England Chapter of the Data Communications Users Association revealed that a major concern for many MIS directors is cabling. Yes, cabling.

A number of these users indicated they were either in the process of moving to new buildings or faced rewiring their current site. And they were mighty confused about which side to take in the cabling wars. The big fear, they said, was that whatever they chose today would be obsolete five years down the road.

They'll take twisted-pair

Still, these particular users were unwilling to shell out big bucks for the so-called cable of the future — fiber-optic media — preferring to wait for pricing to drop further. Most intend to stick with good old twisted-pair wiring until the dust clears. That's right, telephone wire.

But what the heck. It's commonplace, it's already there and it's cheap. What's more, it's compatible with AT&T's 1M-bit Starlan and Premises Distribution System, and certain forms are compatible with IBM's 4M-bit Token-Ring network. Even Ethernet is available, albeit at low speeds, over lowly twisted-pair wiring.

The plethora of cheap twisted-pair wire has prompted at least two companies — 3Com Corp. and Synoptics, Inc. — to work on separate projects designed to bring 10M-bit Ethernet to twisted-pair wiring — no small feat — by year's end. Some observers say 3Com, which uses expensive coaxial baseband cable for its Ethernet networks, is turning to twisted-pair wiring to overcome resistance in some sites to pulling coaxial cable.

Any excitement generated by these projects could be premature. Users need to be careful. First of all, if the twisted-pair wiring in your building is more than 10 years old, it probably needs to be replaced.

There are several different kinds of twisted-pair wiring, and the wrong cable will tie networks in knots. There are two-, four- and six-pair; there's shielded (Types 1 and 2) vs. unshielded (Type 3). The big issues often cited with this media are speed, distance and distortion. Another concern is, How do you separate voice and data signals running over the same wire? Have 3Com and Synoptics addressed these areas?

The rule of thumb in cabling is the higher the speed, the shorter the distance. Generally speaking, twisted-pair wiring is said to carry the least amount of data, have the lowest transmission rate and be the most susceptible to electromagnetic interference. It also carries data over longer distances, which can be disastrous to a high-speed network.

A design of the times

3Com and Synoptics have to come up with a design that prevents deterioration of data packets traveling at high speeds over a distance of at least 150 feet — the average distance between the corporate desktop and the wiring closet. Peaceful coexistence of voice and data will keep both MIS and telecom managers happy.

But design options are inhibited by the need to keep costs down so as not to negate one of the compelling reasons for going with twisted-pair wiring in the first place. Even trickier for 3Com, which cannot rely on a direct sales force, is the need to build a truly user- or dealer-installable product.

Many users, and the industry in general, will be watching closely to see what these two vendors unveil at the end of the year. Successful products will reinforce decisions to stick with twisted-pair wiring for at least the near future and possibly prolong the life span of that media. A flop can only mean more and more users will bite the bullet and go with fiber optics, a popular choice already among users of Proteon, Inc.'s high-speed token-ring networks. And Proteon execs say fiber isn't a thing of the future — it's here today.

In either case, whether 3Com and Synoptics are successful or not, users will be watching closely.

Keefe is a ***Computerworld*** *senior editor, networking.*

NEW PRODUCTS

Local-area network hardware

Gateway Communications, Inc. has reduced the price of its G/Net network adapter card.

G/Net supports up to 255 IBM Personal Computers, PC XTs, ATs and compatibles over a baseband, coaxial-cable linear-bus network. The G/Net network adapter, called the Local Network Interface Module, features an on-board coprocessor with 64K bytes of random-access memory. It supports Novell, Inc.'s Netware as well as communications servers for IBM's Systems Network Architecture, CCITT X.25 and asynchronous gateways and bridges.

The G/Net network adapter card now costs $395.

Gateway Communications, 2941 Alton Ave., Irvine, Calif. 92714.

Customer-premise equipment

Jetfax, designed to provide any standard personal computer with data communications, image network features and the functions of a Group III facsimile machine, has been introduced by **Datacopy Corp.**

The product consists of Datacopy's Microfax facsimile board, its Jetreader scanner and a PC interface board. It gives users PC-to-fax, fax-to-PC and PC-to-PC communications access. The PC-to-PC communications feature consists of the capability to send and receive ASCII data, printed text, images or text and images.

Features of the Microfax board include background operations, multiple addressing, delayed transmission and store-and-forward capabilities.

Jetfax is priced at $2,790.

Datacopy, 1215 Terra Bella Ave., Mountain View, Calif. 94043.

Links

Adapt3274 RJE, software said to allow IBM Personal Computers to communicate with mainframes using the 3770/remote job entry (RJE) protocol via a 3274/3174 controller, and **Adapt3274 IDS**, software said to allow an IBM PC to emulate an IBM 3278/9 Information Display Station, have been announced by **Network Software Associates, Inc.**

Adapt3274 RJE allows IBM PCs to perform batch data transfers to and from a mainframe. The controller may be connected to the host via a local-channel attach or via a remote communications link. It reportedly offers concurrent background mode, multiple mainframe sessions, file-transfer program and printer spooling.

Adapt3274 RJE costs $985. Adapt3274 IDS costs $585.

Network Software Associates, 22982 Mill Creek, Laguna Hills, Calif. 92653.

File servers

Forest Computer, Inc. has enhanced its Gateway/1000 product for use with Digital Equipment Corp. VAX computer systems.

The Gateway/1000 now allows VAX systems in a Decnet networking environment to perform bidirectional file transfer and terminal emulation and to have printer access with either Hewlett-Packard Co. HP 3000 minicomputers or IBM mainframes.

Gateway/1000 hardware and software prices begin at $18,000 and $16,000, respectively.

Forest Computer, 1749 Hamilton Road, Okemos, Mich. 48864.

The data transfer software that lets nothing stand between New York and San Francisco.

A company needed to transfer data between its New York and San Francisco data centers. They were looking for a tool to move all types of data, do it automatically and provide complete security and management control. Their goal was to operate the two data centers like a single facility.

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How do they initiate transfers?
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How does it affect the operations staff?
NDM automates labor-intensive operator functions and enables unattended operation. Transfers can be initiated by time, day, date, class and priority.

How does New York know when data reaches San Francisco?
NDM notifies both data centers and provides complete statistics and audit trails.

What does San Francisco do with the data when it arrives?
The completed transfer can automatically initiate an application or pass control to a job scheduler, such as UCC-7.

How is the data kept confidential?
NDM prevents unauthorized access and reports on unsuccessful attempts. It also supports ACF2, RACF and TOP SECRET security systems.

What types of NDM products are available?
NDM-MVS (SNA and HYPERchannel versions), NDM-VSE and NDM-PC. They're all part of a family of data transfer products that will soon include NDM-VM and NDM-VMS.

NDM products are being used by more than half of the nation's largest financial institutions and a who's who of Fortune 500 companies. Because they believe nothing should stand in the way of results. Not even their own data centers. If you feel the same, call 1-800-292-0104. In Texas, call 214-550-0318.

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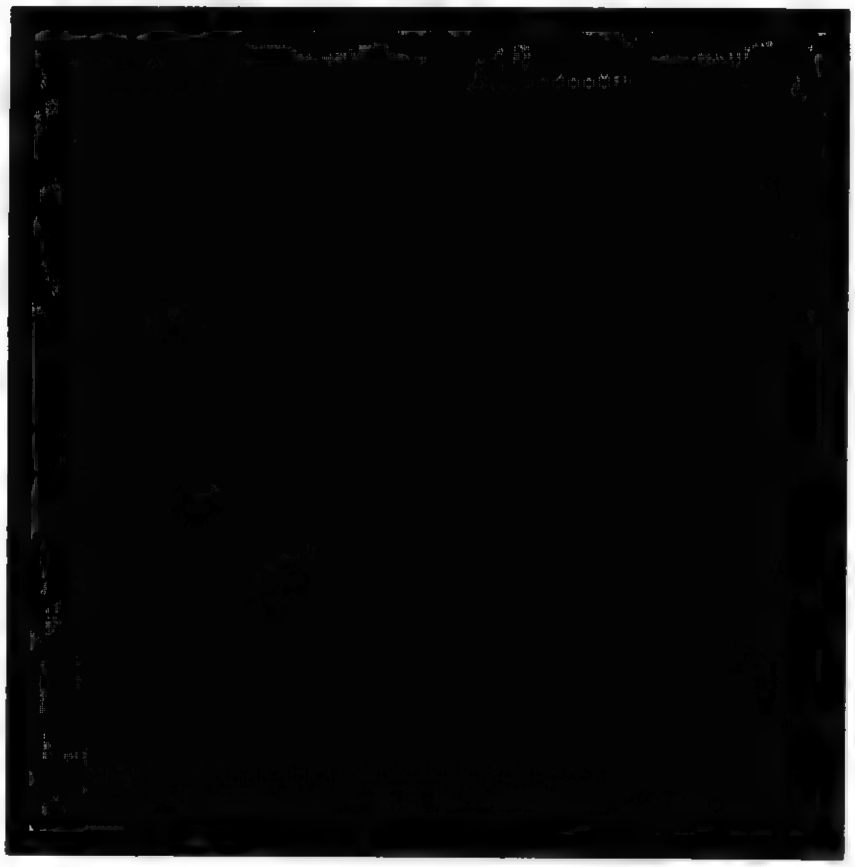

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SPOTLIGHT

COMMUNICATIONS SOFTWARE

Communications is about to become a great deal more complicated, as a stream of fresh developments challenges some long-held assumptions about the way connections work.

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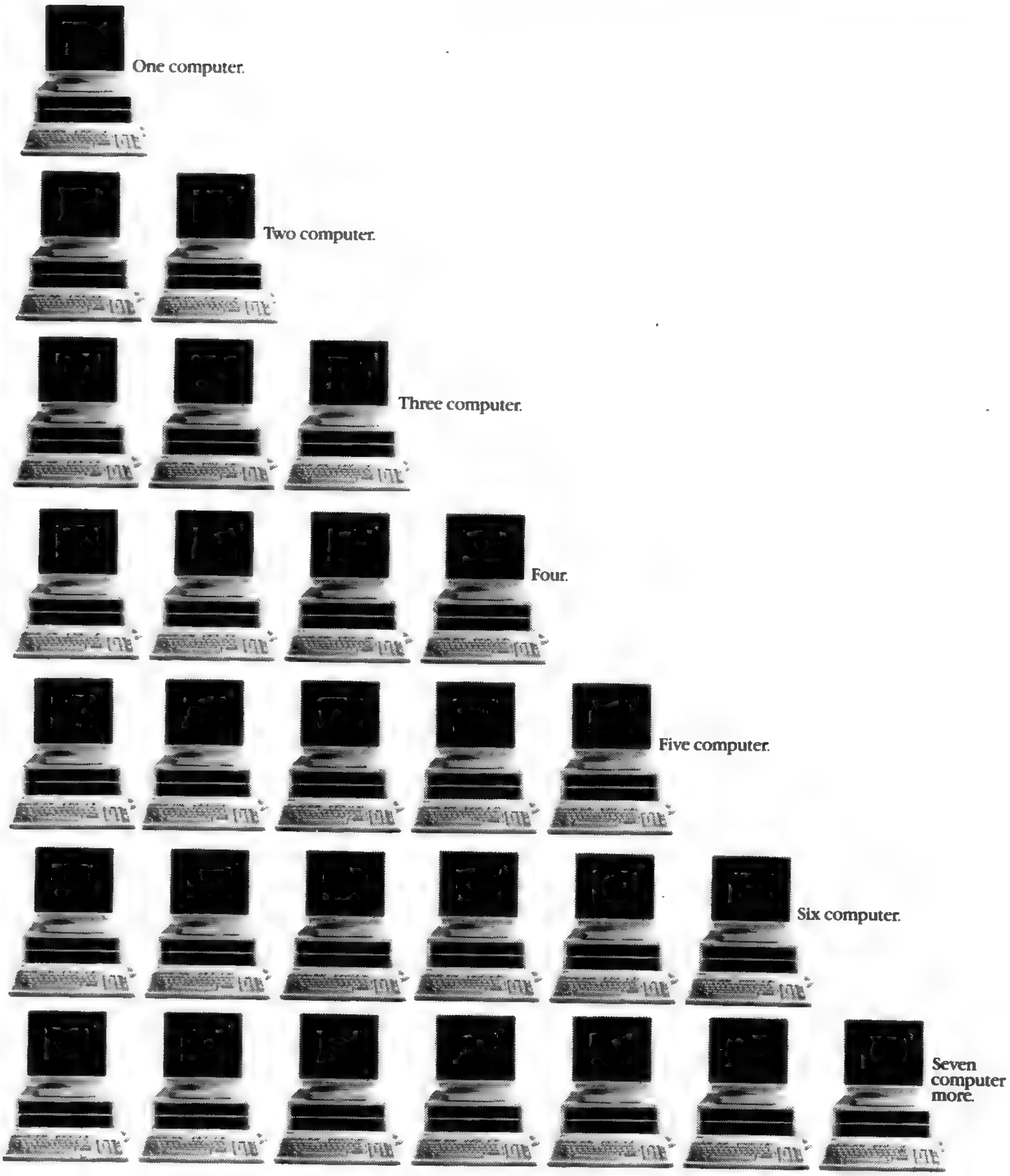

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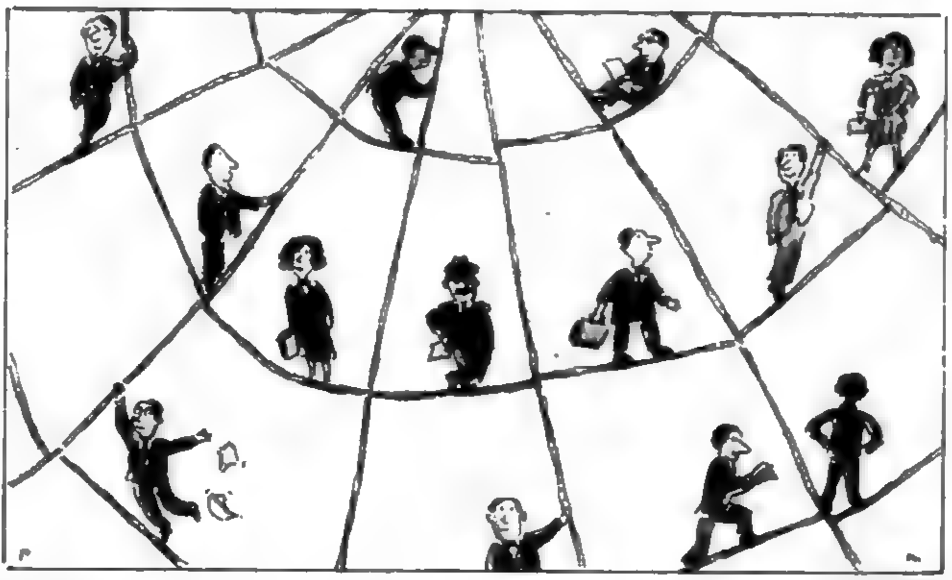
It will soon be apparent that communications is not a separate application but a structure supporting every type of data movement.

FINDING ORDER IN THE CHAOS

BY DANIEL GROSS



PAUL MEISEL

The role of software in data communications has recently gone through some important redefinitions. There was a time when hardware was expected to do nearly everything, and communications software was relegated to playing a utility role, such as getting data from a disk onto a wire. As development tools improved, however, it became apparent that software could also perform terminal emulation, protocol conversion and file compression — all the tasks previously assigned to black boxes. What we have now is a state of logical balance, which recognizes that each method exhibits its own particular strengths. Hardware does certain things — such as protocol conversion — more effectively than software and at a similar cost. Software, on the other hand, is more easily modified; it is better able to play chameleon, emulating an ever-increasing variety of terminals.

It is fortunate that the data communications industry has finally come to an agreement on the relative merits of hardware and software, because great changes are rushing in on communications systems like a howling Chicago wind, and the imminent confusion will leave no time to solve leftover problems. Development is moving more quickly than the user community's ability to assimilate new technologies, with the strongest currents concentrated on three fronts — personal computer software, host systems and micro-to-mainframe connections. This last area is a subset of the notorious and ill-defined issue of connectivity, to be discussed later.

Fundamental design assumptions behind PC communications software are changing as quickly as the features listed on the latest packages, which says a great deal, since one of the most explosive phenomena in recent data communications history has been the software's exponential growth. Gone are the days when Crosstalk, the original and dumb, terminal- and file-transfer program from Microstuf, Inc. in Roswell, Ga., shared with Ashton-Tate's Dbase II the honor of being perceived as a "serious" software program for microcomputers that ran on Digital Research, Inc.'s CP/M operating system.

Now, the PC software market is crowded, and things are not quite so simple. Danbury, Conn.-based VM Personal Computing, Inc. offers Relay Gold, a package that among other things, sends and receives files simultaneously in the background while the PC user runs another program. Relay can also emulate an IBM 3270 terminal. Microsoft Corp. includes a script language in its Access software that is as sophisticated as Basic.

The writing on the bulletin board

Until recently, PCs in communications were seen as no more than smart terminals. Their low cost, however, spawned a civilian kind of host system — the bulletin board system. Bulletin-board system operators use special software to make their PCs act as host systems. The two main services found on these systems are electronic mail and public-domain software distribution.

The development of bulletin-board system software is beginning to have considerable

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Gross is chairman of Magnetic Press, Inc., a New York-based research and intelligence firm specializing in the computing and telecommunications industries.

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impact on new communications programs. Originally, a PC could act like a host using the answer mode of software like Crosstalk, Relay and Access. Products appearing on the market were intended exclusively for host/bulletin board system applications. Some of these programs are still in the public domain.

Microstuf's Remote software represents a new type of product, one on which the use of the PC as a host is not intended primarily for E-mail. Users can call a PC running Remote and employ applications as if they were sitting at the PC's keyboard — albeit at the slower speed enforced by a modem. Remote can also be used as a dial-up gateway into local-area networks (LAN), allowing isolated remote users to share network resources and exchange data.

Another package similar to Remote has an even more specialized purpose: complete remote control of a PC. Newport Beach, Calif.-based Meridian Technology, Inc. recently released Carbon Copy Plus, a package that mirrors every action a user takes on two connected PCs. A copy of Carbon Copy Plus must be running on both machines, a feature that has made it popular among custom-software developers as part of their service contracts.

> MAJOR COMPUTER manufacturers, each convinced that its own way is better than the others, have spawned an entire industry that tries, through communications, to undo what it has wrought through competition.

"Both sides of the Carbon Copy equation help," says Dan Seltzer of Daniel Seltzer & Associates, a Brooklyn, N.Y.-based software consulting firm. "We can give our customers instant technical support and problem solving while drastically reducing our number of on-site visits."

Host software

Remote access and host software available for larger systems is primarily oriented toward electronic mail. On-line Software International, Inc. in Fort Lee, N.J., has been selling Bulletin, its mainframe E-mail software product, since October 1986.

Bulletin offers a feature increasingly common in E-mail: Users can choose to receive their mail in a store-and-forward fashion or be interrupted in the middle of an application if new mail arrives.

Metropolitan Life Insurance Co. says it has been using Bulletin to great advantage. The company has a distributed network of IBM mainframes supporting more than 3,000 terminals across the U.S. In the 1970s, Metropolitan Life decentralized processing, but policy records remained situated in the home office in New York.

"The logistics of distributing several million paper files, occupying two floors, were too difficult to implement," says John Kador, a Chicago-based mainframe software specialist.

According to Kador, Metropolitan Life was using a telex-based system until it moved to Bulletin, and equipment breakdowns made the system less than reliable. Steven Berto, Metropolitan Life's project manager responsible for the E-mail implementation, claims the new system is saving the company more than $100,000 per year.

Countrywide net

One of the most remarkable examples of messaging systems developed outside the nests of academia and corporate America is Fidonet. Fido is a host/bulletin board system for PCs that offers standard features such as E-mail, menu creation, editing software for system operators and file transfer with a choice of popular protocols. Fidonet is the name for both a loosely knit organization of Fido bulletin board systems operators and a particular feature of Fido software.

If properly configured, Fido will shut down its host operations at predetermined times — typically between 3 a.m. and 5 a.m. — and call other Fido systems locally and across the country to forward E-mail. With this system, Fido users in New York, for instance, can send E-mail to users of a San Francisco Fido bulletin board system for the cost of a local call.

The success of bulletin board system software has inspired some vendors to produce similar applications for LAN environments. PCC Systems, Inc. in Palo Alto, Calif., developed CC:Mail exclusively for in-house LAN-based E-mail requirements.

In the LAN environment, the file server plays the role of the host. CC:Mail allows the creation and editing of text and graphics. In addition, messages can be sent, forwarded, broadcast or similarly manipulated. The product's effort to mimic traditional means of carrying out a task — in this case, sending and receiving conventional mail — marks CC:Mail as a prototype for communications software of the future.

Micro-to-mainframe link

Most new communications software involves connections between small and large systems. This is most apparent in the evolution of micro-to-mainframe links.

Digital Communications Associates, Inc. in Norcross, Ga., made its name with the Irma card, which provides a straightforward coaxial-cable connection to an IBM 3274 cluster controller. Many other vendors followed in DCA's footsteps, but the market shifted unexpectedly when users were disappointed with the limitations of these links. IBM's LAN-based Systems Network Architecture (SNA) gateways changed the rules of the game.

Whereas in single PC cards the micro-to-mainframe link cannot be shared as a resource, this is possible with LAN gateways. LAN vendors are also better positioned to offer a seamless environment, providing access to the mainframe as well as to the LAN.

Software like VM Personal Computing's Relay line and the SIM3278 programs from Ottawa, Ontario-based Simware, Inc. gives users more flexibility in selecting the underlying hardware. With Relay Gold or SIMPC, you can do without any hardware on the PC end, using protocol converters attached to the host mainframe.

Simware's product line allows dumb ASCII terminals to be used instead of IBM's expensive 3270s. The cost difference between 3270 and dumb ASCII terminals can reach $1,200.

Incompatibility gap

The single most important gap communications software can bridge today is not physical distance but what can only be called the chasm of incompatibility.

Major computer manufacturers, each convinced that its own way is better, have spawned an entire industry that tries, through communications, to undo what it has wrought through competition. This industry sells multivendor connectivity.

Two major groups of standards are competing for dominance in communications: IBM's SNA and the Open Systems Interconnect (OSI) scheme promoted by the International Standards Organization (ISO) and the Consultative Committee on International Telephone and Telegraph (CCITT).

Many large players are presumably going with SNA on the belief IBM will have to provide some upgrade path from its own standards to the international ones. Understandably, these vendors perceive IBM as a more

Continued on page S3

Telecommuting makes information a movable feast

BY THOMAS CROSS

By whatever name it is known — remote work, home office work, telework, location-independent tasks or home distributed data processing — telecommuting means one thing: performing job-related work at a site away from the office and electronically transferring the results to the office or another location. Although many jobs can be completely handled in this manner, telecommuting is most widely used to supplement normal office activities.

Spurred by the vast array of sophisticated new communications and computerized equipment, the business world is extending the communications networks of its automated offices to include the telecommuter.

As manufacturers enhance such features as memory, hard-disk storage, graphics displays, personal computer-based video teleconferencing and applications software, PCs are becoming increasingly valuable for remote work. Applications software can provide financial analysis as well as job- and industry-specific programs.

Small, portable PCs sporting a growing number of features are exerting a special influence on the growth of telecommuting. Because many models fit easily into a briefcase, people are able to leave noisy, congested city areas early to work at home in the evening. Portables also permit the occasional off-site worker to become accustomed to telecommuting.

Executives of banks, brokerage houses, insurance companies and similar service companies who must occasionally work at home often buy a computer to do so and then approach their companies to secure remittance for the purchase.

Modems with smarts

Communications software emerged as a response to the demand for easier networking with smarter modems. On-line data base, electronic mail and computer time-sharing sparked the need for rapid logons to multiple systems.

In the old days of dumb modems, one could spend the better part of an evening dialing the phone and going through all the logon names, passwords and commands only to discover that there was no new mail. Often, more than 100 keystrokes were needed to get through the telephone, the packet network, computer security and the special commands needed for each system.

Also driving the development of communications software was the integration of modems into personal computers. With internal modems, software was needed simply to locate the user's modem. But beyond that, communications software also allowed the user to convey special instructions to the modem and use the disk storage to save files and keystrokes, as well. Tasks that used to take up to 1,000 keystrokes can now be accomplished with only one.

There are also many communications software packages that will "fetch the newspaper" from different electronic mail systems and deposit responses.

On the growth path

Communications software has become highly sophisticated in a short amount of time, with feature-rich parameters for network dialing, waiting, dial-tone detection, delayed dialing (to save telephone charges and take advantage of late-night computer time-sharing discounts), off-line editing and the ability to design your own keywords.

Further development of communications software is headed in many directions, thus blurring the difference between local and remote computer systems. The creation of expert systems may automatically provide preprogrammed responses to certain types of messages and may blur the distinction as to who wrote the message.

At least one manufacturer is bringing together facsimile capability with scanning features and modems to solve many of the issues related to the types of documents that flow in and out of the office.

The next logical step for communications software packages will be the incorporation of artificial intelligence technology. The day may not be far off when software will not be used simply to connect users but to actually help them analyse their communications. ●

Cross is vice-president of Cross Information Co., a software development and research firm in Boulder, Colo. He is coauthor of *Telecommuting: The Future Technology of Work* with Marjorie B. Raizman.

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viable bandwagon than standards organizations that have no direct impact on the industry or the market.

Eastman Communications Co. (Eastcom), a wholly owned subsidiary of Rochester, N.Y.-based Eastman Kodak Co., has chosen the SNA route. Eastcom's software product Syncra links PCs, IBM's System/34, 36 and 38 and mainframes and Digital Equipment Corp.'s Microvax, VAX and PDPs. Its features are characteristic of software that is used for multivendor networking.

Syncra supports file compression and decompression to minimize file-transfer times. It is data transparent, so binary code or files using different character sets can all be transferred. Most important, Syncra can also pick up file transfers where it left off if a line failure interrupts transmission.

Protocol of one's own

As are an increasing number of communications packages that must deal with a wide range of architectures, Syncra is exclusively a file-transfer program. It does not offer features like terminal emulation. Also, like Relay Gold and the Simware line, Syncra uses a proprietary file-transfer protocol.

Ed Sterling, vice-president of U.S. operations at Simware, says his company's decision to use a proprietary protocol was made strictly out of technical necessity.

"We found that we had to make our own standards because we deal with ASCII characters," he says. IBM mainframes use EBCDIC, IBM's own standard character set. "There is no direction from IBM on what to do with micro-to-mainframe links.

"Microcom, Inc. published the Microcom Networking Protocol, which was really one of the first. Then came the Blast protocol [from Communications Research Group]," Sterling adds.

Renegades and establishment

Among these renegade protocols, the best known is Columbia University's Kermit. "It doesn't have a lot of business support because it comes from academia, but for occasional data transfer, Kermit is outstanding," Sterling says.

"We wrote our own protocols because we couldn't adapt something like Xmodem, and we needed something for linking to the IBM mainframe."

Xmodem was originally developed for asynchronous computers and so does not work well in IBM's synchronous half-duplex connections.

Spectrum Concepts, Inc. in New York hedged its bets even further. Its Xcom 6.2 software, an LU6.2-compatible file-transfer package, uses a serious standard. Xcom 6.2 currently supports IBM PCs, mainframes, System/34, 36 and 38 and DEC VAXs. Spectrum is likely to offer support for Wang Laboratories, Inc. and Data General Corp. products in the near future. Unlike LANs, the purpose of interconnecting these various machines is purely data transfer. Remote access and terminal emulation do not even enter the picture.

"We only address the bulk data-transfer market," says Joe Mohen an engineer at Spectrum. "Trying to address both the batch file-transfer and the terminal-emulation markets is a big mistake. Bulk transfer is 50% of the market and 10% of the complexity [of terminal emulation]."

> "TRYING to address both the batch file-transfer and the terminal-emulation markets is a big mistake. Bulk transfer is 50% of the market and 10% of the complexity."
>
> JOE MOHEN
> SPECTRUM CONCEPTS, INC.

Simware is also transforming itself into a file-transfer company. "The emulation business is becoming a hardware game," Sterling says. "Hardware protocol converters are cheap and reliable, and with IBM's entry into the market, we felt it was time to make a move."

These attitudes reflect important recent changes in the way mainframes are perceived strategically. Originally used as large host systems, mainframes lost their value as computers when minis and eventually PCs brought processing power closer to users. However, the PC did not replace the mainframe so much as the mainframe terminal. Other forces have been at work to keep mainframes around for a long time.

The changing mainframe

Now less useful as a processor, the mainframe is still the repository of years of corporate information buildup. Large data bases, as well as the applications that manipulate them, will remain tied to the mainframe for the near future.

Now that personal computers can handle multiple hard-disk storage devices with total capacities of up to 1G byte, some data bases can be moved. Certainly applications are more easily developed for PCs than for mainframes. But many large tasks will stay on the mainframe. It then

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needs to be accessed not as a host but as a [illegible]

When you say "resource," you are speaking the language of LANs, and many LAN vendors now offer micro-to-mainframe links. The LAN is to connectivity what the queen is to chess pieces; it is the most flexible tool for solving interoperability problems.

LAN gateway to the world

Developing a LAN gateway to a mainframe solves the problem of involving PCs in the unified-field theory of MIS. A representative and well-implemented line of gateway products is available from Dayton, Ohio-based Fox Research, Inc., maker of the 10-Net LAN. Fox's three-part offering consists of an SNA PC-to-mainframe link, an RS-232 serial or dial-up gateway and a software-only package that allows single PCs to dial into the RS-232 gateway without the need for a network interface card.

Fox's SNA gateway involves an IBM 3274 cluster-controller emulator card placed in a server machine and software, which must be installed on each PC requiring mainframe access. The system supports 32 logical units, allowing a maximum of 32 users to access the mainframe simultaneously. Each logical unit can support from one to four concurrent sessions with the mainframe.

The new generation of more capable mainframe gateways share a number of the following characteristics:

- They treat each link to the mainframe as a shared resource rather than as a dedicated connection. Unless an application requires users to be logged on to the mainframe at all times, the ability to reallocate logical units to a sort of free pool allows the gateway to support significantly more than 32 users in the real world.
- Most of these products cost about as much as the Fox gateway, which retails for $1,995. This price compares very favorably with that of an IBM 3270 terminal, which costs about $1,575, retail.
- Gateway products use an intelligent combination of hardware and software to provide a flexible solution. Once an SNA port is available on the network, a vendor can make other software available to exploit the port for other links, such as a PC-to-VAX link using LU6.2. An RS-232 LAN gateway allows distant network islands to be linked together by leased lines or dial-up connections. Such gateways require only software to handle the interface between the serial connection and the local-area network hardware.

The popularity of RS-232 gateways attests to the most important standard interface in the non-IBM world: the serial port. From Apple Computer, Inc.'s Apple II to the VAX 8600, asynchronous serial communications, while slow, is the cheapest, most popular way to move data between computers.

Asynchronous communications software, using serial connections, ties together everything from laptop computers to minicomputers to private branch data exchanges. The Unix operating system provides so many services oriented to serial connections that it almost seems to be a communications package with a built-in operating system.

RS-232 interfaces can also connect to the ever more popular packet-switched networks using the CCITT X.25 protocol. Packet assembly-disassembly (PAD) software, the key to transmitting data via X.25, is widely available for VAX computers. PC-based implementations cannot be far off. This will allow companies with disparate LANs to link them together using a combination of RS-232 gateways and nationwide X.25 PADs offered by value-added network vendors.

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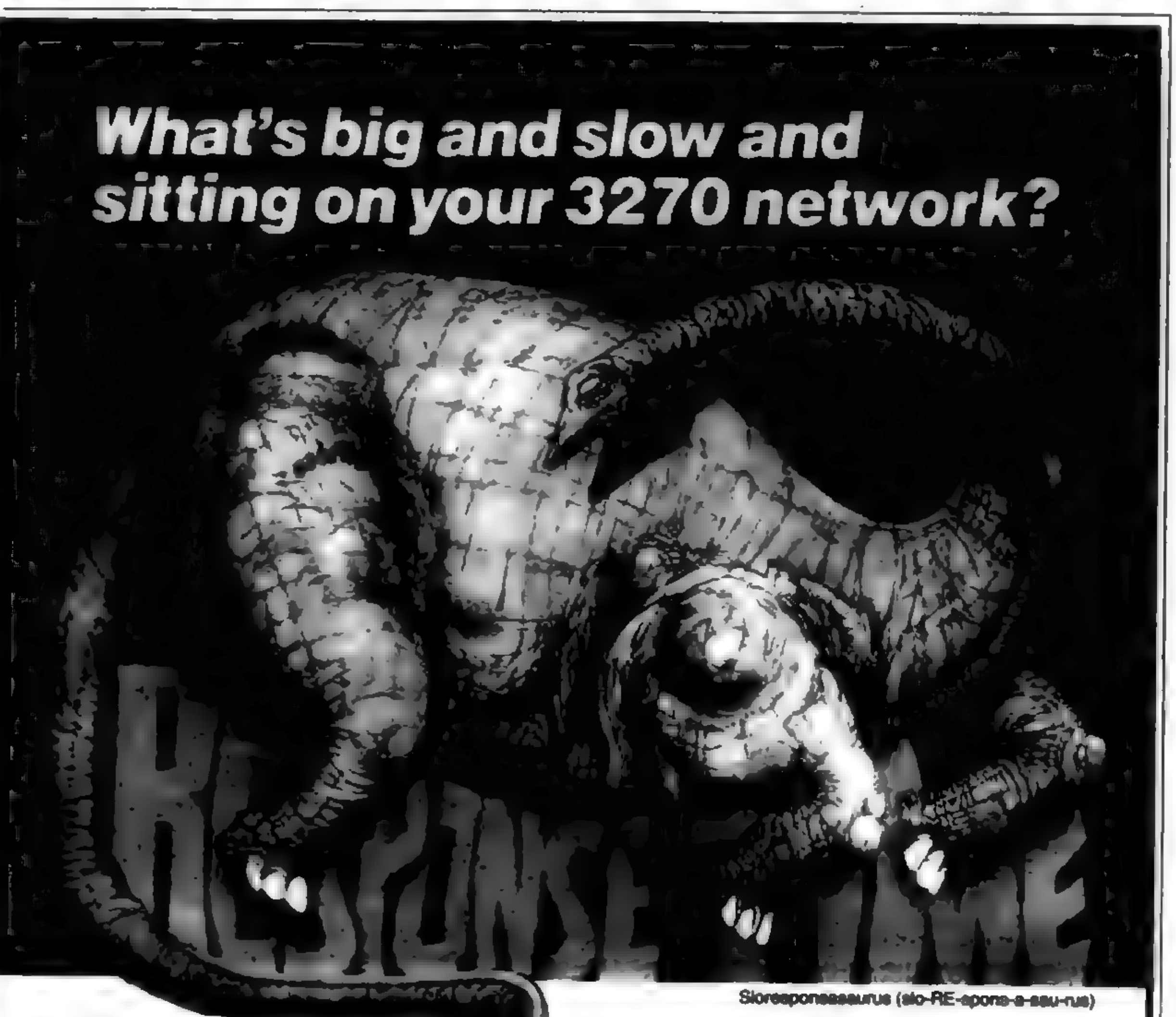
Overseas mail

One of the most taxing applications to keep within the constraints of standards is E-mail software. There are several levels at which compatibility must be guaranteed. For instance, message text must be converted to the proper character set and addressing conventions vary from system to system. The problems are compounded by store-and-forward requirements, since different systems use different file-storage formats.

Retix in Santa Monica, Calif., has been making headway with these problems. The company recently demonstrated a prototype E-mail system bridging the gap between the Document Interchange Architecture standard associated with SNA and the CCITT X.400 electronic messaging specification promoted by the ISO.

Retix does not produce applications per se but provides OSI standard functions and subroutines that can be used by software developers and an MIS staff in building their own programs.

Unfortunately, even forward-thinking companies like Retix may not be prepared for developments overseas. In Europe, E-mail is associated with videotex systems, particularly the tremendously successful Minitel network installed by the French Postal Telephone and Telegraph. Many major players in the U.S., including IBM and AT&T, have invested heavily in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videotex in the past — but to no avail.

Trials were announced with great hoopla, but most were considered failures. After years of skepticism, however, many vendors feel videotex may be making a comeback. In 1985, IBM joined forces with CBS, Inc. and Sears, Roebuck and Co. to form Trintex, a joint venture to produce a national system. CBS has dropped out of the project, but Trintex is still aiming for a 1988 announcement.

The approval of the North American Presentation Level Protocol Syntax, a text-and-graphics transmission and terminal behavior standard, has also encouraged many software vendors to enter the videotex game on an experimental basis. IBM's Videotex/370 Version 2 allows access to videotex systems using 3270 terminals.

AT&T offers the comprehensive Ariel 1500 system, which includes a videotex frame-creation system and networked terminals based on the AT&T 3B2 minicomputer.

Point-to-multipoint

An important — yet largely neglected — area of the communications software market is the subject of point-to-multipoint applications. A serious lack of standards in data acquisition as well as broadcast methods has left many users fending for themselves. Among those developing applications for PCs, the Greenleaf Software, Inc. communications subroutine library is very popular.

Users who need data acquisition and polling on the factory floor will find many applications based on the Manufacturing Automation Protocol (MAP) standard. However, the recently approved Version 3.0 of MAP lacks certain important interprocess communications features that make it less effective, slowing down its widespread acceptance.

Graphics will play an increasingly prominent role in future software development as computer graphics, particularly PC business graphics, grow in sophistication.

The arrival of the Integrated Services Digital Network, expected to go into operation in France in 1989 and to become available in the U.S. within five years, will provide the speed necessary to make regular graphics data communications feasible.

Ricoh Co., the West Caldwell, N.J.-based U.S. subsidiary of the Japanese facsimile manufacturer of the same name, will soon announce PC software that allows the package's users to compose text-and-graphics images by using existing word processors and paint programs and then send the composite documents across an X.25 network or dial-up lines using the CCITT-standard facsimile protocol. This software product represents one of the first attempts to apply the existing facsimile standards for image transmission to the realm of computer graphics.

As desktop publishing becomes more popular, more software will include the capability of merging text and graphics. Conventions for transmission of graphics will become a pressing problem in the near future.

Invisible resource

Where will all these wide-ranging developments lead? If the many new capabilities promised by developers of communications software are to be accepted, they must not require a massive reeducation of users or a complete rethinking of data communications strategies.

> THE MOVE AWAY FROM terminal-to-host concepts in software design will probably continue, making communications a feature of almost all applications rather than an application in its own right.

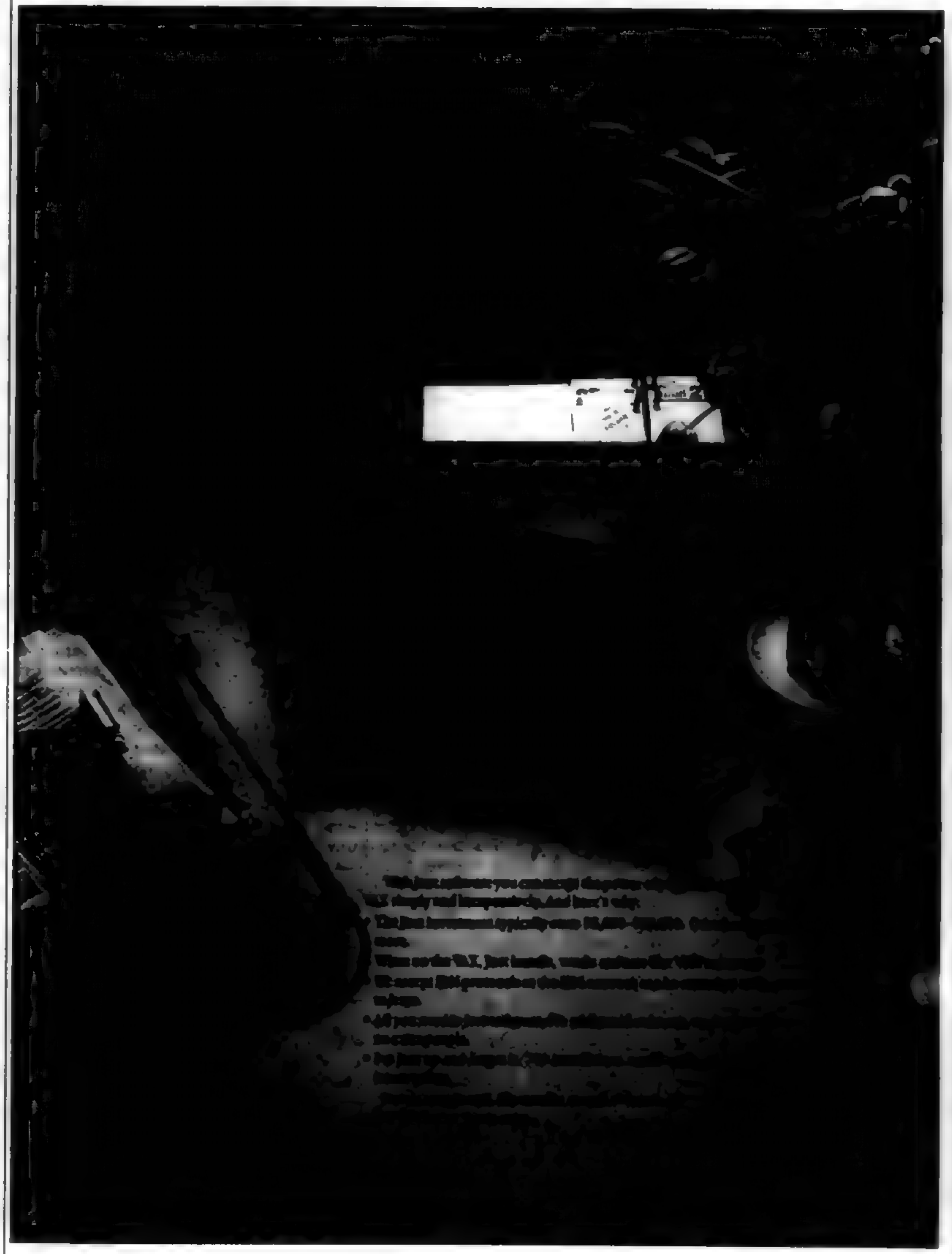
The move away from terminal-to-host concepts in software design will probably continue, making communications a feature of almost all applications rather than an application in its own right.

The transition from application to invisible resource requires communications programs to be easily customized and integrated into existing software environments.

Simware's Sterling says, "The watchword is API — applications programming interface. It is important for applications to have good APIs. Simware is scrambling to provide this. Most companies have developed in-house applications, and when you come in as a vendor, you're forcing the company to fit you in an environment where your product didn't exist before. People are not very cognizant of how communications work, but you still need procedures that are user-programmable."

The key word here is service. Users rightly perceive software not as a product but as a service. The evolution of videotex and on-line information services serve only to encourage this perception.

Why should the user have to distinguish between information on the LAN and the dial-up newswire? Ultimately, the arbitrary technical distinctions in the data stream serve to distract users. Transmitted data is a single information resource, and its classification and absorption take place not in the network — but in our minds. ●



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Westinghouse Management
Systems Software

Mark Potenzone is National Sales Manager for Westinghouse Management Systems Software. This group within Westinghouse markets IBM mainframe productivity enhancement software and operating systems software.

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INSIDE
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INTERVIEW

READYING A DIGITAL THRUST

The nature of data communications — what can be attempted and achieved between two computers — is changing, in large part because of changes in the public telephone network. In the next 10 years, U.S. telephone companies will be rebuilding the phone network top to bottom, at an estimated cost of more than $100 billion.

Bailey Geeslin, vice-president of network planning at Nynex Corp., spoke recently with Bruce Page, president of Magnetic Press, Inc., about Nynex's plans to become a diversified information carrier.

How much data is moving through the Nynex network, as compared with voice traffic?

We have no solid way of knowing the answer to that without listening to the lines, which we cannot do. Ten percent is the highest estimate we've made.

There are probably 250,000 modems connected to the Nynex network today; that number is doubling every two years. Still, out of our 10 million lines in service, that's not a very high percentage. My guess is that data takes up 5% or less on the public switched telephone network.

With leased lines, the figure is a bit higher. Overall, probably 10% of the traffic on conditioned lines is used for data. At the upper end of the market, our large customers use 15% of their leased-line capacity for digital data traffic.

What percent of your switching offices is digital?

Seventeen percent of the end offices today are digital; 50% will be in 1990. That number is deceivingly low, however, in terms of the impact digital is having on our network. For instance, anyone in New York or Boston who wants digital service can get it, whether or not he is served by a digital end office.

What are Nynex's plans for offering switched digital services?

In terms of digital services, Nynex currently has several. Digipath is our trade name for digital data service, and it comes in several speeds up to 56K bit/sec. Other digital nonswitched services include Nysernet, the New York State Educational Resource Network, which is a 1.5M bit/sec. network that ties together university computer centers throughout New York State.

We also offer switched 56K bit/sec. service and the Centrex-based Central Office local-area network [CO LAN] service, which supports data rates of up to 19.2K bit/sec. The CO LAN is used mostly for extending the reach of our customers' on-premises LANs.

Finally, we're introducing Infopath, our packet switching service, in New York and soon in Boston. Our customers will have access to packet facilities either by leased access or by modem — synchronous or asynchronous. We'll also offer dial-up access eventually for small business or residential access to the kinds of information resources only big companies currently use.

As more people begin to use data, traffic patterns on your network will change. What impact will more data have on your plans for building your network?

Nobody can predict what the future of data communications is going to be like. But we're doing two things at a fundamental level that will help us handle more data. The first is that we're putting in digital facilities whenever we replace equipment. Digital is more efficient and cheaper to operate, so eventually we'll have an all-digital network.

The second thing we're doing is pursuing the Integrated Services Digital Network [ISDN] concept through research and development projects. For example, we're testing an ISDN internally here at Nynex and will offer commercial ISDN service in the next couple of years. In fact, a lot of our services today are early ISDN services that will fall away as ISDN comes on-line.

What are your plans for packet switching?

Packet switching is a good solution for switching large amounts of "bursty" data — noncontinuous streams of data with relatively long periods of silence on the line. In traditional dial-up circuit-switched networks, the long holding times of data calls can make the network bog down. Packet switching handles these types of calls quite nicely.

With the increasing amount of fiber-optic cable in our network, we'll be less sensitive to traffic loads than ever before. We're finding fiber has almost limitless capacity, so once we've got the fiber in the ground, we can increase our capacity very easily. For example, Nynex is currently experimenting with sending up to a terabit per second over one fiber. One such fiber could carry all the telecom traffic in the U.S.

With all that capacity, the biggest question is where to apply it. That's why the big focus at Nynex now is on marketing.

What is Nynex doing to promote use of its network?

Right now we're focusing our R&D in several key areas in software, including artificial intelligence, expert systems and voice recognition. By doing fundamental research in these areas we mean to develop leading-edge information applications for the mass market. If the market for using digital data transmission is only the people who already use information systems, we'll have a very large amount of capacity on our hands and a very small market for it.

On the other hand, if we can make it easier for the common person to use computers and data communications, then we can expand the market for our services. For example, more people might use computers if they could talk to them. So we're working on voice-recognition systems. For instance, a computer-shy executive manager might make data base inquiries by simply asking for the figures.

Another use for our bandwidth might come from high-definition TV [HDTV]. The difference in picture quality is so great that we feel it will be a real driver for broadband telecommunications service. HDTV has 1,125 scan lines per raster vs. the 525 TV has today. The signal for HDTV is too broad to be broadcast over the airwaves. It probably takes a 150M bit/sec. channel to carry it. One day we may deliver television channels by fiber-optic cables to the home.

What other applications do you envision from the advanced network?

A certain amount of that is out of our hands. The Federal Communications Commission requires us to have an open network architecture that makes it easy for other companies to build their applications on. So we anticipate a number of novel services to be introduced by other companies.

Bailey Geeslin

ALAN WITSCHONKE

Nynex is also working with Citibank NA and RCA Corp. on an interactive home-shopping service that may build on the success of some of the home-shopping services offered on cable [television]. We're looking at freeze-frame video technology as one way to deliver shopping services more economically.

How do you prepare for the future when the applications are so uncertain?

You do it with an insecure feeling. Fortunately, we don't have to deploy equipment now for use in 1995. It isn't like building a major public works project where we have to break ground 10 years in advance. We still have time to experiment.

Still, we are doing the research into future applications of the network. Over the next couple of years, we'll probably push more optical fiber into the end loops that serve our customers. That fiber will give us the capability to offer broadband services for users and service vendors to experiment with. ●

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Sept. 14	DB2 Market	Aug. 28
Sept. 21	Hardware Roundup: Large & Medium Scale Systems	Sept. 4
Sept. 28	Hardware Roundup: Small Scale Systems	Sept. 11
Oct. 5	Hardware Roundup: Micros	Sept. 18
Oct. 12	Leasing & Used Equipment	Sept. 25
Oct. 19	Capacity Planning/ Performance Monitoring Software	Oct. 2

One man's exploits in PC data transfer

BY BERT GREEN

Communicating with a microcomputer should be as easy as using the telephone. After all, you use ordinary telephone lines for computer communications as well as familiar accessories like jacks and plugs. Unfortunately, though, the similarity stops there.

My background is in telephone communications, which only sketchily prepared me for dealing with the element that really makes the critical difference in computer communications — communications software. In previous employment, I rejected any contact with computers or terminals. Then I started a voice-communications consulting business. The secretarial service I used was reaping a windfall from me, so two-and-a-half years ago, I bought an AT&T 6300 Personal Computer.

I am now completely fascinated by microcomputers, but I am still learning about communicating with them. Learning to communicate with a computer can be a frustrating experience although, finally, a rewarding one.

Communications software has saved me time and money in sending and receiving telex and teletype messages and has greatly enhanced my ability to react swiftly to client needs for reports and documents.

The rewards continue as you successfully send and receive messages, transfer data information or connect to Readers Digest Association, Inc.'s The Source, Compuserv and other mainframe data bases. The software program you select is the key to how quickly and easily you actually get on-line.

In the public domain

Communications software comes from multiple sources. Some are public domain, such as shareware, which is freely distributed on bulletin boards but for which you pay support and documentation fees, and others come from software specialty companies. Prices range from $2 for packages in the public domain to several hundred dollars for other packages.

One of the better programs I have encountered is Procomm, a shareware product. Some patience is needed to learn to use Procomm, but it is capable of performing nearly any asynchronous communications task. This includes uploading, downloading, terminal emulation and the remotely controlling another PC across telephone circuits.

Different purposes

There are five communications programs loaded into my computer: PC Talk III and Procomm 2.4.1, Bitcom from Bitcom Communications and AT&T's Softcall and Mail Access I for electronic mail. Each serves a different purpose.

The Procomm and PC Talk III shareware programs were given to me, and I am not yet fully comfortable with them. I always use Bitcom when I call a bulletin board because it will grab everything that I send or receive with no effort.

Softcall's menus and function keys do nearly everything for you, including logging on and off. Although it lacks the complete functionality of Procomm, Softcall is a capable fast and easy-to-use program.

E-mail is available as a function of Compuserv, Source, Mail Access I or other common carriers. You can use a standard software package or buy those companies' specific software package. These are special programs that encourage you to use the service. I subscribe to all three services, but I get the most use from Mail Access I.

With Mail Access I, all you have to do is bring the program on-screen and then use function keys to send, receive, review, read or prepare to write a message. The Message Editor is an easy-to-use word processor and will handle up to 150 lines for each message.

Compuserve, Source, AT&T and other common carriers offering services that involve communications with a remote mainframe design their access schemes for ease of use. Digital Equipment Corp., Hewlett-Packard Co., Tandem Computers, Inc., AT&T and Unisys Corp., all of which have mainframes that operate in an asynchronous environment, are also easily accessible. The synchronous environment of IBM and Wang Laboratories, Inc. is another matter, however.

If you need to communicate with mainframes in the synchronous world, you face a more complicated process that involves two stages of software. This is an area in which you may benefit from the expertise of a value-added reseller. In general the best experts are other users and the best teacher is practice with actual calls.

Green is president of Green Consultants of Vero Beach, Inc., which provides voice and data communications consulting services.

The merging of DP and telecom is vital

Interconnect firms help to mediate

Data processing and telecommunications are like tides on either side of an ocean. Although the two technologies have merged considerably from a manufacturing point of view, they continue to be separate in the ways they manifest themselves to users.

Until local-area networks (LAN) appeared, companies almost always had completely different sources for their data processing and communications needs. AT&T bravely tried to buck this trend by introducing its own line of personal computers, but even its mighty voice could not carry in the din of competition. The connectivity deadlock will not be overcome, however, until the merging of processing and communications is understood as more than a marriage of convenience.

A step in the direction of solemnizing this union has been taken by some communications product vendors. These vendors, dismayed by the lack of communications and connectivity literacy exhibited by many PC dealers, have begun looking to telecommunications interconnect companies as an alternate distribution channel.

The interconnect method

That is the route chosen by Newbridge Communications Network Corp., an Ottawa-based manufacturer of small data communications switches. Company President Terry Matthews says Newbridge chose telephone interconnects — value-added resellers of telephone systems — as its distribution route for two reasons: "They sell to small users and departmental users and frequently go knocking on doors."

Newbridge's distribution strategy points up the way development has seesawed between computing and telecommunications since the invention of the telephone.

As Peter Huber says in "The Geodesic Network," his massive report on the U.S. telecommunications industry, "When switching is expensive and transmission is cheap, the efficient network looks like a pyramid. The system has comparatively few switches; it has many lines. By contrast, when switching is cheap and transmission expensive, the efficient network is a ring." Huber adds in a footnote, "This partly explains why AT&T is Pharaoh of the pyramid network while IBM is Lord of the Ring."

Currently, the data processing installations in most corporations resemble haystacks, in which connectivity is the needle. And that needle is going to remain elusive if MIS managers as well as vendors continue to pursue it in the same old places. Neither pyramid nor ring architectures can solve the conundrum of PC networking. Clearly, vendors must shift their approach from a technology-driven one to a solution strategy.

Limited imagination

Today, switching costs and transmission costs are roughly equivalent, which means the choices should be wide open in terms of connectivity options.

> "I'D HATE TO BE a buyer right now facing the incredible plethora of standards. Even the acronyms are getting difficult to understand."
>
> ROBERT MILLSTEIN
> VM PERSONAL COMPUTING, INC.

That they are not, as yet, is more a function of limitations in imagination than in information handling. Vendors will not experiment because they are wedded to the safety of historical precedent and proven engineering.

There is a lesson to be learned from the evolution of the telephone interconnect industry. The market for traditional office communications systems — key systems and private branch exchanges — has reached the top of its curve, as the PC market will shortly.

In the current phone system market, the major trend is basically to surround the phone systems, which have become commodity items, with gadgetry, most of which is PC-based.

PCs, which are also on the way to becoming commodities, are beginning to travel the same road. At first, the direction for add-ons was clear: to fill the expansion slots, offer more memory and greater display resolution and provide special features like voice recognition or additional ports.

The common weakness of all these first-generation enhancements is that while they all increase existing functionality, they add nothing to the PC's fundamental capabilities. LANs, gateways and micro-to-mainframe connections, on the other hand, truly change what users can do with their machines.

It is no longer enough, however, to look for solutions inherent in the technology. Strategies for connectivity must stem directly from the problems they are supposed to solve. Right now, the two dominant problems are compatibility and standards.

"Multivendor interoperability" is a term that slides off the tongue more easily than it is understood. When people consider compatibility, they are inclined to think about it as strictly a hardware problem; in fact, it is much more complicated than that.

Gabe d'Anunzio, vice-president of marketing at Micom Systems, Inc., says, "The operating systems of all the computers that might be connected are unable to understand one another. Existing applications don't know anything about the concept of distributed information. Even if MIS standardizes on something like Unix, it would help, but it wouldn't solve the problem."

In order to successfully connect all computers, MIS managers require a thoroughly new data processing environment. Patching the old cloth won't suffice. But this takes longer in computing than in any other evolutionary environment.

Finally, there is the issue of standards to contend with. Since IBM's seal of approval is no longer a guarantee of universal acceptance, a dangerous gridlock is developing in the promotion of standards.

"I'd hate to be a buyer right now facing the incredible plethora of standards," says Robert Millstein, president of VM Personal Computing, Inc., a Danbury, Conn., communications software development firm. "Even the acronyms are getting difficult to understand."

Vendors have responded to some market needs in recent years, and LANs have become more useful. In the process, the oldest connectivity problems of personal computing — simply connecting the printer to the right port, configuring the software and so on — have been, if not solved, at least tremendously simplified. It is for the sake of more of this kind of efficiency that MIS must actively promote connectivity in the office.

Two major connectivity challenges remain. We must learn to connect incompatible systems and develop formal methods to ensure standardization of software development. Only when these goals are achieved will we reap the connectivity's benefits.

DANIEL GROSS

AIDS research project buys critical time savings with communications package

BY BECKY BATCHA

Because of the special urgency that accompanies their work, the coordinators of a national Acquired Immune Deficiency Syndrome (AIDS) research project are especially grateful that packaged communications software exists. A commercial communications package saved them precious time during the start-up of a five-year, $100 million project to gauge the effectiveness of a variety of drugs in combating the AIDS virus.

The Research Triangle Institute (RTI), a nonprofit contract research organization in Research Park Triangle, N.C., was granted a government contract in October 1986 by the National Institute of Allergy and Infectious Disease to coordinate the data collection and analysis efforts of 19 AIDS treatment centers that would be conducting clinical trials for the project. Participating centers included facilities at Johns Hopkins University, Stanford University, Harvard University and the Memorial Sloan-Kettering Cancer Research Institute and other prestigious institutions nationwide.

The RTI crew had no time to lose in setting up its data gathering network, since the clinics would begin enrolling patients in February, just four months down the road.

"Usually, there is anywhere from six months to a year of preparation before a clinical trial actually goes to the field," says Dick Paddock, RTI's data communications specialist on the AIDS research project. "But we hit the ground running, and it was really difficult."

Programmers had to pull together a sophisticated set of data entry programs that would allow the 19 clinics to key pertinent data from clinical forms into on-site IBM Personal Computer ATs. They also needed to develop routines that would channel the collected raw data into clinical records on the project's host computer, a Digital Equipment Corp. VAX 8650 at RTI headquarters. In addition, they had to find a way for the VAX to poll the PCs remotely over standard dial-up telephone lines.

Development and customization of the data collection and processing components consumed more than 3,000 man-hours of work, according to Paddock. However, the packaged communications software RTI purchased to handle data transmissions, the Blast program from Communications Research Group, required only minor modifications before it was ready to roll. "I'm certainly glad something like Blast was available to handle that part of the problem so we could concentrate on other things," he says.

THE AIDS research project is RTI's first attempt at distributed data entry via phone lines. The standard method has been to gather paper clinical forms by mail and have the information keypunched.

Paddock spent only about 150 hours coding the Blast software to work as required. Most of his modifications, on both the personal computer end as well as the host end, consisted of writing scripts that either allowed the clinics' PC ATs to accept commands from the VAX at RTI headquarters or allowed the VAX to issue commands to the PCs. Paddock says his only other enhancements to Blast were accessory routines for the PCs, such as one that performs automatic backups.

The finished data collection arrangement for RTI's AIDS research project is a model of efficiency in data entry and transmission. It works as follows:

Everyday, employees at each of the clinics enter patient information into an AT. The proprietary RTI Data Entry Package presents an exact on-screen duplicate of the paper forms that clinicians fill out for their patients, making it easy for data entry clerks to transfer the information. "It displays the forms electronically on the screen, and they just fill in the blanks," Paddock says.

The data entry screens reflect the project's focus on drug treatment trials. Along with standard screens that mimic physical examination forms and follow-up exam forms, the software includes forms that record the administration of specific

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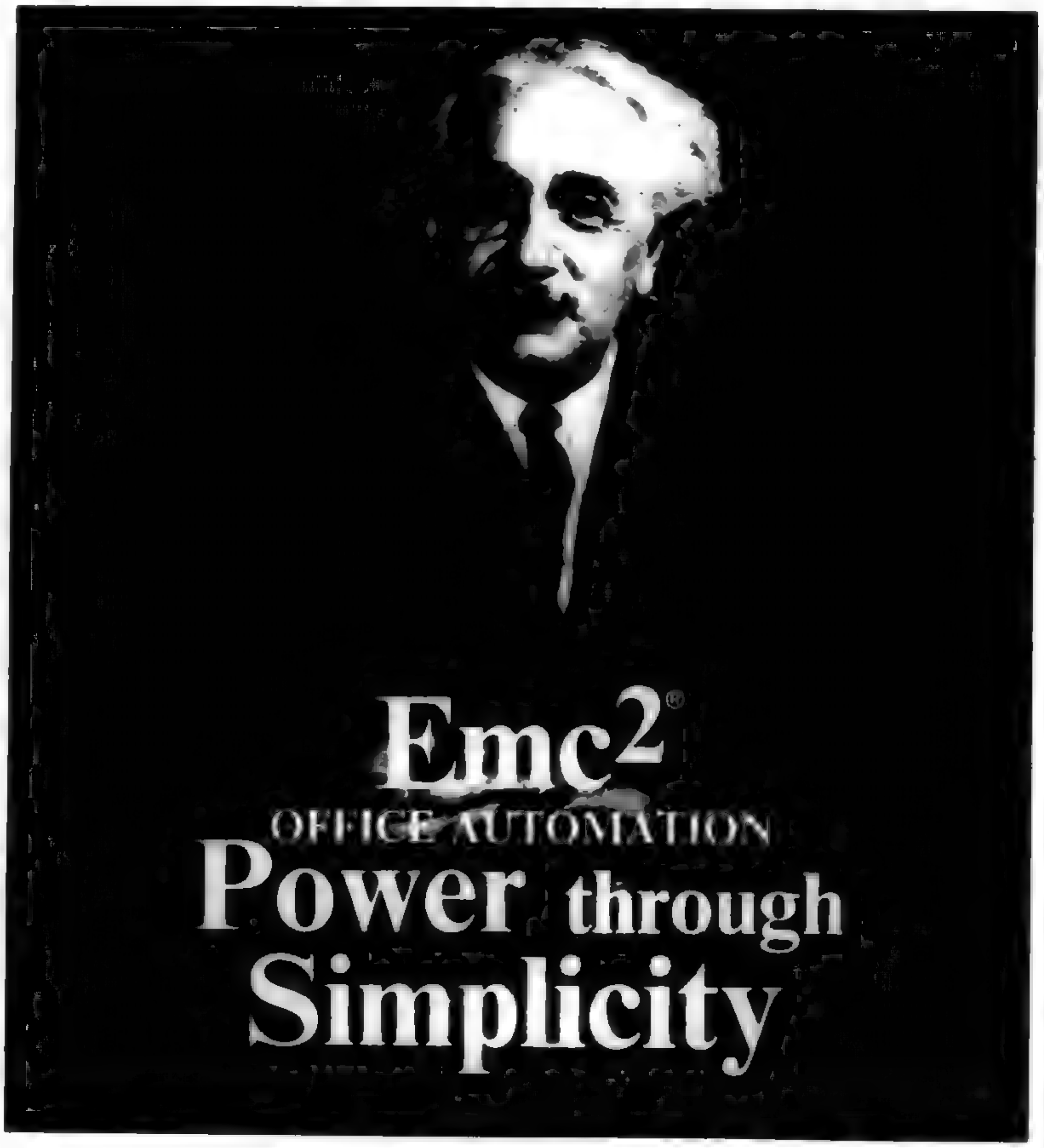
Batcha is a free-lance writer based in Boston.



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drugs, forms that report adverse or unusual reactions and so on.

As the data is entered, it is stored on disk for retrieval by the VAX at RTI headquarters. Every night, when they sign off of their PC ATs, the clerks initiate a set of batch transactions to prepare the machines for remote polling by the host. They need only type "goodnight" to start the processing. "We had to make it easy for them to remember," Paddock says.

The Blast package comes into play at this point. A copy of Blast runs on each of the clinical PCs and on the VAX 8650 at RTI, giving the machines a common protocol with which to communicate.

This ability is nothing unusual, Paddock points out, and can be attained with any number of software packages, two of them (Kermit and Xmodem) available free in the public domain. What attracted RTI to the Blast package in particular was its ability to operate in unattended batch mode on the VAX.

RTI wanted its host machine to poll the clinics' PCs late at night to take advantage of low phone rates. Blast was the only package RTI found that would work on its own, Paddock says.

Every night after midnight, the VAX at RTI dials the PC ATs and sends commands that call for the transfer of data from the remote locations. At the same time, the VAX sends any critical electronic mail messages or project documents that need to be forwarded to the remote sites and downloads any software updates.

Security measures

Its work completed, the VAX signs off, leaving a display on the PC screen that alerts clinicians to awaiting messages. A security measure that Paddock programmed into the Blast software then instructs the PC's modem not to answer the phone again that night.

Blast provides additional security through a two-way password scheme. The software requires the presentation of a password before any system can either send or receive clinical information.

Once the data arrives at the VAX, RTI's proprietary data management software, the Fully Integrated Control System (FICS), cleans up incoming data. The software also calls attention to critical incoming data and notifies the originating clinic of any missing information.

Data from the clinical trials then enters a master data base, where it is filed into separate queues for each of the 19 clinics. At this stage, any clinic can go through Blast to access information in the data base about its own AIDS treatment trials.

As clinical information passes into the master data base, RTI's FICS flags any instance in which a patient develops a bad reaction to a drug or shows any unexpected reaction, good or bad. Researchers are then immediately alerted to watch for similar reactions.

Paddock says the ability to generate an immediate alert is one of the biggest benefits of using an electronic data collection scheme. "The typical clinical trial is run on paper. You don't see results for a couple of months, and that's too long."

Paddock stresses the urgency attached to AIDS research. "There are lots of people out there dying," he says.

As a nonprofit contract research organization, RTI is currently conducting several hundred studies for the federal government, state and local governments and commercial clients. Its work includes studies on everything from the effectiveness of public education throughout the country to the use of diamonds as a substrate in semiconductor chips. The institute employs about 1,100 people, 900 of whom are researchers and scientists.

The AIDS research project is RTI's first attempt at distributed data entry via phone lines. The institute's standard method has been to gather paper clinical forms by mail and have the information keypunched at a central location.

However, the electronic data gathering and transmission have worked so well in the AIDS research project that, according to W. Kenneth Poole, vice-president in charge of statistical methodology and analysis, these methods will be used in future clinical trials of all sorts. ●

> "USUALLY, there is anywhere from six months to a year of preparation before a clinical trial actually goes to the field. But we hit the ground running, and it was really difficult."
>
> DICK PADDOCK
> RESEARCH TRIANGLE INSTITUTE

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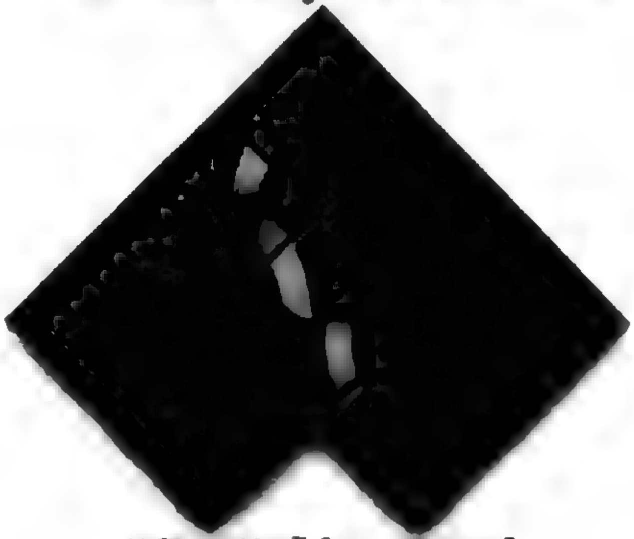

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Asynchronous PC communications software

COMPANY NAME	PRODUCT NAME	OPERATING SYSTEM SUPPORTED	HARDWARE SUPPORTED	MINIMUM MEMORY SUPPORTED (IN BYTES)	MAJOR FUNCTIONS	COMMUNICATIONS PROTOCOLS SUPPORTED	ERROR-CORRECTION PROTOCOLS SUPPORTED	INCLUDES AN APPLICATION PROGRAMMING INTERFACE	SUPPORTS MICROSOFT WINDOWS	PRICE
AT&T [illegible]	Remote File Sharing	Unix System V Release 3	Intel 80386- and Motorola 68020-based workstations	1M	Transparent sharing of files, printers, communications links, program-to-program communications	Ethernet, X.25	OSI transport service	Yes	NA	Contact vendor
Advanced Technology Center (213) 568-0119	Twisterm-05	MS-DOS, PC-DOS	IBM PC and compatibles	256K	Graphics support for CGA, EGA, text support, macro support, screen dumps, terminal reporting, Tektronix 4105 terminal support, mouse support	Kermit	—	Yes	Yes	$345
[illegible] Corp. [illegible] 732-[illegible]	Intellink	MS-DOS	IBM PC and compatibles	64K	Automatic logon, menu-driven	Xmodem	Xmodem	Yes	NA	[illegible]
	Intellink Plus	MS-DOS	IBM PC and compatibles, VT100 emulation	64K	Automatic logon, menu-driven	Xmodem	Xmodem	Yes	NA	[illegible]
Cambridge Computer Corp. (203) 288-6004	PC 73/78	MS-DOS, PC-DOS	IBM PC, XT, AT and compatibles, PS/2	256K	Emulates Honeywell VIP 7200, 7300, 7800 asynchronous terminals, provides support for eight asynchronous adapters on PS/2, script processing, print redirection, attended and unattended modes of operation	Kermit, Xmodem, Honeywell Kermit	Kermit, Xmodem	No	No	$295
Chi Corp. [illegible]	Chi DEC VT100 Emulator	MS-DOS	IBM PC, XT, AT and compatibles	256K	Full VT100 emulation, on-line Help functions, compatible with other Chi emulator products	Kermit, Xmodem, VT100 native emulation	Kermit, Xmodem	No	No	[illegible]
Coefficient Systems Corp. (212) 777-6707	Vterm Version III	Unix, VMS, RSX, RSTS	IBM PC and compatibles	256K	Terminal emulation of VT52, VT100, VT101, VT102, scroll-back buffer, save and recall, up to 80 scrolled-off screens	Kermit, ASCII, Xmodem, proprietary	CRC[1], Checksum	No	Yes	$195
	Vterm/220	Unix, VMS, RSX, RSTS	IBM PC and compatibles	320K	User-mappable keyboard, bundle with data-conversion program, a superset of Vterm III to include VT220 emulation	ASCII, Xmodem, Kermit, proprietary	CRC, Checksum	No	Yes	$245
	Vterm Version 4010	Unix, VMS, RSX, RSTS	IBM PC and compatibles	256K	Tektronix 4010 emulation, VT100 series mode for file transfer, supports a host of different plotters	ASCII, Xmodem, Kermit, proprietary	CRC, Checksum	No	Yes	$249
Communications Research Group (800) 24-BLAST	Blast	MS-DOS, Unix, Xenix, VMS, Primos, VS, CMS, MV, TSO, MPE, RTE	Micros, minis, mainframes with RS-232 ports	128K	Error-free peer-to-peer file transfer across different operating systems, script language to automate repetitive functions, automatically invokes transactions on unattended systems	Proprietary, Xmodem	Proprietary, Xmodem	Yes	Yes	[illegible] (depending on hardware)
Computer Vectors, Inc. (800) 262-RCOM	R Com2/PC	PC-DOS, MS-DOS	IBM PC, XT, AT and compatibles	256K	Terminal emulation, file-transfer protocols, automatic script processing and dialing, resident option	Xmodem, ASTP	Any	Yes	—	$69.95
Concept Omega Corp. (Thoroughbred Software division) [illegible]	Thoroughbred Link	PC-DOS, MS-DOS	IBM PC, XT, AT and compatibles, PS/2	256K	Terminal emulation, file transfer, autodialing into host system	—	NA	No	No	[illegible]
Connect Computer Co. (612) 944-0181	Connect	PC-DOS, MS-DOS	IBM PC, XT, AT and compatibles, PS/2	256K	Terminal emulation (VT100, IBM 3161), file transfer, automatic script processing and dialing, fully customizable, menu- or command-driven	Kermit, Xmodem	NA	Yes	No	$99
Convergent Technologies, Inc. [illegible]	PC Exchange	MS-DOS, Unix	IBM PC, XT, AT and compatibles, Unix System V Release 2 and compatibles	256K (PC), 1M (Unix)	Transparent access to network resources, large networks with many servers, ability to use multiple media	Proprietary	Proprietary	Yes	Yes	Contact vendor
Crosstalk Communications (a division of Digital Communications Associates, Inc.) (404) 998-3998	Crosstalk XVI	MS-DOS	IBM PC, XT, AT and compatibles	128K	Electronic mail, file transfer, terminal emulation, macro capability, capture-to-disk capabilities	Proprietary, Xmodem	Proprietary, Xmodem, Kermit	Yes	Yes	$195
	Crosstalk XVI (network version)	MS-DOS	IBM PC, XT, AT and compatibles	128K	Works with IBM Token-Ring, requires IBM asynchronous communications server, file transfer, terminal emulation	Proprietary, Xmodem	Proprietary, Xmodem, Kermit	Yes	Yes	$600
	Crosstalk Mk.4	MS-DOS	IBM PC, XT, AT and compatibles	256K	File transfer, terminal emulation, multiple sessions, macro capability, capture-to-disk capabilities	Proprietary, Xmodem, Ymodem	Proprietary, Kermit, Xmodem, X.PC, Compuserv B	Yes	Yes	$245

[1] Cyclical redundancy check

The companies included in this chart responded to a recent telephone survey conducted by *Computerworld*. Further product information is available from vendors.

COMPANY NAME	PRODUCT NAME	OPERATING SYSTEM SUPPORTED	HARDWARE SUPPORTED	MINIMUM MEMORY SUPPORTED (IN BYTES)	MAJOR FUNCTIONS	COMMUNICATIONS PROTOCOLS SUPPORTED	ERROR-CORRECTION PROTOCOLS SUPPORTED	INCLUDES AN APPLICATION PROGRAMMING INTERFACE	SUPPORTS MICROSOFT WINDOWS	PRICE
[illegible] Communications [illegible]	[illegible]	MS-DOS	IBM PC, XT, AT and compatibles	128K	Electronic mail, remote operation of another PC, file transfer, remote [illegible]	Proprietary, Xmodem	Proprietary, Xmodem	No	No	[illegible]
Datran Corp. (800) 332-0456	Turbocom	MS-DOS, PC-DOS	IBM PC, XT, AT and compatibles	—	Single-command-line file transfer, easy to use, increases bit/sec. rate of modems by four times	Proprietary	—	No	—	$95
[illegible], Inc. [illegible]	[illegible]	MS-DOS	IBM PC, XT, AT and compatibles	[illegible]	Emulates more than [illegible] different terminals, own programming language built in, extended applications program language, advanced keyboard macros	Proprietary, Xmodem	Proprietary, Xmodem	No	No	[illegible]
Diversified Computer Systems, Inc. (303) 447-9251	EM220	MS-DOS	IBM PC, XT, AT and compatibles, PS/2	128K	Modem dialer, Xmodem and Kermit file-transfer protocols, DOS hot key, hard-copy support, on-line Help	Xmodem, Kermit, ASCII	Xmodem, Kermit	—	Yes	$169
	EM4010	MS-DOS	IBM PC, XT, AT and compatibles, PS/2	256K	Modem dialer, Xmodem and Kermit file-transfer protocols, DOS hot key, hard-copy support, on-line Help	Xmodem, Kermit, ASCII	Xmodem, Kermit	—	Yes	$240
	EM4105	MS-DOS	IBM PC, XT, AT and compatibles, PS/2	350K	Modem dialer, Xmodem and Kermit file-transfer protocols, DOS hot key, hard-copy support, on-line Help	Xmodem, Kermit, ASCII	Xmodem, Kermit	—	Yes	$349
[illegible], Inc. (716) [illegible]	[illegible]	MS-DOS	IBM PC, XT, AT and compatibles	[illegible]	Uses Xmodem protocol, can write to all drives and subdirectories, various levels of security, sends and receives data files of any type	[illegible] supported by Hayes modem	Xmodem	No	No	[illegible]
	[illegible] Communications	CP/M	Kaypro 2, 4, 10, Osborne Executive, Osborne 1, Morrow MD2, Morrow MD3	64K	Uses Xmodem protocol, can write to all drives and subdirectories, various levels of security, sends and receives data files of any type	Xmodem	Xmodem	No	No	[illegible]
Dynamic Microprocessor Associates (212) 687-7115	Ascom IV	MS-DOS, PC-DOS	IBM PC, XT, AT and compatibles, PS/2	256K	File transfer, terminal emulation, script language, bulletin board/electronic mail, dial directory	Xmodem, Xmodem CRC, Kermit, CRLF, X-on/X-off, proprietary	Yes	Yes	—	$195
Eastman Communications Co. (an Eastman Kodak Co. company) [illegible]	PC Spans Software	MS-DOS, PC-DOS	IBM PC, XT, AT and compatibles	256K	File transfer with wide-area network including other PCs, micros, mainframes (each having a separate copy of Spans software installed)	Proprietary	Proprietary, CRC	No	NA	[illegible]
Five Paces Software, Inc. (404) 873-1096	Unilink	Unix, Xenix	IBM PC AT and compatibles	—	Xmodem file transfer, virtual terminal emulation of a variety of ASCII terminals with logging function	Xmodem	Xmodem	No	—	$200
GCE [illegible]	[illegible]	MS-DOS, CP/M	IBM PC and compatibles	[illegible]	File transfer, terminal emulation	Proprietary	Proprietary with CRC-16	No	No	[illegible]
Generic Computer Products, Inc. (906) 249-9801	F-Trans	CP/M-80, MS-DOS, PC-DOS	Any machine with an RS-232 serial port	64K, 128K	File transfer, multiple files per command using wild cards, 50 to 38.4K bit/sec.	Proprietary	Proprietary	No	No	$59.95
[illegible] Corp. (415) [illegible]	[illegible]	MS-DOS, PC-DOS, [illegible]	IBM PC, XT, AT and compatibles, Datapro 386, Intel microcomputer Series II, III, IV	[illegible]	File transfer between PCs and Intel development systems, support of development system software on PCs, board to run 8-bit software on PC	Proprietary	Proprietary	No	No	$1,[illegible]
	[illegible]	MS-DOS, PC-DOS, [illegible]	IBM PC, XT, AT and compatibles, Datapro 386, Intel microcomputer Series II, III, IV	64K	File transfer between PCs and Intel development systems, support of development system software on PCs, software support for running 16-bit development software on the PC	Proprietary	Proprietary	No	No	[illegible]
Gould, Inc. (617) 475-4700	Modbus II	MS-DOS	IBM PC, XT, AT and compatibles	640K	Peer-to-peer communications, high-speed data transfer, file transfer	Token-passing network	Yes	Yes	No	$1,000-$4,000
[illegible] Co. [illegible]	TGraf 05	MS-DOS	IBM PC, XT, AT and compatibles, PS/2	[illegible]	Tektronix 4105 emulator	Asynchronous, Xmodem, Kermit	NA	Yes	No	[illegible]
	TGraf 07	MS-DOS	IBM PC, XT, AT and compatibles, PS/2	[illegible]	Tektronix 4107 emulator	Asynchronous, Xmodem, Kermit	NA	Yes	No	[illegible]
	TGraf 15	MS-DOS	IBM PC, XT, AT and compatibles, PS/2	[illegible]	Tektronix 4115 emulator	Asynchronous, Xmodem, Kermit	NA	Yes	No	$1,[illegible]
Greenleaf Software, Inc. (800) 523-9830	Greenleaf Comm Library	MS-DOS, PC-DOS	IBM PC and compatibles	256K	Hayes modem functions, control break exit	X-on/X-off, Xmodem	Xmodem	Yes	Yes	$185
[illegible], Inc. [illegible]	[illegible]	MS-DOS, PC-DOS	IBM PC, XT, AT and compatibles, PS/2	64K	Hot key switches between terminal and word processor instantly, supports dial directory, electronic mail	Xmodem, Kermit, proprietary, X-on/X-off	Xmodem, Kermit, proprietary, X-on/X-off	Yes	Yes	[illegible]

COMPANY NAME	PRODUCT NAME	OPERATING SYSTEM SUPPORTED	HARDWARE SUPPORTED	MINIMUM MEMORY SUPPORTED (IN BYTES)	MAJOR FUNCTIONS	COMMUNICATIONS PROTOCOLS SUPPORTED	ERROR-CORRECTION PROTOCOLS SUPPORTED	INCLUDES AN APPLICATION PROGRAMMING INTERFACE	SUPPORTS MICROSOFT WINDOWS	PRICE
[illegible]	[illegible]	[illegible]	IBM PC, XT, AT and compatibles, [illegible]	64K	IBM 3101 emulation, hot key, background processing, works with any asynchronous device	Asynchronous	Asynchronous	Yes	—	[illegible]
Hayes Microcomputer Products, Inc. (404) 441-1617	Smartcom I	Apple DOS, Pascal CP/M, Pro DOS	Macintosh II series	64K to 128K (depending on hardware)	File transfer, Xmodem protocol, prints as you download or store to disk	Stop/Start, Hayes protocol, Xmodem	Xmodem, Hayes protocol	Yes	Yes	$119
	Smartcom II (for the Macintosh)	Macintosh operating system, PC-DOS	Macintosh, Mac Plus, Mac SE, Mac 512	128K, 512K (for interactive graphics)	File transfer, Xmodem protocol, prints as you download or store to disk	Sendline, X-on/X-off, Await Character Echo	Hayes, Xmodem Mac Binary, Xmodem Mac Terminal	Yes	—	$149
	Smartcom II (for the IBM PC)	MS-DOS, PC-DOS	IBM PC, XT, AT and compatibles, PS/2	192K	File transfer, automatic logon to data bases, terminal emulation, unattended operation	Sendline, Start/Stop	Hayes protocol, Xmodem, Xmodem-CRC	Yes	—	$149
	Smartcom III	MS-DOS, PC-DOS	IBM PC, XT, AT and compatibles, PS/2	512K (hard disk)	On-line editor, scripting language, multiple sessions	Sendline, Start/Stop	Xmodem, Xmodem-CRC, Kermit, Xmodem-1K, Ymodem, Ymodem-G	Yes	—	$249
Hewlett-Packard Call local HP office	HP AdvanceLink	MS-DOS	IBM PC and compatibles, HP Vectra, HP Touchscreen	[illegible]	Access to HP Personal Productivity, shared information, shared printing, central backup	[illegible]	—	No	Yes	[illegible]
	HP Serial Network	MS-DOS	IBM PC and compatibles, HP Vectra, HP Touchscreen	—	Remote, transparent access to shared disks and peripherals for MS-Net and HP Personal Productivity Center	HP TCP/IP	HP TCP/IP, CRC-16	No	Yes	[illegible]
Ideassociates, Inc. (800) 257-5027	Ideacom 5251/Share	SSP, CPF	IBM System/36, 38	128K	Allows up to four PCs to emulate IBM 5250-type terminals and printers, supports local and remote asynchronous communications	Twin-axial (5250 communication)	NA	Yes	No	$495
	Ideacom 5251/Gateway	SSP, CPF	IBM System/36, 38	128K	Allows PC to attach to LAN and communicate with System/36, 38	Twin-axial (5250 communications)	NA	Yes	No	$1,495
Information Technologies, Inc. [illegible]	[illegible]	MS-DOS, PC-DOS	IBM PC, XT, AT and compatibles	—	Peer-to-peer communications, VT100 emulation	Proprietary	CRC	No	No	[illegible]
	VT52/100	MS-DOS, PC-DOS	IBM PC, XT, AT and compatibles	—	Xmodem, Kermit, VT100 emulation, printer support	Xmodem, Kermit	—	No	No	[illegible]
Inner Loop Software (213) 822-2000	VDTE	PC-DOS	IBM PC, XT, AT and compatibles	256K	Emulates HP terminals	HP Blockmode (HP proprietary protocol)	NA	No	No	$200
	DLX	PC-DOS	IBM PC, XT, AT and compatibles	512K	Multiline bulletin board system	Xmodem, ASCII	Xmodem	No	No	$200
Interactive Systems Corp. [illegible]	[illegible]	MS-DOS, Unix	IBM PC, XT, AT and compatibles	64K	Emulates several different terminals, file transfer between Unix and PC-, MS-DOS, allows Unix system to control PC-, MS-DOS system	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Intercomputer Communications Corp. (513) 745-0500	ICC/ Intercom 102	MS-DOS, BTOS, CTOS	IBM PC, XT, AT and compatibles, Wang PC, Convergent Technologies computers	256K	Provides terminal emulation to Unysis mainframes	Poll/Select	Poll/Select	Yes	No	$295
	ICC/File Xpress	MS-DOS, BTOS, CTOS	IBM PC, XT, AT and compatibles, Wang PC, Convergent Technologies computers	512K	Advanced file transfer	Poll/Select	Poll/Select	Yes	No	$495
	ICC/ Intercom 500	MS-DOS, BTOS, CTOS	IBM PC, XT, AT and compatibles, Wang PC, Convergent Technologies computers	512K	Provides UTS 20/40 emulation	Poll/Select	Poll/Select	Yes	No	$295
	ICC/ Intercom 1500	MS-DOS, BTOS, CTOS	IBM PC, XT, AT and compatibles, Wang PC, Convergent Technologies computers	512K	Provides PT1500 emulation	Poll/Select	Poll/Select	Yes	No	$795
KEA Systems Ltd. [illegible]	[illegible]	MS-DOS, PC-DOS	IBM PC, XT, AT and compatibles	[illegible]	Emulation and communications, true double-high/double-wide characters, 132-column support, [illegible]	Kermit, Xmodem	X-on/X-off, ENQ/ACK	—	Yes	[illegible]
Metaresearch, Inc. (503) 228-5806	Griffin Terminal	Macintosh operating system	Macintosh	128K	Tektronix 4012 emulation, VT100 emulation	Xmodem, Tektronix 4012, VT100	Xmodem	No	No	$99
[illegible]	[illegible]	MS-DOS	IBM PC and compatibles	—	—	[illegible], ASCII, Xmodem	Xmodem	[illegible]	[illegible]	[illegible]
Micro Call Services (301) 776-5253	AM Call	CP/M, MS-DOS	IBM PC and compatibles, CP/M-based systems	64K or 512K	File transfer, terminal emulation	Xmodem, Mcall-T	Xmodem, Mcall-T	No	No	$100-$125
[illegible]	[illegible]	MS-DOS, PC-DOS	IBM PC, XT, AT and compatibles	[illegible]	[illegible] VT102, VT220 and IBM 3101, Televideo 910, 925, ADM 3A terminal emulation, can be preconfigured to automatically come up [illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Microft Labs, Inc. (904) 562-3930	Maxi-Mite	MS-DOS	IBM PC, XT, AT and compatibles	128K	Terminal emulation, file transfer	Kermit, Xmodem, Ymodem	Kermit, Xmodem, Ymodem	Yes	Yes	$49.95

COMPANY NAME	PRODUCT NAME	OPERATING SYSTEM SUPPORTED	HARDWARE SUPPORTED	MINIMUM MEMORY SUPPORTED (IN BYTES)	MAJOR FUNCTIONS	COMMUNICATIONS PROTOCOLS SUPPORTED	ERROR-CORRECTION PROTOCOLS SUPPORTED	INCLUDES AN APPLICATION PROGRAMMING INTERFACE	SUPPORTS MICROSOFT WINDOWS	PRICE
Microft Labs, Inc. (904) 563-3939	Mini-Mite Plus	MS-DOS	IBM PC, XT, AT and compatibles	128K	Terminal emulation of VT52, Televideo 925, Zentech ADM-3A, IBM 3101	Kermit, Xmodem, Ymodem	Kermit, Xmodem, Ymodem	Yes	Yes	$74.95
	Dyna-Mite	MS-DOS	IBM PC, XT, AT and compatibles	128K	12 emulations with Morse programming, encryption/decryption capability	Kermit, Xmodem, Ymodem, Zeta	Kermit, Xmodem, Ymodem	Yes	Yes	$99.95
	Krypto-Mite	MS-DOS	IBM PC, XT, AT and compatibles	128K	12 emulations with Morse programming, encryption/decryption capability, hardware board with DES encryption	Kermit, Xmodem, Ymodem, Zeta	Kermit, Xmodem, Ymodem	Yes	Yes	$249.95
Microsoft Corp. (206) 882-8088	Access	MS-DOS	IBM PC, XT, AT and compatibles	256K	Consistent menu structure, built-in interfaces to Dow Jones News Retrieval service, Compuserv, Newsnet, Official Airline Guide, MCI Mail, Easylink	Xmodem, X.PC	Xmodem, X.PC	Yes	No	$250
Palantir Software Co. (713) 955-8880	Intalk (for Microsoft Windows)	Microsoft Windows	IBM PC, XT, AT and compatibles	512K	Terminal emulation, file transfer, includes CCL script language, only communications package for Microsoft Windows, text editor	Kermit, Xmodem, Crosstalk, proprietary	Xmodem, Kermit	Yes	Yes	$195
	Intalk (for Macintosh)	Macintosh Operating System	Macintosh 512K, 512E, Mac Plus, Mac SE, Mac II	512K	High-speed modem, built-in editor, CCL script language, terminal emulation, file transfer	Mac Binary, Xmodem, Crosstalk, Yterm, Connect	Mac Binary, Xmodem, Crosstalk, Yterm, Connect	Yes	No	$195
Persoft, Inc. (608) 273-6000	Smartmove	MS-DOS	IBM PC, XT, AT and compatibles	320K	Precise VT100 emulation, full European keyboard and character support, advanced soft-key language, dialing directory	Kermit, Xmodem	Kermit, Xmodem	—	No	$149
	Smarterm 400	MS-DOS	IBM PC, XT, AT and compatibles	192K	Precise emulation of Dasher text terminals, smart soft keys	Xmodem, proprietary	Xmodem	—	No	$149
	Smarterm 4014	MS-DOS	IBM PC, XT, AT and compatibles	384K	Precise emulation of Tektronix 4014 graphics terminal, VT100, VT102, VT52 emulation	Xmodem, PDIP	Xmodem	—	No	$225
	Smarterm 220	MS-DOS	IBM PC, XT, AT and compatibles	384K	Precise emulation of VT220, VT100, VT102, VT52 terminals, true double-high/double-wide characters, split-screen capability	Kermit, Xmodem PDIP	Xmodem, Kermit	—	No	$195
	Smarterm 240	MS-DOS	IBM PC, XT, AT and compatibles	512K	Emulation of VT241 color graphics terminal, VT240, Tektronix 4014 monochrome graphics terminal, all DEC text terminals	Kermit, Xmodem PDIP	Xmodem, Kermit	—	No	$345
Polygon, Inc. (314) 576-7709	Poly-Com/220	MS-DOS, PC-DOS	IBM PC, XT, AT and compatibles	256K	Terminal emulation, file transfer	Proprietary	Proprietary, CRC	No	No	$300
	Poly-Com/240	MS-DOS, PC-DOS	IBM PC, XT, AT and compatibles	256K	Terminal emulation, file transfer, DEC graphics emulator	Proprietary	Proprietary, CRC	No	No	$300
	Poly-Star/220	MS-DOS, PC-DOS	IBM PC, XT, AT and compatibles	384K	Terminal emulation, file transfer, script language, remote-control features, multinational/international keyboard support, soft remappable keyboard	Proprietary	Proprietary	No	No	$300
	Poly-Star/240	MS-DOS, PC-DOS	IBM PC, XT, AT and compatibles	512K	Terminal emulation, file transfer, script language, remote-control features, multinational/international keyboard support, soft remappable keyboard, DEC graphics emulator	Proprietary	Proprietary	No	No	$300
Prime Computer, Inc. (617) 655-8000	Primelink	MS-DOS	IBM PC, XT, AT and compatibles, 50 series systems, Macintosh, Data Access	512K	Allows Lotus spreadsheet users to extract data, direct access to data base, seamless integration with Prime systems, full PT200 terminal emulation, ability to transmit several files in a batch, easy to use	Hayes modem, RS-232	Yes	No	No	Contact vendor
	PC Interface	MS-DOS	Prime EXL 316, IBM PC XT, AT and compatibles	128K	Allows PC user to initiate Unix programs directly from PC-, MS-DOS prompt, seamless integration with Prime system and PC environment, virtual file system, virtual print, file transfer, terminal emulation	Ethernet, RS-232	Yes	Yes	Yes	Contact vendor
Rabbit Software Corp. (215) 647-0440	PC Async 300	MS-DOS	IBM PC, XT, AT and compatibles	28K	Allows asynchronous terminal connection to PC for IBM communications	Coaxial IBM 3270, SDLC 3270	NA	Yes	No, proprietary windows	Contact vendor

COMPANY NAME	PRODUCT NAME	OPERATING SYSTEM SUPPORTED	HARDWARE SUPPORTED	MINIMUM MEMORY SUPPORTED (IN BYTES)	MAJOR FUNCTIONS	COMMUNICATIONS PROTOCOLS SUPPORTED	ERROR-CORRECTION PROTOCOLS SUPPORTED	INCLUDES AN APPLICATION PROGRAMMING INTERFACE	SUPPORTS MICROSOFT WINDOWS	PRICE
[illegible] Corp. (313) [illegible]	Synchrony, Synchrony utilities	MS-DOS, Unix	IBM PC and compatibles, 40 different Unix systems	192K	Terminal emulation, file transfer, keyboard macros, Unix-oriented interface	None	Xmodem	Yes	No	[illegible]
Simware, Inc. (800) 267-9991	SIMPC	MS-DOS	IBM PC, XT, AT and compatibles, DG laptops, HP laptops	225K	Command language so the product can be completely customized, sophisticated paneling system for accessing other CPUs, PC-, MS-DOS hot key support, background file-transfer support, statistical information on file transfer	Kermit, Xmodem, VT100, Teletype, IBM 3270 emulation	Kermit, Xmodem, proprietary	Yes	—	$250
Softklone Distributing Corp. (904) 878-8564	Mirror 2	MS-DOS 2.0 and higher	IBM PC and compatibles	192K	Crosstalk compatible, background communications, autolearn mode, on-line Help, integrated text editor	Xmodem, Ymodem, Hayes, Crosstalk	Xmodem and Ymodem with CRC option	No	Yes	[illegible]
Sourceview Software International (800) 662-2860	The Executive	MS-DOS	IBM PC, XT, AT and compatibles	128K	Integrated desktop productivity package, communications software, supports transfer of source and object code	Kermit, Xmodem, Checksum	Kermit, Xmodem, Checksum	Yes	No, proprietary	$199.95
	Commstar	MS-DOS	IBM PC, XT, AT and compatibles	128K	Full, customizable bulletin board and message center, support transfer of source and object code	Kermit, Xmodem, Checksum	Kermit, Xmodem, Checksum	Yes	No, proprietary	$199.95
Systems Interface, Inc. (613) 230-4103	StepIV	MS-DOS, MPE	IBM PC, XT, AT and compatibles, Motorola Series 4000, 5000	75K	File transfer between PCs and Motorola systems, turns PC into a Motorola screen	Proprietary	NA	No	No	Contact vendor
Telexpress, Inc. (609) 877-4900	Teleterm EM	MS-DOS	IBM PC, XT, AT and compatibles	256K	Terminal emulation, file transfer, unattended operation, autodial/autologon, character translation, transparent printing	Asynchronous	Proprietary, Xmodem, Kermit	Yes	No	$95
	Teleterm EM 4425	MS-DOS	IBM PC, XT, AT and compatibles	256K	Terminal emulation, file transfer, unattended operation, autodial/autologon, character translation, transparent printing	Asynchronous	Proprietary, Xmodem, Kermit, upload/download	No	No	$150
	Teleterm X	Xenix, Unix	IBM PC AT and compatibles	512K	Teletype, file upload/download, unattended operation, autodial/autologon, character translation	Asynchronous	Proprietary, Xmodem	Yes	No	$295
Tymnet, McDonnell Douglas Network Systems Co. (800) 872-7654	[illegible] 3270	MS-DOS	IBM PC, XT and compatibles	192K	Designed for use with Tymnet's asynchronous-to-3270 service, supports 25th status line, keyboard mapped to emulate 3270 keyboard, X.PC error protection, soft keys	Asynchronous	X.25	No	No	$175
Unisys Corp. (215) 542-2240	PCU	MS-DOS	IBM PC, XT, AT and compatibles	256K	Provides an asynchronous link to Unix-based host systems	VT100, VT200 emulation	NA	Yes	Yes	$175
	PCworks	MS-DOS	IBM PC, XT, AT and compatibles	256K	Provides link to Unix-based host systems	VT100, VT200 emulation	NA	Yes	Yes	$195
	Infoview	MS-DOS	IBM PC, XT, AT and compatibles	256K	Provides Unisys host environment that uses PC as a workstation, works with Unisys A, V series	VT100, VT200 emulation	NA	Yes	Yes	$199
VM Personal Computing, Inc. (800) 84-RELAY	Relay Gold, Relay Silver	MS-DOS, PC-DOS	IBM PC, XT, AT and compatibles, HP 150, Wang PC	192K	Transfers any file, size checking, data compression	Proprietary, Xmodem, Kermit	CRC, Checksum	Yes	No	$150-$250
Virtual Microsystems, Inc. (415) 841-9594	V-Drive	MS-DOS, PC-DOS	IBM PC, XT, AT and compatibles, PS/2	640K	File transfer, terminal emulation, virtual disks	Proprietary	Proprietary	No	No	$2,000-$3,000 (for host price)
Western Wares, Inc. (303) 327-4898	[illegible] Plus	MS-DOS, CP/M, ISIS-II	IBM PC, XT, AT and compatibles, all CP/M systems, all Intel MDS systems	256K	Wildcard Xmodem file transfer, text collection and editing, Hayes modem supported	Xmodem	Xmodem-CRC	No	No	[illegible]
White Pine Software, Inc. (603) 886-9050	Vmac	VMS	DEC VAX	1M	Xmodem and Mac binary, bidirectional conversion between Mac and VMS text files, displays files in directory format using Finder information	Xmodem, Mac binary	Xmodem	No	No	$399-$999
Wolf Software Systems, Inc. (818) 703-8112	Move-It	PC-DOS, MS-DOS, Concurrent DOS	IBM PC and compatibles, most others	128K	Transfers all files, automatic file compression, remote-control functions, scripting system, multiple protocols	X-on/X-off, Wait After Character, Wait After Line	Proprietary, Xmodem with CRC and Checksum	Yes	Yes	[illegible]
Wordcraft (415) 534-2212	The Micro Link II	PC-DOS, CP/M	IBM PC and compatibles, Kaypro	64K	Teletype, keyboard, all types of data files	Xmodem with CRC option	Xmodem with CRC options	No	No	$99
Workstation Products & Services (312) [illegible]	WPSynch	MS-DOS, CP/M, Netware	IBM PC, XT, AT and compatibles	256K	Hooks up to any systems, sends and receives files, works on any type of editing system	Kermit, Xmodem	MNP, proprietary	No	No	$250

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HARD TALK

James Connolly

RISC goes for broke

The technology known as reduced instruction set computing (RISC) is entering a crucial phase in its young but controversial life.

Heralded during the 1970s as an architecture of the future, RISC has been battered by its critics, particularly with claims that it cannot be adequately adapted for commercial computing. Those critics have maintained that it might be nice to reduce the number of instructions used in a CPU — for example, cutting the number of instructions in half, to fewer than 150 — but that there is little benefit if instructions cannot be executed in one cycle or if the machines will not run commercial code such as Cobol.

RISC is now ready to be tested on two fronts. On the technical computing side, where RISC's greatest benefits have been predicted, a second generation of RISC systems is hitting the market. The 10 million instructions per second workstations now being introduced by vendors such as Sun

Continued on page 44

Amdahl widens storage options

High-speed channel arrives; disk-cache feature quadrupled in size

BY JAMES CONNOLLY
CW STAFF

SUNNYVALE, Calif. — Amdahl Corp., which leapfrogged IBM with the announcement of a 4.5M byte/sec. channel feature in September 1986, last week said those high-speed channels are now available and that the company has quadrupled the size of its disk-cache feature.

In addition, the IBM plug-compatible vendor reported that its High Speed Channel Feature (HSCF) can now be used with cache controllers to improve disk performance by as much as 80%.

The HSCF was originally introduced for use with Amdahl's 580 series mainframes and 6680 electronic direct-access storage device, which is a 512M-byte solid-state storage subsystem.

The 4.5M byte/sec. channel speed represents a 50% gain when compared with the 3M byte/sec. channel speed available on most existing IBM and IBM-compatible mainframes.

Twelve times faster?

Amdahl claimed that the combination of a 6680 and HSCF can provide a twelvefold improvement in I/O response time compared with conventional disk drives.

When Amdahl announced the HSCF for the 6680, analysts predicted that IBM's introduction of 4.5M or 6M byte/sec. channels and the disk drives that could handle the increased throughput was imminent.

IBM has yet to announce such products, although Amdahl's plug-compatible manufacturer rival, National Advanced Systems Corp., announced in March a cartridge tape drive that supports 6M byte/sec. channels.

Refreshed memory

Amdahl increased the maximum cache-memory size for its 6880 controller from 32M to 128M bytes through the use of 1M-bit dynamic random-access memory chips.

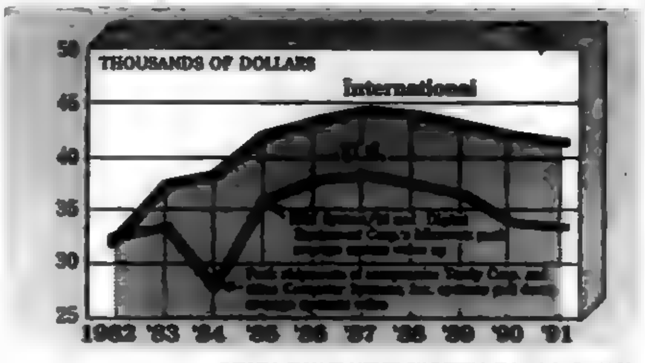
The HSCF costs $20,000 per 6680 or cache device. Amdahl said the feature will be available for cache devices in September.

The 6880 cache capacity will be increased to 48M and 64M bytes in September and then to 96M and 128M bytes during the first quarter of 1988, the vendor said. The purchase price of 64M bytes of cache is $306,900.

Data View

Small-scale systems

Trends in average system value



INFORMATION PROVIDED BY INTERNATIONAL DATA CORP.
CW CHART

Publishing line edited

BY STANLEY GIBSON
CW STAFF

STAMFORD, Conn. — Building on its XPS 701 electronic publishing system, Xerox Corp. recently announced a series of products designed to create a corporatewide publishing system.

A key new product, the Xerox 7650 Pro Imager, is a photo-

Continued on page 45

Optical VAX drive debuts

BY STANLEY GIBSON
CW STAFF

HOPKINTON, Mass. — EMC Corp. recently announced an optical-disk subsystem for all Digital Equipment Corp. VAX systems. The Archeion subsystem, which offers 56G bytes of storage, can be connected to a VAX with no hardware or software changes, the vendor said.

The Archeion attaches to the computer using a Pertec Computer Corp. interface, which assures compatibility with VAX hardware and software, according to Kevin Fitzgerald, product manager at EMC. A user views the subsystem as a configuration of from one to eight logical DEC TU series tape drives and can address it with standard tape commands, Fitzgerald said.

The Archeion supports three modes of data transfer: between computer and optical disk; between computer and tape drives;

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Inside

• EMC introduces disk subsystem for Prime systems. Page 44.
• HP develops high-capacity Winchester drives. Page 45.
• Raster Technologies announces color graphics subsystem for two-dimensional applications. Page 46.

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HARDWARE NOTES

Intel inks OEM deals; CDC pegs lottery

Intel Corp.'s Systems Interconnect Operation reported that it recently installed six of its **Fastpath** control units in Fortune 500 data centers to establish connections between IBM mainframes and other hosts, such as Digital Equipment Corp. VAX minicomputers. New customers include Eastman Kodak Co. and McDonnell Douglas Corp.

Intel also signed Fastpath-related OEM agreements it said would be worth $3 million during the next 18 months. **Unisoft Corp.** reportedly will add its terminal control and connectivity products to Fastpath for Unix-based Amdahl Corp. and IBM hosts. **Advanced Computer Communications** said it plans to develop driver software to allow operation of a Fastpath controller with its Acces/MVS software, which connects IBM mainframes and other nodes on Transmission Control Protocol/Internet Protocol-based networks.

Control Data Corp. is gambling on expanding one of its niches — the lottery market — with its 4-month-old Cyber 180 Model 930 departmental system. CDC, which announced the Model 930 in March, reintroduced the superminicomputer last month at the North American Association of State and Provincial Lotteries convention in Montreal. CDC already has six statewide lottery networks in place and said it wants to use the Model 930 to expand those networks.

Large computer sites continue to be the most dependent on uninterruptible power supplies (UPS), according to a recent survey by **Computer Intelligence**, a market research firm based in La Jolla, Calif.

The research firm found that 18% of all UPS sites have computers and disk drives that consume more than 100 kVA of power. However, the survey also found a high percentage (29%) of power-conditioning systems were at sites in the 1- to 3-kVA range. In looking at acquisition plans, Computer Intelligence concluded that low demand for UPS systems at large sites indicated a saturation at the high level and that power-conditioning systems will remain popular at the low end.

National Advanced Systems Corp. (NAS) has extended a 1986 development grant under which **Iowa State University** is converting its mathematics library for use on NAS's vector-processing facility-equipped mainframes. The latest

Prime users get faster EMC drive

HOPKINTON, Mass. — EMC Corp. recently brought out the 6000XL-1 disk subsystem for Prime Computer, Inc. systems.

The new drive boosts performance by up to 30% over EMC's previous offering, according to the vendor.

Part of what is planned to be a family of 6000XL drives, the 6000XL-1 features 800M-byte disks that are half as wide as conventional 315M-byte drives. A single subsystem can support up to 3.2G bytes of storage and up to 4.8G bytes can be configured in a cabinet, EMC said.

The 6000XL-1's average access time is 15 msec, and its transfer rate is 2.46M bit/sec., which makes it the fastest subsystem available for Prime users, EMC claimed.

Now shipping, the 6000XL-1 is priced at $23,500 for the subsystem and $15,500 for each additional drive.

RISC

CONTINUED FROM PAGE 43

Microsystems, Inc., Prime Computer, Inc. and Silicon Graphics, Inc. offer several times the performance of earlier products like the IBM RT Personal Computer. Such performance moves RISC-based workstations out of the curiosity stage.

But even more significant is the scheduled delivery of the first Hewlett-Packard Co. HP 3000 Model 930 systems this month. HP, which announced the Spectrum family in February 1986, was the first major data processing vendor to commit its future to RISC. HP deliveries will mark the start of RISC's trial by fire in the commercial marketplace rather than at carefully monitored HP test sites or in the limited installed base of vendors such as Pyramid Technology Corp. and Ridge Computers.

HP officials have acknowledged that they gambled a bit when they committed to RISC, and analysts have noted that the company's future as a computer vendor is largely tied to Spectrum's success. But it also may be that RISC, as a concept, has more at stake than HP itself. One has to wonder if anyone else will commit to RISC if Spectrum fails.

Connolly is *Computerworld's* senior editor, systems & peripherals.

[redacted]

$870,000 grant is an extension of a $130,000 award made last year.

The growth of the parallel processing market has spawned a series of **consultant newsletters** focusing on those systems. One of the latest is "The Serlin Report on Parallel Processing," published monthly by Omri Serlin, owner of Itom International Co. in Los Altos, Calif. The newsletter is priced at $495 per year.

Research group **Datek Information Services** in Waltham, Mass., reported that few of the printers sold in the booming laser printer market are purchased as add-ons to existing systems.

Instead, the printers, which cost an average of $3,660, tend to be just part of a $14,404 transaction that includes a computer, terminals, other printers and software.

Digital Equipment Corp. has announced a series of contract awards, including a $114 million U.S. Air Force pact for computer systems to be used in research and development of air defense systems. That contract is separate from an Air Force request for proposal on which DEC recently filed a protest against the requirement of AT&T Unix System V for administrative systems.

DEC also announced a $4.75 million contract to supply United Press International, Inc. (UPI) with systems to support business operations and UPI's news network.

HP broadens OEM drive line

PALO ALTO, Calif. — Hewlett-Packard Co. recently introduced two high-capacity 5¼-in. Winchester disk drives for the OEM marketplace.

The announcement is the latest in a series of OEM disk drive announcements by the company. Since last year, Hewlett-Packard has offered two other disk drives to the OEM market.

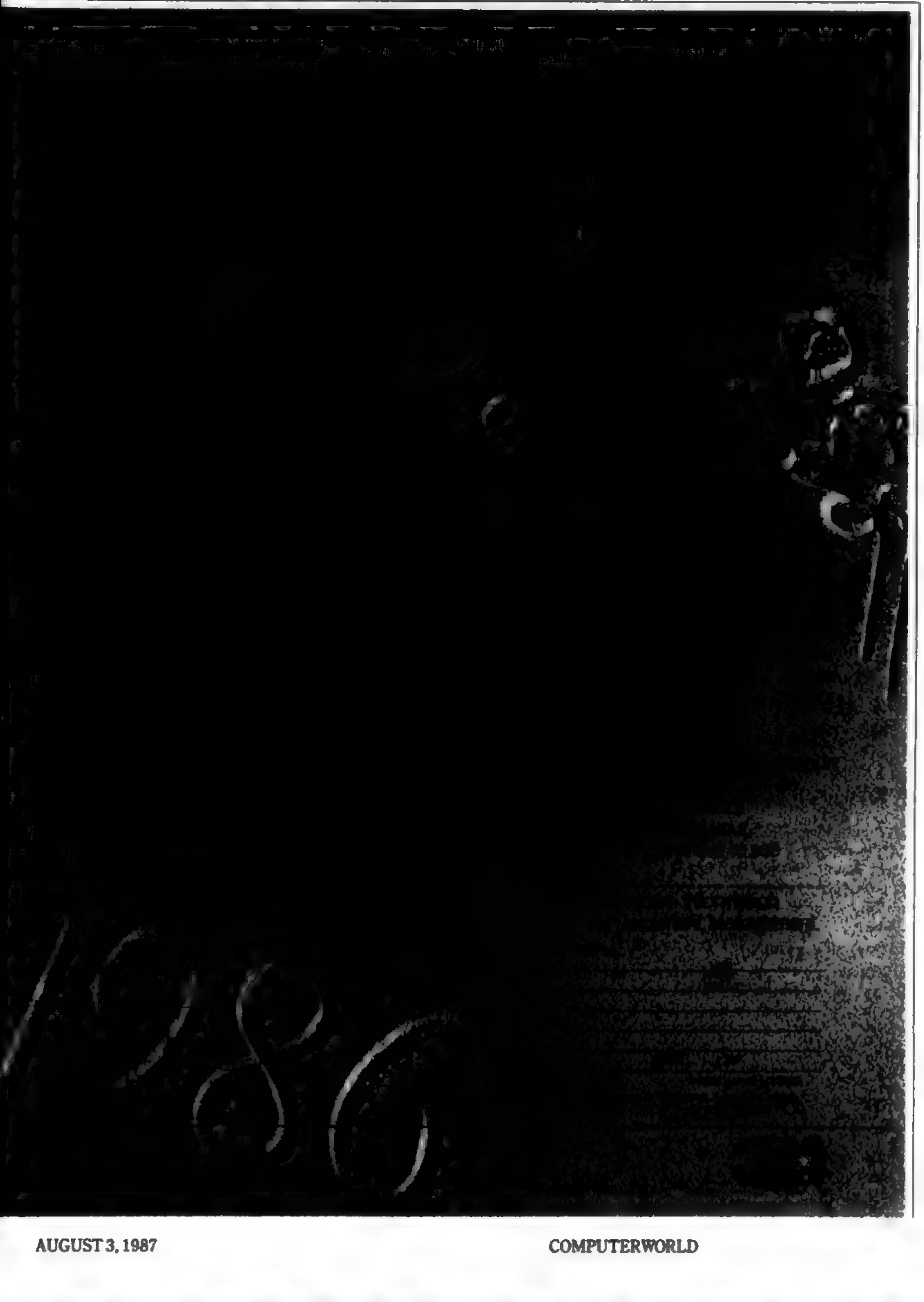
In July 1986, the company announced the HP 97501B, a 3½-in. drive with a 28M-byte capacity.

Shortly thereafter came the HP 7937S, an 8-in. disk subsystem with 715M bytes of storage.

HP currently has more than 10 contracts signed for the 3½-in. drive, a spokesman said. The company just signed a "very large" contract for the 8-in. drive and expects to have two more signed by the end of this month, according to the spokesman.

The HP 97530E and HP 97530S are available with unformatted capacities of 129M, 194M and 389M bytes. Two interfaces are available.

For OEM sales, the 389M-byte enhanced small device interface- and small computer systems interface-based disk drives typically cost $1,900 and $2,050, respectively, in quantities of 1,500 or more.



Publishing

CONTINUED FROM PAGE 43

graph and illustration scanner that offers 600 dot/in. resolution and is priced at $8,500. The scanner is to be used with Version 2.0 of the Xerox Publishing Illustrator's software, which enables users to view an illustration before scanning it into the workstation for editing and annotation. The software also allows reduction, enlarging, or cropping of the image, Xerox said.

Another product introduced for the publishing system is Version 4.0 of the XPS 701 software. Version 4.0 allows for multiterminal publishing by linking Xerox 6085 workstations and the Xerox Publishing Illustrator's workstations with its XPS 701 system via an Ethernet local-area network.

A multiterminal configuration of the XPS 701 requires 300M bytes of hard-disk storage, which Xerox offers in a peripheral cabinet designed for the XPS system.

Xerox also announced price reductions on its XPS 701 electronic publishing system and on its XICS mainframe composition software.

The price of the entry-level XPS 701 has been reduced to $55,000 from $68,000. XICS mainframe composition software has been reduced to $6,000 from $32,000.

VAX drive

CONTINUED FROM PAGE 43

and between tape drives and optical drives. Thus, a user may move data from tapes to optical disks without tying up the CPU, Fitzgerald explained.

The optical drives may also be taken off-line without interrupting system activity, he said, a feature that can make troubleshooting easier.

The subsystem is the first of a series of scheduled mass-storage products for VAX computers, signaling a change from EMC's previous focus on memory and memory-system conversions, Fitzgerald said.

EMC plans to introduce an optical-disk system that attaches to a DEC HSC50 controller and a high-performance tape storage system similar to DEC's TA78, he said.

The optical drive and peripherals controller, priced at $42,000, will reportedly be available in September. Additional drives are priced at $12,000.

NEW PRODUCTS

Processors

A control system said to integrate a real-time industrial computer with a programmable controller has been announced by **Gould, Inc. Industrial Automation Systems.**

The **C986** integrated control processor uses C programming to handle calculations, generate reports and link incompatible devices. Up to three of the single-board devices can be used on one system.

Data is sent and received via four serial ports that can be configured as RS-232, RS-422 or RS-485.

The C986 integrated control processor is priced at $7,600.

Gould Industrial Automation Systems, One High St., North Andover, Mass. 01845.

Graphics systems

Model One/85, a color graphics subsystem designed for two-dimensional graphics applications, has been announced by **Raster Technologies, Inc.**

The Model One/85 supports a video format of 1,280 by 1,024 pixels. According to the vendor, the unit's image-memory architecture supports options such as double buffering, multiple independent displays and 8-bit pre-emptive graphics overlays.

Other features include on-line Help, command stream translator and interactive debugger, macro programming and local shading and display list.

Prices vary depending on configuration. An 8-bit increment memory unit (IMU), single buffered, costs $18,500. A 16-bit IMU, double buffered or double headed, costs $24,000.

Raster Technologies, Two Robbins Road, Westford, Mass. 01886.

Data storage

The **VS-IDC**, an intelligent disk controller for Wang Laboratories, Inc.'s VS 85, 90 and 100 computers that is equipped with a Motorola, Inc. 68000 microprocessor and supports up to four drives, has been announced by **EMC Corp.**

The VS-IDC provides 64K bytes of first-in, first-out memory, which is said to allow the system bus to interface with Winchester disk drives, including the 620M-byte drive. The controller also supports a 76M-byte removable cartridge drive.

Features include power-up self-diagnostics with a four-digit LED readout; power-on, activity and fault lights to monitor board status and usage levels; and an on-line/off-line comfort switch.

The VS-IDC is priced at $9,500.

EMC, 171 South St., Hopkinton, Mass. 01748.

Terminals

IIS, Inc. has announced options and features for its **IS-391 ISM 3191** plug-compatible workstation.

The standard IS-391 consists of a green or amber 14-in. display in a tilt-and-swivel cabinet, a logic unit and a 122-key keyboard. It connects to IBM or IIS 3174 and 3274 type controllers and the 3299 type multiplexers. It is supported by native and emulation modes.

Available options include direct attachment of a bar code reader, wand and magentic-card reader; built-in coaxial doubler; integrated interface for parallel printers; and an 87-key compact keyboard.

The basic unit costs $1,095.

IIS, 92 Kansas St., Hackensack, N.J. 07601.

Printers/Plotters

A laser printer designed for use with the IBM System/34, 36 and 38 has been announced by **Acom Computer, Inc.**

The **LO8219 Executive Laser Printer** has an internal twinaxial interface allowing direct twinaxial attachment to IBM minicomputers. Other features include 8 page/min print speed, software support for IBM's Displaywrite/36 and a built-in sheet and envelope feeder.

The LO8219 costs $3,995. It can be leased for $149 per month.

Acom Computer, 3534 Atlantic Ave., Long Beach, Calif. 90807.

Harris Corp. has announced three dot matrix printers and a screen printer for its Challenger 3270 information display systems, which are plug-compatible with IBM 3174 and 3274 controllers.

The **H087-01** is a Coaxial A, dot matrix printer offering a 220 char./sec. draft mode, a 188 char./sec. compressed-quality mode and a 44 char./sec. near-correspondence mode. Features include IBM 3287 compatibility and bidirectional printing.

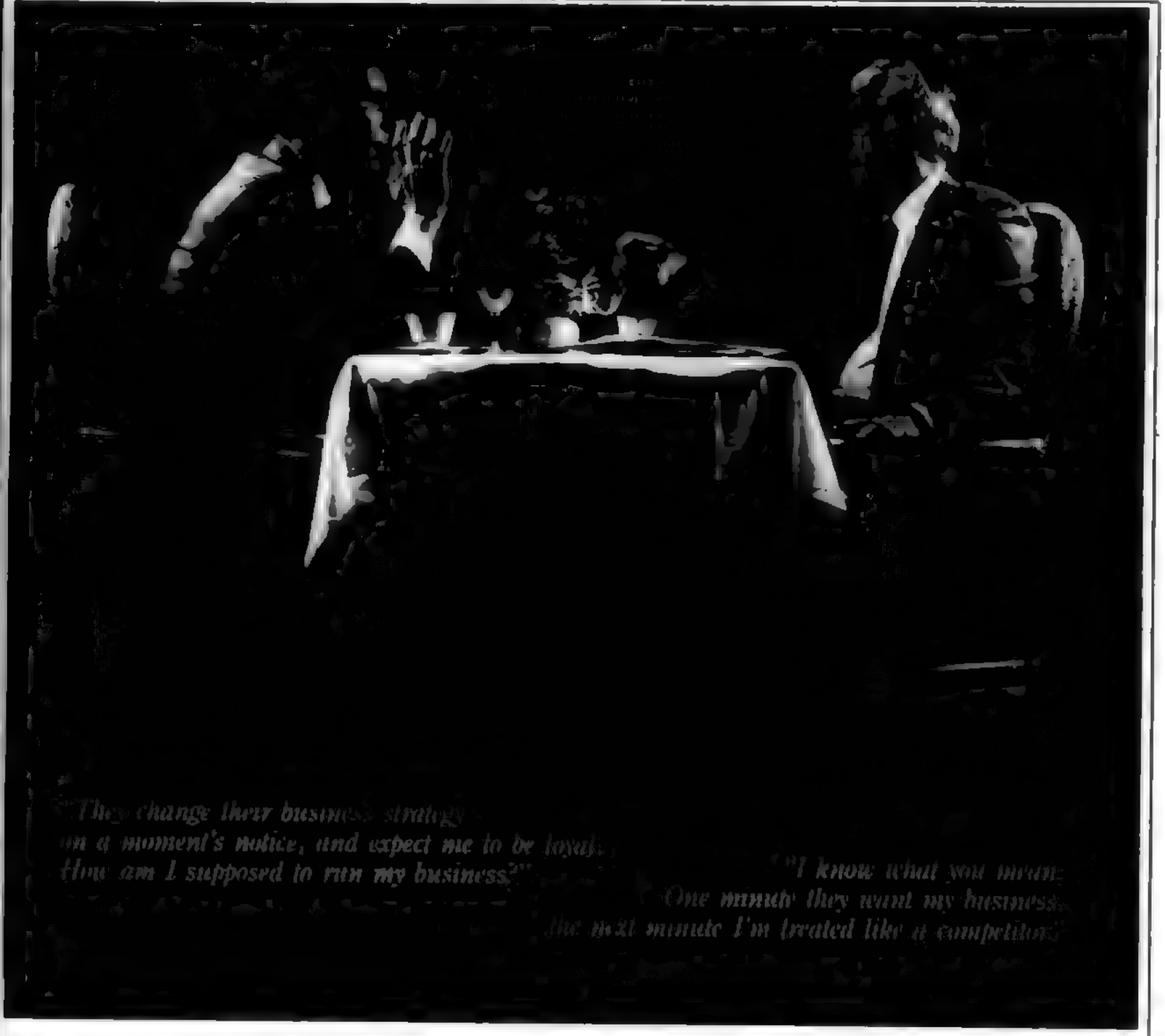
The **H224-200** and **H224-400** dot matrix printers offer draft and near-letter-quality modes.

The H224-200 also offers high-speed draft mode for uppercase printing at 300 char./sec.

The **H286-01** screen printer offers draft printing at 120 char./sec. and correspondence printing at 24 char./sec. It includes a parallel interface and international character sets.

Prices are $2,885, $3,985, $5,600 and $495, respectively.

Harris, 16001 Dallas Pkwy., Dallas, Texas 75248.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IN DEPTH

When you're asked to cost-justify systems . . .

A good benefit analysis model can satisfy the bottom line

BY A. PERRY SCHWARTZ

Advocates of advanced technology bemoan the fact that management is turning an increasingly skeptical eye on the benefits of information and computer technology. Executive sponsors who welcomed office automation projects a few years ago are much slower to embrace today's local-area network or artificial intelligence proposals.

The day of reckoning for information system budgets draws near. In this atmosphere, any recommended computer project must have ample prospects for solid, real-dollar payoffs. Yet, payoffs become more difficult to assess as information technologies — office systems, personal computers, expert systems and application enhancement projects — are increasingly directed at improving the performance of white-collar workers.

In fact, in the absence of head-count reduction, there are no easy ways to assess improvements in white-collar productivity. This situation is problematic because many, if not most, successful end-user computing projects actually raise direct costs and do not decrease the labor force at all.

Gauging success

This does not mean there is no payoff but that measuring the results requires different, more appropriate models.

More often than not, the problem lies with white-collar productivity measurement techniques, not with information technology.

Although a number of approaches to measuring productivity have been proposed, there is simply no methodology that can be used without fail to link computer technology to white-collar productivity payoffs. In fact, quite the opposite is true.

Thus, for meaningful evaluation, I advise considering the use of one or more models from a portfolio of cost-benefit analysis techniques. In this article, a variety of techniques are organized and discussed, each with its pluses and minuses.

Direct output models

The most appealing and straightforward techniques for cost-benefit analysis are those that model the flow of costs and revenues by explicitly and mechanistically representing how improvements in one area will have an effect on a bottom-line measure of financial performance such as revenue or profits. I call these direct output models.

In 1978, Fred McFadden and James Suver described the use of this approach in a *Harvard Business Review* article, "Cost and Benefit of a Data Base System." They showed how the introduction of a data base management system increased sales and production while reducing operational costs at Apex Products, a manufacturer and distributor of consumer products. At Apex, the results were observable and clear-cut, and a dollar value could easily be placed on the increased sales.

More recently, Dean Meyer and Mary Boone documented 120 computer applications in which dollar payoffs could be calculated on the specific, verifiable changes that resulted. Their book, *The Information Edge*, published in Canada this year by McGraw Hill, Inc., presented an excellent, comprehensive assessment of payoffs using the direct output approach.

During the past few years, fellow colleague Peter Sassone and I have developed a general direct output model format for projecting increased cash flow or revenue acceleration. For instance, in a large regional bank, we showed how the introduction of office automation would produce a 50% increase in the number of contact hours between bank officers and prospects with a projected increase in revenue of 15% to 25%.

Minimum of assumptions

The major advantage of direct output models is that they are essentially operational rather than analytical. By this, I mean they are based on explicit interpretation of a firm's financial data and require a minimum number of assumptions and inferences. In most instances, you must only assume that historical

WILLIAM CONE

Schwartz is president of Computer Research Associates, Inc., a software development and consulting firm in Atlanta. He has contributed to several handbooks on managing office automation and end-user computing.

- **Direct output vs. inferred input**
- **How to account for lost time**
- **Measuring white-collar productivity**

patterns of growth or revenue are going to continue for a limited period of time.

Furthermore, benefits are calculated using standard accounting techniques. This means most executives will be comfortable with the model, finding it similar to those used for standard capital-investment decisions, and they will readily comprehend the results.

Unfortunately, while it is a relatively simple matter to construct direct output models to measure the dollar value of productivity gains in manufacturing activities, tracing improvements in white-collar work to the bottom line, especially in large corporations, is usually difficult and often totally infeasible.

The reason is that the output of white-collar activity is frequently intangible, uncountable and not easily related to revenue. This means numbers to make the calculations and build the model are unavailable.

Additionally, we have found that, even when a model can be created for a particular unit or department, managers in other departments frequently greet it with skepticism, which makes the results difficult to sell across the organization.

So the more a computer system is focused on improving the productivity of white-collar workers, the less viable a direct output model of benefits is likely to be. In such cases, it is useful to turn to cost-benefit analysis techniques that rely on inferring rather than directly measuring increases in output.

Inferred output models

Inferred output models are an alternative to direct output models. There are two main models of this type.

The first, a consensus model, was used successfully at GTE and described in the *Best Quality and Productivity Report* by David Shay of Peat, Marwick, Mitchell & Co. The consensus model projects benefits by seeking agreement among managers on the range of the payoff expected from the introduction of a specific computer technology.

For example, the managers may decide that a department can turn out 10 more research reports a year by using desktop publishing. The managers may be asked to estimate the value of the reports and then share their estimates and reasoning.

THE TIMES-savings/times-salary model cannot distinguish between making a white-collar worker a better manager or analyst or making that worker a better clerk or receptionist.

Based on repeated estimation and sharing, a consensus might be formed that these additional reports are worth at least $1 million but less than $1.5 million in extra annual revenue.

A good consensus model will use data such as profit per employee, sales figures, market research, costs of operations or other financial data to set upper and lower limits. However, you should recognize that, regardless of the bounding techniques, the estimates are basically subjective.

Consensus models are most appropriate for judging potential payoff when there is a limited quantitative basis for making estimates of value.

This may be the case with information systems that require major organizational restructuring, operational changes, innovations or new ways of conducting business.

In such cases, a consensus model is best thought of as a method for risk assessment or forecasting rather than for strict weighing of costs against benefits.

For instance, I worked with Ellett Brothers in Chapin, S.C., the largest wholesale gun dealer in the U.S. This firm completely substituted telephone sales for direct sales. Although extrapolations from early trial telephone sales efforts were made, acceptance among the general customer set was impossible to gauge.

The president, Chilton Ellett, had to look beyond the numbers and decide to accept the risk — a decision that proved to be immensely successful. In five years, the company's annual sales grew from approximately $2 million to $100 million.

Bayesian theory

The second type of inferred output model is based on Bayesian probability theory. This model reflects the classic view of information and decision making in organizations: More information leads to a lower probability of bad decisions (dollar losses) and a higher probability of good decisions (dollar gains).

For example, an information system might be expected to assist a bank loan officer in increasing the number of loans accepted that are paid in full while decreasing those that go into default.

This has obvious economic value to the bank, and, if the probabilities of accepting good and bad loans can be determined, a close estimate of the dollar payoff can be projected.

Unfortunately, there is little evidence to support the view that more information improves decisions or boosts their payoff. Indeed, Hillel Einhorn at the University of Chicago and Terry Connolly at the University of Arizona, respected researchers of decision making, have produced evidence suggesting that, under many circumstances, more information may actually lead to worse decisions.

Moreover, even if more information were to lead to better decisions, the probability estimates required for the Bayesian model are often impossible to determine. Thus, I have found Bayesian probability models are rarely practical.

Direct input models

Direct input models are useful when inputs can be exactly determined, but outputs cannot be measured. The most common direct input model is a cost or labor displacement model.

Although direct input models involve no output measurement, there is always the assumption, explicit or implicit, that outputs at least remain at the current level. If this is actually true and if inputs such as head counts are cut, then productivity (output divided by input) clearly can be inferred to have increased, although the absolute amount of the increase cannot be determined.

The biggest plus for cost displacement models is their extreme simplicity. They simply require that real labor cuts be made or actual equipment savings be achieved in response to the introduction of new information technology.

For example, a department that bases its benefits on a 10% average salary savings must actually dismiss 10% of its work force when the computer system is installed. On the other hand, without a real cut in head count or equipment costs, cost displacement models are inappropriate.

Inferred input models

In my experience, inferred input models are the most frequently used type of cost-benefit analysis models for information systems. These models differ from direct input models in that they use projected increases in efficiency and effectiveness among workers rather than actual, verified cuts in labor or head count.

Generally, these projections are based on the development of a task/time matrix that jointly reflects the amount of time workers devote to activities and the time-saving impact of computer technology.

The most common model of this sort is attributed to IBM and is an outgrowth of extensive research by Booz, Allen & Hamilton, Inc. In this formulation, office professionals are asked to estimate the time they spend in specific activities, such as reading, typing and talking on the telephone.

Suppose employees report that 20% of their workday is spent reading; the projection might be that an office system will provide the basis for a 10% reduction in that time. Then the savings are figured as follows: 20% multiplied by a 40-hour week, multiplied by a 10% reduction multiplied by an hourly salary.

This times-savings/times-salary (TSTS) model is disarmingly simple and easy to use but flawed. Harvey Poppel, the principal architect of the current formulation of TSTS, found that professionals spent about 50% or less of their time on activities they rated high in value and the remainder of their time on quasi-professional, clerical and totally nonproductive activities.

So the flaw in the TSTS model is that it counts time saved on lower value activities as being equivalent to savings on higher value activities.

In other words, TSTS cannot distinguish between making a white-collar worker a better manager or analyst or making that worker a better clerk or receptionist.

On the other hand, the simplicity of TSTS is appealing when applied to a situation in which growth in volume or revenue is reasonably certain, in which time savings is expected to be approximately equal across all activities and in which there is a commitment to keep a cap on head count. I suggest TSTS be applied only in such cases.

A hybrid model

In response to problems in using direct output models and shortcomings with inferred input models, my colleagues and I developed a hybrid model called work value analysis (WVA). This model evaluates the payoff from computer technology as it impacts the effectiveness and efficiency of white-collar workers.

WVA is based on recognizing that white-collar workers regularly engage in a wide variety of activities. Some activities directly advance the purpose of the organization and reflect the primary reasons for which the organization was formed and the workers were hired.

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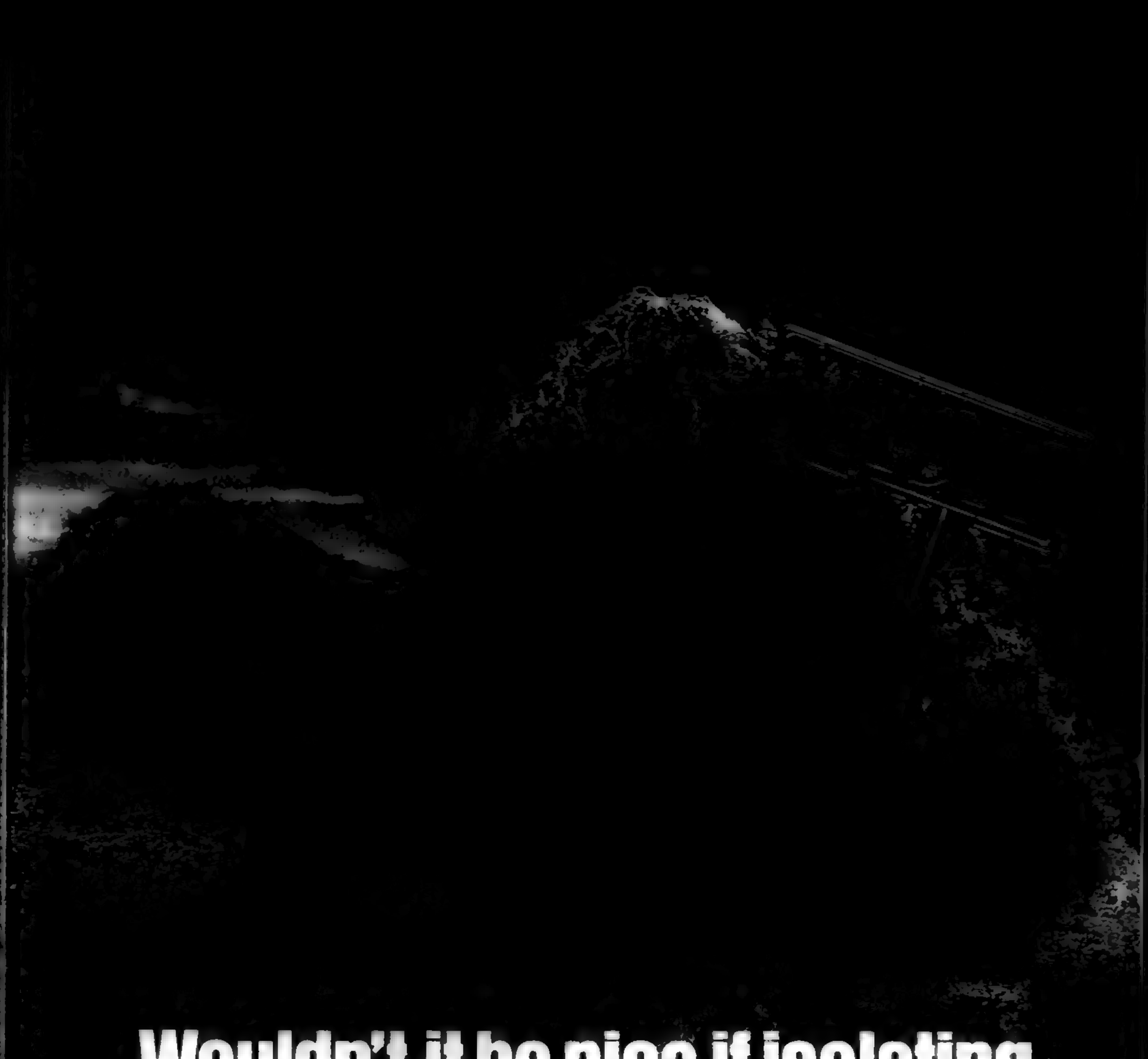

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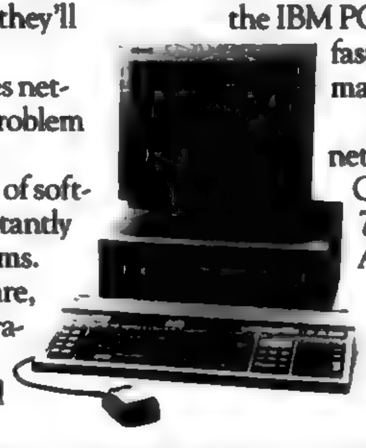

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an accountant performing an audit. These are primary or high-value activities.

However, it is unrealistic, if not impossible, for white-collar workers to restrict their work to primary activities. In fact, we have found that office professionals spend only about 35% of their time on the key parts of their jobs. This is not because they are somehow lazy or inept, but because constraints of management, environment and budget frequently necessitate that white-collar workers engage in their own support and clerical activities. It turns out that these support and clerical activities take up approximately another 45% of a professional's time.

Finally, about 20% of professionals' time is lost time. This includes such activities as looking for misplaced, mislabeled and misfiled information, traveling and waiting for others. This time is not deliberately wasted but must be considered lost because it does nothing to further an organization's mission.

Productivity improvements

The WVA model accounts for two types of white-collar productivity improvements. First, technology can shorten the amount of time required to complete a given task, or it can allow more of the task to be completed in the same amount of time. This is efficiency.

Second, technology can be the basis for managers and professionals to shift their work pattern so that more time is spent on primary activities and less on the lower value activities involved in support, clerical and lost time. This is effectiveness, and it is this shift in the professional work profile that produces the most valuable productivity improvement. Unlike the previously discussed conventional cost justification and productivity measurement methods, WVA explicitly accounts for effectiveness.

The key to using WVA to assess payoff is to recognize that, over the long run, a going concern cannot pay more for work than the value of the output. Therefore, wages can be regarded as a reasonable lower boundary for the value of white-collar activities. With wages as a benchmark, the dollar worth of changes in work patterns can be determined analytically.

Consider, for example, a group of secretaries who spend 80% of their time on clerical work and 20% on lost time. If each secretary costs the company $20,000 in salary, benefits and overhead, and we already know that lost time is worth nothing, then clerical work must be worth at least $25,000 on an annual basis ($20,000 divided by 80%).

Likewise, suppose professionals in the same department, with an average loaded salary of $50,000, spend 50% of their time doing professional work, 30% clerical work and 20% as lost time.

We already know that lost time is worth $0, and clerical work is worth $25,000 per year; therefore, professional time must be worth at least $85,000 on an annual basis. This figure is determined by solving the following equation:

— 50% multiplied by the value of professional work;

— Plus 30% multiplied by $25,000 (value of clerical work);

— Plus 20% multiplied by $0 (value of lost time) = $50,000.

Given these sample numbers, if professionals were to accomplish 5% more professional work and less clerical tasks, the value to the firm would be 5% multiplied by $85,000 (the value of the additional professional time) minus 5% multiplied by $25,000 (the value of the clerical work that is being off-loaded from the professional to the secretary). This is a total gain of $3,000 per professional per year.

Keep in mind that this is a simplified example. The full model, based on a linear system with constraints, requires the construction of a set of simultaneous equations, one for each classification or job level, to be solved statistically.

The strength of WVA is that it permits objective determination of payoff when external dollar criteria, relating to profit or value of work, other than salary, cannot be measured or otherwise inferred.

On the other hand, the use of WVA requires significant efforts, such as time logging, to objectively determine work activity profiles, and the mathematical calculations can be complex.

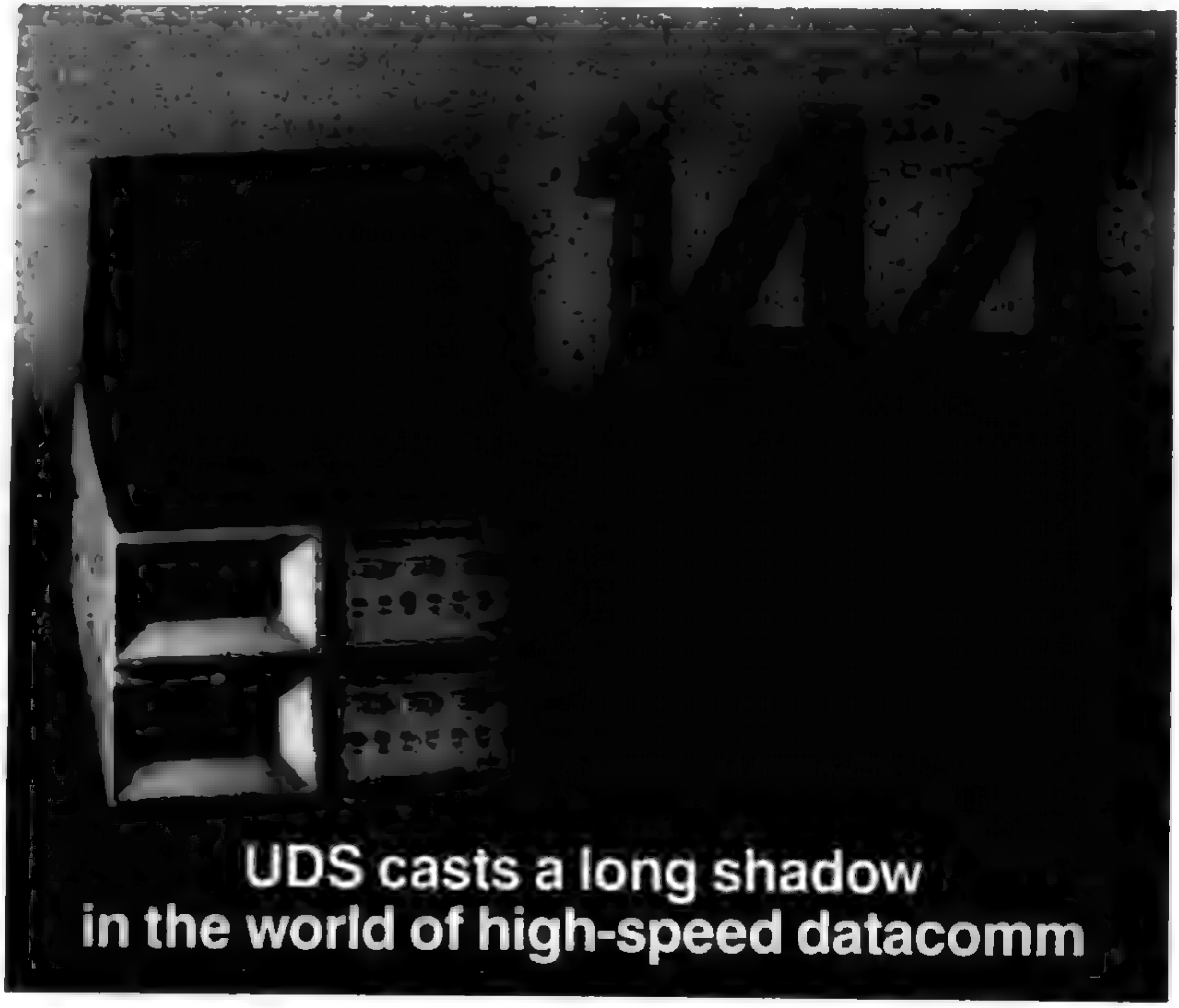
Gaining understanding

The goal of cost-benefit analysis is to permit a fair determination of an investment's worth. The keys to successful application of cost-benefit analysis are:

- Use objective rather than subjective data whenever possible.
- Use more than one method if possible and compare results.
- Make sure the methods and results address the major issues and are comprehensible to nontechnical professionals.
- Do not be satisfied with projections but insist on follow-up studies.

Of course, cost-benefit analysis for computer systems, regardless of the elegance of the models, has little meaning without an appropriate organizational response. If information technology is to successfully improve white-collar productivity, management must assure that the staff actually learn and use the new tools, that the organization responds to take advantage of the new technology, that the enhanced capabilities of workers are recognized and channeled and that those who are successful at making the technology pay off are rewarded. Otherwise, results will be disappointing.

Without these organizational changes and insights, a workstation may be little more than an expensive paperweight, and numbers produced by a cost-benefit analysis will have little meaning beyond documenting what might have been. ■



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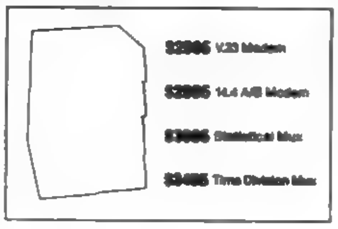

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MANAGEMENT

TAKING CHARGE

Jack Bologna

Computer insecurity

As long as computer crimes were being committed by programmers, analysts, data entry clerks, console operators and hackers, the general public showed no great concern or alarm. But even then, data security managers saw a far more serious risk in the offing as computer technology became less expensive and simpler to use and as information systems became more accessible to more people.

The computer frauds discovered in earlier days were sometimes ingenious but rarely expensive monetarily. A few poorly drafted computer crime laws were passed, and everyone hoped that the problem of high-technology crime would go away.

But the problem hasn't died down or gone away; nor is it likely to stop anytime soon. High-tech crime is here to stay. Why? Because there is a lot of money to be made in it and the probability of being caught is very low.

Theoretically, there are several layers and types of controls intended to deter and detect high-tech crimes, such as audits and other organizational controls. But those controls rest on the theory that general managers and accountants are more knowledgeable about defenses to fraud, theft and embezzle-

Continued on page 56

McKesson scouts managers

Firm's top MIS exec seeks systems experience, teaches business

BY JEFFRY BEELER
CW STAFF

SACRAMENTO, Calif. — Individuals who are skilled at managing programmers and other computing professionals are as rare as they are valuable, according to John Fitzgerald, McKesson Corp.'s vice-president of information services.

At McKesson, a distributor of drugs, toiletries, liquor and chemicals with sales of $6.3 billion last year, the chore of selecting and training such managers is the most serious personnel-related challenge the company's MIS organization faces, according to Fitzgerald.

Not all managers, especially those who are accustomed to dealing with clerical or administrative staff, have the know-how to give systems technicians the wide latitude they seek and, at the same time, keep them under control. But if individuals have the necessary management knack, McKesson has learned through experience how to identify and cultivate them.

Rare breed

To manage systems technicians effectively requires a deft touch, if only because of the unusual nature of the employees being managed. Programmers, systems analysts and others of their ilk are truly a breed apart. Unlike many other categories of white-collar workers, computing specialists favor job settings that afford them a high degree of professional autonomy, stimulation and task variety, Fitzgerald says.

They thus contrast sharply with their clerical and other nontechnical counterparts, who typically prefer to have a well-defined routine and to receive detailed instructions from their superiors, he adds.

To achieve the best possible results from systems personnel, supervisors have to adopt a fairly light-handed management style that takes into account their charges' strong need for independence and professional growth.

On the other hand, even DPers require a minimal level of direction to ensure that they and their employers are always working toward the same end.

The trick, therefore, in managing technical employees "is to reconcile their personal needs with the larger goals of the organization as a whole," Fitzgerald says.

McKesson's greatest successes in finding individuals who can manage MIS professionals have been with employees who already have two to five years of experience in information systems, he said. The company then

Continued on page 57

West, Northeast split highest DP pay honors

BY DAVID A. LUDLUM
CW STAFF

The highest paying jobs for data processing managers in the U.S. are in the Northeast, while the best pay for programmers and analysts is found on the West Coast, according to a recent study.

DP professionals in the Northeast generally earn less than their West Coast colleagues but tend to catch up with and surpass them if they work their way up to management, according to a report by Dunhill Personnel Systems, Inc.

Salaries for professionals are higher along the Pacific because of the relatively strong demand for the available supply of workers, says Rick Kean, director of national operations for Dunhill, a recruitment firm based in Carle Hill, N.Y. But a concentration of large data centers in the Northeast boosts pay for managers there, Kean says. "I would have to think that's because, on the average, the size of the DP operations tends to be a little larger, there are more corporate headquarters and more data processing centers per geographic area." Both areas offer far better DP salaries than other regions of the country, Kean notes.

Average salaries for a programmer last year were $33,000 on the West Coast, $32,200 in the Northeast and $29,400 for the U.S. as a whole, according to Dunhill. Average salaries for data processing managers were $51,000 in the Northeast, $44,300 on the West Coast and $44,200 overall.

In the South, the salary pattern of the Northeast and West Coast is reversed, with the Southeast offering better wages for programmer/analysts and DP auditors and the Southwest providing higher pay for systems analysts, systems programmers and DP managers.

The highest DP salaries overall were registered in the Northeast, followed, in order, by the West Coast, Southwest, Southeast and North Central regions.

Average pay

Average U.S. salaries for data processing positions, according to an analysis of placements made by Dunhill Personnel Systems

Programmer	$29,400
Programmer/Analyst	$33,500
DP auditor	$34,800
Systems analyst	$36,000
Systems programmer	$38,100
DP manager	$44,200

INFORMATION PROVIDED BY DUNHILL PERSONNEL SYSTEMS, INC.
CW CHART

MANAGERS ON THE MOVE

Navy veteran sets strategic course

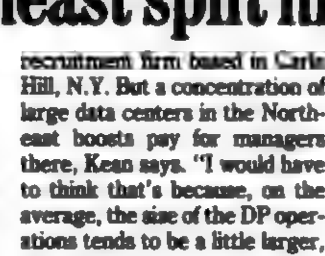
The **Inmont Division of BASF Corp.** has turned to an unusual sector in seeking an information systems manager with business expertise — the U.S. Navy.

John M. Shiels, who will serve as Inmont's director of information services, actually comes from Equitable Life Leasing Corp. in San Diego, where he was vice-president of information systems for two years.

But prior to that experience and a stint at Flexivan Corp. in New York, Shiels spent 20 years in logistics and financial and general management with the Navy Supply Corps, which he described as "the businessmen of the Navy." A graduate of the U.S. Naval Academy, he earned the Navy's equivalent of an MBA with a DP concentration. He retired a commander.

"I believe they were looking for someone with a strong business background who could relate to the users," Shiels said of his latest appointment. "Basically, my role is to help analyze business problems and ascertain whether there is technology out there so we can solve that business problem in a better way."

Shiels said the Navy Supply Corps offers outstanding training in management, particularly in logistics and finance. "You learn to make the most of limited resources," he said.


Inmont's Shiels

Inmont, a maker of automotive coatings and printing inks based in Clifton, N.J., was recently purchased from United Technologies Corp. by BASF, a major chemical company based in West Germany. Shiels succeeds **Michael Freeman**, who retired.

Shiels said the division, which uses equipment from the former Burroughs Corp., is moving from a batch-oriented environment to distributed processing and pushing information out to users. The idea is "to get information in the hands of the decision makers in time for it to be meaningful — to get the information out to where it can be used," he said.

Inmont also aims to employ information systems in a strategic manner, Shiels said. The division is starting a project to use artificial intelligence to capture knowledge of soon-to-retire technical service personnel who work with customers. "We want to make use of that corporate asset they have in their heads and distribute it to other people," Shiels said.

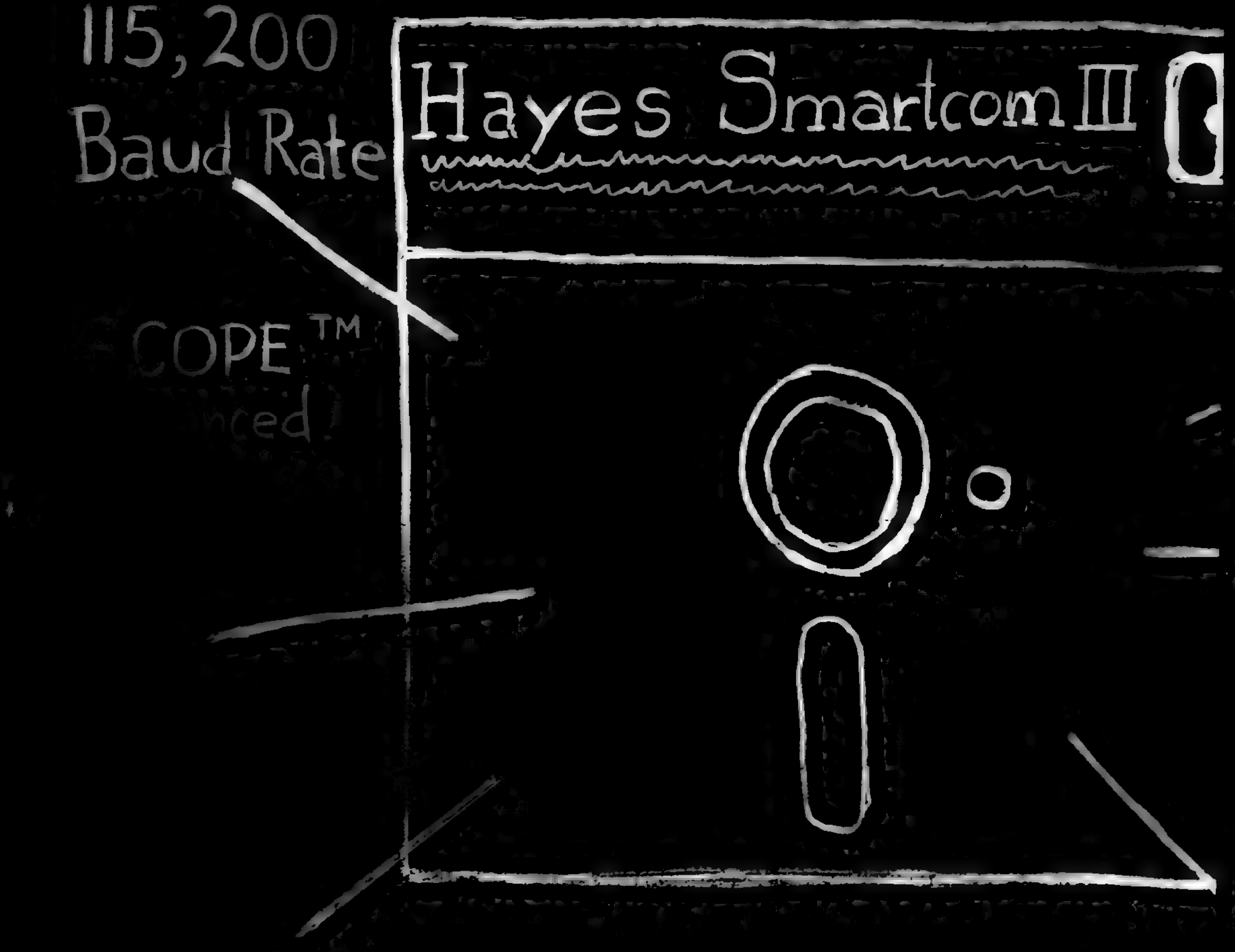
Murdic G. Coleman has been appointed director of the **Wayne State University Computing Services Center** in Detroit.

Before coming to the university, Coleman was director of the Wayne County Department of Information Processing. From 1972 to 1979, he worked at Ford Motor Co. as a supervisor of business systems and operations, a computer specialist and a methods-and-systems analyst. Previously, he was a programmer/analyst for Uniroyal, Inc.

Terry Medlin has been pro-

Continued on page 58

THIS TIME WE OUTSMARTED



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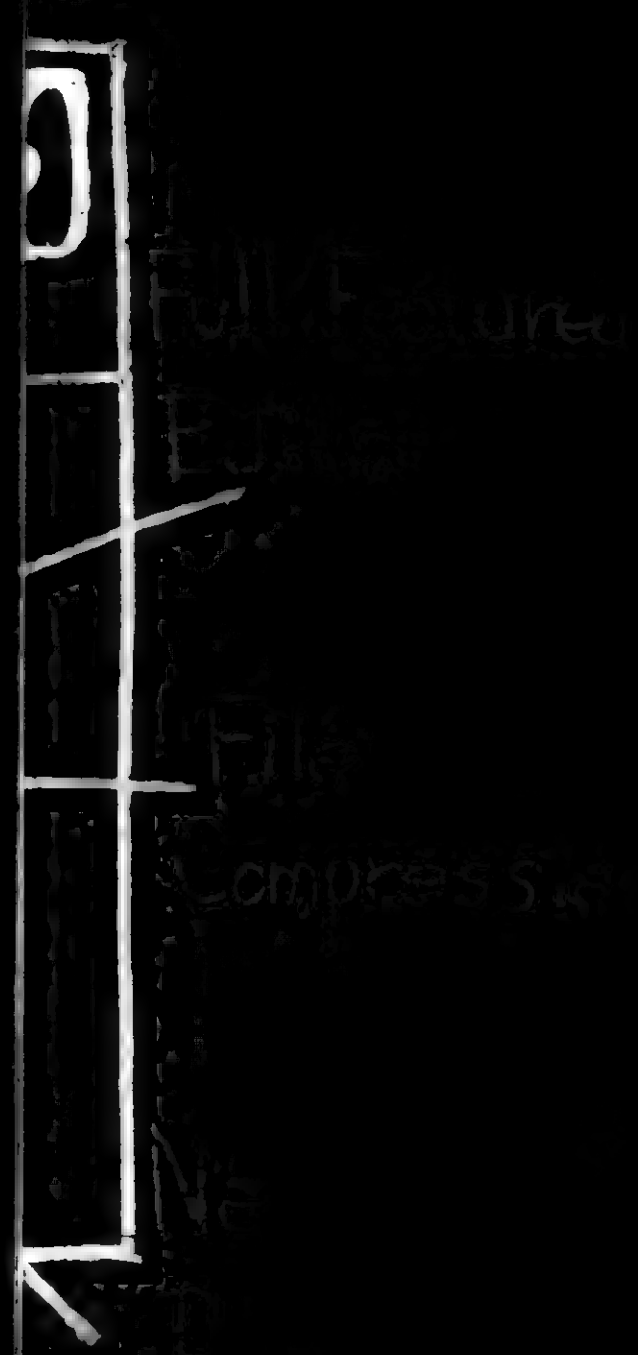

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Insecurity

CONTINUED FROM PAGE 53

ment than wiley, corrupt and incompetent employees are about methods to compromise the systems of control. Experience, if not logic, suggests the opposite. Defense follows offense. So the criminal mind always has a lead. The critical question is: Has the application of modern technology to accounting systems provided more lead time to the criminal? If so, we may have a greater social threat today from high-tech crime.

The granddaddy of computer-related crimes is the Equity Funding case, in which an insurance firm deceived its stockholders for many years by falsely representing its revenue and profits. Both were grossly inflated. Revenue was overstated to the tune of $200 million. The technique was simple: The company merely stated it had sold more insurance policies than it really had. The ploy used to deceive company auditors consisted of generating fictitious policies for fictitious people. This continued for five years and involved 200 company employees, including top managers, most of the EDP staff and even an outside auditor.

> HIGH-TECH crime is here to stay because there is a lot of money to be made in it and the probability of being caught is very low.

Why was the fraud so difficult to detect? Wrapped in a conspiracy of such large and diverse proportions, how could any mortal auditor discover the ruse? It was uncovered only when a disgruntled employee left the firm and blew the whistle to an investment adviser whose clients had a fair-size stake in the company. The adviser, in turn, notified the Securities and Exchange Commission.

Other reasons for the difficulty in detecting the fraud included the following:

- Audit tools available at that time were inadequate.
- Auditors were not knowledgeable enough about auditing in a computerized accounting environment.
- Auditors were inadequately trained by their firms and poorly educated in colleges.
- Auditors were not equipped to deal with the fast-changing world of financial services.

These are rather serious charges. But Equity Funding took place in the late 1960s and early 1970s. We've come a long way since then — but so has computer technology. And unfortunately, the gap between computer technology and audit, accounting and management controls hasn't shrunk at all. If anything, it has grown.

Take as another example the recent Volkswagen AG case, in which it appears that someone inside VW, and perhaps another person outside the firm, manipulated the auto maker's accounting records to cover up $259 million worth of trading losses on foreign currencies. The losses occurred in 1984 but went undiscovered until March of this year. The critical question is, Did technology inspire the crime? I don't think so. The case involved incompetence or bad luck more than an evil intention to steal money from the company. But technology provided a method to cover up the fraud.

Frauds worth $10 billion?

My hunch is that in the float of the world's banking system today, there may be as much as $10 billion in specious electronic funds transfers that cover up employee frauds, thefts and embezzlements. Look at the Iran-Contra affair.

Even the most technologically sophisticated country in the world can't trace $20 million in arms sales beyond the cover of the banking system of Switzerland. With 24-hour global banking and trading markets available today, money can be electronically whipsawed through 100 countries and 1,000 accounts in a matter of minutes. Who is prepared to deal with such an audit trail?

The point is that high-tech crime is here to stay and will continue to grow until we shift from a crisis mode of audit and control to a preventive mode. Prevention means awareness, education, training and early involvement of auditors in the design of new systems. Even if we do all of this, we won't completely solve the problem of high-tech crime. We never will. For, as University of Western Ontario Professor John M. Carroll says, "There is no such thing as computer security. There are, however, relative levels of computer insecurities."

Bologna is an assistant professor of management at Siena Heights College in Adrian, Mich., and president of Computer Protection Systems, Inc.

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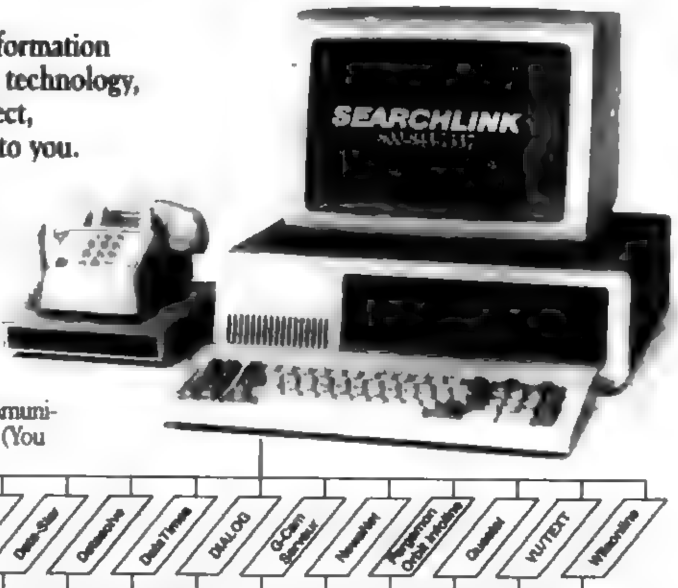

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CALENDAR

AUG. 9-15

Spocade III CAD/CAM Conference. Coeur d'Alene, Idaho, Aug. 9-11 — Contact: Spocad, E. 502 Boone Ave., Spokane, Wash. 99258.

Very High Performance Engineering Workstations. Bedford, Mass., Aug. 9-11 — Contact: Institute for Graphic Communication, 375 Commonwealth Ave., Boston, Mass. 02115.

International Computers in Engineering Conference and Exhibition. New York, Aug. 9-13 — Contact: American Society of Mechanical Engineers, 345 E. 74th St., New York, N.Y. 10017.

2nd Annual Summer Camp for the Information Professional. Andover, Mass., Aug. 9-14 — Contact: Arnoudse & Ouellette Associates, Inc., #66, 40 S. River Road, Bedford, N.H. 03102.

Computer Art & Design Conference. Chicago, Aug. 10-14 — Contact: National Computer Graphics Association, Suite 200, 2722 Merrilee Drive, Fairfax, Va. 22031.

RDB Frontiers '87. Boston, Aug. 10-14 — Contact: The Relational Institute, Suite 106, 6489 Camden Ave., San Jose, Calif. 95120.

Macworld Expo. Boston, Aug. 11-13 — Contact: World Expositions, Mitch Hall Associates, P.O. Box 860, Westwood, Mass. 02090.

Third Annual Access Technology 20/20 Users' Group Meeting. Boston, Aug. 12-14 — Contact: Access Technology, Inc., 6 Pleasant St., Natick, Mass. 01760.

National Computer Graphics Association's Industry Roundtable. San Diego, Aug. 13 — Contact: NCGA, Suite 200, 2722 Merrilee Drive, Fairfax, Va. 22031.

AUG. 16-22

The Tenth Annual McCormack & Dodge User Conference. Chicago, Aug. 16-20 — Contact: M&D, 1225 Worcester Road, Natick, Mass. 01760.

National Computer Graphics Association CAD/CAM '87 Conference and Exposition. Boston, Aug. 17-20 — Contact: NCGA, Suite 200, 2722 Merrilee Drive, Fairfax, Va. 22031.

1987 International Conference on Parallel Processing. St. Charles, Ill., Aug. 17-21 — Contact: Department of Computer Science, University of Minnesota, 136 Lind Hall, Minneapolis, Minn. 55455.

Techdoc Eleven: Graphic Communications Association's Eleventh Annual Conference and Exhibition. San Francisco, Aug. 18-20 — Contact: GCA, Suite 604, 1730 N. Lynn St., Arlington, Va. 22209.

Information Forum for Local Government. Dallas, Aug. 19-20 — Contact: Infomart, Suite 6308, 1950 Stemmons Freeway, Dallas, Texas 75207.

AUG. 23-29

Image Scanning and Processing. Monterey, Calif., Aug. 23-25 — Contact: Gail Montgomery, Institute for Graphic Communication, 375 Commonwealth Ave., Boston, Mass. 02115.

Share 69. Chicago, Aug. 23-28 — Contact: Share, Inc., 111 E. Wacker Drive, Chicago, Ill. 60601.

Tex Users Group's Annual Conference. Seattle, Aug. 24-26 — Contact: Tex Users Group, c/o American Mathematical Society, P.O. Box 9506, Provi-

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McKesson

CONTINUED FROM PAGE 53

gives them in-depth training in how its business works.

The object of McKesson's training "is to instill in our technical managers the idea that they're in business to apply technology, not for its own sake, but to provide a customer service," Fitzgerald says.

As part of its management training procedures, McKesson routinely assigns prospective managers of its information systems personnel to pull at least brief stints on the help desk in its main data center here.

The desk is equipped with on-line personal computers and staffed with trained troubleshooters who field phone calls from customers and internal users in need of assistance with the company's systems, which include the Econoscan order-entry system for retailers.

Managers of McKesson's computing professionals are also expected to meet and talk with the end users who periodically visit the data center for guided tours. The interactions "help our systems managers understand what the people they are supposed to support are trying to do," Fitzgerald says.

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Continued from page 57

dence, R.I. 02940.

The Omni User Second Annual Technical Conference (on IBM's System/34, 36 and 38). Chicago, Aug. 25 — Contact: The Omni User, P.O. Box A 3031, Chicago, Ill. 60690.

Voice Recognition Applications in Manufacturing. Chicago, Aug. 25-26 — Contact: Nancy A. Loerch, Society of Manufacturing Engineers, One SME Drive, P.O. Box 930, Dearborn, Mich. 48121.

First Conference on Speech Technology in Healthcare. San Francisco, Aug. 26-27 — Contact: Registrar, Institute for Medical Record Economics, 121 Mount Vernon St., Boston, Mass. 02108.

AUG. 30-SEPT. 5

The National Conference on Network Publishing. Dallas, Aug. 31-Sept. 2 — Contact: Interactive Features, Inc., 28½ Cornelia St., New York, N.Y. 10014.

Show CASE Conference II. St. Louis, Sept. 1-2 — Contact: Donna Skaggs, Center for the Study of Data Processing, Campus Box 1141, Washington University, One Brookings Drive, St. Louis, Mo. 63130.

Computer Aided Publishing CAP'87 West. Los Angeles, Sept. 1-3 — Contact: Computer Aided Publishing CAP, Suite 200, 90 W. Montgomery Ave., Rockville, Md. 20850.

5th Anniversary PC Expo. New York, Sept. 1-3 — Contact: PC Expo, 333 Sylvan Ave., Englewood Cliffs, N.J. 07632.

Thirteenth International Conference On Very Large Data Bases. Brighton, England, September 1-4 — Contact: VLDB 87, The Conference Department, British Computer Society, 13 Mansfield St., London, UK W1M 0BP.

SEPT. 6-12

Banque '87 — The 6th European Trade Fair for Techniques and Organization in Banking. Copenhagen, Denmark, Sept. 7-9 — Contact: Bella Center A/S, Center Blvd., 2300 Kobenhavn S, Denmark.

1987 Capital Microcomputer Users Forum. Washington, D.C., Sept. 9-10 — Contact: Jackie Voigt, National Trade Publications, Inc., Suite 400, 2111 Eisenhower Ave., Alexandria, Va. 22314.

The Desktop Publishing Conference. Santa Clara, Calif., Sept. 9-12 — Contact: Seybold Seminars, 6922 Wildlife Road, Malibu, Calif. 90265.

Distribution/Computer Fall Expo '87. New Brunswick, N.J., Sept. 10-11 — Contact: C. S. Report, Inc., P.O. Box 453, Exton, Pa. 19341.

SEPT. 13-19

Vaulting the Barriers to EFT Success. Washington, D.C., Sept. 13-15 — Contact: Linda Munday, Electronic Funds Transfer Association, Suite 1000, 1726 M St. N.W., Washington, D.C. 20036.

13th National Conference of North American Honeywell Users. Cincinnati, Sept. 13-17 — Contact: Les Pacca, NAHU, P.O. Box 2037, Willingboro, N.J. 08046.

The First Annual Conference on Expert Sytems in Financial Institutions. New York, Sept. 14-15 — Contact: Conference Administrator, Institute for International Research, Inc., Suite 600, 9301 Wilshire Blvd., Beverly Hills, Calif. 90210

Data Storage 87. Santa Clara, Calif., Sept. 14-16 — Contact: Forum Management, Cartlidge & Associates, Inc., Suite M-259, 1101 S. Winchester Blvd., San Jose, Calif. 95128.

7th Annual Conference on Control, Audit & Security of IBM Systems. Chicago, Sept. 14-17 — Contact: MIS Training Institute, 4 Brewster Road, Framingham, Mass. 01701.

Integrated Manufacturing Solutions '87. Long Beach, Calif., Sept. 14-18 — Contact: Intertec Communications, Inc., Building 33-34, 2472 Eastman Ave., Ventura, Calif. 93003.

ICCC-ISDN '87 . . . Evolving to ISDN in North America. Dallas, Sept. 15-17 — Contact: International Council for Computer Communication, c/o Bell Communications Research, Room 1B349, 290 W. Mount Pleasant Ave., Livingston, N.J. 07039.

Workshop on Computer-Assisted Map Analysis. Corvallis, Ore., Sept. 16-17 — Contact: Joseph K. Berry, School of Forestry and Environmental Studies, Yale University, 205 Prospect St., New Haven, Conn. 06511. Also being held Oct. 24-25 in Berkeley, Calif.

Information Systems Consultants Association's Second Annual Conference and Consultants Market. Atlanta, Sept. 18-19 — Contact: ISCA, Inc., P.O. Box 467190, Atlanta, Ga. 30346.

SEPT. 20-26

Interex North American Conference of Hewlett-Packard Co. Business Computer Users. Las Vegas, Sept. 20-25 — Contact: Interex Conference Department, 680 Almanor Ave., Sunnyvale, Calif. 94086.

Management Information Systems for Strategic Advantage. Philadelphia, Sept. 20-25 — Contact: Registrar, Office of Executive Education, 200 Vance Hall, The Wharton School, University of Pennsylvania, Philadelphia, Pa. 19104.

CD-ROM Expo. New York, Sept. 21-23 — Contact: IDG Conference Management Group, 375 Cochituate Road, Box 9171, Framingham, Mass. 01701.

Corpcon Corporate Microcomputer Exposition and Technical Conference. Los Angeles, Sept. 21-23 — Contact: Corporate Expositions, Inc., P.O. Box 3727, Santa Monica, Calif. 90403.

Office Technologies Conference. Los Angeles, Sept. 21-23 — Contact: Corporate Expositions, Inc., P.O. Box 3727, Santa Monica, Calif. 90403.

CSM '87: Conference on Software Maintenance. Austin, Texas, Sept. 21-24 — Contact: The Computer Society of the IEEE, 1730 Massachusetts Ave. N.W., Washington, D.C. 20036.

10th National Computer Security Conference. Baltimore, Sept. 21-24 — Contact: Linda Muzik, Attn: C421, National Computer Security Center, 9800 Savage Road, Fort George G. Meade, Md. 20755.

5th Annual 1100 Data Center Management Conference. San Diego, Sept. 22-25 — Contact: Datametrics Systems Corp., 5270 Lyngate Court, Burke, Va. 22015.

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CONTINUED FROM PAGE 53

moted to vice-president for systems at **Survey Sampling, Inc.**, which supplies sampling data to the research industry.

Medlin, who had been director of systems since joining the company in 1984, will continue to manage its data base, software, systems, operations and quality-control groups. He will also become involved with the long-term planning and development of the department. Medlin was responsible for the company's upgrade from a Digital Equipment Corp. PDP-11/44 to a DEC clustered VAX-11/750 and a VAX 8300.

Coleman

Continental Illinois Corp. has announced the promotions of five employees to vice-president in its systems department.

They are: **Mitchell L. Claver**, a programmer in the Processor Support Division; **Lyanne E. Devine**, who manages software development for lending systems; **Stephen Gerth**, who manages a support program for internal software developers that provides operating areas with access to central computer information; **Melvin P. Hirsch**, who manages all of the corporation's international systems; and **L. Lee Lewis**, a project manager responsible for the acquisition and support of large computer systems.

Daniel Price has been promoted to an assistant manager in data services at the **Zurich Insurance Co.**'s U.S. branch, a member of the Zurich-American Insurance Group. Price joined Zurich-American in 1985 as a senior accounting analyst.

Previously, he had been a consultant for Deloitte Haskins & Sells. He graduated from the University of Illinois with a degree in accounting.

COMPUTER INDUSTRY

INDUSTRY INSIGHT

Alan Alper

Will M&D go on the block?

To some observers, Dun & Bradstreet Corp.'s recent sale of its Nomad line of fourth-generation language productivity tools was another indication that the $3 billion-plus conglomerate is losing its enthusiasm for the software products business.

Adherents of this analysis point to Dun & Bradstreet's acquisition of A. C. Nielsen Co. a couple of years ago as the watershed event in the firm's transformation into a broad-based provider of information and market research services.

The Nomad sale caused some observers to wonder whether the firm's remaining software products operation, McCormack & Dodge Corp., is a strategic fit — and some have speculated that M&D may eventually be sold.

To others, the disposal of Nomad to Thomson SA of France for roughly $17 million represented the sale of a technology that was late to market, had not captured a significant customer base and did not attain corporate revenue and profit goals. The sale of Nomad, proponents of this view say, had nothing to do with a corporate strategy of withdrawing from the software business, but rather, it was a classic economic decision.

Software still strategic

One thing is certain: Dun & Bradstreet has a tactical interest in software. Technology that helps Dun & Bradstreet enhance the delivery of its information and market research services is more than likely to continue to find its way into the conglomerate's hands.

But future Dun & Bradstreet acquisitions of companies that make their living selling software — be it applications or systems — seem out of the question. And Dun & Bradstreet's public statements do little to convince observers otherwise.

Bob Weissman, Dun & Brad-

Continued on page 62

Bridge, 3Com come out ahead

Analysts say LAN firms' proposed merger will boost users' migration paths

BY PATRICIA KEEFE
CW STAFF

ANALYSIS

The proposed $193 million merger of network vendors 3Com Corp. and Bridge Communications, Inc. will greatly expand the migration paths available to their separate customer bases, according to local-area network (LAN) market analysts.

3Com customers will benefit from Bridge's superior support capabilities, high-end networking products and interconnectivity into Digital Equipment Corp., AT&T Unix and Transmission Control Protocol/Internet Protocol environments, analysts said. In turn, Bridge will benefit from access to 3Com's 3+ network software, distribution channels and microcomputer LAN products, especially with terminal sales dropping.

"Bridge said it will try to incorporate 3+ into its network management software," said Douglas Whitman, a network analyst with Alex Brown & Sons, Inc. in San Francisco. "That's a key area," agreed 3Com Chairman Robert Metcalfe.

Ten days ago, LAN vendor 3Com, based in Santa Clara, Calif., and its OEM customer Bridge, located in Mountain View, Calif., announced a definitive agreement to merge in a tax-free swap of stock. Metcalfe said the two firms have discussed merger possibilities "off and on" for years.

3Com President Krause

3Com agreed to exchange 1.4 shares of its common stock for each of Bridge's outstanding 8.3 million shares, making the transaction worth about $193 million at current stock market valuation. The merged company is expected to have sales of $200 million in 1988, 1,000 employees and about $81 million in cash. Stockholders will vote on the merger in October.

Teaming with teamings

Communications mergers rage as vendors seek connectivity focus. Page 60.

Analysts have rallied around the prospective combined companies, which will continue operations under the 3Com name, although Bridge will operate initially as a separate subsidiary under Judith Estrin. Estrin, an executive vice-president at Bridge, will become a senior vice-president at 3Com. Estrin is married to Bridge President William Carrico and is a former student of 3Com Chairman Metcalfe.

Better position

The merger is being lauded by some as a joining of two profitable, high-growth firms with complementary product lines. The combined company is expected to be in a better position to challenge Ungermann-Bass, Inc., DEC and Sun Microsystems, Inc.

The buy-out of Bridge is 3Com's first acquisition since announcing its intent last month to pursue a strategy of purchases and strategic alliances.

3Com intends to introduce 10 products in 1988 and to more aggressively court corporate accounts. Bridge sells primarily into the Fortune 1,000 as well as large government and university sites.

Still, the pending buy-out caught many by surprise. As recently as a few months ago,

Continued on page 63

Storage Tech ends Chapter 11

BY JULIE PITTA
CW STAFF

LOUISVILLE, Colo. — Nearly three years after its filing, the industry's most celebrated case of protection under Chapter 11 of the Federal Bankruptcy Code came to an end last week.

Mainframe disk drive maker Storage Technology Corp. last week officially began the process of distributing the combination of cash, notes and stock that it agreed to repay its creditors, a spokeswoman said. The U.S. Bankruptcy Court approved Storage Technology's reorganization plan in June.

Under the plan, the company will pay back its estimated $800 million debt with $132.5 million in cash, $285 million in 10-year notes and the issuance of 192 million shares of common stock.

Storage Technology began to

Continued on page 62

Inside

- Former Wang exec joins Dataproducts. Page 60.
- Ungermann-Bass sales climb 59%. Page 60.
- Computer crime case revived. Page 63.

Data View

1987 second-quarter earnings

Most vendors are strong, but Storage Technology and Infotron post declines

Company	*Net income April-June (millions of dollars)*	*Percent change from 1986*	*Revenue April-June (millions of dollars)*	*Percent change from 1986*
Alliant Computer Systems Corp.	$1.7	+144	$13.3	+125
Britton Lee, Inc.[1]	($4.2)	—	$5.3	[illegible]
Comdisco, Inc.	$25.4	+29	$271.4	+9
Convergent Technologies, Inc.[2]	$0.13	—	$104.7	+19
Excelan, Inc.	$0.97	+79	$8.4	[illegible]
Informix Corp.	$1.1	+157	$9.1	+98
Infotron Systems Corp.	$0.16	-81	$20.5	-5
Mentor Graphics Corp.	$4.7	+106	$53.9	+25
Network Equipment Technologies Corp.	$2.9	+729	$17.3	+158
Sequent Computer Systems, Inc.	$1.2	+108	$9.1	+81
Storage Technology Corp.	$9.8	-36	$96.9	+16

Parentheses indicate loss
[1] Reported loss of [illegible] in 1986
[2] Reported loss of [illegible] in 1986

CW CHART

Sun finishes scorching year, passes $500M milestone

BY JAMES A. MARTIN
CW STAFF

MOUNTAIN VIEW, Calif. — Sun Microsystems, Inc. reported one of its strongest quarters to date last week and finished its fiscal year with more than $500 million in revenue.

In the fourth quarter ended June 30, Sun posted net income of $10.9 million, or 31 cents per share, up 98% from $5.5 million, or 19 cents per share, from the same quarter a year earlier.

Revenue for the fourth quarter was up 142% to $185.9 million from revenue of $76.7 million last year.

Sun closed the books on fiscal 1987 with revenue of $537.5 million, a 156% increase over the $210.1 million reported for fiscal 1986. Net income tripled, from 1986's $11.2 million, or 42 cents per share, to $36.3 million, or $1.11 per share.

Fourth-quarter revenue exceeded the expectations of both Sun and Wall Street analysts. "Their sales have been very impressive and were far ahead of everyone's expectations," said Peter Rogers, an analyst with Mabon, Nugent & Co., an investment consulting firm in New York. "The workstation market is growing only at one-third of Sun's pace, and Sun is about $50 million in revenue ahead of their nearest competitor, Apollo Computer, Inc.," he added.

Rogers said Sun's profit margins were slightly lower than anticipated, however, as a result of recent reductions in retail prices, the introduction of a new reduced instruction set computing-based system and increases

Continued on page 60

Mergers target connectivity

Recent focus fuels marriages of 3Com-Bridge, Tandem-NAS

An industrywide focus on connectivity has fueled a rash of strategic alliances and mergers in data communications during the past two years, as vendors strive to position themselves as providers of communications capabilities.

The ideal marriage is one between partners of equal and complementary strengths that combine to expand their impact on the market, said Richard Kimball, an analyst with Montgomery Securities in San Francisco. A good example is the recent announcement by 3Com Corp. in Santa Clara, Calif., and Bridge Communications, Inc. in Mountain View, Calif., of their intent to merge. 3Com will provide Bridge with personal computer networking while gaining gateways into larger networks (see story page 59).

Two CPU hardware vendors; Tandem Computers, Inc. and National Advanced Systems Corp. (NAS), recently jumped on the connectivity bandwagon by announcing strategic relationships designed to broaden their offerings.

Tandem branches out

Cupertino, Calif.-based Tandem leads the way with two investments: a minority interest in Netlink, Inc., a privately held developer of enhanced IBM Systems Network Architecture (SNA) hardware and software located in Raleigh, N.C.; and GTE Corp. subsidiary General Telephone Co. of the Northwest, Inc. in Everett, Wash.

Netlink and Tandem have agreed to jointly develop and market products to enhance integration between Tandem's Nonstop systems and IBM systems through the use of Netlink's SNA products.

"Our products will operate with Tandem systems serving as processors of transactions in distributed, often heterogeneous networks," said Paul Wood, Netlink's chief executive officer.

Tandem's pact with GTE-Northwest involves integrating each company's products into a comprehensive offering for the management of telecommunications within large organizations. Tandem said it plans to evaluate GTE-Northwest's Network Management Control Center system as a possible product for joint marketing.

Focus on turnkey products

Joint development of turnkey connectivity products is the goal behind a five-year agreement between NAS, a subsidiary of National Semiconductor Corp., and gateway vendor Interlink Computer Sciences, Inc., based in Fremont, Calif. NAS has taken a minority position in privately held Interlink, gaining the right to develop, design, market, lease or sell products based on Interlink technology for installation on NAS systems.

NAS sells Hitachi Ltd. mainframes on an OEM basis and has developed a product incorporating Interlink's software, which links Hitachi mainframes to Digital Equipment Corp. systems. Interlink's software links DEC and IBM MVS and VM systems and is ported to DEC PDP-11s and VAXs, which function as black boxes.

Separately, Counterpoint Computers, Inc. in San Jose, Calif., a manufacturer of multiuser workstations, and Italtel Societa Italiana Telecommunicazioni, Italy's largest manufacturer of telecommunications equipment, formed a strategic alliance to spur integration of their data communications and telecommunications products.

The alliance involves an OEM contract, joint product development and a future equity investment. Under the OEM contract, the state-owned Italtel will purchase $5 million to $10 million in Counterpoint equipment during the next three years.

PATRICIA KEEFE

INDUSTRY NOTES

IBM promotes three executives

IBM announced three promotions last week.

David E. McKinney, former vice-president of communications, was named senior vice-president and chief of IBM's corporate operations staff. McKinney was formerly president of the IBM World Trade Americas/Far East Corp.

John P. Cunningham Jr., formerly assistant group executive for plans and controls in IBM's Information Systems Technology Group, was named a vice-president.

Robert N. Mattson, IBM's former director of taxes, was named assistant treasurer for the firm.

Robert L. Doretti, the former head of U.S. operations for Wang Laboratories, Inc. who recently resigned from that company, was appointed executive vice-president of sales and marketing for **Dataproducts Corp.** last week. Dataproducts is a 25-year-old printer manufacturer that is based in Woodland Hills, Calif.

Computer Sciences Corp. (CSC) is protesting the State of California's award to **Electronic Data Systems Corp.** of a $122 million five-year contract to process claims in the state's medical insurance program.

"It was our determination that they were not a responsible bidder, based on their price structure and past performance," said Stan Rosenstein, project manager for the state's Medical procurement project.

El Segundo, Calif.-based CSC has processed claims in California since 1978. "We are nonplussed by the whole development," said Arthur B. Sims, president of CSC's Industry Services Group.

Separately, CSC reported that its profits for the first quarter ended July 3 grew by 42% from the like quarter last year. This year's first-quarter profits were $9.5 million, or 59 cents per share, on revenue that increased 17% to $274.6 million.

Maxtor Corp. in San Jose, Calif., recently announced the appointment of **George M. Scalise** as president and chief executive officer, replacing **James M. McCoy**, who will remain in his capacity as chairman of the board.

Scalise, 53, was formerly senior vice-president at Advanced Micro Devices, Inc. in Sunnyvale, Calif., where he most recently was involved in Japanese trade agreements. Scalise's strengths are said to be in marketing, manufacturing and finance, and he has served on Maxtor's board of directors for the past year.

McCoy, 40, a Maxtor founder, said it was his intention all along to "build a team that I could turn the management of the company over to." His focus reportedly will be on the company's strategic direction and planning.

Former disk drive maker **Computer Memories, Inc.** recently announced its intent to establish a $15.5 million settlement fund to compensate the plaintiffs in a 1984 shareholder suit. The fund will consist of stock and cash, of which $7 million will be paid by the company's directors' and officers' insurer.

Initially filed in September 1984, the suit alleged misstatements and omissions in an August 1983 stock offering prospectus. Plaintiffs sought $50 million in damages.

Chatsworth, Calif.-based Computer Memories was a promising drive maker until August 1985, when IBM opted not to renew the firm's contract as an OEM of hard disk drives. The loss of the IBM account and a resultant $18 million loss for that year drove Computer Memories out of the disk drive business in July 1986.

General Electric Co.'s **GE Information Services** division last week announced an agreement for the marketing of its network-based teleprocessing services by **ISI-Dentsu** to Japanese companies operating in the U.S.

ISI-Dentsu has formed a wholly owned subsidiary corporation called ISI-Dentsu of America, to be based in the U.S.

ISI-Dentsu has been a distributor in Japan of GE Information Services' teleprocessing services since 1971.

Under severe financial pressure caused by a lack of equity financing and a patent infringement lawsuit, **Lattice Semiconductor Corp.** in Beaverton, Ore., recently filed a voluntary petition for protection under Chapter 11 of the Federal Bankruptcy Code.

Lattice is struggling to shake its two-year losing streak, in which a $10 million equity placement fell through, payrolls went unpaid, bills mounted and top management was fired.

Matters grew worse as a result of a patent infringement lawsuit filed last fall against Lattice by **Monolithic Memories, Inc.**, which intimidated potential venture capital investors from coming to the former's rescue.

N I C K E L S & D I M E S

Ungermann-Bass, Inc. earned $1.2 million, or 7 cents per share, for the second quarter ended July 4, compared with a loss of $3.9 million, or 23 cents per share, in the second quarter of 1986. Sales rose 59% to $36.2 million from $22.7 million a year earlier.

IPL Systems, Inc. announced revenue for its second quarter ended June 27 of $1.15 million, compared with $564,000 last year. Profits were $383,000, or 8 cents per share, vs. $207,000, or 4 cents a share, for the like quarter in 1986.

Contel Corp. reported revenue for the second quarter ended June 30 of $745.6 million, compared with $775.4 million for the previous year. Net profits were $46.9 million, or 61 cents per share, down from $56.9 million, or 74 cents per share, last year.

Dataproducts Corp. announced revenue for the quarter ended June 27 of $77.4 million, compared with $84.4 million in the like period a year earlier. Income was $335,000, or 2 cents per share, down from $2.5 million, or 12 cents per share, last year.

Bridge Communications, Inc. reported revenue for its second quarter ended July 4 of $17.1 million, up 68% from the like period in fiscal 1986. Net income was $1.8 million, or 21 cents per share, up from $1 million, or 13 cents per share, reported for the like quarter last year.

Cypress Semiconductor Corp. reported revenue for the second quarter ended June 29 of $17 million, compared with $11 million last year. Net income was $3.5 million, or 9 cents per share, compared with $3.3 million, or 12 cents per share, last year.

Pyramid Technology, Inc. reported revenue for its third quarter of $13.7 million, compared with $10 million in the like quarter last year. Profits were $801,000, or 9 cents a share, compared with a loss of $2.1 million, or 27 cents a share, in the third quarter of 1986.

Sun

FROM PAGE 59

in research and development funding.

"Sun has been investing aggressively," said Scott McNealy, president and chief executive officer, in a prepared statement.

"We have entered a period of new product introductions unprecedented in Sun's history. We recently began manufacturing in a 156,000-sq-ft facility, and we are in the midst of a major expansion of our worldwide sales and support organizations," McNealy said.

Sun will spend 13% to 14% of its revenue during fiscal 1988 for developing products and enhancements, he added. The average annual industry research and development investment is about 8%.

Analysts said they expect Sun's fiscal 1988 sales to grow by 50% to 75%, while the workstation market should expand by 40% to 50%. Sun's sales will be spurred by an increased market as a result of lower prices, a strong product line and increased manufacturing capabilities, analysts said.

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1. **Industry** (check one only)

Non-computer related businesses

- ☐ 1. Aerospace
- ☐ 2. Agriculture, mining, construction, oil
- ☐ 3. Business consulting (non-computer related)
- ☐ 4. College/university
- ☐ 5. Elementary/high school
- ☐ 6. Engineering/architecture
- ☐ 7. Finance, banking, accounting, insurance, real estate
- ☐ 8. Government
- ☐ 9. Health/medical services
- ☐ 10. Legal services
- ☐ 11. Manufacturing
- ☐ 12. Military
- ☐ 13. Other business services
- ☐ 14. Publishing/advertising/public relations
- ☐ 15. Research & development
- ☐ 16. Retail/wholesale
- ☐ 17. Transportation, communications, utilities
- ☐ 98. Other (please specify) ______________________

Computer-related businesses

- ☐ 18. Computer consultants
- ☐ 19. Computer retail
- ☐ 20. Distributor/wholesalers
- ☐ 21. Manufacturer (computers, software, peripherals)
- ☐ 22. Service bureau
- ☐ 23. VAR/systems house/integrator
- ☐ 99. Other (please specify) ______________________

2. **Title** (check only one)

- ☐ A. Chairman/president/owner/partner
- ☐ B. Vice president
- ☐ C. Controller/treasurer/accountant
- ☐ D. Director/supervisor/manager
- ☐ E. Project manager/chief/group leader
- ☐ F. Art director/writer/creative head/technical writer
- ☐ G. Engineer/scientist
- ☐ H. Administrator
- ☐ I. Consultant/advisor
- ☐ J. Microcomputer specialist/manager/analyst
- ☐ K. Programmer
- ☐ L. Educator
- ☐ M. Professional (lawyer, doctor, etc.)
- ☐ Z. Other (please specify) ______________________

3. **Department or function** (check only one)

- ☐ A. Accounting/finance
- ☐ B. Administration/management/personnel
- ☐ C. Consulting
- ☐ D. Education/training
- ☐ E. Engineering/R&D
- ☐ F. Manufacturing/production
- ☐ G. Microcomputer center/office automation
- ☐ H. MIS/DP
- ☐ I. Purchasing
- ☐ J. Sales/marketing/distribution
- ☐ Z. Other (please specify) ______________________

4a. **Does your company own or lease any mainframe computers at this location?** ☐ Yes ☐ No

	Existing (quantity)	Plan to buy (quantity)
☐ 1. IBM		
☐ 99. Other (specify)		

4b. **Does your company own or lease any minicomputers at this location?** ☐ Yes ☐ No

	Existing (quantity)	Plan to buy (quantity)
☐ 1. IBM		
☐ 2. DEC		
☐ 3. Sun/Apollo		
☐ 99. Other (specify)		

5. **Does your firm have or plan to buy any of the following types of personal computers or microcomputer systems at your location?** ☐ Yes (indicate quantity below) ☐ No

Manufacturer	Currently own (quantity)	Plan to buy within 1-12mos	13-24mos
☐ 1. Macintosh 128/512			
☐ 2. Macintosh Plus			
☐ 3. Macintosh SE			
☐ 4. Macintosh II			
☐ 5. Apple IIe/IIc/IIGS			
☐ 6. IBM Compatible (Compaq, Tandy, etc.)			
☐ 7. IBM PC/XT/AT/RT			
☐ 8. IBM Personal System/2			
☐ 9. Sun/Apollo workstation			
☐ 99. Other scientific or engineering workstations (non-mini)			

6a. **Please indicate your involvement with each of the following types of personal computers or microcomputer systems** (check all that apply)

	Macintosh	Micros	Software	Networks & Peripherals
☐ 1. Approve purchase				
☐ 2. Develop/manufacture				
☐ 3. Evaluate/select vendor				
☐ 4. Own (at least one)				
☐ 5. Own (two or more)				
☐ 6. Purchase or acquire				
☐ 7. Establish specifications				
☐ 8. Recommend to others				
☐ 9. Sell				
☐ 10. Train people to use/or provide support				
☐ 11. Use				
☐ 12. No involvement				
☐ 99. Other (please describe by name and quantity)				

If you have no involvement with any of the above, skip to question 8.

6b. **For approximately how many total personal computers or microcomputer systems do you have the above involvement?** (check only one)

☐ A. 1-3 ☐ C. 10-19 ☐ E. 50-99 ☐ G. 500+
☐ B. 4-9 ☐ D. 20-49 ☐ F. 100-499

7. **For approximately how many Macintosh personal computers do you have involvement described in question 6 above?** (check only one)

☐ A. 1-3 ☐ C. 10-19 ☐ E. 50-99 ☐ G. 500+
☐ B. 4-9 ☐ D. 20-49 ☐ F. 100-499

8a. **How many people work at your location?** (check only one)

☐ A. 1-9 ☐ D. 100-499 ☐ G. 2500-4999
☐ B. 10-24 ☐ E. 500-999 ☐ H. 5000-9999
☐ C. 25-99 ☐ F. 1000-2499 ☐ I. 10,000 or more

8b. **How many people are employed by your entire company?** (check only one)

☐ A. 1-9 ☐ D. 100-499 ☐ G. 2500-4999
☐ B. 10-24 ☐ E. 500-999 ☐ H. 5000-9999
☐ C. 25-99 ☐ F. 1000-2499 ☐ I. 10,000 or more

9. **What percentage of people who work at your location actually use a personal computer?** (check only one)

☐ A. 1-24% ☐ C. 50%-74% ☐ E. None
☐ B. 25%-49% ☐ D. 75%-100%

10. **The personal computer purchased for this location would be** (check all that apply)

☐ A. for internal use ☐ B. for resale
☐ Z. Other (please specify) ______________________

11. **How are personal computers normally obtained for this location?** (check all that apply)

- ☐ A. direct from manufacturer
- ☐ B. manufacturer's representative
- ☐ C. distributor or wholesaler
- ☐ D. retail computer store
- ☐ E. mail order
- ☐ F. VAR/systems house
- ☐ G. In-house (company or university store)
- ☐ Z. Other (please specify) ______________________

12. **Personal computers or microcomputer systems at your location are or soon will be used for the following communications activities** (check all that apply)

- ☐ A. Communicate with internal company mainframe or mini
- ☐ B. Communicate with other micros via modem
- ☐ C. Communicate with outside mainframe or mini through service bureau, database or time-sharing service
- ☐ D. Local area network
- ☐ E. Voice data
- ☐ F. None of the above
- ☐ Z. Other (please specify) ______________________

13. **Are you involved in any of the areas shown below?**

☐ Yes (check all that apply) ☐ No
☐ A. Recommend ☐ C. Specify
☐ B. Influence ☐ D. Buy
(check all that define your involvement)

Software

- ☐ 1. spreadsheets
- ☐ 2. word processors outline processors
- ☐ 3. database management
- ☐ 4. accounting
- ☐ 5. statistics
- ☐ 6. communications networking
- ☐ 7. graphics
- ☐ 8. presentation
- ☐ 9. project management
- ☐ 10. desktop publishing
- ☐ 11. CAD CAM
- ☐ 12. programming language
- ☐ 13. back-up systems
- ☐ 14. utilities
- ☐ 15. other ______________

Peripherals

- ☐ 24. dot matrix printers
- ☐ 25. letter quality printers
- ☐ 26. plotter
- ☐ 27. laser printer
- ☐ 28. local area network
- ☐ 29. file server
- ☐ 30. optical disk
- ☐ 31. monochrome monitor
- ☐ 32. color monitor (standard)
- ☐ 33. hi-res color monitor
- ☐ 34. add-on board
- ☐ 35. external hard disk
- ☐ 36. internal hard disk
- ☐ 37. back-up systems
- ☐ 38. modem
- ☐ 39. other ______________

Computers

- ☐ 16. personal computers
- ☐ 17. multiuser microcomputers
- ☐ 18. laptop microcomputers
- ☐ 19. portable microcomputers
- ☐ 20. engineering workstation
- ☐ 21. minicomputers
- ☐ 22. mainframe computers
- ☐ 23. others ______________

Outside Services

- ☐ 40. on-line services
- ☐ 41. education training
- ☐ 42. maintenance
- ☐ 43. custom application
- ☐ 44. service bureau
- ☐ 45. other ______________

14. **Over the course of one year, how would you quantify your level of involvement in total microcomputer systems products?**

☐ A. Recommend ☐ C. Specify
☐ B. Influence ☐ D. Buy
(please check all that define your involvement)

- ☐ 1. less than $10,000
- ☐ 2. $10,000-$24,999
- ☐ 3. $25,000-$49,999
- ☐ 4. $50,000-$99,999
- ☐ 5. $100,000-$249,999
- ☐ 6. $250,000-$499,999
- ☐ 7. $500,000+
- ☐ 8. None of the above

(check only one)

5AAD4

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M&D on block?

CONTINUED FROM PAGE 59

street's president and chief operating officer, says he can't address the issue of the firm's software business strategy because the term "software" is not meaningful to his company. "To say you're in software is almost like saying you're in manufacturing," Weissman says. "The question is: What are you a manufacturer of?"

To make assumptions based on the sale of Nomad is, therefore, meaningless, Weissman stresses. Nomad, orginally a time-sharing system, got a late start in the market and never caught up with fourth-generation language market leaders Focus and Ramis, which are marketed by Information Builders, Inc. and On-Line Software International, Inc., respectively. Rather than reinvest in a maturing technology, Dun & Bradstreet decided to sell Nomad and invest the proceeds in its other businesses, Weissman says.

In contrast, Weissman says he sees opportunity for M&D. The $120 million Natick, Mass., firm is meeting its corporate financial goals, he says, noting that revenue grew by 30% last year.

Weissman disputes some analysts' assessments that M&D has not lived up to its parent company's lofty goal of overtaking Management Science America, Inc. (MSA) on a revenue basis. To look solely at MSA's revenue growth is unfair, he claims, because much of that increase has been achieved through acquisition and diversification into different application software segments.

"If you compare apples to apples, you'll find M&D gained market share substantially on MSA," he says. M&D "is a profitable business that is growing faster than the corporation on the whole."

Still, some analysts are unconvinced that M&D will remain with Dun & Bradstreet for the long haul. "I can't see, from a logical view, where it [M&D] fits. It just doesn't make any sense," says Tom Lawton, publisher of "The Computer Services Report," which is based in Belmont, Mass. "Maybe they're trying to get the earnings up so that it will make more money for them when they make the sale."

Besides subsidiaries Erisco and M&D, Dun & Bradstreet owns 40% of TSI International, Ltd., a Norwalk, Conn., on-line data entry software vendor that formerly operated as a wholly owned subsidiary. Interestingly, TSI has gone from a nonentity to a successful niche-oriented company since leaving the Dun & Bradstreet corporate fold.

Dun & Bradstreet's experience with Nomad and TSI may have taught the firm that it cannot effectively own, manage and effect the direction of small software operations. Dun & Bradstreet is making more money as a TSI shareholder than it did as an owner, notes Ernest Keet, president of Vanguard Atlantic Ltd., the investment and merchant banking firm that led the leveraged buy-out of TSI.

Keet was the Dun & Bradstreet software executive who arranged the purchase of M&D. He says he expects Dun & Bradstreet to continue investing in software technology that is synergistic with the rest of its businesses. "There was a software strategy when I was there, and I'm sure there still is one," Keet says.

But Dun & Bradstreet's Weissman remains noncommittal, leaving the door open for speculation as to just what his company's corporate goals are in the software business. "We're expanding where we've already been," Weissman says, "rather than going in a different direction."

Alper is *Computerworld*'s Mid-Atlantic bureau correspondent.

Storage Tech

CONTINUED FROM PAGE 59

stumble in 1983, the year in which it filed for protection from its creditors. Industry observers blamed the company's difficulties on a loss of focus. When Storage Technology filed for reorganization in 1984, it was the largest computer company to ever enter Chapter 11 protection.

"They ran in too many directions at once," said Robert Katzive, disk drive industry analyst for Disk/Trend, Inc., a Mountain View, Calif., market research firm.

"They got into the mainframe processor business — that was a disaster. They were developing a high-performance optical drive that they didn't have the resources to carry through. Once they stopped those activities, things started looking up," Katzive said. "They've gone back to doing what they do best."

Today, the company has four product lines that center around IBM-compatible disk and tape drives as well as a line of high-speed impact printers. Since filing for Chapter 11 protection, the company has slashed its work force from a peak of 16,000 to 8,500.

Additionally, the company has returned to the black, reporting earnings of $36.2 million on revenue of $696 million in 1986. In its most recent quarter, ended June 30, Storage Technology remained profitable, although earnings fell 36% from year-earlier levels to $8.8 million, or 4 cents per share. Quarterly revenue was up 16% to $95.9 million.

Storage Technology's reorganization was engineered by Ryal Poppa, appointed as chairman and chief executive in early 1985 to replace founder Jesse Aweida.

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Computer crime case revived

BY JEFFRY BEELER
CW STAFF

LOS ANGELES — In what appears to be an unprecedented computer crime case pending here, a computing services provider is battling charges that it altered its own system in an apparent attempt to frustrate a troublesome client.

The Los Angeles County District Attorney's Office has requested a hearing before the California Supreme Court to revive a case against BHI, Inc. for allegedly preventing Downey Schools Federal Credit Union from gaining access to financial data the credit union had stored in the computing services firm's system.

In a complaint that was originally filed in Los Angeles Municipal Court, BHI was accused of violating the state's computer crime law by deliberately changing the credit union's passwords without the customer's consent.

The decision to issue new passwords climaxed an already bitter contractual dispute between the two parties, according to Deputy District Attorney Steve Plafker.

Trial remains uncertain

But whether the matter will ever go to trial remains highly debatable. In May, an appellate court judge overturned a lower court's refusal to dismiss the case.

In granting the defense's earlier motion for dismissal, the Court of Appeals voiced serious doubts about whether the California legislature ever intended the state's computer crime law to apply to conduct such as BHI's.

Although the password changes were apparently calculated to "inconvenience, annoy and vex" the credit union, the computing services company's actions fell short of constituting a criminal offense, according to the court.

'Intriguing matter'

"No court in California has ever faced a case quite like this one," said BHI legal counsel Ed George, a private practitioner in Long Beach, Calif. "It's an intriguing matter and is being written up in all the legal books because of the novelty of the issues it raises."

California's penal code already outlaws unauthorized systems accesses by corporate employees and external intruders such as teenage hackers.

However, existing statutes fail to address the question that lies at the heart of the BHI case: Does the malicious use of systems resources qualify as a crime if the offender is also the hardware's owner?

Tracing roots

Filed in February 1985, the case traces its roots back to Downey Schools' decision to replace BHI with an alternative computing services supplier.

When efforts by the two sides to negotiate an interim services contract collapsed, one of the defendant's principals, Leslie Richard Mahru, reportedly instructed a subordinate to change the credit union's passwords without prior notification.

BHI counsel George defended the action. "They were merely trying to protect the integrity of the system so that if the credit union later brought in people who didn't know much about computers, they wouldn't screw up its data base," George said.

Whatever the motivation behind BHI's actions, the sudden issuance of new passwords forced the credit union to hire an independent consultant, who worked for four days before he could restore the client's access to its files.

Bridge, 3Com

CONTINUED FROM PAGE 59

Bridge was holding similar talks with 3Com rival and LAN software vendor Novell, Inc. in Provo, Utah. However, talks broke off after three months.

Also, 3Com has been exceedingly unlucky in previous merger attempts, which have included Sytek, Inc., Convergent Technologies, Inc. and Centram Systems West, Inc. 3Com's investment bankers scuttled the Convergent marriage at the altar, while Centram jilted its suitor to elope with Sun, a large 3Com OEM.

Room for two at the top?

Despite a generally positive assessment of the merger, some analysts question whether there is room in the combined venture for both Bridge's Carrico and 3Com President William Krause. Krause will be chairman and chief executive officer with Carrico as president of the firm.

Others have questioned 3Com founder Metcalfe's status. He will no longer be chairman, but he will remain on the board and continue as a senior vice-president. Metcalfe characterizes the chairmanship as a ceremonial position, and he stressed in an interview last week that he is happy directing product development.

There are also potential distribution conflicts to be resolved. 3Com sells exclusively through resellers, but larger, complicated networks typically require some direct sales involvement. There have already been problems with Bridge sales personnel and 3Com dealers calling on the same accounts, Metcalfe said.

In addition, it remains to be seen what role Bridge will play in 3Com's joint development of the OS/2 LAN Manager with Microsoft Corp. in Redmond, Wash.

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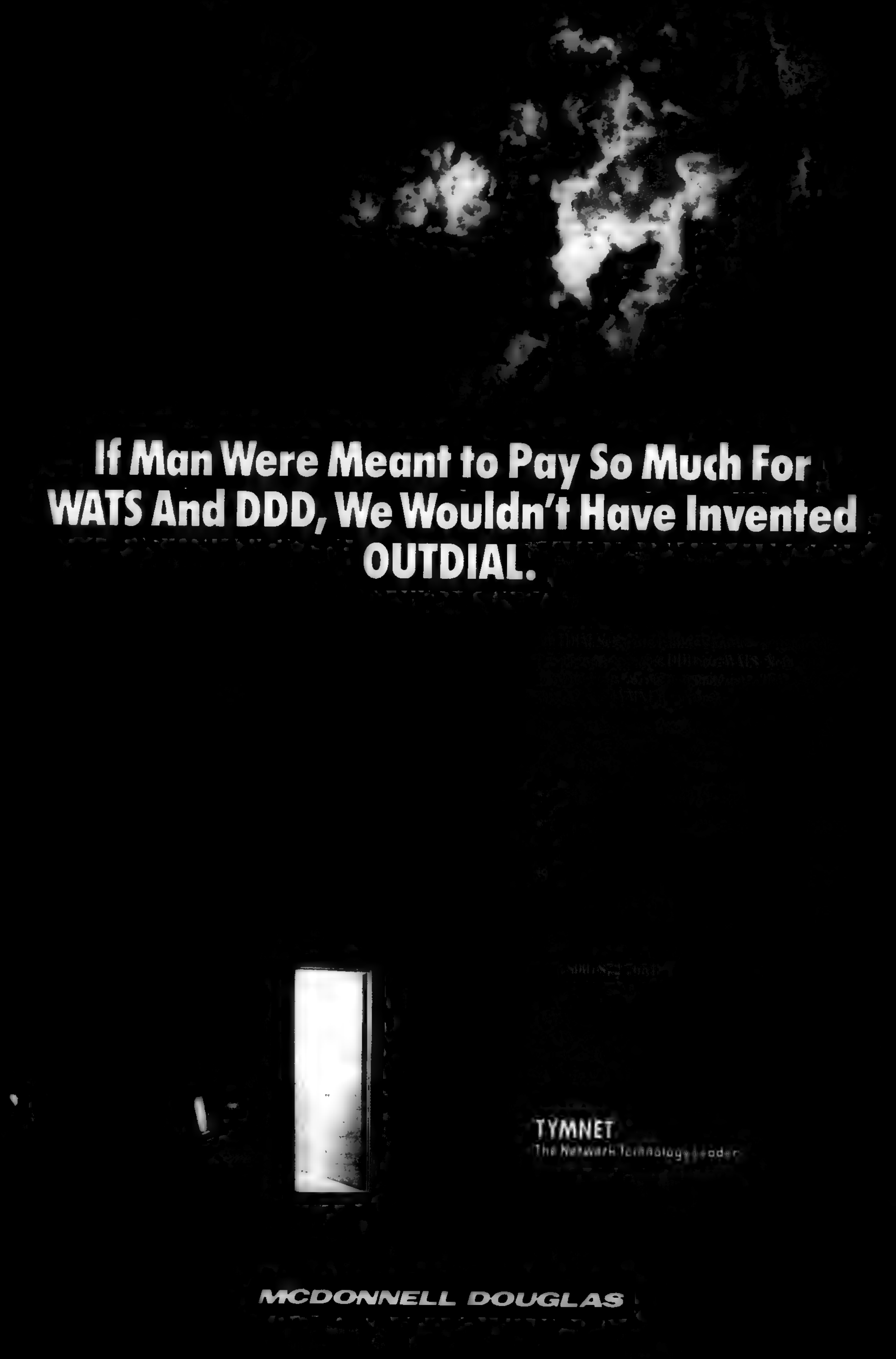

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EMPLOYMENT TODAY

Insurers stake claim on MIS

Seek qualified professionals to implement systems for competitive edge

BY DALE F. FARMER
SPECIAL TO CW

A rebirth of financial stability and employment growth is creating openings for MIS professionals in the insurance industry. Industry experts forecast growth of 15% to 25% for MIS personnel during the next two to five years.

Because of deregulated markets and high demand for new insurance services, opportunities for MIS are almost unlimited. "So far, the application of technology to sales and administrative services in insurance has just scratched the surface," says Dave Allen, executive vice-president at Lincoln National Corp. in Fort Wayne, Ind.

User acceptance of information technology in insurance is paving the way for new applications. Not too long ago, personal computers were used as stand-alone devices. Now, they are becoming integrated into the communications structure and allowing users to access mainframe data bases.

"We are reaching out to clients and to brokers who sell insurance," says Bill Skowyra, senior vice-president of MIS at Blue Cross/Blue Shield of Missouri in St. Louis. "We are now putting PCs in client offices so they can maintain their own files. This cuts costs for both Blue Cross and our clients."

Shopping for talent

Currently, insurance companies are seeking professionals with telecommunications experience, especially in the areas of local-area networks and micro-to-mainframe links. Large companies also want professionals with CICS experience to develop menu-driven mainframe applications. Programmers with advanced applications experience in data base management and artificial intelligence are also in demand.

Another crucial item on every employer's shopping list for MIS professionals is a good background in business and financial applications, preferably in insurance environments. "If you are a programmer with insurance applications experience, you could find a job in a lot of companies across the country," says John McFarland, data processing recruiter for Executive Life Insurance Co. in Los Angeles.

One way to gain this experience — other than working for an insurance company — is through trade associations, such as the Life Office Management Association. The group offers a series of certificate programs that provide experience and knowledge of different facets of the insurance industry.

While there are openings in many parts of the country, many of the best opportunities will be found in major financial districts, such as New York and Chicago, because of the large number of brokerage houses located there.

Insurance companies are also paying more for MIS expertise. In the past, these firms were considered training grounds that relied on poorly paid college students. This policy encouraged a high turnover rate. Currently, companies are offering higher salaries and better benefits to keep employees on the payroll longer.

"We have a staff of over 300, and our turnover rate is around one person per month. We are not cavalier about it, but we do have in-house training and are very selective in hiring. We accept only one out of every 27 applicants," Skowyra says.

According to figures supplied by Blue Cross/Blue Shield, a senior programmer/analyst can earn $26,000 to $40,000, while a systems programmer can make $29,000 to $44,000. Data base managers can take in $36,000 to $54,000, and MIS directors can earn from $54,000 to as much as $81,000.

But what are the real advantages of working in insurance? Because of constant changes in the marketplace, the DP operation provides many opportunities for creativity, McFarland says, "but the only problem is that there is a great deal of hard work and overtime required. If you are an eight-to-five programmer, an insurance industry shop is not for you."

Another attractive aspect of insurance operations is that companies are focusing on integrating information technology with the overall business. "The technology will be an integral part of the company," Allen says. "In many ways, we are starting at ground zero in these things. From my point of view, it is a fascinating, challenging and exciting business. But you had better be good, because it will take very, very good people to do this work."

> "FROM my point of view, it is a fascinating, challenging and exciting business. But you had better be good, because it will take very, very good people to do this work."
>
> DAVE ALLEN
> LINCOLN NATIONAL CORP.

In the future, insurance companies will be examining a wide variety of options that require employees with deep technical backgrounds. Programmers with experience in operating system internals will be in great demand.

Professionals with experience in imaging technology will also be sought. Some companies, such as Blue Cross/Blue Shield, are advancing themselves into an electronic-office complex. "We get 60% of our documents electronically," Skowyra says, "but for the other 40%, we need imaging, possibly using a teller machine. Current scanners are just too slow."

McFarland says that his company will need "lots of people with experience in CICS and telecommunications. There is a lot of opportunity because so many of our salespeople are on-line. We are also looking at video conferencing and point-of-sale terminals for the future."

The bottom line, Allen says, is that companies are looking for "innovative people. We need those who can walk on water and fly without wings. We need people who can do the work of three before breakfast. We just need the best."

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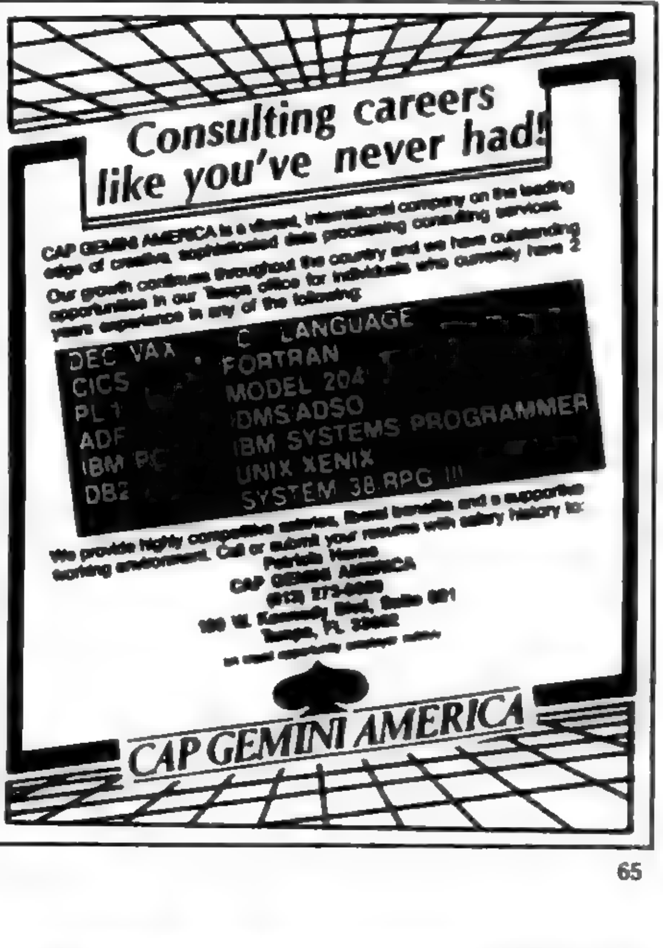

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"*Our clients are from varied interests — financial, food, high tech to mention a few,*" John explains. "*And most of them have at one time or another been looking for qualified data processing people. Our recommendation as to where to look? Not just in the local and national newspapers, but in Computerworld as well.*"

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Advanced Systems Division

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C9E3E840E2C5E5C5D9C1
D340D7D6E2C9E3C9D6D5
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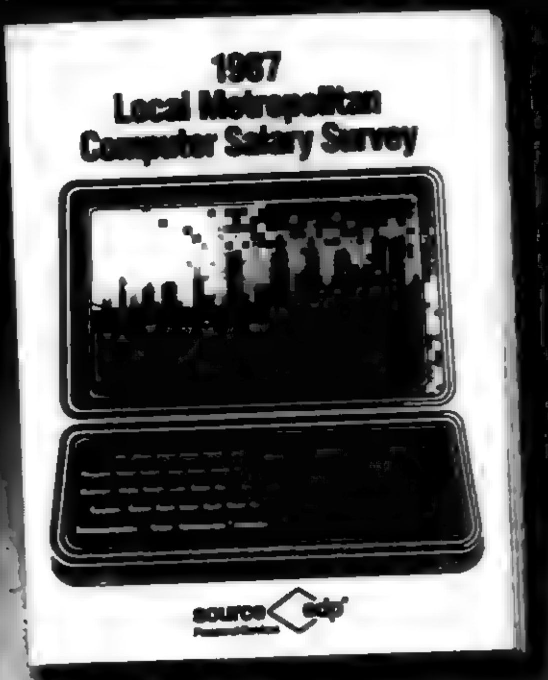

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Please call Dewey Raymond,
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Systems Analyst: 40 hrs/wk; 8 a.m. - 5 p.m., $28 000/yr. Job requires Master's degree in Computer Science. Job also requires, 1) 1 grad course in data structures, 2) 2 grad courses in operations research, and 3) 1 grad course in systems programming. Job duties: Design system specifications for Information Management Systems (IMS) - Database - Datacommunication (DB-DC) systems. Design detailed program specifications and code modules using IMS-DC and COBOL & computer languages. Test systems using Batch Testing System (BTS) and DLT 0 utilities. Design screens using Message Format Service. Implement computer systems and prepare for production. Train users in proper operation of newly developed systems. Modify and enhance software as required by customer. Using principles of operations research, improve data flow within data processing environment. Qualified applicants should send resume and verification of requirements to: 7310 Woodward Ave., Rm. 415, Detroit, MI 48202, Ref #40187. Employer Paid Ad.

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Analyze and design software for an Air Force Logistics Program. Also, assist in preparing system and program specifications. Requires a BSCS plus 5 years' experience with Honeywell mainframes, COBOL and Fortran. DoD clearance and experience with WWMCCS a plus.

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OPERATIONS MANAGER PS31-33 $39,394 - $41,988 PER ANNUM (BDA$ — US$) (Under Review)

The Data Processing Unit of the Bermuda Government provides a data processing service to all Departments of the Government, using a central IBM System/38 computer plus distributed microcomputers where appropriate. Applications are now invited for the position of Operations Manager.

The postholder will be required to schedule and manage the activities of the Operations Department staff and establish and maintain job schedules. Other areas of responsibility will include interviewing and selection of new staff, maintenance of personnel records, training recommendations and review of staff performance.

The postholder will be expected to ensure physical security of the computer site, evaluate equipment performance, maintain records of machine usage, report on machine capacity, maintain adequate supplies of consumables, and recommend and implement operational procedures which will improve efficiency, control, and security.

In conjunction with systems and programming staff, he or she will ensure integrity of data files progress and operation procedures, including the review of new systems to ensure adherence to standards and the authorizing and scheduling of implementation of these systems. In addition there may be other administrative functions as required and defined by the Controller.

The successful applicant will have had a minimum of three (3) years experience in Data Processing at the Management/Supervisory level and should possess the equivalent of a United Kingdom Higher National Diploma/Certificate. Preference will be given to candidates with a University degree in a numerate discipline.

At present, there is no personal income tax in Bermuda but the cost of living is high. Total non-refundable statutory deductions will amount to some 5% of gross salary. The cost of renting furnished accommodation could amount to 25% of gross salary and a housing subsidy may be payable. Return passage, baggage and settlement allowances will be provided. An employment contract for a period of three years service will be offered to the successful applicant.

Applications must provide full details of employment, academic and professional qualifications, relevant experience, personal information for immigration purposes, and the names of four referees (two professional, two character) and telephone numbers for confidential contact. Applications should be forwarded by air mail to the Secretary to the Public Service Commission, Global House, 43 Church Street, Hamilton HM12, BERMUDA to arrive not later than the 24th, August, 1987

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- **SENIOR PROGRAMMER-minimum of three to five years programming experience required.**
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Responsibilities: Manages the support program for research computing and the associated support personnel (3 PA-2 professionals) of the SUNY-Binghamton Computer Center Academic Support Group. Consults with faculty to estimate computer resources (hardware, software and dollars) needed for research projects. Coordinates documentation and consulting for users of the IBM 3090/180VF, the Cornell Theory Center, and the various external networks accessed by researchers; coordinates documentation and access to databases maintained for research purposes. Maintains awareness of available advanced workstations and data acquisition products.

Requirements: M.S. in Computer Science, Electrical Engineering or related discipline and 3-5 years of scientific programming experience. Some realtime data acquisition/control experience and one or more years experience as a software development team leader is also preferred.

Candidates selected for interview may be asked to present a seminar on a topic related to scientific or laboratory computing.

General Information: The Computer Center supports several IBM and DEC computers, a network of hundreds of terminal and personal computer workstations, and a large collection of software which runs on this equipment. As a member of the Academic Support Group, the incumbent will have high visibility in serving the University community of approximately 3,000 graduate students and 1,700 faculty and staff.

Submit letter of application with resume and names of 3 professional references by August 21, 1987, to Geraldine MacDonald, Computer Center, SUNY-Binghamton, Binghamton, NY 13901. Equal Opportunity/Affirmative Action Employer

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Design, program and install computer systems used for controlling automated numerically controlled turret punchpresses, Plasma machines and Laser machines, etc. These are machines used in the fabrication of sheet metal components. Each installation has a different set of specialized programs, revisions and configurations using Protopro, Proto-Optimizer, Protoverify and Cad/Cam computer systems.

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Job Order No.0808280, D.O.T 020.187.014. Report to: N.Y State Job Service, 1510 Fifth Ave., Bay Shore, N.Y 11706 or Job Service, closest to your home. Bring 3 copies of resume.

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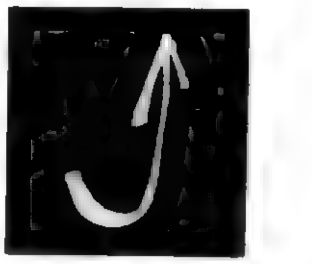

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Assist in the selection, installation and maintenance of Operating System related software in an IBM/OS-MVS and IBM/VM environment. Seek 8 years' data processing experience with 4 years' operating systems programming.

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Ability to analyze, design, develop and maintain on-line application systems in an IBM environment. Requires 2 years' analysis and 3 years' structured COBOL programming in an IBM/OS environment. CICS and DBMS experience preferred.

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GM-334-15

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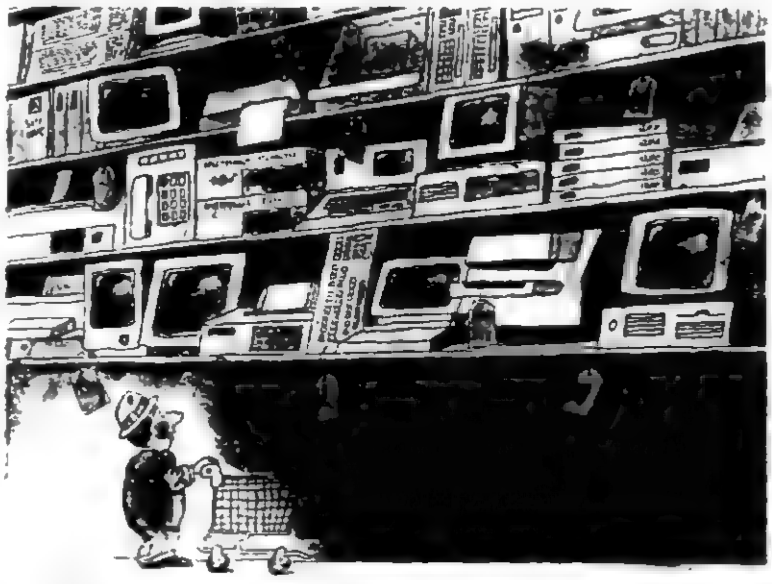

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Aug. 31	DBMS for Micros & Small Systems	Aug. 14
Sept. 14	DB2 Market	Aug. 28
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Sept. 28	Hardware Roundup: Small Scale Systems	Sept. 11
Oct. 5	Hardware Roundup: Micros	Sept. 18

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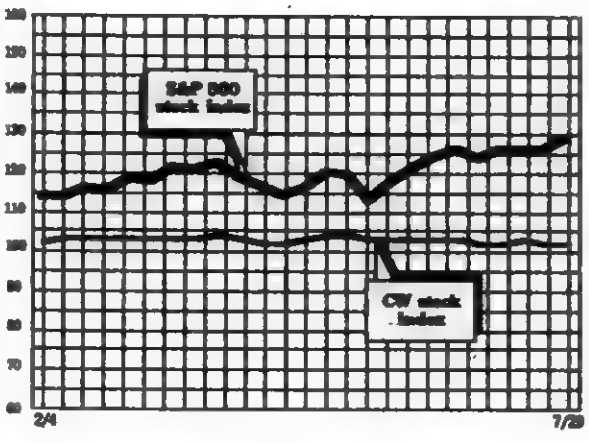

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Computer Systems	123.9	**123.6**
Software & DP Services	130.8	**131.6**
Semiconductors	115.0	**117.1**
Peripherals & Subsystems	116.8	**113.0**
Leasing Companies	120.4	**116.7**
Composite Index	103.2	**103.1**
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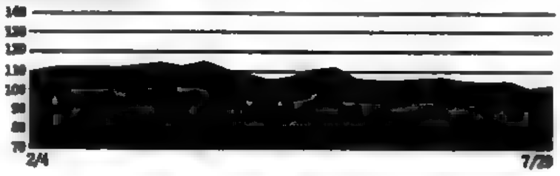
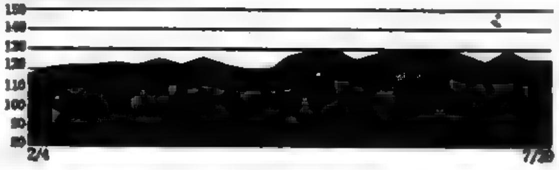
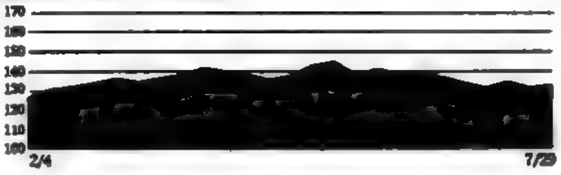
Communications



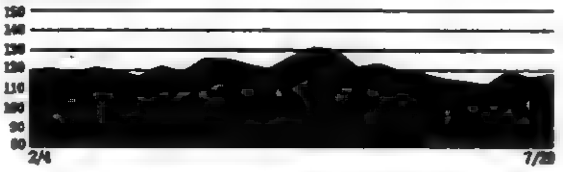
Computer Systems



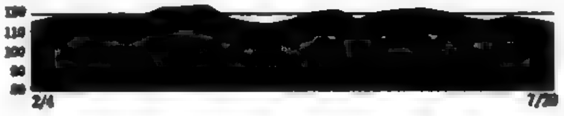
Software and DP Services



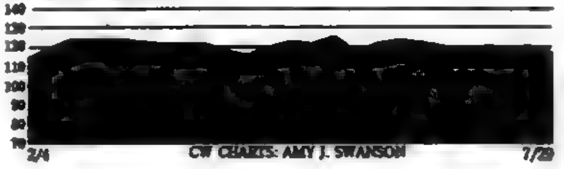
Semiconductors



Peripherals and Subsystems



Leasing Companies



CW CHARTS: AMY J. SWANSON

Computerworld Stock Trading Summary

CLOSING PRICES WEDNESDAY, JULY 29, 1987

Communications and Network Services

EXCH		52-WEEK RANGE (1)		PRICE CLOSE JULY 29 1987	WEEK NET CHANGE	WEEK PCT CHANGE
N	AMERICAN INFO TECHS CORP	101	77	87.88	+4.9	+5.9
O	ANDREW CORP	19	14	17.00	+2.0	+13.3
O	ARTEL COMM CORP	5	2	2.88	+0.0	+0.0
N	AT&T	33	22	32.38	+1.9	+5.7
O	AVANT GARDE COMP INC	7	3	3.00	+0.3	+11.4
O	AVANTEK INC	19	13	14.63	+0.6	+4.5
N	AYDIN CORP	38	18	32.63	-0.1	-0.4
N	BELL ATLANTIC CORP	77	62	67.50	+2.0	+3.1
N	BELLSOUTH CORP	40	35	38.00	+2.0	+5.4
O	BRIDGE COMMUNICATION	27	11	20.38	-0.6	-3.0
O	COMPRESSION LABS INC	13	4	4.88	-0.2	-3.8
O	COMPUTER NETWORK TECH	8	4	4.06	-0.2	-5.8
O	CONTEL CORP	39	27	33.25	+0.8	+2.3
O	DATA SWITCH CORP	9	5	6.38	-0.1	-1.9
O	DIGITAL COMM ASSOC	40	17	34.50	+0.0	+0.0
O	DYNATECH CORP	44	27	28.13	-1.5	-5.5
O	EQUATORIAL COMM CO	6	2	3.25	+0.0	+0.0
O	GANDALF TECHNOLOGIES	11	5	7.00	-1.3	-15.2
N	GENERAL DATACOMM INDS	14	8	8.88	+0.6	+7.6
N	GTE CORP	43	34	38.38	+1.0	+2.6
O	INFOTRON SYS CORP	13	7	9.00	+0.5	+5.9
N	ITT CORP	66	47	62.63	+0.6	+1.0
N	M A COM INC	16	12	15.63	+0.8	+5.0
O	MCI COMMUNICATIONS CORP	9	5	7.88	+0.4	+5.0
O	MICOM SYS INC	18	10	11.13	+0.8	+7.2
O	NETWORK SYS CORP	19	9	10.38	+0.1	+1.2
N	NORTHERN TELECOM LTD	24	14	22.00	+0.4	+1.7
O	NOVELL INC	27	9	18.50	-0.6	-3.9
N	NYNEX CORP	73	59	68.25	+1.8	+2.6
N	PACIFIC TELESIS GROUP	31	23	25.38	+1.1	+4.5
N	PARADYNE CORP	8	4	6.88	+0.0	+0.0
A	PENRIL CORP	6	4	4.50	-0.1	-2.7
N	PLESSEY PLC	41	24	34.00	-0.1	-0.4
N	SCIENTIFIC ATLANTA INC	20	9	16.75	-0.1	-0.7
N	SOUTHWESTERN BELL CORP	41	33	37.13	+2.1	+6.1
O	3 COM CORP	24	9	14.75	-1.8	-10.6
N	TIMEPLEX INC	41	14	33.00	+1.4	+4.3
O	UNGERMANN BASS INC	16	7	11.13	-0.5	-4.3
N	U S WEST INC	62	46	51.75	+2.0	+4.0

Computer Systems

EXCH		52-WEEK RANGE (1)		PRICE CLOSE JULY 29 1987	WEEK NET CHANGE	WEEK PCT CHANGE
O	ALLIANT COMPUTER SYS	37	16	20.25	+0.0	+0.0
O	ALPHA MICROSYSTEMS	7	3	5.00	-0.1	-2.4
O	ALTOS COMPUTER SYS	17	10	12.25	-0.3	-2.0
A	AMDAHL CORP	42	17	38.50	-0.3	-0.7
O	APOLLO COMPUTER INC	25	9	19.25	-0.8	-3.9
O	APPLE COMPUTER INC	46	18	41.00	-1.5	-3.5
N	BOLT BERANEK & NEWMAN	30	16	20.00	-19.3	-49.0
O	BRITTON LEE INC	5	3	2.50	-0.1	-4.8
N	COMPAQ COMPUTER CORP	51	13	47.00	+0.4	+0.8
O	COMPUTER AUTOMATION INC	17	2	11.75	-0.8	-6.0
A	COMPUTER CONSOLES INC	12	7	8.75	+0.4	+4.5
O	CONCURRENT COMP CORP	20	11	20.00	+1.8	+9.6
N	CONTROL DATA CORP DEL	35	20	27.63	-0.9	-3.1
O	CONVERGENT TECH	12	4	7.25	+0.0	+0.0
O	CONVEX COMPUTER CORP	22	8	14.00	-0.8	-6.1
N	CRAY RESH INC	136	69	101.88	+4.4	+4.5
O	DAISY SYS CORP	13	7	7.00	-0.6	-8.7
N	DATA GEN CORP	39	25	32.00	+2.1	+7.1
N	DATAPOINT CORP	9	4	6.13	-0.1	-2.0
N	DIGITAL EQUIP CORP	175	87	160.50	+2.0	+1.3
N	FLOATING POINT SYS INC	19	8	11.50	+0.5	+4.5
N	GOULD INC	23	16	23.13	+2.8	+13.5
N	HARRIS CORP DEL	43	27	34.50	-0.3	-0.7
N	HEWLETT PACKARD CO	67	37	62.00	+2.1	+3.5
N	HONEYWELL INC	88	58	82.75	-0.6	-0.7
N	IBM	170	116	161.50	+0.1	+0.1
O	INFORMATION INTL INC	17	13	14.25	-0.3	-1.7
O	IPL SYS INC	3	2	3.13	-0.1	-3.8
O	MASS COMPUTER CORP	10	5	8.50	+0.3	+3.0
O	MATSUSHITA ELEC INDL LTD	169	81	168.25	+21.0	+14.3
O	MEGADATA CORP	7	2	5.00	-0.3	-4.8
O	MENTOR GRAPHICS CORP	34	11	28.63	+0.3	+0.9
N	NBI INC	14	8	13.13	+0.3	+1.9
N	NCR CORP	80	42	78.25	+2.5	+3.3
N	PRIME COMPUTER INC	30	16	26.13	+0.1	+0.5
O	PYRAMID TECHNOLOGY	12	4	8.00	-0.3	-3.0
O	STRATUS COMPUTER	41	18	27.00	+0.5	+1.9
O	SUN MICROSYSTEM INC	48	11	35.25	-0.9	-2.4
O	SYMBOLICS INC	6	4	4.38	+0.5	+12.9
N	TANDEM COMPUTERS INC	38	16	28.88	+0.4	+1.3
N	TANDY CORP	56	31	46.38	+1.5	+3.4
N	ULTIMATE CORP	30	13	27.88	+0.6	+2.3
N	UNISYS CORP	132	65	129.38	+2.9	+2.3
A	WANG LABS INC	19	11	16.75	+0.5	+3.1

Software & DP Services

EXCH		52-WEEK RANGE (1)		PRICE CLOSE JULY 29 1987	WEEK NET CHANGE	WEEK PCT CHANGE
O	ADVANCED COMP TECH	6	3	3.63	+0.0	+0.0
N	ADVANCED SYS INC	25	12	23.00	-0.3	-1.1
N	AGS COMPUTERS INC	22	8	18.88	+2.3	+13.5
O	AMERICAN MGMT SYS INC	19	7	17.13	+1.1	+7.0
O	AMERICAN SOFTWARE INC	22	7	15.75	-0.1	-0.8
N	ANACOMP INC	10	3	9.88	+0.9	+9.7
O	ANALYSTS INTL CORP	9	3	7.25	-0.5	-6.5
O	ASHTON TATE	30	10	23.00	-1.8	-7.1
O	ASK COMPUTER SYS INC	17	10	13.38	+0.0	+0.0
O	AUTODESK INC	285	8	22.00	+0.0	+0.0
N	AUTO DATA PROCESSING	61	29	47.50	+0.8	+1.6
O	BOOLE & BABBAGE INC	11	4	11.00	+0.0	+0.0
N	COMPUTER ASSOC INTL INC	29	10	24.13	+0.3	+1.0
O	COMPUTER HORIZONS CORP	15	10	13.25	-0.8	-6.4
N	COMPUTER SCIENCES CORP	61	30	56.75	+3.9	+7.5
N	COMPUTER TASK GROUP INC	18	11	12.25	-0.3	-2.0
O	COMSHARE INC	28	11	24.00	-0.5	-2.0
N	CULLINET SOFTWARE INC	13	8	12.25	+0.3	+2.1
O	CYCARE SYS INC	12	7	8.63	+0.3	+3.0
O	DUQUESNE SYS INC	33	12	19.00	+3.0	+18.8
O	ENDATA INC	12	5	9.63	-0.3	-2.5
N	GENERAL MTRS (CLS E)	45	24	42.38	+0.4	+0.9
O	HOGAN SYS INC	17	9	13.63	+2.6	+23.9
O	INFORMIX CORP	23	7	19.00	-0.8	-3.8
O	INTELLICORP INC	11	4	7.00	-0.6	-8.7
O	REANE INC	10	5	8.00	+0.3	+3.2
O	LOTUS DEV CORP	37	9	30.50	-1.0	-3.2
O	MANAGEMENT SCI AMER	21	11	12.00	-0.4	-3.0
O	MICRO PRO INTL CORP	8	2	5.50	-0.3	-5.4
O	MICROSOFT CORP	128	26	98.25	-0.8	-0.8
O	NATIONAL DATA CORP	27	17	28.88	+1.9	+7.5
O	ON LINE SOFTWARE INTL INC	20	6	17.38	+0.8	+4.5
O	ORACLE SYS CORP	30	7	20.75	-0.8	-3.5
N	PANSOPHIC SYS INC	23	12	18.00	-1.0	-5.3
O	POLICY MGMT SYS CORP	30	15	23.50	-1.3	-5.1
O	PROGRAMMING & SYS INC	13	8	11.00	-0.5	-4.3
O	REYNOLDS & REYNOLDS CO	42	27	33.00	+0.0	+0.0
O	SEI CORP	18	8	15.75	-1.0	-6.0
O	SHARED MED SYS CORP	53	23	25.38	-2.6	-9.4
O	SOFTWARE AG SYSTEMS INC	20	10	12.50	-0.8	-5.7
O	SOFTWARE PUBG CORP	17	5	9.25	+1.1	+13.8
A	STERLING SOFTWARE INC	19	9	9.88	-0.3	-2.5
O	SUNGARD DATA SYS INC	21	10	18.00	-0.3	-1.4
O	SYSTEMATICS INC	30	14	26.25	+0.0	+0.0
N	UCCEL CORP	45	19	40.75	+1.0	+2.5
N	URS CORP	21	13	18.50	+0.3	+1.4
O	VM SOFTWARE INC	46	15	17.50	+0.5	+2.9

Semiconductors

EXCH		52-WEEK RANGE (1)		PRICE CLOSE JULY 29 1987	WEEK NET CHANGE	WEEK PCT CHANGE
N	ADV MICRO DEVICES INC	25	13	17.88	+1.0	+5.9
N	ANALOG DEVICES INC	24	14	21.50	+0.3	+1.2
O	ANALOGIC CORP	13	10	12.00	+0.1	+1.1
O	INTEL CORP	51	16	47.25	+0.8	+1.6
O	LSI LOGIC CORP	17	8	10.63	+0.6	+6.3
O	MONOLITHIC MEMORIES INC	19	10	15.25	+1.0	+7.0
N	MOTOROLA INC	64	34	56.75	+1.6	+2.9
N	NATL SEMICONDUCTOR	17	8	12.88	-0.2	-1.9
N	TEXAS INSTRS INC	68	34	58.75	-0.8	-1.3
A	WESTERN DIGITAL CORP	33	12	28.50	-1.3	-4.5

Peripherals

EXCH		52-WEEK RANGE (1)		PRICE CLOSE JULY 29 1987	WEEK NET CHANGE	WEEK PCT CHANGE
N	AM INTL INC	9	5	7.63	+0.5	+7.0
O	AST RESH INC	25	11	15.00	+0.3	+1.7
O	AUTO TROL TECH CORP	9	3	6.50	+0.0	+0.0
O	BANCTEC INC	16	8	12.50	+0.0	+0.0
O	CIPHER DATA PRODS INC	18	8	10.00	-0.3	-2.4
A	COGNITRONICS CORP	5	2	3.88	+0.0	+0.0
N	COMPUGRAPHIC CORP	24	16	23.50	+0.3	+1.1
N	COMPUTERVISION CORP	23	11	15.00	+0.0	+0.0
N	CONRAC CORP	30	12	0.00	-27.3	-100.0
A	DATAPRODUCTS CORP	16	10	11.13	+0.0	+0.0
A	DATARAM CORP	10	7	7.25	+0.0	+0.0
N	DECISION INDS CORP	13	7	12.00	-0.5	-4.0
N	EASTMAN KODAK CO	94	52	93.88	+5.1	+5.8
O	E M C CORP MASS	34	11	28.75	-2.8	-8.7
O	EMULEX CORP	10	6	7.63	+0.0	+0.0
O	EVANS & SUTHERLAND	40	20	30.00	-0.5	-1.6
O	ICOT CORP	13	5	6.38	+0.0	+0.0
O	INTERLEAF INC	20	8	15.88	-1.0	-5.9
O	IOMEGA CORP	12	2	3.13	+0.0	+0.0
O	LEE DATA CORP	10	5	5.13	+0.1	+2.5
O	MASSTOR SYS CORP	6	2	5.44	-0.3	-6.4
O	MAXTOR CORP	34	12	14.13	-1.8	-11.0
O	MICROPOLIS CORP	44	14	32.00	-3.6	-10.2
O	MINISCRIBE CORP	18	5	12.75	-0.4	-2.9
N	MINNESOTA MNG & MFG CO	73	50	72.25	+2.5	+3.6
A	MSI DATA CORP	19	10	18.00	+0.9	+5.1
O	PRIAM CORP	6	2	3.50	-0.1	-3.4
O	PRINTRONIX INC	14	10	11.25	-1.3	-10.0
N	QMS INC	22	11	19.00	+0.0	+0.0
O	QUANTUM CORP	36	15	17.00	+1.0	+6.3
O	RAMTEK CORP	6	4	5.00	+0.0	+0.0
N	RECOGNITION EQUIP INC	27	10	18.63	-0.3	-1.3
O	REXON INC	14	5	9.25	+0.3	+2.8
O	SCAN TRON CORP	17	11	12.50	+0.0	+0.0
O	SEAGATE TECHNOLOGY	46	11	27.00	-1.6	-5.7
N	STORAGE TECH CORP	6	2	3.63	+0.0	+0.0
O	TANDON CORP	7	2	4.88	-0.4	-7.1
A	TEC INC	7	3	5.25	+0.1	+2.4
N	TEKTRONIX INC	43	28	37.50	-0.4	-1.0
O	TELEVIDEO SYS INC	3	2	2.38	-0.1	-5.0
N	TELEX CORP	102	53	65.00	-2.3	-3.3
O	WYSE TECH	35	13	31.38	+1.1	+3.7
N	XEROX CORP	81	51	74.50	+2.0	+2.8
O	XIDEX CORP	20	11	12.88	+0.0	+0.0

Leasing Companies

EXCH		52-WEEK RANGE (1)		PRICE CLOSE JULY 29 1987	WEEK NET CHANGE	WEEK PCT CHANGE
N	COMDISCO INC	33	15	29.50	+0.5	+1.7
N	CONTINENTAL INFO SYS	14	7	10.50	-0.8	-6.7
O	PHOENIX AMERN INC	8	3	4.25	-0.4	-8.1
O	SELECTERM INC	7	5	5.63	-0.4	-6.3
N	U S LEASING INTL	53	38	52.63	+2.1	+4.2

EXCH: N—NEW YORK; A—AMERICAN; O—NATIONAL;
O—OVER-THE-COUNTER; S—SPLIT

O-T-C PRICES ARE BID PRICES AS OF 3 P.M. OR LAST BID
(1) TO NEAREST DOLLAR

Wallflower

High tech stays on fringe of market's week-long bash

The overall stock market had a party last week, and while the computer industry got to dance a little bit, it wasn't invited to the main festivities.

While the Dow Jones industrial average soared to new highs and other market indicators also climbed, most leading computer stocks registered only modest gains. The week's activity indicated that investors are remaining cool to high-tech stocks after those stocks' surge in the last several months.

That trend was particularly true of Compaq Computer Corp. and Sun Microsystems, Inc., which both reported outstanding quarterly results. But Sun gained only 1¼ points to 36⅛ in four days of trading, while Compaq fell ½ of a point to close Thursday at 46½.

The lackluster pattern was reflected in the stocks of IBM, up 1½ points to 162⅜; Digital Equipment Corp., unchanged at 162½; NCR Corp., up 2¼ points to 78⅜; Apple Computer, Inc., down 1 point to 41½; Apollo Computer, Inc., up ⅜ of a point to 19⅜; Data General Corp., up 1¼ points to 32½; and Microsoft Corp., down 1½ points to 97.

CLINTON WILDER

Users heeding COS call-up

Consortium's campaign attracts federal, civilian heavyweights

BY MITCH BETTS
CW STAFF

MCLEAN, Va. — A recent campaign by the Corporation for Open Systems (COS) consortium to attract more users as members is starting to pay off, although users are still outnumbered by vendors by a ratio of more than 2-to-1.

In recent weeks, COS has signed up Morgan Guaranty Trust Co. of New York; the Defense Communications Agency, which is part of the U.S. Department of Defense; and the National Communications System, a federal office that oversees military and civilian communications during national emergencies.

Moreover, sources said the National Bureau of Standards, representing all civilian federal agencies, is expected to officially join COS in the next few weeks. The agency may join either as a full member or as an "alliance associate," like the MAP/TOP Users Group.

COS is a consortium started by vendors to speed up the development of products that meet Open Systems Interconnect and other standards for systems interoperability. The group will also test product compliance with the standards.

The recent additions bring COS membership to 68, including 46 vendors and 19 voting members from the user community. With users making up 28% of the membership, COS is still short of its goal of 50% user membership.

MIS unconvinced

Several corporate MIS and communications managers interviewed last week said either they had not heard about COS or that they saw no compelling reason to spend $25,000 for full membership.

"The issue we'd have to consider, besides the money to join, is setting aside the resources [such as a staff member] to participate and make it worthwhile," said Bernard J. Survoy, assistant vice-president of technical support for Ameritrust Co. in Cleveland.

Survoy and other MIS executives said the high cost of joining COS, in terms of dues and staff time, would limit COS membership to only the very largest corporations in the country.

Current user members of COS include such corporate giants as General Motors Corp., Du Pont Co., Citicorp, Aetna Life & Casualty Co., Procter & Gamble Co., Eastman Kodak Co. and Dow Chemical Co.

Testing the waters

Sources said that two major network users organizations, the International Communications Association (ICA) and the Tele-Communications Association, are considering joining COS, but only as affiliate members.

Affiliate members pay dues of $500 a year but cannot vote or attend the COS Strategy Forum meetings at which policy is established. Full voting members pay dues of $25,000 to $200,000 and must be either profit-making businesses or government agencies.

ICA and COS officials met last week to discuss ICA membership. "We want to see what this $500 affiliate membership will do for us," said Chester Bellairs, the former ICA president who is negotiating with COS.

"We know we'll get mailings and updates on issues, but we'll have no vote or real participation when they meet," Bellairs said, expressing concern that affiliate members will have little clout in the organization.

Newsletter dialogues

Ted Manakas, information products manager at COS, defended the affiliate membership as an information exchange program that allows affiliates to make comments in the COS newsletter and receive COS responses. Furthermore, he said, COS is planning an annual affiliates' conference to foster a dialogue between the affiliates and the COS Strategy Forum.

"It's better to be in the process in some form than out of the process," Manakas stressed. He expressed hope that corporate members of associations that are COS affiliate members will consider "stepping up" to full COS membership once they see the value of participating in COS.

Manakas said COS has a concerted recruitment program aimed at companies from particular industries, such as banking and insurance. For example, it is easier to persuade a bank to join, he said, when he explains the consortium's high-priority projects include security and transaction-processing standards.

Graphics manager tool arrives

BY JAMES A. MARTIN
CW STAFF

TORRANCE, Calif. — Ashton-Tate last week introduced its Master Graphics Presentation Pack, a $595 software package that combines three graphics management packages with a common menu interface.

Master Graphics consists of Chart-Master, Sign-Master and Diagram-Master, packages that Ashton-Tate acquired last year from Decision Resources, Inc. in Westport, Conn. The software is available in 5¼-in. format for IBM Personal Computers and compatibles with a minimum of 384K bytes of random-access memory and in 3½-in. format for the Personal System/2 models.

The Master Graphics Presentation Pack, available now, features one "umbrella" menu that enables hard-disk users to install the three graphics packages at one time. A hard disk is required to use the master menu, an Ashton-Tate spokeswoman said.

Master Graphics reportedly supports seven type styles in 16 sizes, 94 business symbols and italics, color and underline highlighting. Approximately 130 printers, plotters and film recorders are supported.

Link for flexibility

Combining the three packages is "an excellent idea," said Diane Schlottmann, a graphics product specialist with Marine Midland Bank NA in Buffalo, N.Y., and a user of all three graphics products. "Marrying those packages would save us time and give us a great deal more flexibility for our graphics needs," she added.

The trio of graphics products in Master Graphics is "fun to work with, easy to use and trouble-free," said James Karl, office automation systems manager for Owens-Corning Fiberglas Corp. in Wayne, Pa. "Together, it's a complete program."

Chart-Master is said to enable users to create bar, area, scatter and pie charts for business reports and proposals. Data can be accessed from Ashton-Tate's Dbase or Lotus Development Corp.'s 1-2-3 spreadsheet program.

Sign-Master creates word charts for outlines and summaries, and Diagram-Master is used for creating Gantt charts and customized diagrams.

The three software packages will continue to be sold individually in both 5¼- and 3½-in. formats. A fourth Master Graphics package, Map-Master, is available separately.

AST reworks printer

Says Turbolaser meets Laserjet for $600 less

IRVINE, Calif. — AST Research, Inc. last week announced a version of its Turbolaser printer that it said offers the same capabilities as the Hewlett-Packard Co. Laserjet II printer for $600 less.

The 8 page/min Turbolaser/EL incorporates a Ricoh Corp. 4081 engine that reportedly can handle 5,000 to 10,000 pages per month and has a life expectancy of 600,000 copies.

The printer also includes AST's Laser Printer Controller, an IBM Personal Computer expansion board that enables HP Laserjet and Diablo Systems, Inc. Diablo 630 emulation.

The printer, priced at $1,995 and scheduled to be available in September, is said to offer a variety of configurations appropriate to either low-end word processing or computer-aided design applications.

AST said three upgrade kits will be available, including a 512K-byte memory upgrade for $395 and the $995 XL Language Option, which includes Diablo 630 and HP Graphics Language emulation.

The Adobe Systems, Inc. Postscript option is available for $2,495. It includes three communications channels for RS-232C serial, RS-422/Apple Computer, Inc. Appletalk serial and Centronics Data Computer Corp. parallel ports. The Postscript option also offers 35 printer-resident Adobe fonts, AST said.

Twelve additional font packages are available for $199 each.

VAX 8000 line upgraded

MERRIMACK, N.H. — Digital Equipment Corp. provided growth paths last week for its VAX 8000 series users with the long-expected announcement of upgrades for four models.

DEC had been promising the upgrades to customers for several months [CW, May 4]. The announced growth paths let users move from the VAX 8200 to the 8250 or dual-processor 8350, from the 8530 to the 8550 and from the 8700 to the dual-processor 8800.

The "50" models were announced in March.

Starting prices for the VAX 8000 series upgrades range from $34,000 for an 8250-to-8350 upgrade to $336,000 for a 8700-to-8800 conversion.

Apple to announce Juggler; seen as response to PS/2

BY PATRICIA KEEFE
CW STAFF

BOSTON — Apple Computer, Inc. is expected this week to announce a multitasking extension to its Finder operating system that will be positioned as Apple's official response to IBM's Personal System/2, sources said.

Apple will unveil the operating system extension, which is code-named Juggler and scheduled for a September delivery, at this week's Seybold Conference on Desktop Productivity, sources close to the company said [CW, July 6].

At Macworld Expo here next week, Apple is expected to follow up with the release of a slew of connectivity products, including a version of Appletalk with speeds up to 1M to 2M bits.

In October 1986, Apple Chairman John Sculley said Apple would devote the following 18 months to delivering IBM-compatible communications.

What to look for

Among the expected introductions are the following:

- A faster, intelligent Appletalk running on unshielded twisted-pair and able to accommodate a mixture of slow and fast Appletalk by adjusting the data transmission rate.
- Software for the Appletalk PC adapter card, which was introduced earlier this year. PC Appleshare is said to resemble Centram Systems West, Inc.'s TOPS and to allow IBM computers to fully participate on Appletalk.
- Ethertalk, which was announced in January. It consists of cards from 3Com Corp. and Apple software that connects Mac users to Ethernet.

3Com will follow with its own Ethernet card for Appletalk, priced significantly less than the Apple product, a 3Com executive said.

- A letter-quality upgrade to the Imagewriter II featuring a Toshiba Corp. engine, a 24-pin dot matrix printer, improved speed and resolution and the ability to handle complex graphics.

The Imagewriter LQ will serve as a bridge between the older model and a new Laserwriter slated for a fall introduction.

- Two facsimile modems running at 9.6K bit/sec.; an onboard device for the Mac II and an add-in card for the Mac SE.

West Coast bureau chief Kathy Chin and West Coast correspondent Julie Pitta contributed to this report.

Compaq sales robust, still unscathed by PS/2

BY ED SCANNELL
CW STAFF

HOUSTON — Compaq Computer Corp.'s sales appeared to be relatively unaffected by IBM's Personal System/2 line as the company last week reported record revenue and earnings figures for this year's second quarter.

Compaq said earnings rose to $31 million, a 219% increase over last year's second-quarter earnings, while sales rose 82% to $268 million. The company reported revenue and earnings for the first six months of this year of $478 million and $51 million, respectively.

"It looks like Compaq has done extraordinarily well" since the introduction of the PS/2 series in April, said Harvey Allison, an analyst with Wertheim, Schroder & Co. in New York. "The only question mark in Compaq's remarkable sales growth is whether they are serving as a substitute for IBM offerings that have been pulled back or can't be built fast enough."

Strength test

Some analysts said they think the true test of Compaq's strength will come sometime next year, when IBM stops producing most of its existing Personal Computer XT and AT systems and devotes its marketing and manufacturing efforts to the PS/2 line.

Earlier this year, IBM announced that it would stop production on all models of its XT and AT lines with the exception of the PC XT/286 and PC AT/339.

In June, William Lowe, president of IBM's Entry Systems Division, said there was no date set for when IBM would stop producing the XT/286 and AT/339 but that he was consulting with corporate accounts and dealers to see how many more of the systems they wanted.

Lowe also said that as of mid-June, IBM had shipped 250,000 PS/2s. Analysts said, however, that most of those shipments were PS/2 Model 30s, which contain the industry-standard architecture and not the Micro Channel architecture IBM hopes to create as the new standard.

Compaq's impressive second-quarter growth is attributed largely to its two latest products, the Compaq Portable III and the 12-MHz version of its Deskpro 286, according to company President and Chief Executive Officer Rod Canion. He said the two products have become the most successful the company has ever produced.

The other product contributing significantly to Compaq's second-quarter revenue was the Deskpro 386, Canion said.

Compaq shipped an estimated 90,000 units during the second quarter, according to Michael Geran, an analyst with E. F. Hutton & Co. "We had expected a strong quarter [from Compaq], but we got an excellent quarter," Geran said.

At an analysts' meeting in New York last week, Compaq officials said they do not see a compelling reason to develop a system compatible with the PS/2's Micro Channel. They indicated, however, that they would provide systems compatible with the PS/2's Video Graphics Array and 3½-in. disk drives if customer demand is great enough.

Microsoft buys Forethought

Cements grip on Mac applications market with purchase of developer

BY PATRICIA KEEFE
CW STAFF

REDMOND, Wash. — Microsoft Corp. last week acquired Forethought, Inc., a third-party developer of applications for Apple Computer, Inc.'s Macintosh, for $14 million in cash and designated the firm as its new Graphics Business Unit.

Analysts lauded the transaction as a big plus for both Microsoft, which gains a foothold in the emerging presentation graphics market, and Apple, which is assured of Microsoft's continued interest in developing for the Macintosh.

The purchase cements Microsoft's grip on the Macintosh applications market, observers said. Prior to buying Forethought, Microsoft controlled an estimated 50% of the Mac software market as well as three Mac product categories.

Product lead

Jeff Raikes, Microsoft's director of applications development, claimed the addition of the two Forethought products — Filemaker Plus, a low-end data base, and Powerpoint, a presentation graphics application — gives Microsoft the lead in five Macintosh product categories.

Under the agreement, the Sunnyvale, Calif.-based Forethought will serve as a Silicon Valley development and marketing facility for a new generation of graphics-based applications.

Microsoft said it will begin reselling the $395 Powerpoint package almost immediately. Negotiations are reportedly under way with the developer of Filemaker Plus for the transfer of exclusive marketing rights from Forethought to Microsoft. Microsoft will continue to sell its own File program, but marketing emphasis will shift to Filemaker Plus, Raikes said.

Rob Campbell, Forethought's president and chief executive officer, said he will stay with Microsoft temporarily as a senior consultant to ensure a smooth transition and bring Microsoft up to date on desktop graphics.

Pansophic ties data tool to DB2, SQL

BY JEAN S. BOZMAN
CW STAFF

OAK BROOK, Ill. — Pansophic Systems, Inc. announced an interface last week that it said will tie its widely installed Easytrieve Plus data retrieval package to IBM's DB2 relational data base management system and to IBM's SQL/DS query language.

The interface is expected to offer Easytrieve Plus's installed base of 4,800 sites a means to access data from IBM's relational DBMS products through programs developed with Easytrieve. "We've jumped on the SQL bandwagon," said Ken Bowden, product manager of Easytrieve Plus. "Now, Easytrieve Plus has access to all of the standard IBM file structures, including DB2 and IMS."

Pansophic also said it plans to incorporate the SQL standard throughout its product line, as has already been done with the company's Telon applications generation product.

The DB2 SQL/DS Interface is available immediately for all IBM mainframe operating system environments, including MVS, MVS/XA, DOS/VSE and VM. The price for MVS, MVS/XA, VM/CMS and OS/VS users is $15,000, while the price for DOS and DOS/VSE users is $12,000. Those prices are in addition to Easytrieve Plus, which is separately priced at $27,000 for large systems and $21,000 for DOS and DOS/VSE users.

Customization

Pansophic said that by covering all major IBM environments, Pansophic's open architecture "will enable user enterprises to customize and extend data base software implementations."

"You can code any SQL statement in Easytrieve Plus in the same way you would do it in Cobol," Bowden said. "Productivity gains come from the fact that the Easytrieve language requires fewer lines of code to get the same job done."

A prime example is an SQL look-alike statement, called Select, that will deliver full SQL/DS functionality. The often-used Select statement automatically generates five standard SQL statements, reducing the complexity of query commands.

The enhancements to Easytrieve Plus on the mainframe are complemented by functions in the personal computer version of Easytrieve Plus and in the Corporate Tie micro-to-mainframe link, Pansophic said. "Users can write their applications on their PC and execute them on the mainframe," Bowden said.

Twisted-pair

FROM PAGE 1

media, have no room for new wire and literally do not know where some wires go, said Jim Rosen, vice-president of research and development for New York-based network reseller LAN Systems, Inc., also a Synoptics beta-test site.

At the same time, many users are trying to formulate corporatewide networking strategies, and some are rejecting out of hand any network that requires new wiring. Analysts said this resistance has forced major Ethernet vendors to jump on the telephone wire bandwagon.

Bulk and cost are the primary downsides to broadband and coaxial cable, according to Jeff Kaplan, an analyst with International Data Corp. in Framingham, Mass. Both types of wiring can also prove difficult to access. Conversely, twisted-pair is available, inexpensive and easy to use, he said.

A rough breakdown of user wiring costs per foot is about 4 cents for two-pair, unshielded twisted-pair wire vs. almost $1 for thick, yellow coaxial cable. Pricing per foot for IBM cabling includes: 5 cents for Type 3, $1 for plenum-grade Type 1 and $1.40 for plenum-grade Type 2.

Users are increasingly endorsing twisted-pair as their cabling of choice for the next five years. Many users said they fear investing in a cabling system that may not meet all their long-term needs.

Network needs

"A year ago, I was convinced I needed IBM's Cabling System, in part because some of our users needed a high-speed network," said Tad Pinkerton, director of the office of information technology at the University of Wisconsin in Madison, another Synoptics beta-test site. He rejected IBM's cabling as too costly and too bulky.

The university is testing a 16-node network spread out across two floors of a new computer science center and is running data and voice-grade wires side by side. Pinkerton said he is enthusiastic about the results. "We haven't had a single error," he said.

It is difficult to quantify the cost savings of not having to pull new wire, since every installation is different. But Howard Charney, a 3Com cofounder and vice-president of hardware, said most users can readily compute their own savings. In New York, the cost of pulling cable ranges from $350 to $1,000 per workstation, LAN Systems' Rosen said. Using existing wiring eliminates that cost.

Deterioration

Synoptics and 3Com have taken separate approaches to solving the problems of running a high-speed network over twisted-pair wires. Although high speeds typically deteriorate over longer distances, both vendors claimed to have resolved that issue. Synoptics is supporting distances up to 330 ft. Charney said 3Com is supporting a minimum distance of 250 ft but will go "hundreds of feet beyond."

The claims are the same, but the systems are different. 3Com is seeking a patent on its product, a tap box that shuffles bits between a station's Ethernet coaxial cable and a modular phone wire in a twisted-pair cabling scheme. The Ethernet bus takes on the quality of a star configuration with 16-port clusters linked by coaxial cable.

Also using a hierarchical star topology, Synoptics' Lattisnet links nodes to a wiring concentrator in a wiring closet that has eight cards, each supporting eight nodes, for a total of 64 nodes. The box is then linked to a master concentrator tied to a fiber backbone. 3Com and Synoptics both support IBM's, thin coaxial and twisted-pair cable.

3Com's system requires one twisted-pair wire; Synoptics' requires two. Although many private branch exchange companies encourage users to install four twisted-pair wires, users typically install a minimum of three, Charney said. One pair is used to link the phone, while a second set is used for phones with specialized options.

Memorex to upgrade System/38

BY STANLEY GIBSON
CW STAFF

MILPITAS, Calif. — Seeking to expand its role as a supplier of add-on products for IBM systems, Memorex Corp. is scheduled to announce today that it will begin providing CPU upgrades for the IBM System/38. The move marks the first time Memorex has sold CPU upgrades for any processors.

Memorex said it will also maintain System/38 equipment as a third-party maintenance provider. Memorex also provides third-party maintenance on IBM 4300 systems and is planning to expand into complete computer room maintenance, much in the manner of TRW, Inc. and Control Data Corp.'s Engineering Services Division, according to Al Sontag, Memorex marketing manager for storage equipment products.

The CPU offering is a way for Memorex to sell more memory and peripherals, according to Sontag.

The CPU board is obtained from IBM, Sontag said, and combined with other IBM, non-IBM and Memorex equipment to complete the upgrade. A typical upgrade consists of additional memory, direct-access storage device adapters, control storage cards and a motherboard, he said. The service is available later this month.

Because the CPU is IBM's, Sontag said, the upgrade is certifiable for IBM maintenance.

Less expensive

Taken together, all components in a Memorex-supplied upgrade cost some 20% less than IBM upgrade parts, Sontag said. Memorex guarantees the upgrade to be 100% IBM compatible, Sontag added. He said Memorex is also offering rebuilt, upgraded System/38 processors that are 20% below the price IBM would charge. In a recent bid, Memorex offered a rebuilt System/38 Model 300 for the same price IBM charges for a System/38 Model 200, he said.

"Memory is frequently the highest cost item in an upgrade. And the System/38 tends to be a memory hog. You tend to run out of memory before you run out of CPU," said David Andrews, president of ADM, Inc., a System/38 consulting firm in Cheshire, Conn. "It's a creative way for Memorex to sell its own memory."

Memorex is also scheduled to announce today a laser printer and several impact printers for System/34, 36 and 38 computers, the company said.

HP ink-jet

FROM PAGE 1

being the first company to offer a printer with this particular combination of output quality, speed and price, HP will probably set a de facto industry standard," said Tom Idema, manager of MIS technology services at Westinghouse Furniture Systems, Inc. in Grand Rapids, Mich., one of HP's largest customers.

'Brilliant colors'

HP is aiming Paintjet mainly at "experienced, multipurpose personal computer users," such as electronics designers, sales managers, product managers and financial analysts, Borden said. Those users, he said, have to produce a steady stream of professional-looking graphics for internal communication and need "brilliant colors to capture a viewer's attention."

In the past, such users were forced to choose between pen plotters and dot matrix or piezo ink-jet printers to meet their graphics output needs. Pen plotters yield highly polished color graphics but can typically produce only one page of output every 30 minutes and cost thousands of dollars — far more than most PC users can afford, Borden said.

Color dot matrix printers such as Epson's LQ-2500, by contrast, sell for less than $1,600, but their trade-off is slow throughput. When creating letter-quality text, for example, the LQ-2500 prints 90 char./sec., according to Dataquest, Inc. Senior Analyst Robert Fennell. In contrast, Paintjet generates near-letter-quality output at 167 char./sec., according to HP.

At the heart of Paintjet's printing mechanism are two removable liquid ink cartridges. One holds 60 nozzles for squirting black ink onto 8½- by 11-in. paper and comes with a sufficiently large reservoir to produce 1,100 pages of text. The other is equipped with 10 nozzles and contains enough yellow, cyan and magenta ink to yield 180 pages of color graphics.

At its highest resolution and brightest output, Paintjet is especially well suited for users who need to make overhead transparencies for in-house presentations.

Like HP's previously announced Laserjet printer family, Paintjet forms a "nice, complete package," Fennell said. HP said vendors of 55 of the most popular microcomputer applications — such as spreadsheet, word processing and graphics programs — have agreed to provide Paintjet drivers in product updates. Paintjet also supports drivers that enable it to operate with IBM Personal Computers and clones and Apple Computer, Inc. Macintoshes, Borden said.

'Real winner'

"HP may have themselves a real winner with this product," said graphics consultant Carl Machover, president of Machover Associates, Inc.

But whether Paintjet will equal or even surpass the acceptance of the company's hugely successful Laserjet line will depend partly on technological developments in the office copier field. "Sales of the printer may accelerate in a year or two, when we finally start seeing color copiers that can duplicate five or 10 masters per minute rather than forcing us to continually make originals," Machover said.

Paintjet lists for $1,395 and is available for immediate shipment.

INSIDE LINES

Stop the world and let them get on. According to a source in the user community, Lotus may be softening its stance on copy protection. The source was told that the next release of Symphony will likely be issued without the nasty encumbrance of copy protection. Now, if Lotus could just get that beast off of 1-2-3 . . .

Canaan not able. Hambrecht & Quist, Inc. has handed the assets of Canaan Computer Corp. to Accent Systems Corp. of Pittsburgh. "We intend to continue providing maintenance, spare parts and limited sales to the existing Canaan customer base, and we are evaluating whether or not anything else can be done," said Scott Os, an Accent founder, acting interim president of Canaan and Canaan's only current employee. Accent will attempt to sell the remaining inventory of Canaan's VM-based minicomputers, which fared poorly competing with IBM's 9370, he said. Maintenance revenue will be used to forestall bankruptcy, a letter to Canaan creditors reportedly said.

The plot thickens. Dialogic has brought in a partner — Phaser Systems, Inc. — on its joint-development contract with Novell to develop LAN-to-IBM host connectivity software. Both Phaser and Dialogic bring to the party IBM Systems Network Architecture and VTAM expertise that Novell lacks, sources said. While Dialogic President John Mullen refused to name Novell, he said his firm will be developing a VTAM-based micro-to-mainframe package for "a very large LAN company." That package reportedly will allow IBM PCs on multiple interconnected LANs to access IBM hosts via a VTAM link, run applications and download records. Novell President Ray Noorda has invested in both companies and is helping them in their reorganization efforts to get out of Chapter 11.

Full speed ahead? AT&T is busy readying a major product announcement for early September that is said to include the latest Olivetti PCs, including the Intel 80386-based box, and a lot of communications products. One report gaining speed has AT&T introducing a 10M-bit version of Starlan. AT&T announced in January that it is working with Synoptics on a similar project. Also possible is some initial statement on compatibility with IBM's PS/2 Micro Channel architecture and OS/2.

Sparking interest. DEC created a bit of a stir during last week's Siggraph '87show in Anaheim, Calif., when a small electrical fire started in the framework of its booth. The Tuesday mishap, which was accompanied by a shower of sparks, caused a near-total power loss to the booth. No injuries were reported, and some power was restored within a half hour of the incident.

Slip out a few bugs. Look for Apple to unveil replacement read-only memory boards for its Laserwriter printer sometime this fall. According to sources, the new boards were designed to speed up the Laserwriter as well as fix some "minor bugs" in the printer. The introduction is viewed as a precursor to Apple's long-awaited new laser printer, expected to be introduced sometime this year.

IBM probably didn't think anyone would notice. Used computer dealer and lessor Computer Merchants, Inc. has joined the list of critics of IBM's 3090 Model 120E entry-level system, calling the latest 3090 a move to get customers into an expensive upgrade trap. Computer Merchants argues that, while IBM says the Model 120E gets users into the 3090 line for less than $1 million, a buyer can get the same power from a used 3083-J for $425,000.

Will we need a hard disk? A Lotus source revealed that a new version of the Lotus/Intel/Microsoft Expanded Memory Specification (EMS) will be released later this year. The product, which uses bank-switching techniques to allow users to go beyond the 640K-byte RAM limitation of Microsoft's MS-DOS, will receive a number of enhancements. While the current version supports up to 8M bytes of RAM, the next release could shoot as high as 32M bytes. In addition, the new EMS was designed to provide better multitasking on 80386-based machines.

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COMPUTERWORLD

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Canaan's vanishing act vexes

BY STANLEY GIBSON
CW STAFF

Worried because he had not heard from his hardware supplier in more than six weeks, Tony Bye, the Great Britain distributor for Canaan Computer Corp., flew to the firm's Trumbull, Conn., headquarters several weeks ago. He found Canaan's factory locked shut, with a sign on the door saying the computer maker was no longer in business.

The experience was a rude awakening for Bye, who had received no formal notice from Canaan management that the company was going out of business. "We just heard by word of mouth," said Bye, who is managing director of Databench Ltd. in Marlow, England.

He later discussed the situation with Canaan distributors in West Germany, France and Belgium and found they were all likewise in the dark.

Where'd everybody go?

Canaan, which was founded in 1981 and has received some $30 million in venture capital, slipped almost out of existence in recent months, apparently without telling many of its OEMs or customers. Several said they are confused and angry over what they called the silent disappearance of the minicomputer maker.

Canaan's investors, led by Hambrecht & Quist, Inc., have been scrambling to pay off debts and now say they are in the process of belatedly notifying customers.

IBM's announcement of its 9370 departmental processor, which competed directly with Canaan's VM-based minicomputer, sapped Canaan's market appeal as a departmental processor.

Continued on page 4

9370 hits the ground running

Large-volume shipments should push IBM mini past sales target

BY JAMES CONNOLLY
CW STAFF

IBM's goal of selling 5,000 of its 9370 mid-range systems by year's end appears within reach as the minicomputers gain a foothold as distributed processors in major corporations, according to several IBM observers.

Analysts tracking early 9370 shipments and users' buying intentions reported last week that IBM's projection for the last six months of this year is realistic and predicted that IBM will sell 15,000 to 30,000 of the minicomputers during each of the next few years. Only a few of the early shipments have been replacements for IBM 4361 or 4331 systems, with the balance being used in pilot programs for major 9370-based MIS applications.

In addition, one analyst said, IBM will soon release several major corporations from nondisclosure agreements as it announces a half-dozen or more orders, each for 300 to 400 9370s.

That analyst, Kimball Brown of San Jose, Calif., research firm Dataquest, Inc., added that key 9370 accounts are being handled by IBM's Federal Systems Division.

"The wraps are going to come off in August," Brown said, noting that IBM is expected to free customers such as Ford Motor Co. and United Airlines from two-year nondisclosure agreements.

"What is going to happen is

Continued on page 6

DEC again rewrites price tags

BY DAVID BRIGHT
CW STAFF

MAYNARD, Mass. — Digital Equipment Corp. restructured its pricing last week for the second time in five months, raising the prices of high-end VAX 8000 systems while cutting the costs of smaller models.

Analysts said the move sets the stage for next month's scheduled introduction of the Microvax III system.

DEC also reduced the prices of its older PDP-11 line by an unspecified amount, dropped the price of the Microvax 2000 workstation by 17% to 20% and increased the price of "the balance" of its hardware and software products by less than 5%, according to a statement. DEC did not answer requests to specify the products affected.

Although DEC has lately been making low-end prices more attractive, the company has simultaneously increased high-end prices. Analysts suggested that this latest restructuring could be a response to the recent start of 9370 system shipments by IBM.

At the same time, DEC announced lower cost memory modules for the VAX 8000 systems that use 1M-bit chips to in-

Continued on page 93

Fortune 500 slowly warming to PS/2

BY ED SCANNELL
and ALAN J. RYAN
CW STAFF

IBM's Personal System/2 series has made inroads into Fortune 500 companies, but concerns over its unproven technology and the lack of an advanced operating system are stalling some purchasing plans, according to MIS managers at more than a dozen Fortune 500 companies who were interviewed last week.

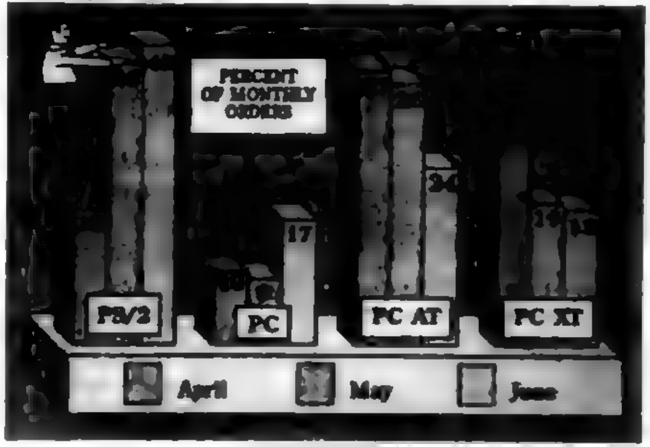
Managers also said the machines are not causing them to scale back plans to buy IBM Personal Computer-compatible systems.

The interviews indicated that firms that have placed significant orders are, for the most part, airlines and insurance companies t plan to resell PS/2s — espe ly Model 30s — to affiliated ganizations. Other Fortune 0 companies said they are hes nt and plan to purchase be een 50 and 200 systems dur g the remainder of this year as well as a sizable quantity of compatibles.

"We're committed to [the PS/2] as a product, as opposed to ordering IBM PC ATs," said Daniel Cavanagh, senior vice-president of MIS at Metropolitan Life Insurance Co. in New York. He added, "That doesn't mean we would stop buying plug-compatible equipment" as PS/2 clones become available.

Continued on page 8

The shift is on
*Surveys of IBM mainframe sites in U.S. indicate increasing demand for PS/2**



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Brushup. ADR upgrades Datacom/DB, its relational-like DBMS, to take advantage of MVS/XA, reduce CPU utilization time and trim response time. Page 93.

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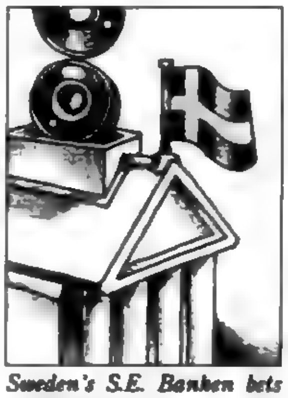

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Congressman, GSA spar over federal net plan

BY MITCH BETTS
CW STAFF

WASHINGTON, D.C. — The federal government's effort to acquire an upgraded private network called Federal Telecommunications System (FTS) 2000 was thrown into turmoil last week. A key member of Congress challenged the government's entire approach to the $4.5 billion procurement just a few weeks before bids are due on Aug. 31.

Rep. Jack Brooks (D-Texas) urged the General Services Administration (GSA) to completely restructure the contract so that it can be awarded to multiple vendors rather than follow the winner-take-all approach of the current procurement.

GSA Administrator Terence C. Golden rejected Brooks' suggestion, a spokesman said, and the GSA is proceeding on its original path. The agency is said to believe that a single-vendor network would be cheaper, because of volume discounts, and easier to manage.

In response to Brooks' criticism, GSA officials emphasized that the 10-year contract can be terminated and opened for a new round of competitive bidding after four years if any problems develop.

Explosive action

Brooks, the tenacious chairman of the House Committee on Government Operations, could still torpedo the GSA's FTS 2000 strategy through oversight hearings and legislation.

"If Brooks beats them about the head and shoulders and prevails . . . then that would be a total abort," said Whit Dodson, research director for International Data Corp.'s Washington Division. Dodson explained that the multivendor approach would be such a major change that the GSA would have to terminate the current FTS 2000 procurement and start over.

The GSA wants to replace its outdated intercity network for federal agencies — the largest private network in the world — with an integrated voice and high-speed data network called FTS 2000.

Brooks, concerned that the government will be locked into a single contractor for the 10-year life of the contract, wants it to be split on a 70%-30% basis between two vendors and rebid every three years to determine which vendor gets the bigger share.

But Martin Marietta Corp. threatened to pull out of the bidding if the procurement is changed to meet Brooks' demands. Martin Marietta is bidding for the contract as leader of a team that includes MCI Communications Corp. Martin Marietta opposes changes that break the contract into pieces, a spokesman said.

AT&T, the only other bidder, does not oppose the Brooks proposal. An AT&T spokeswoman said the carrier is preparing its bid for the current procurement but considers Brooks' multivendor approach an acceptable one.

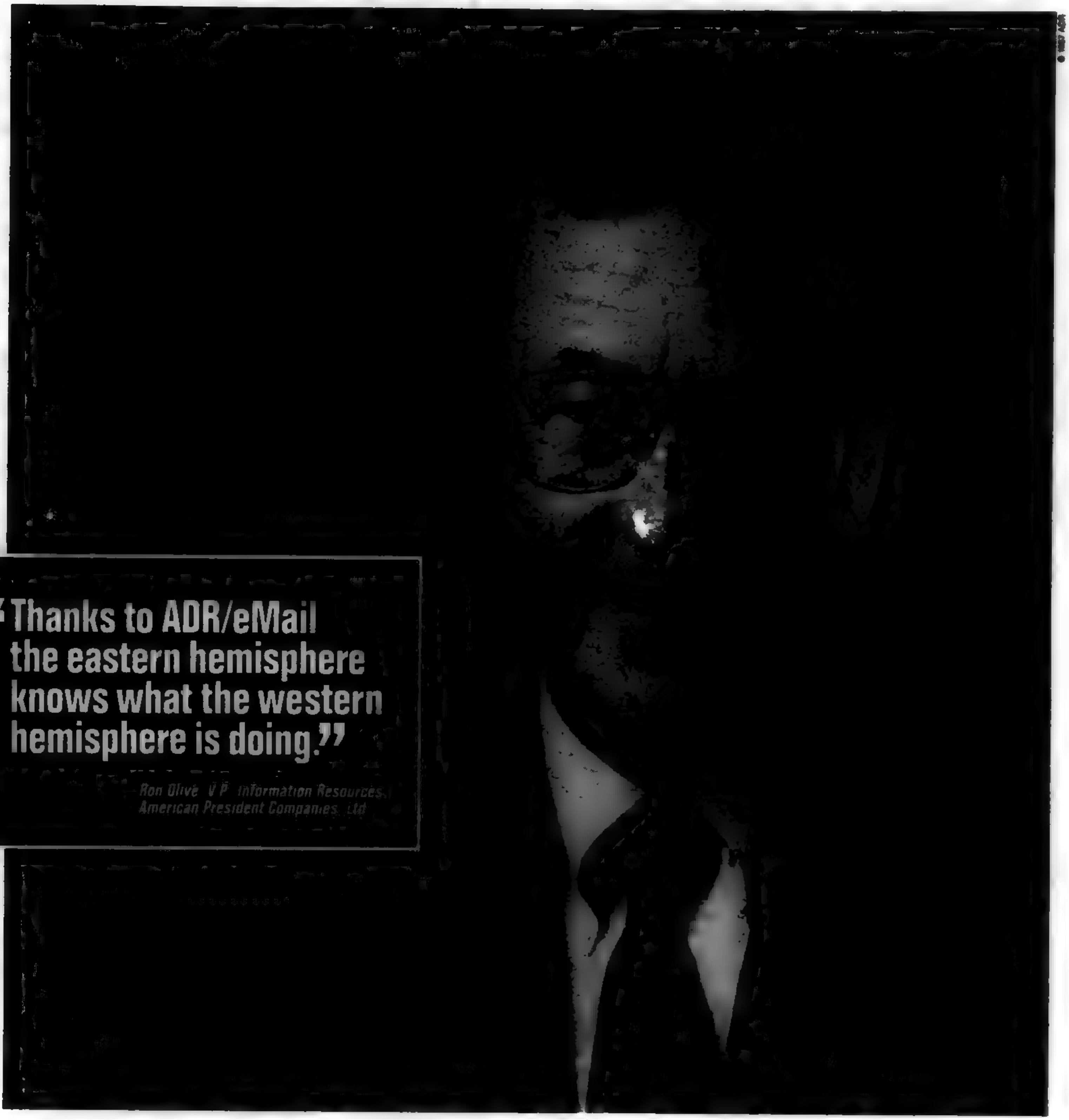
The FTS 2000 procurement has also run into several other problems in the last few weeks:

- AT&T charged in federal court that the regional Bell holding companies have promised to provide the Martin Marietta team with interexchange services that are prohibited by the court order on AT&T divestiture. The Bell companies denied the accusation, calling it an AT&T ploy to knock out a competitor.
- The GSA contract officer for FTS 2000 was recently replaced, sources said, because of a possible conflict of interest.
- The Federal Communications Commission turned down a GSA request that the FTS 2000 carriers be exempt from common-carrier rate regulation. But the GSA, which wants a fixed-price contract, said it was satisfied that the ruling will allow the carriers to file fixed-price tariffs.
- The U.S. General Accounting Office reported that the GSA's initial decisions concerning FTS 2000 were made without adequate analysis.

CORRECTIONS

Computer Solutions, Inc. was inadvertently omitted from the Spotlight MRP II software chart [CW, July 6]. Its product, Growthpower, contains 16 modules such as financial, manufacturing (including manufacturing resource planning) and marketing. It runs on the Hewlett-Packard Co. 3000 series, includes real-time updating for all transactions and an integrated accounting/financial system. A typical system sells for between $40,000 and $75,000. The company's phone number is (617) 229-2200.

Data 3 Systems, Inc.'s MRPS 38-S and MRPS 38-P MRP software are based on both net and regeneration logic and offer relational data base features. The MRPS 38-S has 260 U.S. site licenses; the MRPS 38-P has 10 [CW, July 6].



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Borland set to challenge 1-2-3

Users impatient for Lotus upgrade say Silicon spreadsheet a contender

BY STEPHEN JONES
CW STAFF

SCOTTS VALLEY, Calif. — Borland International President Philippe Kahn is expected to announce today that Borland is developing a spreadsheet that will go head-to-head with the venerable Lotus Development Corp. 1-2-3 in the corporate decision-making software market, sources close to the company said last week.

The product, which has been beta-tested at sites such as Price Waterhouse and GTE Corp. for the last three weeks, offers a soft interface that can be customized by the user.

It can also read and write files from 1-2-3, Microsoft Corp.'s Multiplan and Computer Associates International, Inc.'s Supercalc. While Borland has emphasized that the software is still being developed, sources said the company has guaranteed delivery by year's end.

Expected to be priced between $200 and $300, early versions of the offering have scored points with some users who until now have relied primarily on 1-2-3. Version 2.01 of 1-2-3 is currently listed at $495.

"I'm very impressed with it; it's more intuitive than 1-2-3, but it's similar enough to feel like you're running a Lotus program," said Don Smith, a partner with Price Waterhouse in Chicago who acts as the firm's coordinator of microcomputer consulting.

Grab market share

If the product takes off, it could help Borland grab a chunk of Lotus's share in the market for microcomputer business decision-making tools.

That fits in with the philosophy of the expansion-minded Kahn, who last month guaranteed Borland a foothold in the data base management business by gobbling up Paradox publisher Ansa Software.

Sources, who asked not to be identified, said months of speculation about the Borland spreadsheet will end today when Kahn releases a formal statement about the product. Kahn could not be reached for comment.

Known as Silicon, the spreadsheet's strongest point might be the graphics and charting capabilities it produces using IBM's Enhanced Graphics Adapter. Features include three-dimensional images and exploding pie charts. One user reported the ability to change fonts and make slick-looking charts without the bother of going into a graph package.

'Beats Lotus hands-down'

One tester, who has been using 1-2-3 for the last four years, said Silicon's sharp graphics features "beats Lotus hands-down."

He added that the program has about 500 pages of detailed documentation that is easier to read than earlier product manuals from Borland such as Reflex.

The product also recalculates spreadsheet updates faster than 1-2-3 because it picks out only those numbers that have been changed and ignores the rest during recalculations, testers said.

Integrated graphics, meanwhile, are reported to accommodate the Paradox and Reflex data bases.

Silicon's high functionality could fill a void for users who have grown impatient waiting for long-rumored enhancements of 1-2-3 Release 2.0.

"As we add additonal spreadsheets and wait for Lotus's enhancements, we'll strongly consider the Borland product," Smith said. "The added graphics capabilities are something we always wanted and will certainly use."

Why another one?

But some industry watchers are less enthused about the pending product, with one microcomputer dealer from the Midwest asking: "Why does the world need another spreadsheet? All of corporate America is trained on 1-2-3."

And others questioned whether Borland could win in a David vs. Goliath battle with Lotus. "Frankly, I think Borland could be spending its money better," said Bruce Johnston, a senior analyst with First Boston Corp. in New York. "It seems that Philippe is intent on taking on the big boys, and that's going to be tough."

Despite its early inroads into Microsoft's share of the languages market, Johnston said Borland would be better off targeting niches in the microcomputer software business in which the likes of Lotus and Microsoft are not to be found. Selling low-cost programs into such niches helped the $280 million company gain initial success as a start-up in 1983.

Vanishing act

FROM PAGE 1

Several rounds of layoffs led to a restructuring period in May in which two Hambrecht & Quist officials, Michael Preletz and Jerry Bark, took over the reins of the company.

All employees dismissed

About eight weeks ago, virtually all remaining employees were dismissed, and on July 6, an eviction order was executed on behalf of Canaan's landlord, according to the records of the Superior Court in Bridgeport, Conn. Subsequently, some 300 to 400 computers plus peripherals were moved to a Bridgeport warehouse, according to an employee of the storage company. Two weeks ago, Hambrecht & Quist put Richard Rifenburgh of the firm's Boston office in charge of what remained of Canaan.

Rifenburgh has since relinquished control of the company's assets to Accent Systems Corp. in Pittsburgh. In an agreement currently being finalized, Accent will service the installed base of Canaan systems and perhaps sell systems from inventory in the hope of paying off Canaan's creditors, according to Rifenburgh, who is currently chairman of Canaan. Scott Os, an Accent executive, is serving as president.

Now, Canaan has arranged with its landlord to regain possession of its machines and is in the process of shipping them to Accent, according to Rifenburgh. As of last week, Bye said, he had still not been informed of Canaan's condition.

"We're now faced with the challenge of maintaining them [Canaan computers]," he said, indicating that he has been attempting to obtain old Canaan machines to support his user base of five customers. Databench had sold the system with a project management software package. "They run very well. It was a very powerful and effective machine. The whole thing's a tragedy," Bye said.

Left in the dark

Other users and distributors echoed Bye's account of having been left in the dark by Canaan, Hambrecht & Quist and Accent Systems.

"It boggles my mind. The big disappointment was that we would have expected Canaan to notify the installed base. I didn't hear from Accent, either," said Spike Kasper, president of Norwalk, Conn.-based Document Systems, Inc., which is leasing a Canaan DCS 6100 system and using it for development. Kasper said he has contacted Accent personnel on his own and that he has attempted, without success, to speak with Hambrecht & Quist personnel.

Kasper said he had hoped that Canaan would eventually market his firm's product, a mainframe-based document text storage and retrieval system. Document Systems will now develop solely for IBM's 9370, he said. Kasper expressed surprise and disappointment at Canaan's fate. "Their system did what it said it would do. I can't figure out why they weren't able to capitalise on the 9370 market," he said.

"They were remiss, not notifying us," said another user, who asked not to be named. "We have had no information from Canaan or Accent. We heard about it through the grapevine." The user, who has been running two Canaan processors for about one year, added, "We kind of like the system."

Rifenburgh told *Computerworld* that he is in the process of informing Canaan customers "as fast as humanly possible."

"Customers have every right to be unhappy," Rifenburgh said. Formerly treasurer and a venture investor in Accent Systems, Rifenburgh joined Hambrecht & Quist eight weeks ago.

Accent was created in November 1985 to service the workstations of Perq Systems Corp., a company that had just ceased operations. Since then, Accent has been paying off Perq creditors with maintenance revenue — much in the manner in which the company plans to pay off Canaan's bills.

Ron Ritchie, who was president of Canaan for more than a year, until May, attributed Canaan's demise to IBM's 9370 departmental computer. Canaan would have brought its product to market in time to fill a need for IBM 370-type mid-range processors, he said, "if IBM had not preannounced the 9370."

Ritchie agreed with the notion that IBM "validates" a market by announcing products for it, but he added that the market is only fertile for competitors after IBM ships products — not before. He pointed to the IBM Personal Computer clone market as an example.

Overly optimistic

Another employee said Canaan lost 18 firm orders on the day the 9370 was announced. He added that Canaan made the mistake of building processors based on overly optimistic sales projections. When orders were canceled, Canaan was left with the processors in inventory.

Another former Canaan employee said Canaan had installed 30 to 40 systems in the U.S. "Between the revenue from systems and maintenance, I believe they could still cover all the debt," he said.

The company had reportedly received more than $30 million in venture capital investment from Hambrecht & Quist and other investors, including General Electric Venture Capital Group and Alan Patricof Associates.

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IBM shaves prices on 3090s

Upgrades on 300E and 600E also cut less than month after first shipment

BY STANLEY GIBSON
CW STAFF

Less than a month after initial customer shipments, IBM recently cut prices on its 3090 Models 300E and 600E and on upgrades to those machines.

The price of a Model 600E processor unit was lowered by $600,000, from $10,944,000 to $10,344,000, and the price of a Model 300E processor unit was cut by $150,000, from $5,750,000 to $5,600,000. Upgrades to 600E and 300E machines were cut by up to 20%.

The first customer shipments of the 3090 E models were announced July 1. To be eligible for the price cut, machines must have a date of installation or effective date of purchase on or after July 28, according to IBM.

Always count on a cut

"We'll take the $600,000 and say, 'Thank you very much,'" said George DiNardo, executive vice-president of Mellon Bank NA. Mellon is in the process of upgrading a 3090 Model 400 to a Model 600E. "Anyone who didn't figure on an August or September cut was a candidate for the loony bin," DiNardo said, explaining that he always requests a two-month test allowance on new systems or upgrades in order to be eligible for possible price cuts put into effect after the initial shipping date.

Bob Djurdjevic of Annex Research, Inc. said many customers now include such an on-site test allowance clause in their contracts, generally for a period of 60 days. "IBM wants its sales force to focus on these models. They think they have a marketing advantage over Amdahl and NAS," Djurdjevic said, explaining that the controller IBM uses to manage three processors is more sophisticated than the two controllers Amdahl Corp. and National Advanced Systems Corp. must use to manage three processors in their systems.

"NAS and Amdahl will have to redesign their systems controllers to handle three- and six-way systems," he said, adding that he has made no adjustment to his estimates of residual values on the processors as a result of the price cuts. "The price cuts are really cosmetic. It creates a talking point for sales reps."

IBM's upgrade price changes were lowered as follows:

- A Model 300E-to-Model 600E upgrade was reduced from $5,194,000 to $4,744,000.
- A Model 200-to-Model 300E upgrade was reduced from $1,755,000 to $1,605,000.
- A Model 200E-to-Model 300E upgrade was reduced from $1,605,000 to $1,455,000.
- A Model 400-to-Model 600E upgrade was reduced from $3,160,000 to $2,560,000.
- A Model 400E-to-Model 600E upgrade was reduced from $3,035,000 to $2,435,000.

IBM's 9370

FROM PAGE 1

that you are going to see IBM getting a lot of government bids and big commercial bids through the Federal Systems Division. I think there are probably a half-dozen or so of these Ford-type bids that are ready to roll out," Brown said. He explained that the Federal Systems Division has taken charge of many 9370 accounts because of that division's charter as a systems integrator.

Brown contended that the large scale and lengthy term of the division's contracts require IBM to provide products, including the networking and software tools that the 9370's critics have said it lacks, first to the Federal Systems Division and later to the direct sales force.

Brown said only about 500 of the 5,000 shipments for this year are replacements for 4361 type systems.

Meanwhile, George Weiss, an analyst with the Gartner Group, Inc. research firm in Stamford, Conn., concurred that the early shipments are reaching "primarily very large enterprises with the potential for large volumes."

Weiss said the typical buyer has been a large company that is decentralizing its mainframe operations and is currently using a 9370 with plans to buy many more if the system meets its needs.

Weiss said the Gartner Group expects IBM to ship 20,000 to 25,000 9370s per year beginning in 1988 or 1989. He noted that many potential 9370 users, including those with office automation needs and IBM DOS/VSE users, remain uncommitted to the 9370 pending IBM's introduction of a system code-named Silverlake, which was designed as a successor to the System/36 and 38.

"I still think there are some intra-IBM factors that make the 9370 not a done deal except in those decentralized applications I was talking about," Weiss said.

He said the applications involved tend to run under VM and that the 4300 line's traditional DOS/VSE user base has yet to be a major factor in 9370 sales.

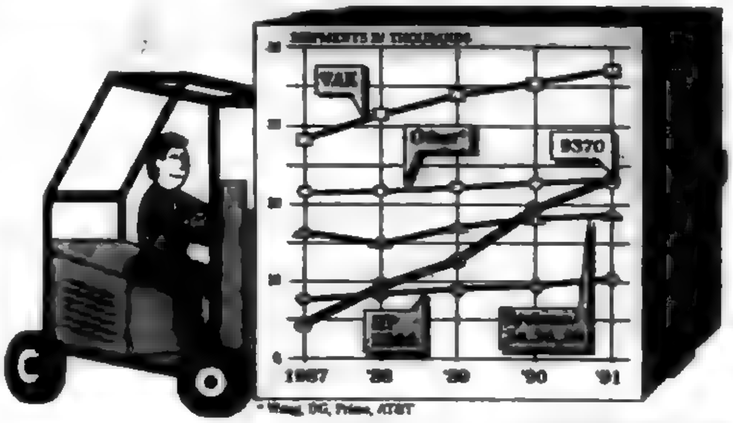
Forrester Research, Inc., a Cambridge, Mass.-based market research group, estimated that annual 9370 shipments will hit the 23,710 mark by 1991, and the New York investment firm of Sanford C. Bernstein & Co. projected an installed base of 141,964 systems by 1991.

A surprising number of 9370s are now being shipped with IBM's Professional Office System (Profs), reported John C. McCarthy, research manager at Forrester.

"Some people are trying to force the 9370 as an office automation and personal computer integration vehicle with Profs, but I just don't think that Profs can do the job," McCarthy noted. He added that a Profs successor being written under IBM's Systems Application Architecture may address the current product's shortcomings.

McCarthy also said many 9370s will be sold as replacements for the IBM 8100 distributed processor when a migration aid is available and that the release of IBM's MVS/IS in 1990 will make it easier to distribute mainframe applications on the 9370.

In a recent survey of 26 Fortune 1,000 corporations, Forrester found that slightly more than half have no plans to order a 9370, while seven of the sites have a 9370 on order and five said they plan to order a system.



Mini revival

Shipment projections for leading vendors show rapid acceptance of IBM's 9370

* Wang, DG, Prime, AT&T

INFORMATION PROVIDED BY FORRESTER RESEARCH, INC.
CW CHART: MITCHELL J. HAYES

DEC may reap rewards

In another survey, West Hartford, Conn.-based research firm Focus Research Systems found that in departmental applications at large companies, the 9370's greatest impact will be on the System/38. IBM's moves in the departmental computing market, Focus said, will fuel market growth and thus benefit its chief rival, Digital Equipment Corp.

DEC last week appeared to be countering IBM's 9370 deliveries with the announcement of lower prices and increased memory capacities for several DEC VAX 8000 models that compete with the 9370 (see story page 1).

In a buying survey it conducted several months ago, Computer Intelligence in La Jolla, Calif., found that most of the systems being replaced by 9370s are small 4300s.

A spokesman said the company also noticed a handful of non-IBM processors, such as Honeywell Bull, Inc. minicomputers, are being displaced but said many of the 9370 orders are for new applications.

Chris Hallgren, an analyst with Framingham, Mass.-based market research firm International Data Corp., said it is too early to know which competitors will be hurt by the 9370, although he raised the possibility of Wang Laboratories, Inc.

"Companies like Wang built their reputation by being small systems vendors with strong IBM compatibility, at least in terms of their communications," he said.

Hallgren said early indications are that the 9370s are being shipped primarily to companies with large data centers that have numerous branch offices such as banks, insurance companies and airlines.

Meanwhile, Dataquest's Brown noted that attempts to measure the 9370's market appeal have been hampered because IBM prohibits such firms from publicly speaking about the 9370 or even responding to a research group's buying intention survey for two years, or until IBM feels comfortable with the system's performance and waives the ban.

Unisys president resigns

BLUE BELL, Pa. — Unisys Corp. President Paul G. Stern, the company's third-ranking executive, resigned unexpectedly last week. Unisys made the announcement in conjunction with a restructuring of top management that observers said will streamline the firm's decision making.

Stern, 48, said in a prepared statement that his departure was amicable. He did not disclose any future career plans, saying he wanted to devote more time to family and investment interests. Stern, former president of Burroughs Corp., said he will be available to Unisys for assistance and support in the coming months.

Unisys will discontinue the president's position.

The restructuring was seen as a signal that Unisys is moving out of its transitional phase from the Burroughs-Sperry Corp. merger. Chairman W. Michael Blumenthal announced the dissolution of the four-member Office of the President, which included himself and Stern, and assigned specific responsibilities to the two other members.

Former Sperry President Joseph J. Kroger, Unisys's vice-chairman, will head up Unisys's marketing strategy. James A. Unruh, executive vice-president, will oversee financial and international operations.

The changes also included the assignment of Vice-President Joseph M. Tucci to direct the U.S. information systems business. The changes take effect Oct. 1.

Hyundai hit by Intel suit

SAN JOSE, Calif. — Intel Corp. filed suit last week against South Korean firms Hyundai Electronics America, Inc. and Hyundai Electronics Co. , alleging patent infringement of erasable programmable read-only memory chips.

Intel, one of several U.S. chip makers to lobby for federal anti-dumping measures against Japanese competitors last year, also asked the U.S. International Trade Commission to investigate its patent infringement charges regarding the chips.

Intel also named two U.S. chip design firms and three U.S. distributors as defendants, alleging that they worked with Hyundai to develop and sell the allegedly infringing chips.

Opponents bemoan ANSI Fortran 8X additions

BY CHARLES BABCOCK
CW STAFF

Although opponents of the proposed Fortran 8X standard differ in their opinions of specific features, a cross section of those surveyed last week appears to agree that too much has been added to the language.

"We thought the ANSI X3J3 Committee was taking the language to a much greater order of change than we thought judicious," said Michael Maynard, a Unisys Corp. spokesman at company headquarters in Blue Bell, Pa.

"The stand we took was that the language was too large and incorporated too many experimental features," said Robert C. Allison, senior engineer in the compiler development group of Harris Corp., another opponent of the standard.

Heavy hitters opposed

The X3J3 Committee submitted the proposed standard, currently called Fortran 8X to reflect the uncertainty of the year of its likely approval, to its parent committee after a 26-9 vote in June. Among the nine opponents were a number of key Fortran compiler writers and users, including IBM, Digital Equipment Corp., Unisys, Harris and Boeing Computer Services.

DEC's X3J3 representative, Gary Robinson, manager of corporate standards, said Fortran is one of the languages most often used by DEC customers and that the firm wants to see a new Fortran standard emerge. Nevertheless, DEC strongly opposes the 8X proposal.

Robinson said the X3J3 Committee is attempting to add array processing to Fortran compilers at a time when the job can be done better in hardware. Two start-up manufacturers offer the feature. Putting array processing into the standard now will retard the development of this new technology, he charged.

Out with the old?

Robinson also attacked the committee's proposal to name "deprecated features" in Fortran with the understanding that they will be dropped in the next full version of the language. Robinson said such a move will make Fortran 66 and Fortran 77 programs incompatible with the new standard and that users will resist converting to the new standard.

He drew an analogy to the Cobol 85 opposition that emerged in the user community when it became known that compilers meeting the new standard would not be able to compile programs written under earlier versions. "These languages are just too old. We can't say we don't want to use their older features," Robinson said.

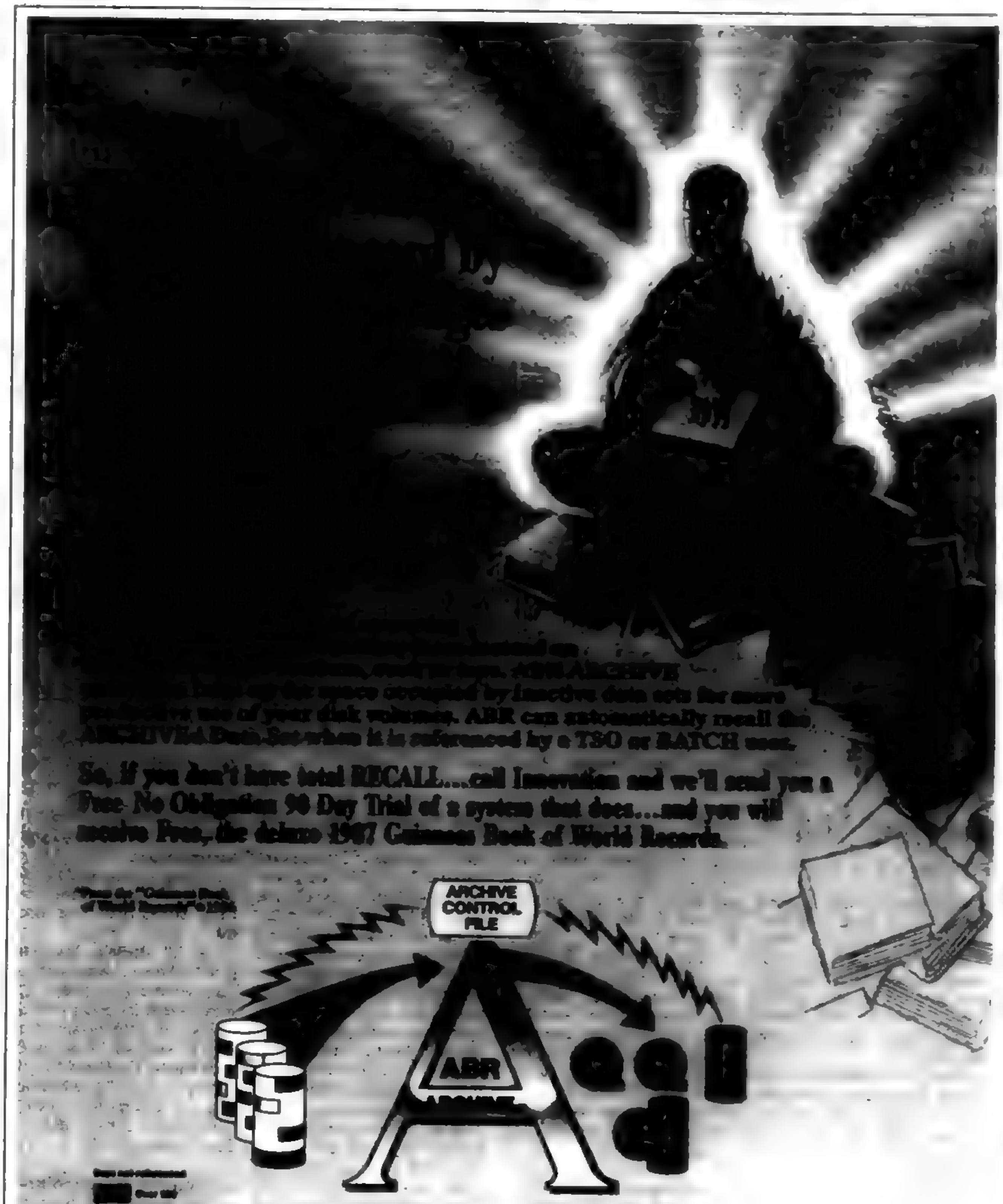
In addition, Robinson said the committee had a number of options to invoke that ensure 16-, 32- and 64-bit machines yield the same answer to a mathematical problem but chose none of them. DEC advocated this issue be addressed, he said.

Another feature that DEC wants to see revised is the INCLUDE statement in the Fortran 8X proposal. During a compile, an INCLUDE statement prompts the compiler to take code from an outside file. "The user is better off if the outside file is defined and certain limits put on it in the original program. The committee left it open-ended," Robinson said.

Brian L. Thompson, senior technical staff member at Concurrent Computer Corp., said he voted in favor of the proposed standard as a "good faith effort" to reach a compromise within the committee but that "we morally side with those who are against it."

Although the opponents include a number of sizable compiler writers and manufacturers, there were several compiler producers besides Concurrent who voted in favor of Fortran 8X.

IBM representative Richard Weaver could not be reached for comment.



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PS/2 Model 80 storage raised

Enlarged 314M-byte drive targets shared systems; low-end model arrives

BY ALAN J. RYAN
CW STAFF

RYE BROOK, N.Y. — IBM last week announced an expanded storage capacity version of its Personal System/2 Model 80 that will target multiuser and file server environments.

The latest high-end PS/2 offering was accompanied by the announcement of the PS/2 Model 25, an Intel Corp. 8086-based entry-level system aimed at the educational, home and local-area network markets. It was also designed to work with IBM System/36 and 38 host processors [CW, Aug. 3].

Analysts said the 20-MHz Model 80-311 machine with zero to two wait states will not adversely affect sales of the other Model 80s.

They cited the computer's main selling point as its 314M-byte 5¼-in. fixed disk drive and optional second drive of the same size.

"The lower end Model 80s will be for people who need a high-performance workstation. This Model 80-311 will be more of a shared device," said John McCarthy, director of professional automation service at Forrester Research, Inc. in Cambridge, Mass.

Part of major thrust

Analyst Robert Tasker of The Yankee Group in Boston agreed. "One reason that the machine would have that size storage capacity is to act as a large server in a network," he said. "Another reason is IBM is preparing a major thrust for its computer-aided design and manufacturing processing."

Brian Jeffery, managing director of International Technology Group in Los Altos, Calif., said he believes the Model 80 could end up positioned as a midrange system or as the low end of IBM's 9370.

"It is not a personal computer," he said. "Can you imagine a 628M-byte single user?"

"Certainly, you've got an engine that's in the power range of a System/36 or small 38 here," said William Zachmann, vice-president of research at International Data Corp. in Framingham, Mass. The Model 80-311, based on Intel's 80386 processor, will reportedly be available in the first quarter of 1988, IBM officials said.

No three-year lull

Forrester's McCarthy said IBM's release of the Model 80 has other implications.

"I think it shows how committed IBM is to driving the PS/2 line aggressively. We're not going to go through the three-year lull that we went through between the AT and the PS/2 machines," he added.

Standard features of the Model 80-311 include 314M bytes of fixed-disk storage, expandable to a maximum of 628M bytes with IBM's new 314M-byte Fixed Disk Drive Option; 2M, bytes of random-access memory, expandable to 4M bytes; IBM's Video Graphics Array (VGA); IBM's Micro Channel architecture with 32-bit data path; a diskette controller; serial, parallel, pointing-device and keyboard ports; and VGA graphics capability integrated on the system board.

Other features include seven available slots and an IBM Enhanced PC Keyboard. The unit has a floor-standing design.

The Model 80-311 will sell for $13,995, and the 314M-byte fixed disk drive option will cost an additional $6,495.

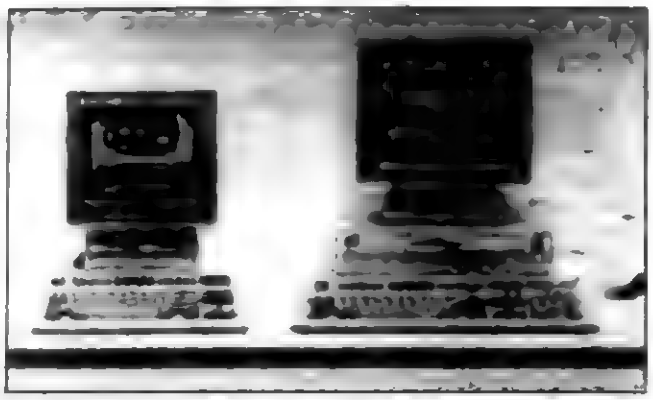
IBM's PS/2 Model 25 will sell for $1,350, but analysts said that even with educational discounts available, IBM is not likely to topple Apple Computer, Inc.'s dominance in the educational market.

Apple 'won't lose sleep'

Senior analyst Michael Goulde of The Yankee Group said IBM will have a difficult time meeting Apple's challenge in the educational market.

"While there are certain opportunities for the Model 25 because of its aggressive pricing and aggressive educational discounting, I don't think Apple has anything to lose sleep over," he said.

Further, some analysts said the Model 25 will not make a big impact in the business market. "I don't see companies — even small companies that are using System/36s and 38s — adopting 8086 technology when, clearly, the trend in the market is for 286 and 386 technology," Goulde said.



PS/2 Model 25, *left, has a much smaller footprint than the Model 30.*

Model 25's Mac assault

BY JEAN S. BOZMAN
CW STAFF

IBM finally has an Apple Computer, Inc. Macintosh look-alike. The Personal System/2 Model 25, which was announced last week, incorporates new features from IBM that play off the Mac's strengths in the areas of size, portability and ease of use.

First, there is the Model 25's screen. Its 64 shades of gray, combined with the system's Microsoft Corp. Windows software, give the PS/2 the look and feel of a Macintosh. A 256-color display is also available. Users can create a text document and, without switching screens, pick up an icon from a space just below the text to start a graphics application. All the maneuvering is done with a two-button mouse, not a keyboard command.

Perhaps spurred by the need to keep things simple for the machine's intended classroom audience, IBM has done much to speed the process of getting the machines up and running. The following are some of these features:

- A wordless instruction setup sheet. Users can follow a single-sheet flyer to set up the Model 25.
- A start-up disk, which leads the first-time user through disk formatting and file labeling. Without this feature, users had to learn Microsoft Corp.'s MS-DOS commands to perform such functions.
- A single power plug for the entire system. IBM has piggybacked the printer and system power wires so that users can plug a single power cord into a wall socket.

The entire package is also made to be portable, with a 40% smaller footprint than that of the IBM Personal Computer. A carrying case for the system is also available, making it movable like the 16-pound Macintosh, although quite a bit heavier. The Model 25 monochrome system weighs in at 28 pounds and the color version at 37 pounds.

Fortune 500

FROM PAGE 1

IBM said it has shipped 300,000 PS/2s from its production facilities to dealers and user sites as of the end of June. Storeboard, Inc.'s monthly survey of computer specialty stores showed that IBM sold 29,400 PS/2s in June, a 15% increase over May sales.

Along with IBM's sales increases, the top compatible makers — most notably Compaq Computer Corp. — have reported sales hikes as well. For June, Compaq reported a 34.5% gain over May's sales, the Storeboard study showed.

Still leery

Some users said they are hesitant to jump into the PS/2 market, not only because Microsoft Corp. and IBM's OS/2 is not available yet but because they are leery of a technology that has not had its bugs worked out.

"We're just looking right now," explained William Griggs, director of telecommunications for Champion International Corp. in Hamilton, Ohio. "We have a couple of Model 30s in evaluation, and we'll decide soon to either go with those or with PC clones."

"We're undecided. We've got to get [the PS/2s in-house] to make sure everything works the way it is supposed to," said Rick Migra, DP operations supervisor at Bendix Corp. in Elyria, Ohio. Migra said his company has ordered 10 PS/2 Model 50s, which will be connected to an IBM 3090 Model 200 mainframe in the fall.

Natural evolution

A handful of major corporate accounts, however, are not intimidated by the wait for OS/2 and have purchased or ordered significant numbers of PS/2s. MIS managers at such accounts said they see the machines as a natural evolution of previous IBM offerings.

"Buying PS/2s is just a continuation of buying ATs. We'll buy primarily Model 50s and some Model 60s," said Joseph Brophy, senior vice-president of data processing at Travelers Insurance Co. in Hartford, Conn. Brophy said the company has placed orders for 5,000 PS/2s. He currently has 200 units installed and expects to receive 400 per month in the next year.

In the last three months, Delta Air Lines and American Airlines have purchased several thousand Model 30s that the companies will use to replace their own dumb terminals and to resell to travel agencies.

Most large companies that have purchased PS/2s have centered their strategy around the Model 50 or 60. Some have bought a few Model 80s but will use those machines primarily as file servers in local-area networks (LAN).

Few major commitments

With the exception of the airlines, few companies have made a major commitment to the Model 30, either because its processor is too slow or because it is not compatible with the IBM Micro Channel architecture used in the Models 50, 60 and 80, Computerworld found.

Most said they would prefer buying an inexpensive Intel Corp. 80286 clone to a Model 30.

"If it doesn't have the [PS/2's] Micro Channel architecture, we aren't interested. The main reason for going with the PS/2s is to be able to take advantage of what will happen in the PS/2 family. The Model 30 is the runt of the litter," said Phil Gordon, an information specialist with Charles Schwab & Co. in San Francisco.

Complement, not replace

At this point, most companies are buying PS/2s to complement, not replace, existing ATs and XTs. "We are adding to our inventory by adding PS/2s, but we are not getting rid of our ATs in stock," said a Travelers spokeswoman.

As more PS/2s are installed, MIS managers are giving existing ATs and XTs to either new employees or novice users. However, some MIS managers are giving the older systems to key personnel to take home.

"A couple of years ago, when new things came out, we'd buy them and move the existing systems elsewhere," said Ed Kline, senior information specialist at Monsanto Co. in St Louis. "But what we've begun to do is put some in people's homes that work in more strategic areas."

Most of the MIS managers interviewed said they are spreading all models of the PS/2 series among a broad spectrum of users — from secretaries to MIS departments and from research and development groups to top executives. While most are presently using the models as stand-alone systems, the majority of the managers said they will gradually integrate the machines into LANs or connect them to mainframes as the communications software for OS/2 becomes available.

Correspondents Julie Pitts and James Martin and Senior Editor Douglas Barney contributed to this report.

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	Winston-Salem	Aug 12
NE	Omaha	Jul 9
NH	Manchester	Aug 27
	Nashua	Aug 13
NJ	Cherry Hill	Jul 30, Sep 9
	Iselin	Jul 15, Jul 23, Aug 5, Aug 18, Sep 16, Sep 29
	Princeton	Jul 9, Aug 12, Sep 22
NM	Albuquerque	Jul 7, Sep 22
NV	Las Vegas	Jul 9, Sep 9
NY	Albany	Jul 14
	Buffalo	Aug 6, Sep 29
	Long Island	Sep 15
	New York City	Jul 8, Jul 16, Jul 22, Jul 29, Aug 6, Aug 13, Aug 19, Sep 9, Sep 17, Sep 23
	Rochester	Jul 30, Aug 20, Sep 22
	Syracuse	Jul 7
OH	Cincinnati	Aug 5
	Cleveland	Jul 16, Aug 13, Sep 17
	Columbus	Aug 4, Sep 30
	Dayton	Jul 21, Aug 18, Sep 22
OK	Oklahoma City	Jul 21, Sep 15
	Tulsa	Aug 11
OR	Portland	Jul 21
PA	Harrisburg	Aug 4, Sep 15
	King of Prussia	Jul 16, Sep 17
	Philadelphia	Jul 9, Aug 6, Sep 10
	Pittsburgh	Sep 8
RI	Province	Jul 8
SC	Charleston	Aug 12
TN	Memphis	Jul 29
	Nashville	Aug 6
TX	Austin	Aug 12
	Dallas	Jul 14, Sep 9
	Houston	Jul 9, Aug 6, Sep 18
	Lubbock	Aug 4
	San Antonio	Aug 13
UT	Salt Lake City	Jul 28, Sep 29
VA	Norfolk	Jul 14
	Richmond	Jul 8, Sep 8
	Virginia Beach	Jul 23
VT	Burlington	Sep 2
WA	Seattle	Aug 6, Sep 3
WI	Green Bay	Aug 10
	Madison	Aug 20
	Milwaukee	Jul 22, Sep 3

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Unisys welcomes Ally to its 4GL fold

BY ROSEMARY HAMILTON
CW STAFF

Unisys Corp. expanded its fourth-generation language offerings last week with the introduction of Ally, a system for the Unix and MS-DOS worlds.

A separate version of Ally, which was previously owned by three other vendors, is offered by Digital Equipment Corp. as a VMS product called Rally.

Ally runs on Unisys Unix-based systems as well as the company's microcomputers. But the product reportedly will be offered as an independent system and will run on any hardware platform using the Unix or Microsoft Corp. MS-DOS operating systems. Also, Unisys hopes to license the system to other vendors, according to Fred Meier, vice-president of corporate program management.

James Davey, a senior consultant at Digital Consulting, Inc., said he expects the product to do well in the Unix market, in which it will compete with Unify Corp.'s Unify and Informix Software, Inc.'s Informix. He also said Ally is "light-years ahead" of development tools in the MS-DOS arena. "This is a mainframe-class product on a micro," he added.

The initial release will support the Oracle relational data base management system from Oracle Corp. and Ashton-Tate's Dbase III, Meier said.

The Ally product had a long history before its introduction. Ally development work began in 1982 at Cary, N.C.-based Foundation Computer Systems, Inc., which is now a wholly owned subsidiary of Unisys. As an independent company, Foundation licensed the product to DEC in 1984, which introduced it a year ago as Rally.

Basil Harris, senior product manager for Rally, said the system has been enhanced since DEC acquired exclusive rights to market it on the VAX. "The products are very dissimilar in terms of what the user sees. DEC added a whole user interface layer on top of Ally that makes the application development process much easier," he said.

Rally applications can be developed to work with DEC's DBMS data base management system, RDB relational data base management system, RMS file management system and All-In-1 office automation system, Harris said.

In 1984, Encore Computer Corp. purchased Foundation and the rights to Ally. But Encore sold the company to Sperry Corp. in April 1986. With the acquisition of Sperry last year by Burroughs Corp., Foundation became a part of the new corporation, Unisys.

According to Richard Goyette, corporate program manager of fourth-generation languages at Unisys, Ally received little modification after the Sperry-Burroughs deal.

Ally is based on a concept of reusable code. It contains 140 modules that are commonly used subroutines in programming applications.

Finding its place

Ally joins two other fourth-generation language offerings from Unisys. Right now, it is unclear how the three will fit together, according to Shaku Atre, president of Atre International Consultants, Inc.

Mapper, which originated from Sperry, is a development environment that focuses on end-user computing. Linc, which came from Burroughs, is intended for the complex design of business systems.

According to Meier, Ally is a combination of Mapper and Linc. But Atre said the product is very similar to Mapper and "eventually, the company will put more emphasis on whatever one is selling better; and the other one has to find a new home."

Licenses range from $695 for an MS-DOS version to $32,000 for a large Unix system version. Runtime-only licenses, which allow users to run an application developed in Ally, range in price from $200 to $8,000.

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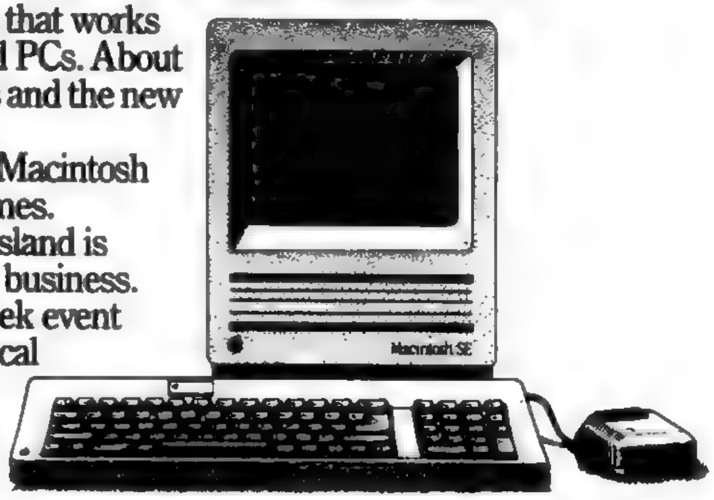

Leading Edge to ship AT compatible

BY ALAN J. RYAN
CW STAFF

CANTON, Mass. — Leading Edge Hardware Products, Inc. announced plans last week to begin shipping its Model D2 IBM Personal Computer AT-compatible computer.

The unit, manufactured by Daewoo Telecom Co. in South Korea, utilizes Intel Corp.'s 80286 processor chip and features 640K bytes of standard memory, expandable to 1M byte on the motherboard, and a 1.2M-byte floppy disk.

John Sullivan, vice-president of Leading Edge, said he expects the Model D2 will run OS/2 when that operating system becomes available from IBM and Microsoft Corp. sometime next year.

Model D2 shipments are scheduled to begin later this month and early next month in sample quantities to Leading Edge dealers, Sullivan said. "A more representative volume will be shipped to our dealer base in the latter part of September," he said. The unit will sell for $1,495.

Also scheduled to be shipped are an optional 30M-byte hard-disk version, which will sell for $1,995, and a "superspeed" drive, which will reportedly be a sub-30-msec drive with either a 30M-byte or 40M-byte hard drive, according to Sullivan. No price has been set.

Fighting bad rep

While Leading Edge has been often criticized by dealers and customers because of delays in shipping its Model D computer, Sullivan said the firm is combatting that reputation.

"We have been getting products out on a more timely basis during the last couple of months," he said.

The company said the 286 clone is one-third smaller than the comparable PC AT, with a footprint of 16 by 15½ in. and is about 6 in. high.

NCR pays user record damages

BY CLINTON WILDER
CW STAFF

SAN LUIS OBISPO, Calif. — NCR Corp. recently reached a multimillion dollar out-of-court agreement that represents the largest damages award ever granted in a user suit against a computer vendor.

The settlement, made earlier this year, ended eight years of legal battling between Madonna Construction Co. President Alex Madonna and the Dayton, Ohio-based systems vendor. Norman Cohen, an Atlanta-based consultant to users who have sued NCR, said Madonna received almost $6 million.

An NCR spokesman denied that figure and declined further comment except to say the settlement was "amicable."

Surpasses previous record

Madonna had won a record $5.8 million damages award in a California Superior Court decision two years ago [CW, June 3, 1985], for surpassing the previous record $2.6 million awarded to an Oakland, Calif., dry cleaning firm, Glovatorium, Inc., in 1982.

NCR agreed to the settlement one day before its appeal of the 1985 Superior Court decision was to be heard in a Santa Barbara, Calif., appeals court, a source close to the case said.

Neither Madonna nor his attorney nor NCR would confirm the amount of the settlement.

Madonna, the leader of one of California's largest highway construction contractors, said he was "very pleased" with the settlement but declined further comment. NCR generally requires the plaintiffs in user suits to sign nondisclosure agreements after their cases are settled.

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PS/2 board, floppy drive hit market

Tecmar founder's start-up leads charge as third parties solve Micro Channel puzzle

BY ED SCANNELL
CW STAFF

CLEVELAND — Cumulus Corp., a start-up company headed by Tecmar, Inc. founder Martin Alpert, last week introduced a multifunction add-in board for the IBM Micro Channel-based Personal System/2 family along with an external 5¼-in. floppy disk drive that can act as the A drive on the PS/2.

The multifunction board, called Curam, holds up to 8M bytes of memory and has an optional 2,400 bit/sec. modem and an I/O card containing a serial or a parallel port in one slot. A 2M-byte version of the board costs $995, with 2M- and 4M-byte daughter cards priced at $595 and $995, respectively. The modem will sell for $445.

By combining multiple functions on a single board, Curam gives users who are considering a PS/2 Model 60 for its expandability a strong reason to purchase the less expensive Model 50, which has only three expansion slots, according to Cumulus President Alpert.

By using two Curam boards, users "can get 16M bytes, serial and parallel ports and a modem for the Model 50," he said. "For a lot of people, that's the difference between buying the Model 50 and Model 60."

Doing the impossible?

IBM claims the Model 50 cannot be upgraded past 7M bytes, but Alpert said Cumulus has run the system with 16M bytes, leaving one slot still open.

The multifunction board supports both the Lotus/Intel/Microsoft Expanded Memory Specification (EMS) and the Enhanced EMS. The latter can be used to run multiple IBM PC-DOS programs in more than 640K bytes of memory space; EMS is commonly used to store large blocks of data in memory.

The external drive, called Stepping Stone, includes software and microcoded hardware, which allows it to function as the A drive. That feature is important for users of Lotus Development Corp.'s 1-2-3, which is copy protected and requires a key diskette in the A drive in order to run. Stepping Stone can also be used to convert programs from 5¼- to 3½-in. formats. The price, including a half-height drive, a controller, cabling and software, is $345, compared with $395 for IBM's external 5¼-in. drive.

Cumulus said it is currently shipping Curam and that it intends to ship Stepping Stone in the next two weeks.

Alpert, who developed some of the first add-in products for the original IBM PC at Tecmar before selling the firm to Rexon, Inc., said writing to the Micro Channel architecture was a delicate job. "You have to be very conscious of timing, particularly in the area of direct memory access," he added.

Despite reports earlier this year from add-in board makers that it would be extremely difficult to develop a multifunction board for the Micro Channel, Alpert said his firm had little difficulty because it "piggybacked" the daughtercards on the board, essentially creating a multifunction card from three separate boards.

Cumulus will introduce a complete line of products for the PS/2 and is now working on six products for "specific markets that are large and growing," Alpert said, including communication products that take advantage of the Micro Channel's ability to support multiple processors.

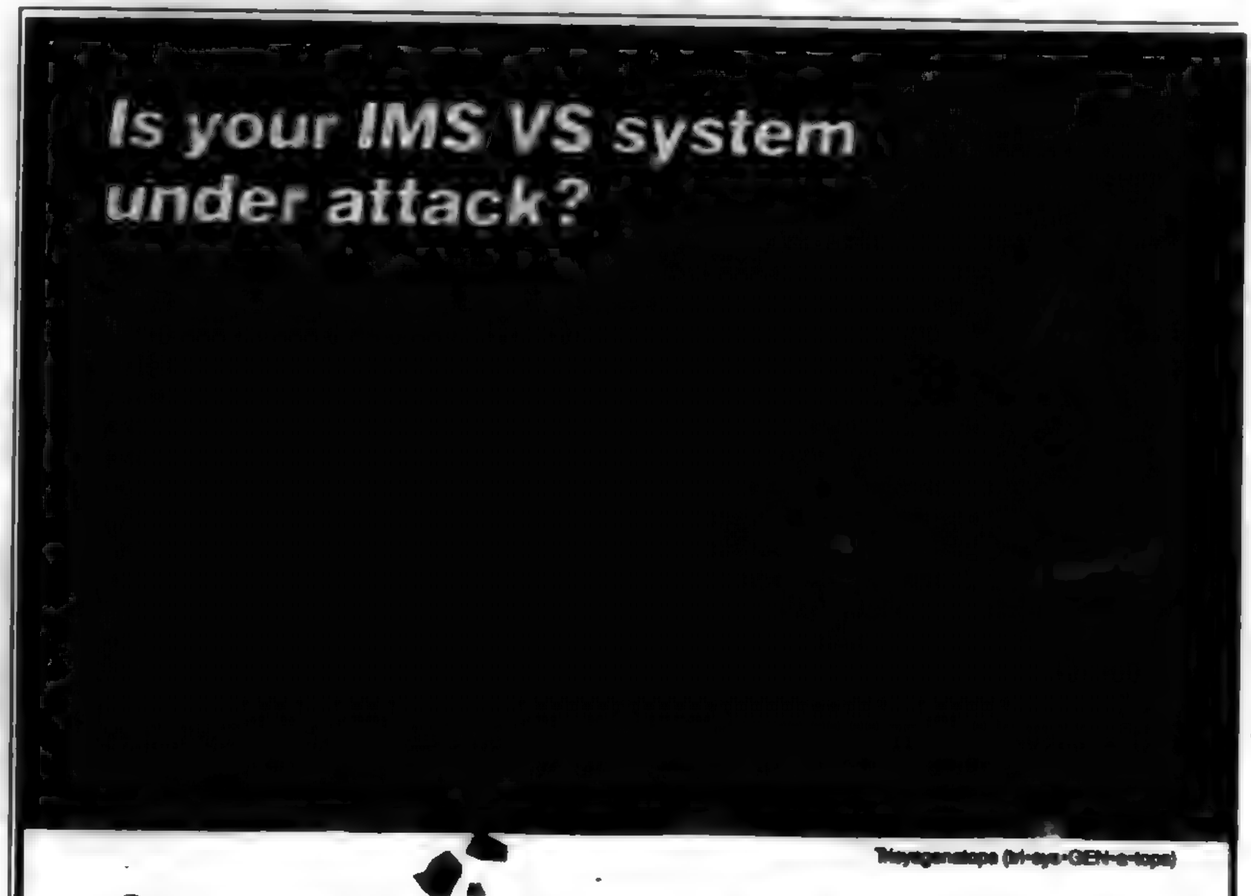
"We have a distinct strategy now, based on multiprocessors and [Microsoft and IBM's] OS/2. Our goal is to have a product ready by the time OS/2 ships," Alpert said.

Chart rewrite to offer 3-D

REDMOND, Wash. — Microsoft Corp. is scheduled to announce today a new version of Chart, a $395 graphics package for IBM Personal Computers and compatibles, that is aimed at business and scientific applications.

Microsoft Chart Version 3.0 now includes mouse support and support for three-dimensional graphics, features lacking in the firm's earlier versions. The package will be available immediately.

Unlike earlier versions, the package runs on local-area networks (LAN), including Microsoft Networks and any network compatible with IBM's PC Network. LAN support is built into the product to let users share expensive peripherals, such as laser printers and plotters, and provide users with external data. Each additional user on a network must purchase the $195 Workstation Pack. For the scientific community, the package includes expanded statistical functions such as regressions and line smoothing.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*virtual terminal: 1. any 3270 or SLU-2 type display in the network that is not defined to IMS/VS, not even within a generic pool; 2. a control block that is dynamically created and deleted for the user at logon and logoff; 3. capable of maintaining a one-for-one relationship between a userid and an IMS/VS logical terminal.

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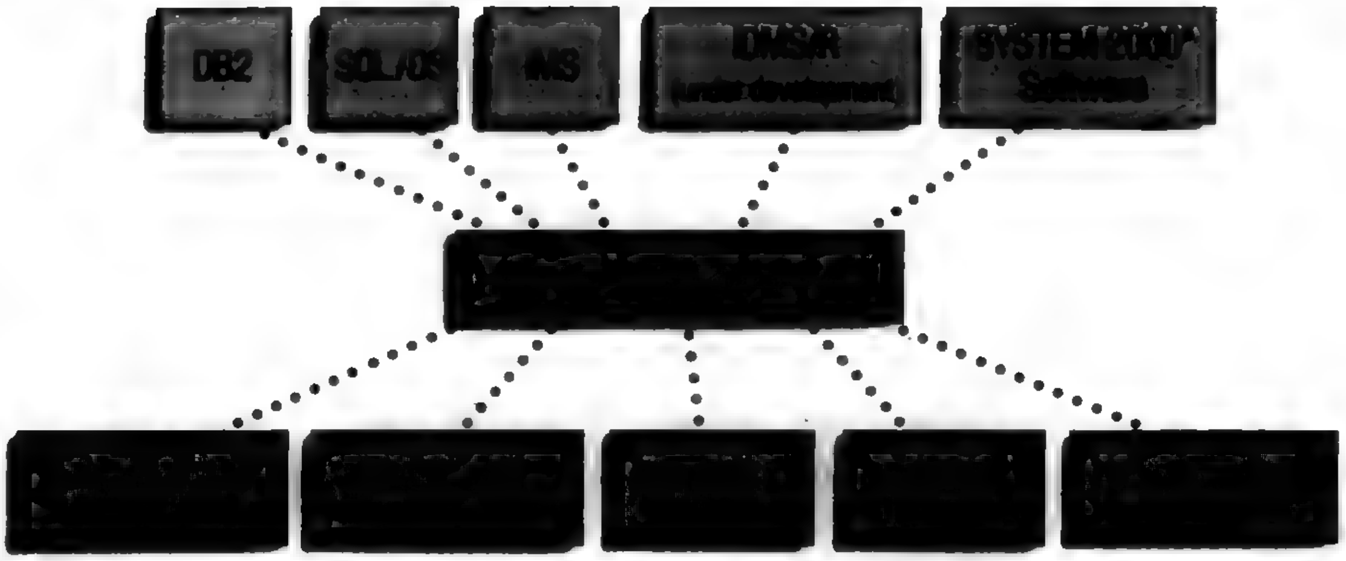

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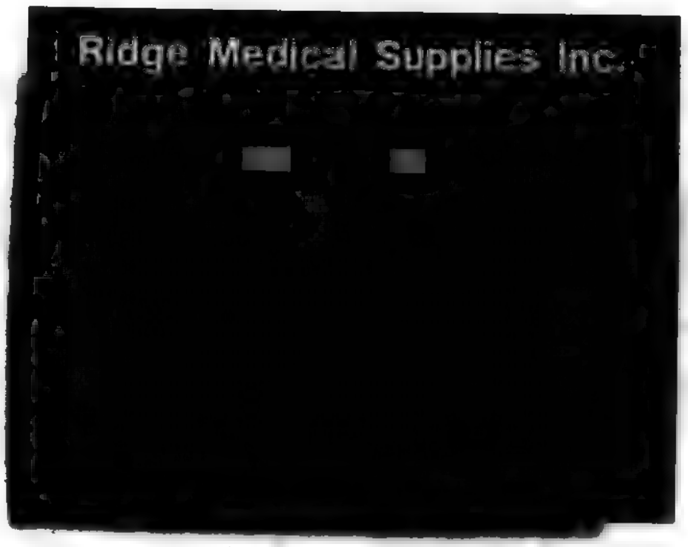

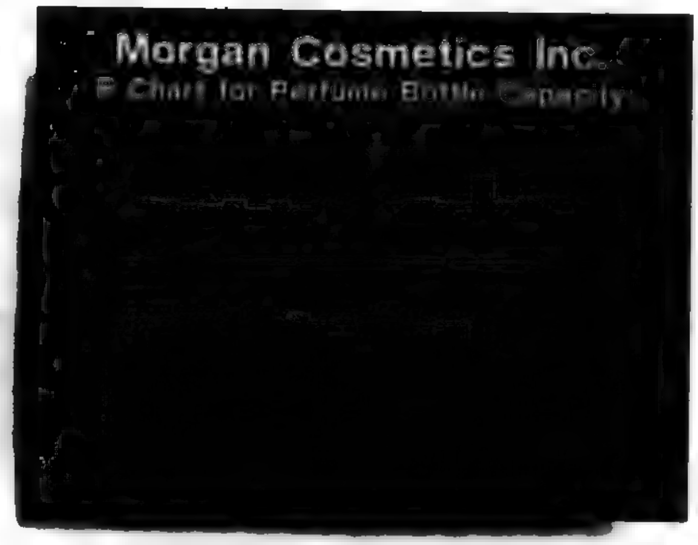

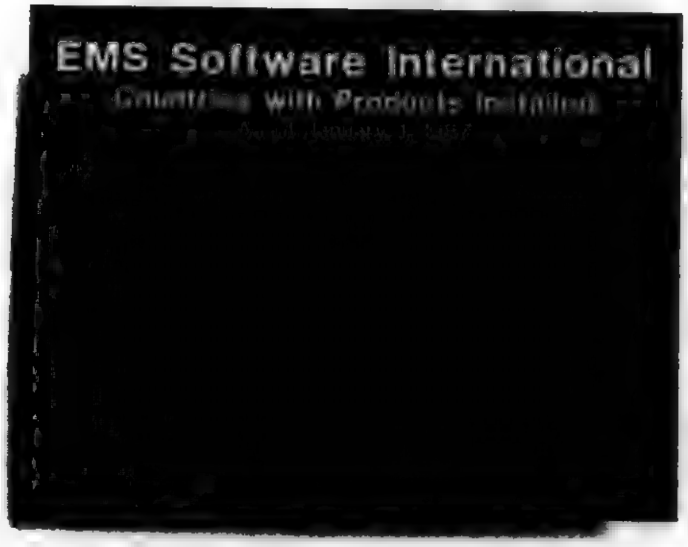

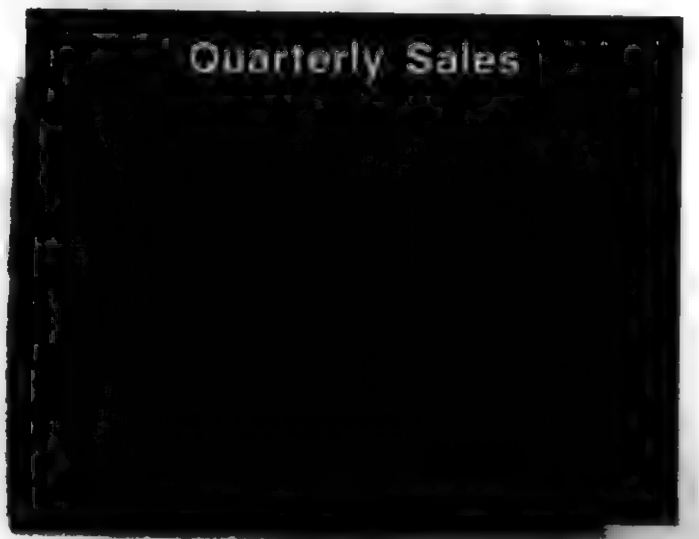

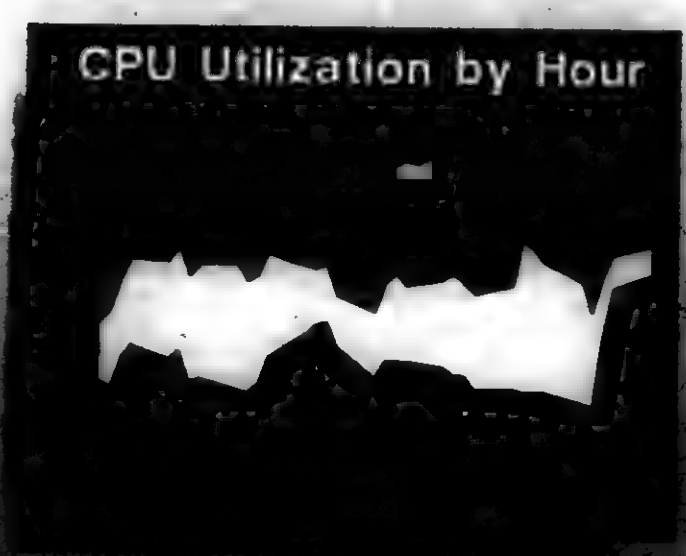

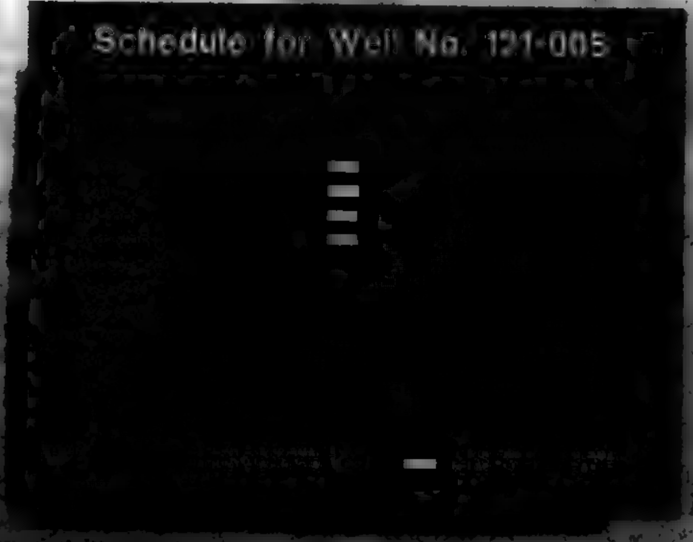

DEC starts Mac attack with VAX data link

BY DOUGLAS BARNEY
CW STAFF

MAYNARD, Mass. — In a move aimed at boosting sales of its VAX computers to Apple Computer, Inc. Macintosh sites, Digital Equipment Corp. will cooperate with Odesta Corp., maker of Helix, on development of a data base that runs on both Macintoshes and VAXs.

The agreement, set for announcement tomorrow, is the first public endorsement by DEC of any Macintosh-oriented product. "It is very unusual for DEC to go that far. They get involved in very few joint announcements,' said John Rutledge, vice-president of research for Dillon, Read & Co., a New York-based investment firm.

Under the agreement, DEC will supply Odesta with software and hardware for development, use Helix as a tool for DEC sales agents and give Odesta direction on product implementation. A key goal for DEC and Odesta, one source said, is to allow DEC terminals to access Helix VMX.

For DEC, the announcement is part of an overall strategy to embrace a variety of desktop architectures. "We are interested in attracting all people with devices on their desks, whether they happen to be Digital devices or other peoples' machines," said Richard Smith, DEC's manager of business development for the Microvax. DEC has already made such an effort to attach IBM Personal Computers and compatibles to VAXs and Microvaxes.

Now DEC is going after Macintosh users. "I am interested in the people who own Macintoshes and maybe don't know about Digital. They might be a lot more interested in us now that they know they can start out with Helix on the Mac and move up to the VAX with absolutely no change in the style of computing," Smith said.

Despite this agreement, DEC has still not stated its position on the Macintosh itself, which competes against DEC's Vaxmate, an IBM PC compatible.

"Don't read anything about Macs into this," Smith cautioned. Rather, it is an example of DEC's "open network policy," he argued.

Apple sees endorsement

An Apple official, however, said he believes the announcement proves that DEC is behind the Macintosh. "The DEC relationship endorses the whole concept of programming with the unique tools and approaches available in the Mac environment as much as it also endorses the Macintosh as a workstation," said Peter Hirshberg, marketing manager for desktop communications at Apple.

DEC's effort should be largely aimed at helping Odesta enhance Helix VMX, which requires a VAX or a Microvax. Unlike earlier versions of Helix, which run only on the Macintosh, Helix VMX provides applications development on a Macintosh, with much of the processing distributed on the VAX. Helix applications are developed with an icon-driven system rather than more conventional programming languages with which it can be difficult and time-consuming to work.

According to Odesta founder and President Daniel Cheifetz, the DEC backing provides a product development boost. "What they are doing is more than just a blessing. They are providing hardware and software support and a significant level of technical support," Cheifetz said.

Odesta is reportedly working to enhance Helix's access to VAX Record Management System (RMS) files. "Eighty percent of the data in VAXs is in RMS flat files. You won't have to use the Helix file structure in the future," a source said.

Continued on page 94

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FCC approves major AT&T rule change

Tentative plan would install price ceiling on long-distance services, remove profit cap

BY MITCH BETTS
CW STAFF

WASHINGTON, D.C. — Led by Chairman Dennis R. Patrick, the Federal Communications Commission last week voted 4-0 for a tentative proposal that would dramatically change the way the agency regulates AT&T's long-distance services and could possibly boost the carrier's profits.

The so-called "price caps" proposal, still subject to many months of public comment and FCC deliberation before becoming a final regulation, would set price ceilings on all AT&T long-distance services and remove ceilings on AT&T's profits.

The new scheme would replace the traditional form of utility regulation, which limits the company's rate of return and sets fixed prices [CW, July 27].

Under Patrick's proposal, AT&T's earnings could increase with virtually no limit, in order to reward the carrier for cutting costs. AT&T could raise or lower rates for long-haul services at will, as long as it does not exceed the price cap, which would be adjusted annually.

Users question price caps

For AT&T's largest customers, the key issues will be the determination of which services get price caps, the reasonableness of the initial price caps and the soundness of the factors used to make annual adjustments, according to James S. Blaszak, counsel for the Ad Hoc Telecommunications Users Committee.

In previous statements, users groups have expressed concern that the first set of price caps will be set too high.

"What the proposal clearly gives AT&T is greater flexibility to retain revenue and make more money," Blaszak said. "It's not clear that they will — it depends on the extent to which they can make their operations more efficient."

Under rate-of-return regulation, cost-cutting efforts that push earnings above the profit ceiling must be refunded to ratepayers. With Patrick's proposal, AT&T could keep some of the earnings derived from greater efficiency.

Wall Street responded favorably to the action. AT&T's stock rose to $32 a share, up 25 cents, in very active trading on the day of the FCC's vote.

The commission said that rate-of-return regulation should be replaced because it has numerous flaws, including perverse incentives to inflate and shift costs from unregulated business ventures to regulated services, since the costs are recouped from ratepayers.

Pricing benefits cited

"By contrast," Patrick explained, "price caps would appear to reduce the incentive to cross-subsidize, might reduce the ability and incentive to engage in any predatory pricing of competitive services and might increase carrier incentives to cut costs, innovate and realize efficiencies."

In addition, Patrick said price caps would protect ratepayers from sharp rate hikes.

The FCC proposal applies to so-called dominant carriers in the interstate services market, so it could be applied to the divested Bell operating companies as well as to AT&T.

However, the FCC said the new regulatory regime will first be implemented for AT&T and perhaps later for the Bell companies.

Bankamerica cozies up to AI to assist lending procedure

BY CLINTON WILDER
CW STAFF

SUNNYVALE, Calif. — As part of its effort to improve its loan portfolio and recover from massive losses, Bankamerica Corp. has turned to an unlikely source: artificial intelligence.

The U.S.'s second-largest bank recently invited 93 of its top executives from the U.S. and overseas to a series of four-day training programs on the commercial lending process. The Executive Lending Forum took place at the small Sunnyvale headquarters of start-up AI software developer Syntelligence, Inc., whose Lending Advisor expert system was the cornerstone of the training programs.

Lewis Coleman, executive vice-president of credit for Bankamerica's world banking division, said he chose an expert system because of its ability to incorporate the multiplicity of factors involved in approving or rejecting a potential debtor. Syntelligence employees programmed six actual Bankamerica loan situations into the Lending Advisor, and bank executives ran the expert system on IBM 3270 Personal Computers linked to Syntelligence's IBM 4381 mainframe.

"An AI system allows you to be able to run lots of variables in a much more efficient way and get a much better feel of the sensitivity of various credit situations," Coleman said.

Cooperative development effort

Introduced in late 1986, the Lending Advisor analyzes an array of loan-decision variables to assist loan and credit advisers with credit evaluation. Syntelligence developed the product in conjunction with loan officers at Wells Fargo Bank NA in San Francisco and Winston-Salem, N.C.-based First Wachovia Corp. Both banks recently installed a new release of the product.

Coleman was familiar with the product, as a former executive with Wells Fargo during the development effort with Syntelligence. To run the Bankamerica Executive Lending Forum, Coleman called on Tom Hofstedt, a Redwood City, Calif.-based bank credit consultant and former professor at Stanford University Business School.

"I had thought that expert systems were blue-sky technology, a long way off," Hofstedt said. "But the system forced the bankers to ask the right questions. The bank views its problems, to some extent, as related to bad decisions. Part of the solution to that lies in better analysis, and some of it lies in technology."

Forum participants attended daytime seminars at the Sunnyvale Sheraton, then ran the software on Syntelligence computers after regular business hours. Syntelligence did not charge a fee for the seminars but hopes to license the Lending Advisor to Bankamerica in the future, according to Syntelligence President Sheldon Breiner.

'Rapid-fire language course'

"Very few of these people were computer literate except for some PC spreadsheet experience," Breiner said. "They did not come here to play golf. The goal was for them to look at the Bankamerica loans in ways that they hadn't before. It was like getting a rapid-fire language course."

Bankamerica's Coleman said he hopes the Executive Lending Forum experience will help overcome some suspicions about AI technology within the bank.

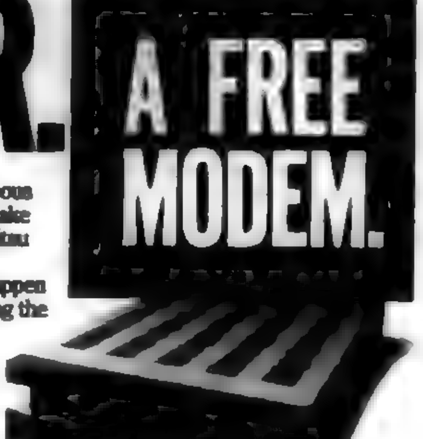
"In the loan business, you're making a decision about future cash flows, and there is no absolute right answer," he said. "An awful lot of people have made their careers on the value of their own judgment, and they're reluctant to deal with a system that might subtract from that value. But that comes from people who don't understand how the system works. Good analysis provides the framework for good judgment."

Although many leading banks are developing or using expert systems internally, Syntelligence's Lending Advisor is one of only a handful of commercially available products, said AI consultant Harvey Newquist of DM Data in Scottsdale, Ariz. But, he said, commercial lending may be ripe for such a product.

"The industry shouldn't take this the wrong way, but the idea of a hamburger university like McDonald's is beginning to be true of the banking industry," Newquist said.

"You'd like to establish a base level of performance, so something like an expert system can help do that," he added.

In a separate announcement, Syntelligence introduced a release of its expert system for the property/casualty insurance industry. Release 2.0 of the Underwriting Advisor is said to contain improved communications interfaces to accept electronic transfers of data from a user's other mainframe software applications.



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PC additions keep Tandy in competitive field

BY ALAN ALPER
CW STAFF

NEW YORK — Seeking to solidify its position as a leading alternative to IBM in the microcomputer industry, Tandy Corp. last week unveiled four IBM Personal Computer-compatible systems spanning the performance spectrum.

At a press conference here, the Fort Worth, Texas, firm brought out its first Intel Corp. 80386-based microcomputer, its initial PC-compatible laptop and an Intel 80286-based version of its Model 1000.

These micros continue Tandy's strategy of remaining compatible with existing Microsoft Corp. MS-DOS standards while providing a vechicle — via the 286- and 386-based PCs — to eventually run applications that take advantage of the multitasking capabilities of OS/2, the next-generation operating system jointly developed by IBM and Microsoft. Tandy said it will continue to study the Micro Channel architecture used in IBM's Personal System/2 line and will only provide compatible products if market requirements are identified.

Tandy said it will also continue to aim its efforts primarily at small to medium-size businesses and home users, although the company remains committed to its recently created outbound sales force, whose charter is to increase penetration of larger corporations.

Citing industry research, John Roach, Tandy's chairman and president, said approximately 3% to 4% of the country's largest corporations are Tandy customers. That figure, he conceded, was not up to initial expectations.

Analysts said last week that the Tandy PCs round out the firm's product line, offering better performance at aggressive price points. The products could enhance the company's attractiveness to large corporate accounts, but Tandy needs to learn how to sell and service major corporations and reduce overlap between its national and local sales forces before it can hope to bolster its position, analysts said.

The firm's 386-based micro, with a base price of $2,599, will be intriguing to some large companies with budgetary restrictions, but aggressive pricing is not always sufficient to attract large corporate users, noted Tom Roberts, an analyst with International Data Corp. in Framingham, Mass. "It's still a Tandy or Radio Shack machine, which has little status in large corporations," he said.

Tandy's top-of-the-line Model 4000 comes standard with one 3½-in. 1.44M-byte floppy disk drive and a 386 microprocessor running at 16 MHz. The Model 4000's bus structure is compatible with IBM's PC XT and AT and offers two 8-bit expansion slots and six 16-bit slots. It will operate as a stand-alone processor or a file server on a PC network and support MS-DOS 3.3, OS/2 and AT&T's Unix System V, Release 3.

With a 20M-byte drive, the Model 4000 is priced at $3,499. Adding a 40M-byte drive boosts the price to $4,299. In contrast, IBM's Model 80-041 lists for $6,995, and Compaq Computer Corp.'s Model 40 costs $6,499.

Laptop debut boosts clarity

Tandy's first PC-compatible laptop — the 1400 LT — features a backlit, supertwist LCD, which is said to provide greater viewing clarity. Priced at $1,599, the Intel 8088-based portable features 768K bytes of random-access memory, dual 720K-byte 3½-in. floppy disk drives, a 76-key keyboard with 12 function keys and a serial and a parallel interface. The unit includes a 12V battery pack with a life of four hours and an AC adapter. An optional spare battery pack is available for $79.95, the company said.

The high-end 286-based Model 1000 — the 1000 TX — is priced at $1,119. The 1000 TX offers 640K bytes of internal storage, expandable to 768K bytes; a single 720K-byte 3½-in. floppy disk drive; five expansion slots; and MS-DOS 3.2. The machine comes bundled with Personal Deskmate 2, Tandy's second-generation graphics-oriented user interface that uses Microsoft Windows conventions and features integrated applications.

Other announcements by Tandy included the following:

- Two versions of its Model 3000. Tandy increased the clock speed of its original Model 3000 to 12 MHz and reduced the price by $200 from $1,999. The 8-MHz Model 3000 HL was reduced in price by $200 to $1,499, making it Tandy's lowest cost "OS/2-ready" computer, the firm noted.
- A version of the Deskmate integrated software package for computing professionals using any of Tandy's PC-compatible systems. Professional Deskmate is priced at $149.95. Through Desklink facilities, users can share applications such as electronic mail or phone listings. Users can exchange data via RS-232 interconnection, a 3Com Corp. network or Tandy's Tandylink twisted-pair network.
- The $699 Model 1000 HX, which features MS-DOS 2.11 loaded into read-only memory and includes a single 720K-byte 3½-in. floppy disk drive.

All the Tandy products are currently available except the Model 3000s, which will be available in the fourth quarter, the company said.

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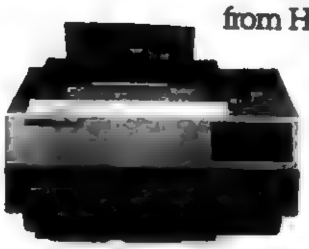

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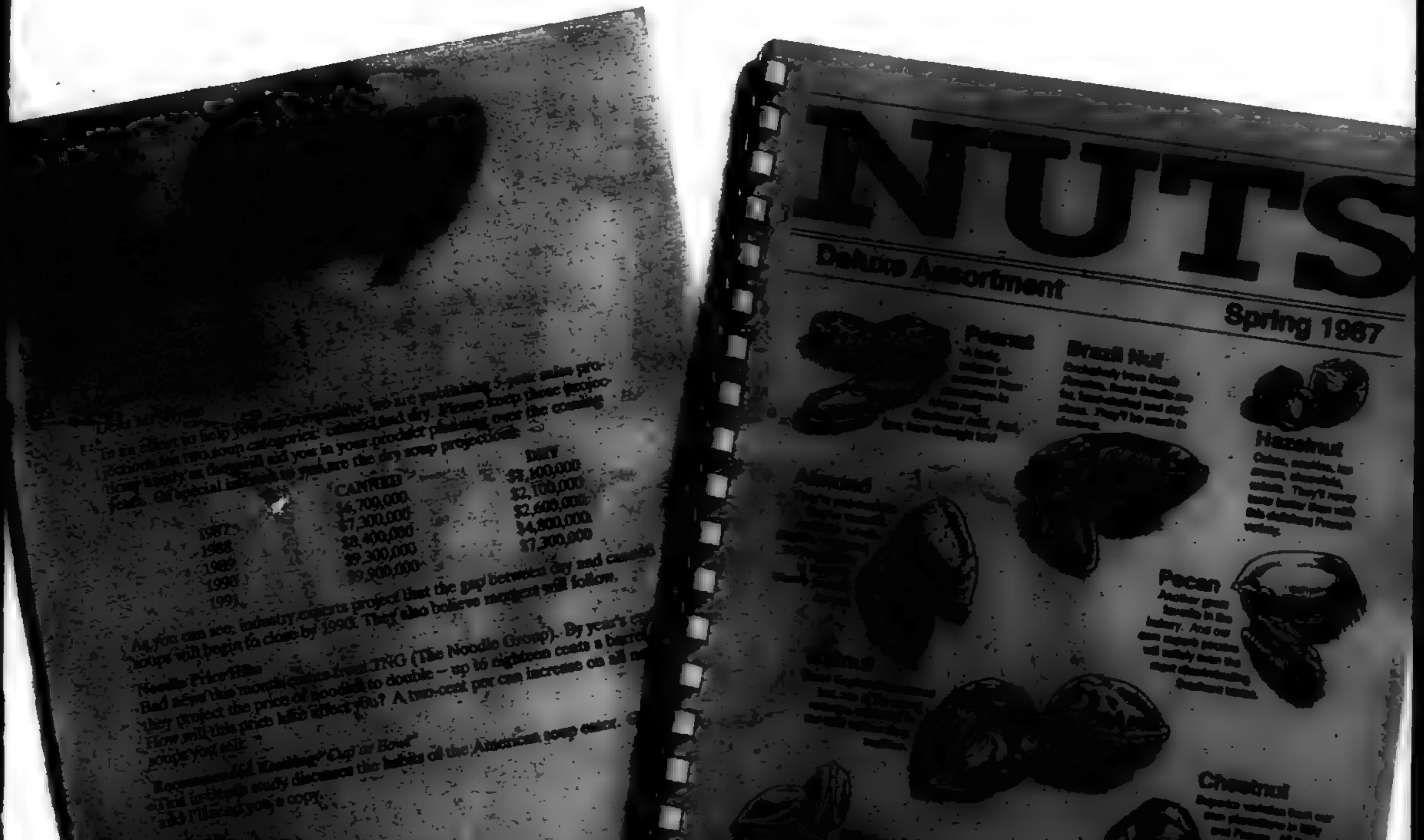

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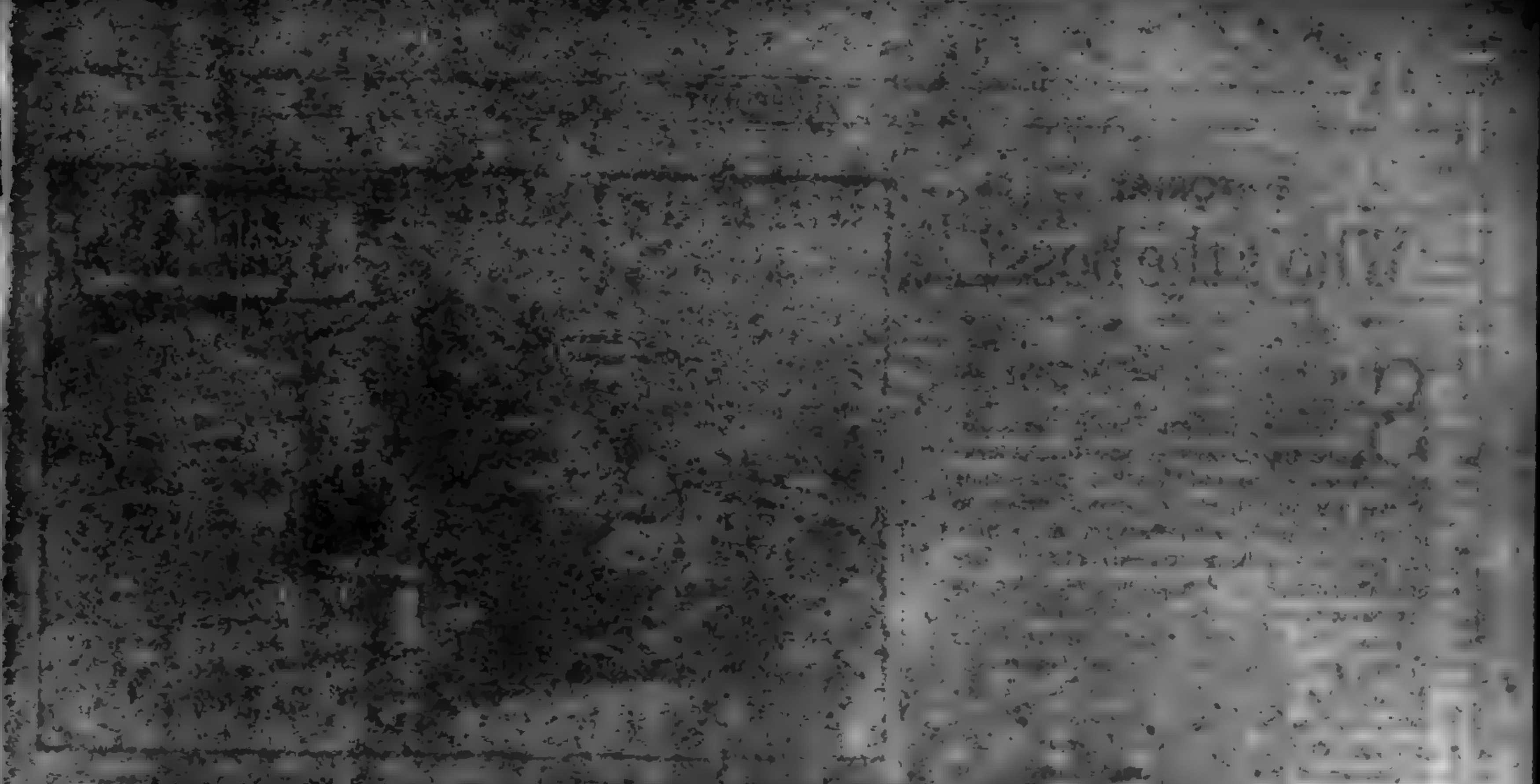

[redacted] "A computing hitecture that raised ome eyebrows when it helped Johns Hopkins raise a few million dollars."

When The Johns Hopkins University decided to launch an ambitious fund-raising campaign, its Development and Alumni Services Department decided to do something even bolder – break away from the administration's traditional mainframe environment. And go with a system from Digital.

"We needed control of our own priorities," says Mel Vogelsang, Director of Development and Alumni Services. "Our old system was too difficult to access. It could never have handled the new demands."

Digital's open architecture made it easy. Now they can quickly move up to more powerful, faster processors. And still keep the same software and operating system. What's more, their new system can run all sorts of software. From Digital's to a third party's to Hopkins' own.

Digital service even helps with customization of that software. Not to mention lots of upgrades. "The demands of my users are more insatiable than ever: more applications, faster output," Vogelsang remarks. "I'm constantly faced with growth. And Digital's open architecture lets me add on whatever I need."

How successful is the department? According to Vogelsang, "We've cut response time from three weeks to three days. And when needed, to three hours. In fact, we've tripled the work processed. Now, we have time to branch out into event management, alumni networking. Even a little PR.

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EDITORIAL

Who's the boss?

Steve Stanton calls them the "Johns and Marys."

We all know them. They're the people in the various discrete departments in organizations — marketing, sales, engineering, etc. — who started out as informal advisers to personal computer users years ago and eventually evolved into the micro gurus of today. They are the driving force behind micro purchase and implementation strategies, Stanton holds.

Down the hall from Stanton at the Index Group, Inc., a widely respected Cambridge, Mass.-based MIS consultancy, is Tom Davenport, research director and former end-user computing manager at Harvard University.

Davenport sees the situation differently, with MIS calling the shots and — rightfully so, he says — driving corporate micro strategies.

Each consultant can point to numerous examples in the real world to support his viewpoint. And each is correct, because the real world today is a mishmash of differing micro implementation strategies. And this begs the vital question, Which strategy is the best? Should MIS assert itself in the micro area to the extent it has with larger systems? Or is it a better idea to leave the development of micro strategies to John and Mary?

One thing is clear: MIS is increasingly cited as the department with primary responsibility for implementing micro strategies and specifying PC purchase plans. A survey earlier this year of several hundred *Computerworld* readers showed MIS holding this primary responsibility in seven out of 10 cases. This data is fully supported in a soon-to-be-released independent survey of 1,000 medium-size and large sites.

So while a trend is apparent, the question still remains as to whether the trend is a desirable one. Our feeling is that it is not only desirable but also essential to the long-term viability of information systems strategies.

Furthermore, it seems that this desirability is being recognized by the Johns and Marys, as former micro managers are steadily moving into mainstream MIS operations in many organizations. Such managers say they gain more respect in doing so, and they certainly position themselves closer to the seats of corporate power, since information systems are rapidly being absorbed into the organization infrastructure.

A similar potentially contentious situation is brewing between MIS and communications professionals. As greater proportions of information outlays fund expanded data and telecommunications operations, telecommunications managers are seeking greater influence and independence from their MIS bosses.

What MIS needs to do is strike a fine balance between the need to grant greater autonomy to subdepartments and the need to hold the information structure together with a skillfully crafted, integrated strategy. This will increasingly require the compromising skills of Henry Clay, the managerial acumen of Lee Iacocca and the visionary abilities of Jeanne Dixon. Any takers?

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Computerworld

LETTERS TO THE EDITOR

Employee hunting

This is an open letter to those who need programmers.

You will never find the person you are looking for if you rely on your personnel department to screen applications. I know because, after two months and 50 applications, I have yet to talk to a real computer person.

Obviously, I have been going about my job search in the wrong way. Actually, it has been several wrong ways. But what do you really want — an expert on job hunting or an expert programmer?

I have some suggestions to protect your own interests. First, do not just give your personnel department a list of languages and operating systems unless you are really looking for a new resident guru.

Applications programming requires knowledge of an editor, a language and your locally defined methods of compiling, linking and running the program. Everything else about your programmer/analyst's job depends on your applications, your business and your local practices. Fitting into them is the hard thing to learn and should top even the programming language in evaluating experienced candidates.

Second, give your personnel department a short form letter to accompany the standard reply. Many resumes will be rejected because personnel employees cannot make sense of them or see how their contents apply to the available job. That may mean the applicant cannot write a resume or that his experience is unfamiliar to those in personnel. Neither should be a surprise, and neither should disqualify him from your search.

Why not give him your selection criteria and a structure within which to discuss himself? Then you can be confident that you will really learn how well he fits the job.

Finally, what you should be looking for is a package of processing power and understanding that will let you implement the ideal employee. You will have to program him to some extent.

Keep in mind that the easiest reason for the personnel department to reject him will be the programmer's ignorance of the things that are the easiest for him to learn. Your risk is not that you will not get good candidates, but that you will miss the best.

Donald H. Sweezy
Raleigh, N.C.

This week in history

Aug. 8, 1977
If programmer productivity remains at its current snail's pace of 3% a year, automated information processing will become the most labor-intensive industry outside of agriculture by 1985, warns Richard I. Tanaka, president of the International Federation for Information Processing.

Aug. 9, 1982
The Stevens Institute of Technology in Hoboken, N.J., has announced that freshmen entering the school's computer science, systems planning or management programs will be required to own an Atari 800 personal computer system.

Relational notes

John Blumberg makes some inconsistent remarks in his article concerning the relational model, the Pick system and miscellaneous data base management systems [CW, July 6].

Two such remarks are the following:

- "The Pick system . . . became commercially available in 1974."
- "Pick's relational data base predates the published works of Edward Codd . . ."

Blumberg clearly made an incorrect guess as to my first name, which is Edgar. My first technical papers on the relational model were the following:

- "Derivability, redundancy and consistency of relations stored in large data banks," IBM Research Report RJ599, Aug. 19, 1969. This report was unclassified and therefore readily available to the public.
- "A relational model of data for large shared data banks," the Communications of the ACM, Vol. 13, No. 6, June 1970.

Of course, I have published numerous others. I would like to challenge Blumberg to answer publicly the following questions:

- What were the papers you or your colleagues published prior to August 1969 that defined the relational model or the approach based on it?
- Where were you and your colleagues during the data base management wars of the 1970s? I did not see you in the trenches.

I have yet to see any sign of any Pick developers putting their reputations on the line by publishing technical papers concerning the relational model.

E. F. Codd
The Relational Institute
San Jose, Calif.

Cold shoulder to network integration

Expense, uncertainty and absence of common system environments leave field untapped

FREDERIC WITHINGTON

For a decade, vendors have been telling users to integrate their communications networks — to combine data with voice and, where relevant, image transmission, or at least combine all data networks into one.

A flood of products has been introduced to support network integration — protocol converters, voice/data private branch exchanges (PBX), satellite earth stations, integrated workstations, video/audio teleconference equipment and the like. And for a decade, users have greeted these network integration products with a yawn, to the general detriment of the industry's growth rate.

The following are three examples of organizations that considered integrating networks — and decided not to.

One of the country's largest insurance companies is composed of divisions that share some resources, including communications facilities and a computer center. However, each division created its own applications, which led to the use of differing terminals and protocols and therefore to multiple communications networks. The manager of central facilities wants the divisions to convert to common protocols so a single, integrated network can be used. The divisions, comparing the cost and inconvenience of changing software with the benefits, have so far refused.

A government agency considered installing a voice/data PBX to handle the traffic of its voice, word processing and data terminal networks. The vendors of processors and terminals could not support multimedia service, however, and end users voted to put up with the inconvenience of multiple terminals rather than learn new systems. So larger versions of the separate systems were installed instead of an integrated one.

Two manufacturers of medical supplies merged. Each had an order entry network for salesmen and customers to use. They considered integrating the networks but found the major saving could be made just by installing multiplexers that enabled the networks to share leased communications lines. To go further would have meant changing software, behavior patterns and large numbers of terminals for little further gain.

TOM LULEVITCH

Some of the following novel services were supposed to lead to integration of networks but have not done so:

- Shared data services were going to induce both business people and consumers to use telephone lines for data inquiries and electronic mail, as well as for voice. After at least 10 years, most providers, except those owning really valuable data, are languishing, and the use of dial-up modems is pretty well restricted to professional personal computer users.
- Teleconferencing was going to create big new markets for multimedia teleconference room equipment and satellite earth stations. Instead, what teleconferencing there is either uses entertainment TV facilities or is restricted to voice and low-rate freeze-frame images.
- Electronic Data Interchange was (and still is, enthusiasts say) going to cause companies in many industries to integrate their data networks. This integration has happened only in industries that already shared data definitions and high levels of transaction interchange. Others are tangled up in standards squabbles and cost-justification studies that persistently come out negatively.
- Desktop publishing is the latest development supposed to lead to the integration of office and data networks. However, most installations are turning out to include only a few workstations, a shared file and a local laser printer.

Keeping progress at a minimum

What's held up progress? Four factors, apparently. First, the absence of common system environments in the networks to be integrated. This one the vendors acknowledge: Diverse communications protocols, system programs and data elements make integration difficult.

This lack is slowly being remedied. Vendors are making progress in developing hybrid systems; de facto (and de jure) standards are emerging at a reasonable rate, and users are slowly squeezing out off-standard networks. More network integration will doubtless result, but not as much as the vendors hope because of the remaining three factors.

Second, the absence of common interest among users. Buyers and sellers of products must communicate information related to orders, and some forecasters say many of them will soon be doing this network to network. But in today's world, such communications are usually reviewed by a person who takes some action, enters the result into a data processing system and simply files the original communication. There is rarely a common interest in interconnected data networks. Even within an organization, departments talk mostly to themselves. When marketing, manufacturing and finance departments talk to one another, it is in terms of finished transactions in relatively low volume or orally. When they talk to top management, it is in terms of financial summaries or, again, orally.

It may be worthwhile to interconnect departmental networks to speed up low-volume communications, but there is rarely enough common traffic or common site coverage to justify full integration.

Third, an inadequate financial benefit. The main cost offset by integrating networks is communication line cost. But a combination of multiplexers and competition has brought communication line costs down. And the cost of integration, which usually requires rewriting software and converting files to a standard, is often high. Many user organizations guiltily add up the costs of their redundant networks, compare this to the cost of network integration and are surprised to find that integration does not pay.

Fourth, resistance to behavior change. This intangible factor is often enough to offset any cost reduction that survived the justification study. People's communication facilities become part of the way they do business. They turn to the telephone, the data terminal or the workstation for rapid service, expecting to use the operating procedures that have become instinctive with practice.

If new operating procedures must be learned, there is naturally resistance and lowered productivity until they become instinctive. Integrated, multimedia networks necessarily involve learning new operating procedures, so user resistance to them is to be expected.

The bottom line is simple. Don't integrate any networks until you're satisfied you have common system environments, the costs are justified, the network users have enough interest to make this project worthwhile and users will accept the behavior change. If you're satisfied, go ahead, and more power to you. If you're not, you're in good company — that of most systems managers in the country.

A 30-year veteran of the computer industry, Withington was a vice-president of Arthur D. Little, Inc. and is now an independent consultant. He has written four books and more than 60 articles and papers.

Grafting a hybrid distributed data base

READER'S PLATFORM

DENNIS CRANE

C. J. Date's article, "Twelve rules for a distributed data base" [CW, June 8], presents an elaborate analysis of requirements for an ultimately flexible implementation of a distributed system. It challenges designers and implementors to press for a degree of integration, transparency and independence (hardware, networking and operating system) that is beyond practicality in today's world.

I would have appreciated an equally thorough review of the circumstances and business justifications for such a robust implementation of a distributed data base. What real-world situations actually call for such an architecture? How would the system compare on a benefit/cost basis when due consideration is given to orchestrating the degree of independence called for in the article?

The truly distributed data base, as proposed by Date, may be analogous to a town deciding that the best way to complement an old library would be to catalog and inventory all the books that each of the town's residents maintain at home and then design a scheme by which any resident could conveniently access, if and when interested, all of this reading material.

Obviously, the town would save the cost of building a new central library, and people would not have to learn the Dewey decimal system or travel downtown to get a book.

How practical is it?

Perhaps it would be easier to borrow the book from a neighbor. But what if the neighbor is away for the week? And how practical is it to ask that everyone organize and catalog the books in their home libraries in the same manner, on the off chance that a fellow townsman might wish to locate and borrow one? And who will be responsible for ongoing compliance with the cataloging scheme, assuming it can be agreed to in the first place?

Practically speaking, most business applications calling for distributed data bases are likely to be served by a hybrid architecture with the following characteristics:

- Data created and used most frequently by a certain user will be retained locally.
- Data created by one person and frequently accessed by many others can be stored centrally.
- Convenient provisions exist for users with disparate hardware and software to access the centrally stored information.
- Procedures are established to request updates to centrally stored information and request data that might be retained locally. Procedures could include indexing or periodic update schedules.

Implementing such a system requires recognition and acceptance of the diversity of the hardware, software and networking likely to prevail in the business environment, particularly when originators and users of the data belong to different business entities.

I applaud Date's well-presented guidelines and encourage designers to consider some of these concepts, along with the concept of a hybrid data base, when constructing actual systems to address most real-world requirements.

Crane is the manager for the Mountain States region of GE Information Services, a division of General Electric Co., in Englewood, Colo.

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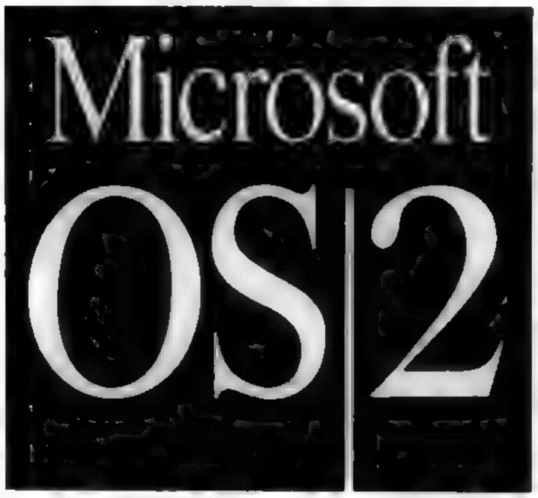

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SOFTWARE & SERVICES

SOFT TALK

Mitch Betts

Pentagon gets personal

Finally, finally, the Pentagon is beginning to see the wisdom of considering the human factor when it designs weapons systems.

The most important benefit of this, of course, is to make it possible for real soldiers to successfully use today's high-priced high-tech weapons. But this welcome news also has an important side benefit: Government-funded research in human factors provides lessons in software design that should be just as useful to the private sector.

We've all read horror stories about "smart weapons" bought by the Pentagon for millions of dollars, whereupon the Pentagon finds out those weapons are virtually impossible for a soldier to use in battle. It may be a fighter jet with too many control switches, a missile that requires 18 steps to aim and fire or a tank with hatches so small that soldiers in winter gear can't climb in. With computer systems such as those found in jet cockpits, there are questions about whether the pilot can see all the screens and whether the system is providing too much information for the pilot to handle.

This is where the study of human factors — the capabilities and limitations of humans, relative to the systems they operate — comes in.

At long last, the Department of Defense is starting to consider human factors in the *early*

Continued on page 26

Information center role changes

Hospital finds it must support applications written by end users

BY ROSEMARY HAMILTON
CW STAFF

COLUMBUS, Ohio — As information center director at Children's Hospital here, Paul Jacobson was recently presented with a patient information management program that had been written by an end user.

Jacobson had to figure out how much responsibility to assume for this work, a challenge that was a far cry from his job of two years ago — teaching the basics of word processing and spreadsheets to uninitiated end users.

"This is a nonprofessional developer developing a critical application. It's spaghetti code, and it isn't documented. But she wrote it, and it works. My concern is how we will support this effort," he says.

Paul Jacobson

Like many information centers, the one at Children's Hospital is struggling through a transitional period. Having achieved its original goal of promoting computer literacy among the hospital's employees, the center is now redefining itself in a world of increasingly sophisticated users, some of whom have produced finished applications. Jacobson says this process is difficult because there is no clearly defined next step for the information center.

"We've gone from relatively simple, stand-alone applications aimed at personal productivity to the need for complex ones aimed at work groups and departmental areas," he says.

This change has raised the question of how much of a role the information center should play in supporting more sophisticated users, Jacobson says.

"The traditional support organization for simple, single-user applications will have trouble handling the more sophisticated departmental issues," he adds.

The need for departmental

Continued on page 29

Industry giant faces fight from Canadian underdog

BY CHARLES BABCOCK
CW STAFF

TORONTO — A job scheduling package that users said offers more control over scheduling options is being pushed by a young Canadian firm to compete with the dominant products from Computer Associates International, Inc. and the former Uccel Corp.

Cybermation, a 6-year-old company in the Toronto suburb of Markham, is offering Release 3.5 of Execution Scheduling Processor (ESP), a $40,000 combination of two predecessor products: Dependent Job Control and Job Scheduling System.

Both products are used under IBM's MVS operating system, with the Job Scheduling System working in conjunction with IBM's TSO or with Applied Data Research, Inc.'s Roscoe. ESP was designed to work with IBM's JES2 or JES3 job entry environments.

Cutting the overhead

The Dependent Job Control component emulates the dependent job capabilities of JES3 for a JES2 shop, noted user Terry Burr, senior software consultant for Canada Systems Group, a service bureau with three data processing centers. Burr said his shop did not want all the overhead of JES3 but needed the job dependency capability and found it through the Cybermation product.

After rejecting IBM's Change Job Scheduler, "We were getting ready to write our own dependent job control program," when the firm learned of ESP, Burr recounted.

An ESP user in Greensboro, N.C., who asked not to be identified, praised the job scheduler component. He said he was able to train users in a 10-minute telephone conversation to define tasks and follow the procedures for executing those tasks.

"It's quite easy to assign a user to ESP. . . . Users identify their own needs and get on board very, very quickly," he said.

Whether these features will allow ESP to enlarge its small installed base of 60 licenses re-

Continued on page 27

Manager displays 10 screens

BY ROSEMARY HAMILTON
CW STAFF

RESTON, Va. — Software AG of North America, Inc. is set to introduce today a session manager with a windowing facility that the firm said will allow users to display up to 10 IBM VTAM applications simultaneously.

Net-Pass, which was designed for the IBM MVS, DOS/VSE and VS1 environments, is said to save users up to 10% of CPU resources by eliminating the need to log on and off as they move from one VTAM application to another.

A one-time license fee for DOS environments is $15,000. An MVS version costs $25,000, and a VS1 version has a $20,000 fee. The one-time fee includes the maintenance charge for one year. Subsequent maintenance charges are 15% of the current license fee.

The session manager has also been designed to work with Software AG's applications manager, Com-Plete. Users can run both products concurrently and can switch between the two with a single keystroke, company spokesmen said.

The windowing facility also

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Inside

- [illegible] system ready to run on 9370. Page 26.
- CASE tool maker to offer interface to Pansophic's Telon. Page 29.
- Libra adds construction accounting tools for VAX. Page 31.

INFORMIX UPDATE: A QUICK REPORT ON DB2

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SSPS ramps up 9370 tools

Analysis, graphics, tables packages to run under VM/IS

NEW ORLEANS — At the recent Information Center Conference and Exposition held here, SSPS, Inc., based in Chicago, announced that it will make its mainframe and minicomputer products available on the IBM 9370 Information System running VM/IS.

SPSS-X is a comprehensive data analysis package that is produced by the company.

SPSS-X Tables, an option to the SPSS-X system, displays analysis results, according to the vendor.

SPSS Graphics can reportedly display information in 40 chart types, including pie, bar, line and regression charts.

In addition, the vendor said, SPSS Graphics has the ability to display maps and text pages as well as multiformat combinations.

SPSS-X Capture, an SPSS-X option, reportedly provides a bridge between SQL/DS query language and SPSS-X.

Initial licensing fees on the IBM 9370 for SSPS-X range from $3,000 to $5,000. SSPS-X Tables prices vary from $1,500 to $2,000. The graphics product costs $2,500 to $6,000.

Pentagon

CONTINUED FROM PAGE 25

stages of systems design, under a program called Manpower and Personnel Integration, or Manprint. Begun three years ago by the U.S. Army, the program is beginning to have a definite effect on military design practices, according to a recent article in the Institute of Electrical and Electronics Engineers' *Spectrum* magazine.

No longer flying blind

For example, the Army is developing the cockpit computer for the Light Experimental Helicopter by running simulator tests. The simulators show how pilots handle the work load and tell cockpit designers how to allocate the tasks between pilot and computer. According to *Spectrum*, the helicopter is expected to have just two or three CRT displays wth simple menus (instead of row after row of gauges and dials), a voice-recognition control system and a helmet-mounted display conveying all the pictorial and digital information needed to fly it.

The military's research into human factors has produced some important lessons about the design of user interface software. The U.S. Air Force Electronic Systems Division contracted with human-factors experts at Mitre Corp. in Bedford, Mass., to develop guidelines for software design. The resulting product should be posted on bulletin boards in MIS shops everywhere.

> AT LONG last, the Department of Defense is considering human factors in the *early* stages of systems design.

The recommendations are contained in a handbook, *Guidelines for Designing User Interface Software*, by Mitre's Sidney L. Smith and Jane N. Mosier. Summarized below are six guidelines:

- Ensure that a user need enter data only once and that the computer can access the data if needed thereafter for the same task or for different tasks. This requires an integrated and flexible software design so that different programs can access previously entered data.
- Ensure that whatever data a user needs for any transaction will be available for a display. For example, header information should be retained or generated anew when a user is paging or scrolling through data tables.
- Provide flexible sequence control so that users can accomplish necessary transactions involving data entry, display and transmission or can obtain guidance in connection with any transaction. For example, the user should be able to go forward or backward at will when scanning a multipage display.
- Design standard procedures for accomplishing similar, logically related transactions. Standard procedures will facilitate user learning and efficient system operation.
- Ensure that data transmission functions are integrated with other information-handling functions within a system. A user should be able to transmit data using the same computer system and procedures used for general entry, editing, display and other processing of data.
- Whenever possible, provide automated measures to protect data security, relying on computer capabilities rather than on more fallible human procedures. This requires automated security measures — both to prevent intrusion by unauthorized users and to minimize data loss due to equipment failures and user errors.

Sure, this all sounds like common sense. But how many systems have you seen that actually follow all six guidelines?

Betts is *Computerworld's* Washington, D.C., correspondent.

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Alliant adds Ada to FX minisupers

LITTLETON, Mass. — Alliant Computer Systems Corp. has announced the availability of parallel-tasking Ada, the FX/Ada Development System, for its FX series of minisupercomputer systems. FX/Ada, an enhanced version of the Verdix Ada Development System, combines Alliant's parallel processing architecture with the parallel constructs inherent in Ada, the company said.

The FX/Ada language has allowed Boeing Co.'s Commercial Airplane Division to mix routines of different languages in the same program, according to Dilip Kumar, manager of the flight systems laboratory that is using the FX/8 minisupercomputer system to perform real-time flight simulation for a new medium-range 7J7 aircraft.

Kumar's staff is developing new code in Ada while also using existing Fortran and C routines, he added.

The FX/Ada Development System, including the compiler, screen-oriented symbolic debugger, library maintenance utilities, programming tools and runtime system, costs $13,000 for an FX/1 uniprocessor license and $41,000 for the FX/8 with one to four computational elements.

It costs $55,000 for the FX/8 with five to eight computational elements.

Industry giant

CONTINUED FROM PAGE 25

mains to be seen. Cybermation is expanding its six-man direct sales force but faces competition from the software industry's heavyweight. Computer Associates' move last June to acquire Uccel will give the resulting software company a near monopoly in the job scheduling package arena. Computer Associates' CA-Scheduler controls approximately 21% of the market, according to Computer Intelligence in La Jolla, Calif. The research firm estimated that Uccel's UCC-7 controls 69% of the market. Smaller players in the market include Southwest Software, VM Software, Inc. and Software Concepts, Inc., which together constitute an additional 9% of the market.

The North Carolina customer is a user of both ESP and UCC-7 and said he reserves UCC-7 for the large batches of production jobs. UCC-7 is more complicated to install and use, leaving many smaller jobs to be handled by the Cybermation product, he said.

In addition, the Cybermation job scheduler allows a user to test the definitions he used to determine when his job will run. With the command Next 10, he can get a display of the next 10 times his job will run.

The Dependent Job Control component manages the order in which jobs run so that a job that depends on the results of another does not run until those results are available. In addition, jobs may be submitted by remote centers, said Tina Rogers, Cybermation marketing manager.

"It's designed for users who don't know that much about data processing" and allows system operators to make modifications to existing schedules dynamically, she said.

Morino buys into BST, will link product lines

BY ROSEMARY HAMILTON
CW STAFF

VIENNA, Va. — Morino Associates, Inc. recently paid $1.5 million for a minority interest in Business Software Technology, Inc. (BST), a Westboro, Mass.-based maker of change control software, officials from both companies have announced.

Under terms of the agreement, both vendors will develop a product that links the BST product, Endevor, with Morino Associates' Information Systems product line, which includes 14 utilities to manage, monitor and analyse the IBM MVS and MVS/XA environments.

Endevor allows users to keep track of changes made in applications software. Endevor-DB, for instance, provides management tools to control development of applications used with Cullinet Software, Inc.'s IDMS/R data base management system.

Snares marketing rights

The alliance will also give Morino Associates the right to market BST products. Mario Marino, president and chief executive officer of Marino Associates, will join BST's board of directors.

The interface product does not have an availability date. "We've been strong in data centers, just made our entry into networking, and we've been working on ways to get into applications," Marino said.

Marino added that the alliance with BST is a "real good first move" in the firm's plans to grow as a systems software vendor.

The two vendors have done business together before. The Marino Associates performance monitor for IDMS/R was developed by BST.

Asked why Marino Associates did not acquire BST, Marino said, "They didn't have to sell."

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Info centers

CONTINUED FROM PAGE 25

solutions requires far more technical expertise than the information center's past responsibility of bringing employees up to speed on personal computers. Yet, departmental support also requires heavy involvement with these users, which is often unfamiliar territory for the traditional data processing team.

What Jacobson says he sees evolving is a blurred distinction between the traditional DP department and the information center. As user issues become increasingly complex, the expertise of both groups will be needed.

Jacobson's theory is backed up by Children's Hospital's assistant vice-president of information systems, J. Malcolm Murray, who oversees both departments. "We try to have different types of people under one management group," he says. "Keeping the information center separate from DP has been a major concern. DP is very much involved in the process of systems requirements and definitions. The information center is much more interactive. We'll always have a need for 'people persons,' as opposed to technical specialists."

Partnership

Jacobson says he expects to work more closely in the future with the DP manager to address departmental needs. Eventually, he adds, end-user computing needs will no longer be considered the isolated problem of the information center. "The director of DP and I now see ourselves as partners," Jacobson says. "By all of us reporting to Malcolm, we can bring a wide suite of disciplines to bear on information problems."

Just how all this will fall into place remains to be seen. Because it is an evolving process, the role that each segment of the information systems department plays is now being decided on a case-by-case basis.

The information center, for instance, took charge in the recent case of an end user — an office manager from the hospital's gastroenterology department — who developed her own application. The information center staff and the end user together developed a four-page work plan "that will take her to full implementation," Jacobson says. The plan took seven hours to develop and will help this user rewrite the program for a multiuser environment.

Manager

CONTINUED FROM PAGE 25

allows users to transfer a screen of data from one application to another, a spokesman said.

Net-Pass, a menu-driven system, includes a response-time monitor that records data on the transactions of active applications, including the number of transactions, the average time of each transaction and the maximum time of all transactions.

The session manager offers a broadcast facility that is said to allow users to send messages to other users, who can receive them regardless of the application they are currently running. Software AG said the product supports commonly used security software products.

Index Technology ties in to Pansophic's Telon

CAMBRIDGE, Mass. — Index Technology Corp., a maker of computer-aided software engineering tools, recently said it will offer an interface product to the Pansophic Systems, Inc. code generator, Telon, later this quarter.

The $9,000 link, XL/Interface Telon, will allow screens and report designs from Index's Excelerator product to be transferred directly to the Telon environment, the company said.

Telon, which generates either Cobol or PL/I code, is often used in developing on-line information systems that require multiple screens and reports. Pansophic specified a transfer format to which Index designed the interface product.

According to Richard Carpenter, president of Index, XL/Interface Telon is the "first in a series of interfaces to applications generators."

"We picked Telon first because, overall, it was the most requested by our customers," Carpenter added.

He said that many of the company's users currently use their own bridges to link the Excelerator design software to the Telon environment. But the majority of users will "pass on the specifications to the Telon programmer who re-enters it. Clearly, there's little value added here," he said.

"The objective here is to automate more of the software development life cycle," said Sue O'Brien, Pansophic's product manager for Telon. O'Brien said the Pansophic-designed transport facility, which specifies the format for data to be used in the Telon environment, will be part of the Index offering. However, it will be wrapped into the next major release of Telon, scheduled for mid-1988.

According to O'Brien, XL/Interface Telon will allow users to pass on the early design work to Telon, enabling them to "pick up work in Telon at a later step [in the design cycle] and eliminate duplication."

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NEW PRODUCTS

Systems software

Template Graphics Software has ported its implementation of the Programmer's Hierarchical Interactive Graphics Standard to Apollo Computer, Inc., Masscomp, Silicon Graphics, Inc., Sun Microsystems, Inc. and Digital Equipment Corp. GPX workstations.

The software, **Figaro**, is a device- and computer-independent graphics standard designed for two- and three-dimensional graphics applications requiring hierarchical data structures, geometric modeling, rapid display modification and interactive input.

License fees for Figaro software on the Apollo, DEC, Masscomp, Silicon Graphics and Sun workstations start at $3,000.

Template Graphics Software, 9685 Scranton Road, San Diego, Calif. 92121.

Applications packages

Libra Programming, Inc. has released a line of construction accounting software for the Digital Equipment Corp. family of VAX computers.

The **Libra Construction Package** includes integrated software modules for accounts payable, accounts receivable, billing, general ledger, inventory, job costing, order entry, payroll and property management.

Prices range from $1,950 to $4,890.

Libra Programming, 1954 E. 7000 South, Salt Lake City, Utah 84121.

Languages

Whitesmiths, Ltd. has announced its **Version 3.2 C Compiler** for Digital Equipment Corp. VAXs running VMS.

Features include C source-level interactive debugging with breakpointing and variable display and improved code generation. The compiler also produces compiler and assembler source listings, including the ability to display high-level source code on one listing.

Standard C features include structure assignment, structure-as-function arguments and functions-returning structures.

The Version 3.2 C Compiler is priced from $1,500.

Whitesmiths, 59 Power Road, Westford, Mass. 01886.

Utilities

Version 2 of DBaid, a menu-driven productivity tool for use with the IBM IMS Data Base Recovery Control (DBRC) feature, has been announced by **Financial Technologies International, Inc.**

DBaid for DBRC operates under IBM's ISPF and generates DBRC cards and executes DBRC in foreground or background mode.

The permanent license fee for DBaid is $15,000.

Financial Technologies International, 46th Floor, One World Trade Center, New York, N.Y. 10048.

Development tools

An automated extension of the Pride Information Systems Engineering Methodology, which is said to provide automated assistance during the design or modification of an information system, has been announced by **M. Bryce & Associates, Inc.**

Automated Systems Engineering for system design is used as a computer-aided design tool. It interprets specifications developed from the Pride chronological decomposition technique and then generates a design, including the application's logical data base design. It can design interactive, batch, office automation or computer-assisted systems. Supporting documentation can be generated.

The Pride products are available on such mainframes as IBM's MVS and MVS/XA and Digital Equipment Corp.'s VAX/VMS. Prices start at $110,000.

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MICROCOMPUTING

SMALL TALK

William Zachmann

Prime rates a thumbs-up

It isn't very often that I get truly excited about a new product, particularly one from a minicomputer vendor. But then, it isn't often that a product from a mini vendor is based on a standard microprocessor and has lots of highly innovative features.

Prime Computer, Inc.'s EXL 316 is just such a product. It's based on a standard 16-MHz Intel Corp. 80386 microprocessor. Running Prime's System V Interface Definition, compatible with AT&T's Unix System V, Release 3, the EXL 316 notches benchmarks of 3.2 million instructions per second, according to Prime.

The EXL 316 would be an interesting product even if it were simply a 386-based multiuser system running AT&T's Unix System V, Release 3. It's an important development that a traditional minicomputer vendor should introduce a powerful product based on a standard microprocessor.

What makes the EXL 316 an exciting product, however, is

Continued on page 34

Chip set pits AT against PS/2

Chips and Technologies claims revamped 20-MHz CPU a match for 386

BY ED SCANNELL
CW STAFF

MILPITAS, Calif. — Chips and Technologies, Inc. last week unveiled a 16-MHz IBM Personal Computer AT-compatible chip set it said will make the AT and compatibles effective price/performance competitors against IBM's Personal System/2 during at least the next two years.

Chips and Technologies also introduced an IBM Video Graphics Array (VGA) chip set that, at $40.50 in quantities of 1,000, is priced the same as its IBM Enhanced Graphics Adapter (EGA). The company said its EGA users can upgrade immediately and are eligible for volume discounts.

The CS8221 New Enhanced AT chip set, or Neat, is centered around Advanced Micro Devices, Inc.'s (AMD) 16-MHz CPU, which is based on Intel Corp.'s 80286-16. It can be upgraded to 20 MHz and offers a 70% improvement in throughput over 10-MHz 80286-based systems with one wait state and is "nearly equivalent" in performance to current 80386-based systems, according to Ed Huber, AMD's director of marketing.

Besides the CPU, Neat consists of a bus/clock controller, an interleaved page-mode controller, a peripheral controller and an address data buffer. The chip

Continued on page 34

Motorola chips away at 386's edge

With so much attention focused on Intel Corp.'s 80386 microprocessor during the past year, many corporate users are perhaps unaware of competing 32-bit chips, including Motorola, Inc.'s 68020.

While Intel's family of chips generally drive Microsoft Corp. MS-DOS-compatible personal computers, Motorola's 68000 family has thus far been the chip of choice for multiuser Unix systems and technical workstations. With a faster 68030 on the way and MS-DOS software emulators already on the market, Motorola officials say their chips' dominance can extend to PCs as well.

Jack W. Browne Jr., Motorola's manager of 68000 marketing, and Jeff Nutt, 68000 technical marketing manager, recently discussed the 32-bit systems market with *Computerworld* senior writer David Bright.

Marketing managers *Jeff Nutt and Jack W. Browne Jr.*

The 68000 family's main competition is obviously the 80386. How does the 68020 stack up performancewise against the 386?

Browne: The 68020 at the same clock speed as the 386 is about 20% faster. The 386, as I understand it, is in the marketplace at 16 and 20 MHz. So we have 12, 16, 20 and 25 MHz. Our 12-MHz part is roughly the same performance as Intel's 16-MHz part. So that gives us a broader range. With the 68030, the first products that go into manufacturing will be 16 and 20 MHz.

Nutt: One of the things that Intel does is they make a lot of benchmark claims of their own.

Continued on page 36

Old pro 8088 soldiers on

Price, reliability fuel aging CPU's success

BY JULIE PITTA
CW STAFF

Despite the razzle-dazzle introductions of systems based on Intel Corp.'s powerful 80286 and 80386 microprocessors this year, manufacturers of Intel 8088-based personal computers continue to report brisk sales.

While the home and the classroom are natural environments for these older PCs, some corporate users are still looking at 8088-based systems as low-cost solutions for less demanding applications.

Last year, 3.9 million 8088-based PCs were shipped domestically, compared with 1.3 million 80286-based systems, according to Dataquest, Inc., a San Jose, Calif., market research firm.

While the momentum will shift from 8088- to 80286-based systems this year, 8088-based machines are nonetheless expected to outsell their 286-based

Continued on page 35

- [illegible] Page 37.
- [illegible] 16- to 20-MHz PC/ [illegible] Page 37.
- [illegible] graphics [illegible] software [illegible] PS/2 VGA [illegible] Page 37.

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Prime

FROM PAGE 33

Prime's bold and forward-looking move in incorporating Locus Computing Corp.'s Merge/386 and PC-Interface software as part of the product offering. As far as I know, the EXL 386 is the first commercially available system on which Merge/386 and PC-Interface are available.

Wears many hats

The EXL 316 is more than just a Unix system; it's a Unix system on which one or more users have the option of running Microsoft Corp.'s MS-DOS from their terminals in addition to, or instead of, Unix System V, Release 3. It is also a Unix system that, via a local-area network (LAN) connection, can make the entire Unix file structure available to one or more micros running MS-DOS or IBM's PC-DOS over a LAN.

Currently, I have an EXL 316 on loan from Prime with two terminals on it. The 10-MHz Wyse Technology WysePC 286 that I regularly use in the office is also connected to the EXL 316 via Ethernet. When I first brought up the whole system, I used the PC-Interface to connect the PC to the EXL 316.

All that is required on the PC are two Ethernet device driver (*.SYS) files loaded through the DEVICE= command in the CONFIG.SYS file and the PC-Interface software. LOGIN.EXE is used with three parameters to initiate the connection to the EXL 316. From then on, Unix files on the EXL 316 appear as DOS files on my F: disk.

Once connected, using the PC-DOS XCOPY/S command, I simply copied the entire contents of my C: disk to the F: disk. Access to the hard disk on the EXL 316 over the Ethernet connection was nearly as fast as accessing my local hard disk on the WysePC 286.

After logging off the USER1 account via the PC-Interface over Ethernet, I was able to log on to USER1 as a regular Unix account on one of the terminals connected to the EXL 316. The DOS directories and files I'd copied from my C: disk on the PC could then be in the /USR/USER1 directory.

Then, by typing the Merge/386 command DOS, I could start MS-DOS directly under Unix on the terminal attached to the EXL 316. It comes up in the DOS C: USR/USER1 directory.

The bottom line is that Prime's EXL 316, equipped with Merge/386 software and connected to personal computers with PC-Interface software, provides a spectacular array of options for moving between DOS and Unix.

Zachmann is vice-president of research at International Data Corp.

Chip set

FROM PAGE 33

set uses CMOS technology, which should help bring AT compatibility to new markets — including the laptop area — according to Raj Jaswa, senior product marketing manager at Intel.

EMS a Neat feature

Neat integrates the Lotus/Intel/Microsoft Expanded Memory Specification (EMS), a capability currently not available in the PS/2 series, according to a Chips and Technologies spokesman. The product is compatible with Microsoft Corp.'s MS-DOS and IBM's PC-DOS in addition to IBM and Microsoft's OS/2 operating system, he said.

With most users planning to operate under MS- and PC-DOS for the next few years, memory above 1M byte has had little value in current implementations. Systems centered around Neat, however, treat memory above 1M byte as EMS, which can be useful for applications requiring large data storage, such as Lotus Development Corp.'s 1-2-3.

Access to EMS will be useful for AT and compatible users running OS/2, Intel's Jaswa noted, because it is so memory-intensive. The multitasking operating system, together with IBM's Presentation Manager, will require about 1.5M bytes of memory just for the program code.

OS/2 for the masses

"A lot of people think OS/2 will be running only on PS/2, but as several compatible makers have recently made clear, OS/2 will also be running on AT-type machines," Jaswa said.

Chips and Technologies made Neat fully bus-compatible with IBM's PC XT and AT through a technique called dynamic bus-clock switching that allows the bus to run asynchronously with the processor. Therefore, if an add-on card responds at 8 MHz, a user can continue to run his AT at 12 or 16 MHz.

Another technique used to make the chip set compatible was configurable command delay, which allows time for add-on cards to respond. The bus will provide 12.5-MHz, one-wait state throughput and still maintain compatibility, according to the company.

Gets along with VGA

The CS8245 VGA chip set works with all the modes used in IBM's recently announced VGA, which is used in the PS/2 Models 50, 60 and 80. The two-chip set also supports IBM's 31.5-KHz analog monitors as well as currently used EGA, Color Graphics Adapter, Hercules Computer Technology, Inc., NEC Corp. Multisync-type and monochrome monitors.

The VGA chip set operates at a standard clock frequency of 30 MHz with a 38-MHz option available. The product provides graphics resolution of 1,024 by 768 or 800 by 600 pixels. Evaluation samples are currently available, according to Johanna Ohlsson, the product's marketing manager.

The Neat chip set costs $108.90 for the 12-MHz version and $136.80 for the 16-MHz edition in quantities of 100. Like the VGA chip set, Neat is available in evaluation samples. The product will be available in production quantities in November, the vendor said.

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Old pro 8088

FROM PAGE 33

counterparts this year, according to Norman DeWitt, a Dataquest analyst. He predicts that 4.8 million 8088-based systems will be shipped, compared with 1.3 million 286s.

While PC makers concede that the 286 will, in the words of one manufacturer, be "the chip of the decade," they report that demand for 8088-based machines is healthy. Michael Amadio, director of computer products at Cordata, Inc., says demand for his firm's 8088-based PCs is three times greater than the firm forecast this year. He declines to state actual shipment figures.

"When what you want it to do doesn't require a 286, customers will stick with a proven technology," Amadio says. "Sometimes I wonder if people just aren't more comfortable with what's already out there. We in the industry are always looking toward the newer and greater, but I don't think that's always the case with the user."

In what serves as a tribute to the viability of 8088 technology, a number of manufacturers have introduced microcomputers in that class in recent months — among them Tandy Corp., Zenith Data Systems and Cordata. Manufacturers have enhanced their 8088-based PCs to improve on the earlier models' storage capabilities, processing speeds and screen resolutions.

The primary appeal of the 8088-based machines seems to be their relatively low cost.

It takes you there

"Why do you drive a Toyota rather than a Corvette? It's because what you drive takes you there," says Ed Juge, director of market planning at Tandy.

Corporate users are employing 8088s as nodes in local-area networks (LAN) and as workstations for simple word processing and the occasional spreadsheet.

Marge Lakin, manager of operations administration at motorcycle manufacturer Kawasaki Heavy Industries, Ltd., says her company purchased 900 8088-based PCs from Zenith late last year. The PCs are being used in a network linking dealers to Kawasaki's U.S. headquarters in Irvine, Calif.

Through the use of the PCs, dealers may order parts from Kawasaki's corporate headquarters. "The technology is fine for what we're doing," Lakin says. "And cost was a consideration."

However, Tom Eagan, vice-president of office systems at Wells Fargo Bank NA, says his company opted for 80286-based IBM Personal Computer AT compatibles in the bank's network, which links its loan officers to corporate headquarters. "The crystal ball as we see it led us to the 286," Eagan says. "It affords us a longer life cycle. Applications using artificial intelligence, for example, will [make] obsolete the 8088." However, Eagan says he will not discard the company's 150 8088-based PCs.

The expected decline in prices of 286-based PCs will cut deeply into the market for 8088-based systems. How long the 8088 PC will survive is a question open to debate.

"I think it will survive well into the 1990s," Dataquest's DeWitt says. "It'll shift into different markets — it'll probably become stronger in homes and schools — and the shipments will begin to decrease."

Others, however, are not so optimistic.

"I think there's a future for the 8088. It's a question of where and for how long," says Steven Holtzman, director of systems marketing at Wyse Technology. "By 1989, the price of the 286 should come down enough so there will be little rationale for anyone to continue buying an 8088."

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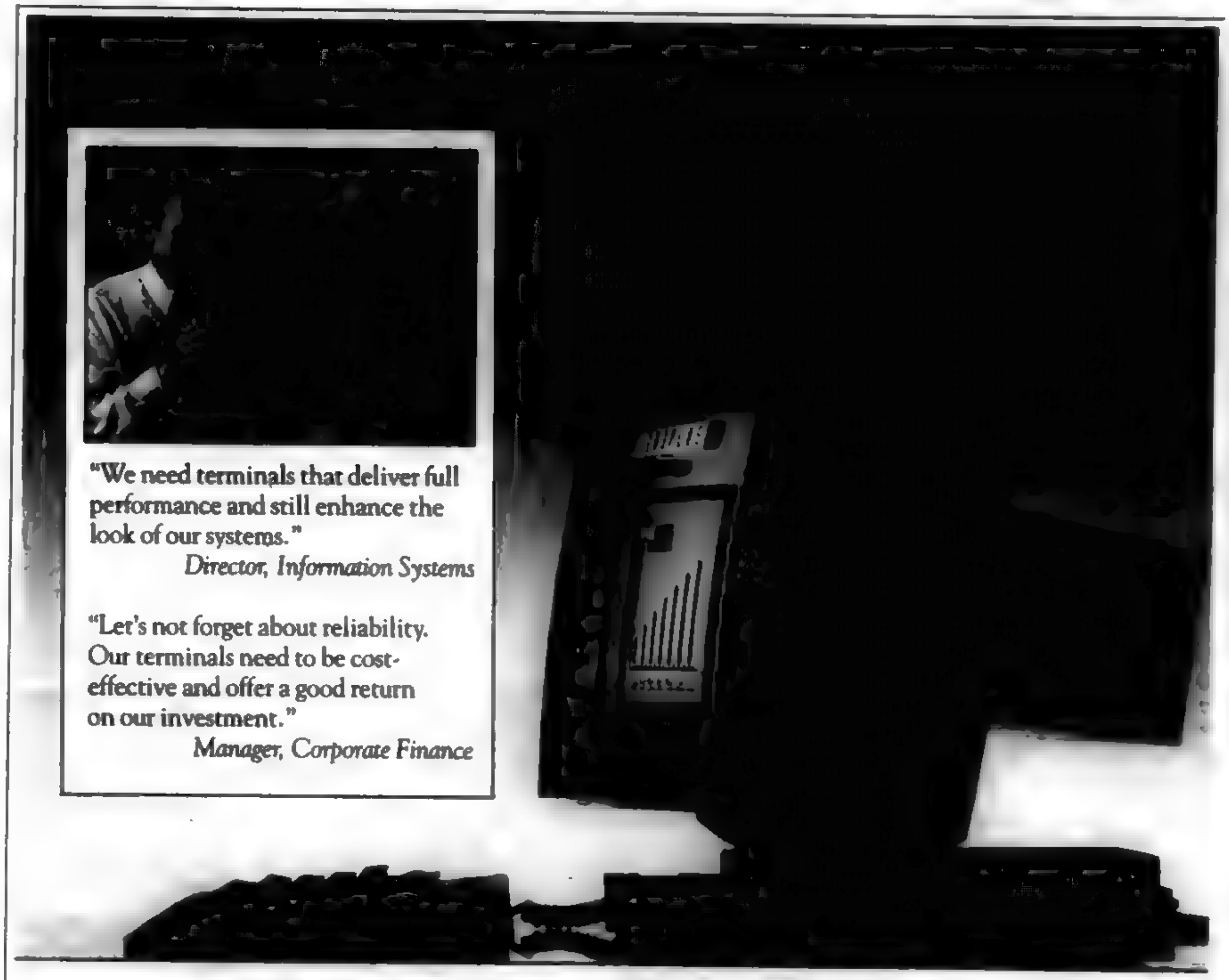

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Motorola

FROM PAGE 33

Motorola doesn't make too many benchmark claims of its own.

They've also come out with a hardware graphics controller. We don't need one. The 68020 is the graphics controller. The 68000 has bit-manipulation instructions. The 386 does not.

So in addition to the basic speed difference, there are other important differences as well?

Browne: Yes. [Differences include] the bit-manipulation instructions, the addressing modes and the general-purpose registers.

Nutt: What really upset us was Intel's claim that the 386 has general-purpose registers. I can prove to you that they only have one or two general-purpose registers. It is exactly the same dedicated register set as the [Intel] 8086. All they did was extend it to 32 bits. It's crazy. Nobody looked at it. They take the word of Intel.

When will the 68030 ship in volume and start appearing in systems that end users can buy?

Browne: We go into manufacturing in the fourth quarter, and I expect the ramp to be much, much faster. I expect to see products show up in the marketplace during the fourth quarter from a number of the smaller firms that move very rapidly into the marketplace. Concerning the larger firms, we've already had statements from NCR [Corp.]'s Tower group, Sun Microsystems, [Inc.] and John Sculley at Apple [Computer, Inc.] that the 68030 will be integrated into their product lines.

Clearly, a major problem for Motorola is that MS-DOS was written for the Intel family, not the 68000 series of chips. Now that IBM and Microsoft are writing OS/2 for the Intel 80286, how can you combat that problem?

Nutt: First of all, OS/2 for the 286 is possibly coming out in mid-1988. So that would be written for the protected mode of the 286 and not utilize the 32-bit environment. The 386 32-bit environment would not be available until 1989, and the applications for that won't be available until 1990. Our customers can't wait that long.

But they say, "I'd like to be able to offer my customers MS-DOS capability." To date, the only way that has been solved is by add-in 286 cards. Those are expensive solutions. They're $2,000 to $5,000. Now, we've worked very closely with two vendors: Phoenix Technologies Ltd. and Insignia, based in the UK. Those companies have basically developed emulation software that runs on the 68020 that totally emulates the IBM Personal Computer. So you can take MS-DOS and run it directly.

Sun has relied on the 68000 family for its workstations but recently introduced a high-end workstation built around a 10 million instructions per second, reduced instruction set computing (RISC) chip. Why would Sun, or any other workstation vendor, need to look outside Motorola's 68000 family for its processors?

Browne: Sun is a computer company, and they see their competitors as [Digital Equipment Corp.] and IBM. If you're going to compete, you're going to compete with the players. So Sun's looking at a broad range of price/performance. As they announced their RISC efforts, which they said they'll ship this year, they said that the 68000 family would continue to be the workhorse for them.

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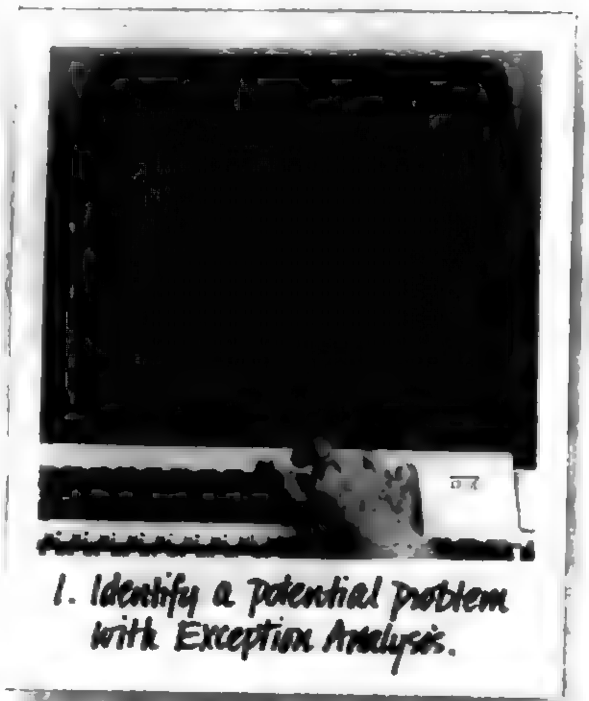

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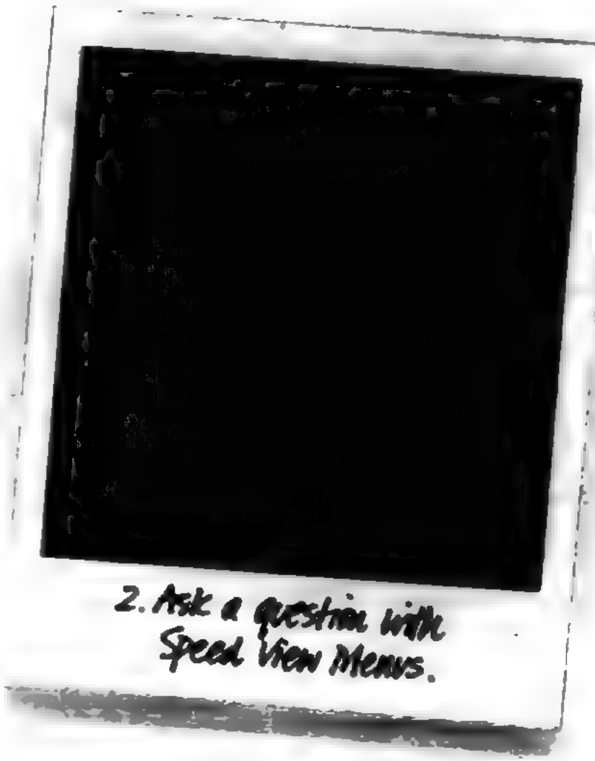

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Systems

A 16- to 20-MHz, zero-wait state IBM Personal Computer-compatible microcomputer has been announced by **CSS Laboratories, Inc.**

The **CSS 386 Personal Computer** features one 32-bit memory slot and five 16-bit and two eight-bit expansion slots. On-board memory starts with 1M byte of static-column random-access memory upgradable to 2M bytes.

The CSS 386 Personal Computer is priced at $2,495.

CSS Laboratories, 2134 S. Ritchey St., Santa Ana, Calif. 92705.

Software utilities

Graphics terminal emulation software designed to support the IBM Personal System/2 Video Graphics Array graphics processor and video controller has been announced by **Microplot, Inc.**

PC-Plot-IV Plus offers such graphics capabilities as 256 colors, a graphics screen dump to Hewlett-Packard Co. Laserjet printers and ASCII and Xmodem file transfer. It is said to enable the personal computer to appear to a mainframe as a Digital Equipment Corp. VT100, VT200 or VT52.

The user can exit PC-Plot-IV Plus leaving the remote host connection intact and run other IBM PC-DOS applications.

PC-Plot-IV Plus is priced at $225.

Microplot, 659H Park Meadow Road, Westerville, Ohio 43081.

NEW AT SIGGRAPH

An IBM Personal Computer AT-based graphics-controller card featuring four internal pixel planes with resolutions of 1,280 by 1,280 pixels each was announced by **Kontron Electronics, Inc.** The **7000CB** card is priced from $2,995. Kontron, 630 Clyde Ave., Mountain View, Calif. 94039.

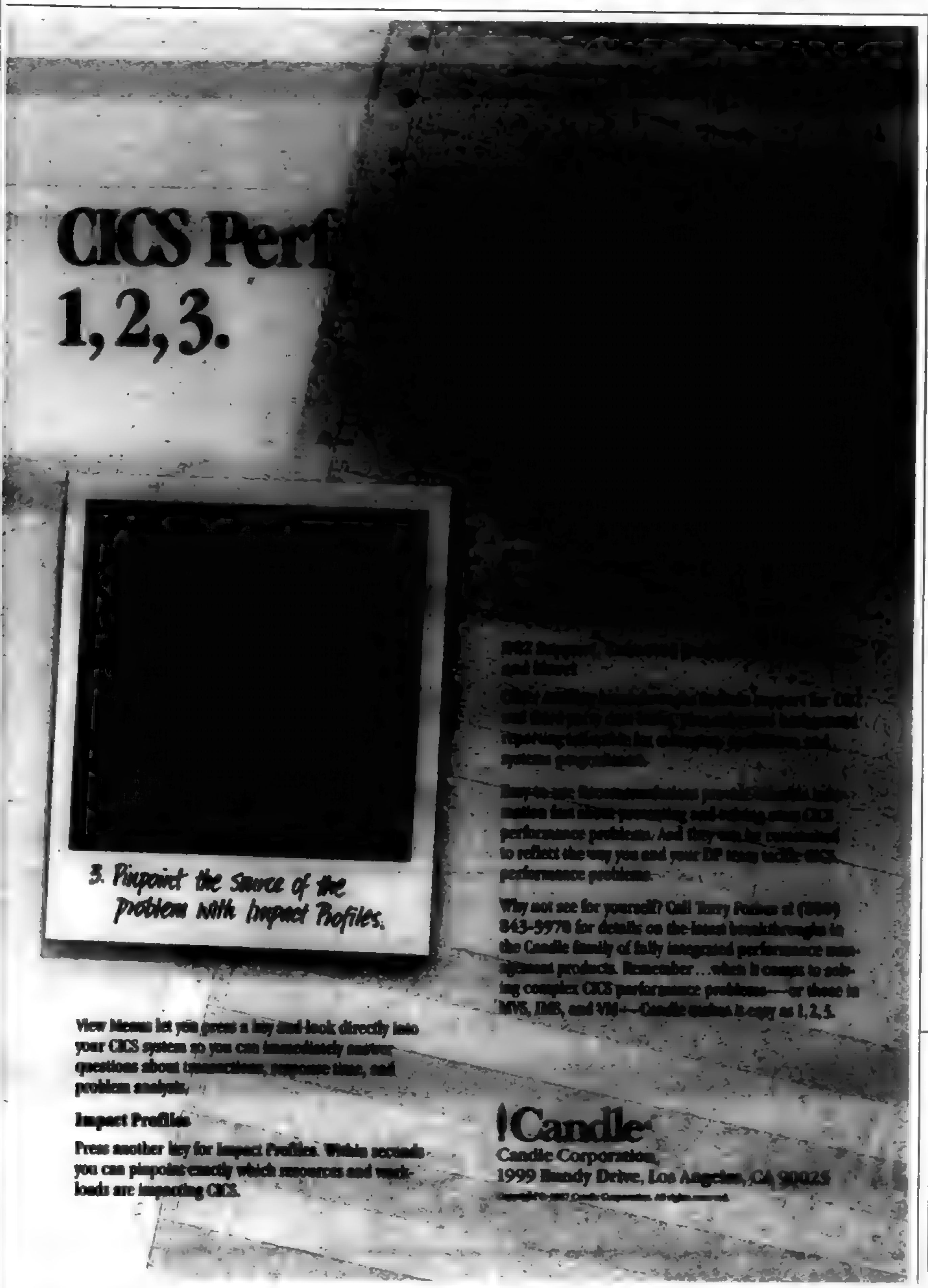
The **Xcel-8000**, an Intel Corp. 80386-based presentation-graphics design and production system said to combine a design station with an imaging management station, was announced by **Autographix, Inc.** Prices start at $150,000. Autographix, 100 Fifth Ave., Waltham, Mass. 02154.

An AT-compatible arithmetic frame grabber, said to store and process up to 16 512- by 512- by 8-bit images in real time, was announced by **Data Translation, Inc.** The **DT2861** costs $4,995. Data Translation, 100 Locke Drive, Marlboro, Mass. 01752.

A single-board coprocessor family for the AT, said to execute computation-intensive vector and scalar operations at speeds of up to 20 million floating-point operations per second, was announced by **Mercury Computer Systems, Inc.** The **MC3200 Series** is priced from $6,500. Mercury, 600 Suffolk St., Lowell, Mass. 01854.

Wingraph, a Microsoft Corp. Windows-compatible presentation-graphics program, was introduced by **Media Cybernetics, Inc.** It is priced at $99.95. Media Cybernetics, Suite 2000, 8484 Georgia Ave., Silver Spring, Md. 20910.

Image capture and paint capabilities have been added to the **Starburst** AT-based graphics workstation, **Pansophic Systems, Inc.** has announced. The basic Starburst system costs $32,500. The image-capture option price starts at $12,000. Pansophic, 709 Enterprise Drive, Oak Brook, Ill. 60521.



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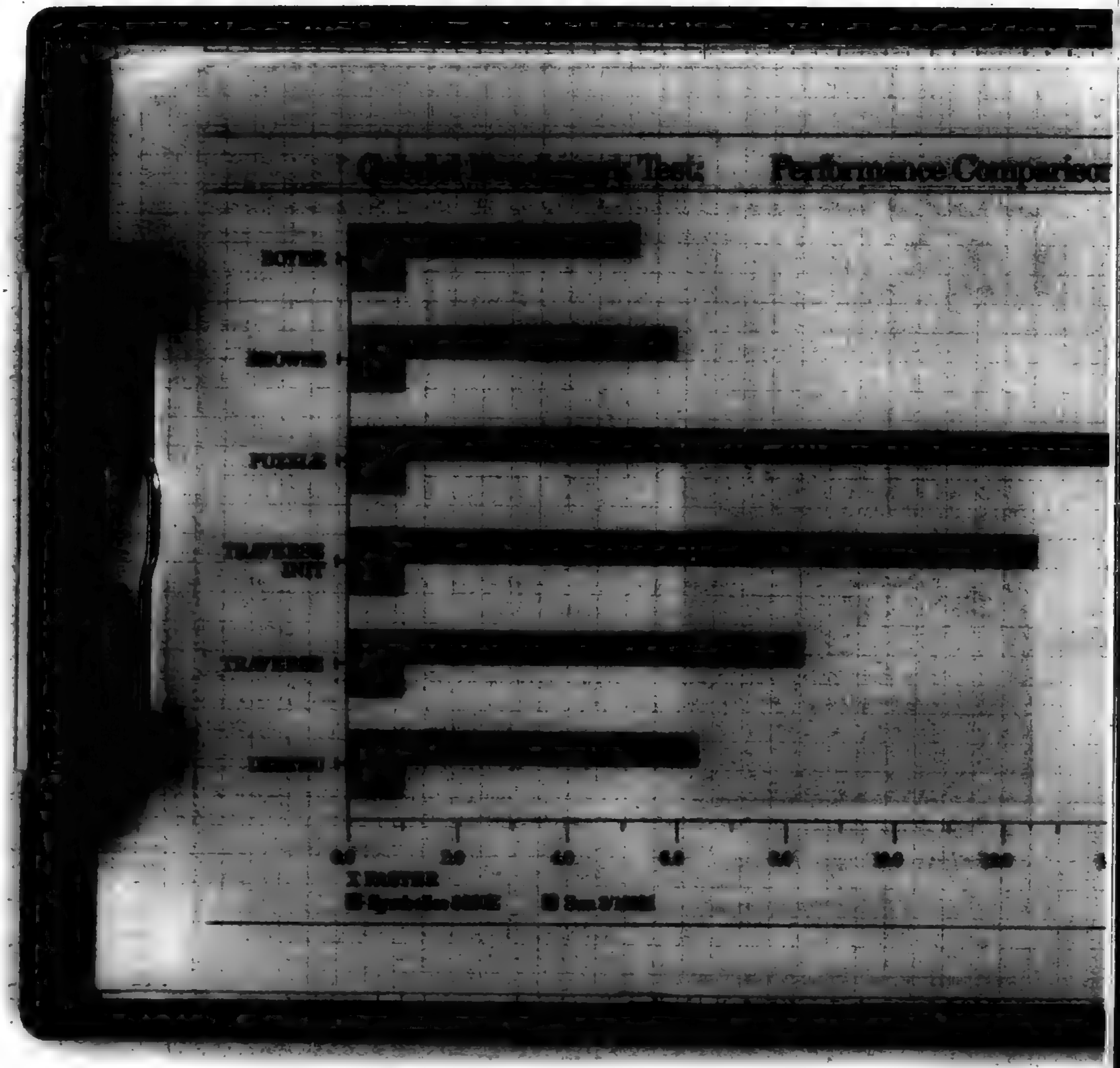

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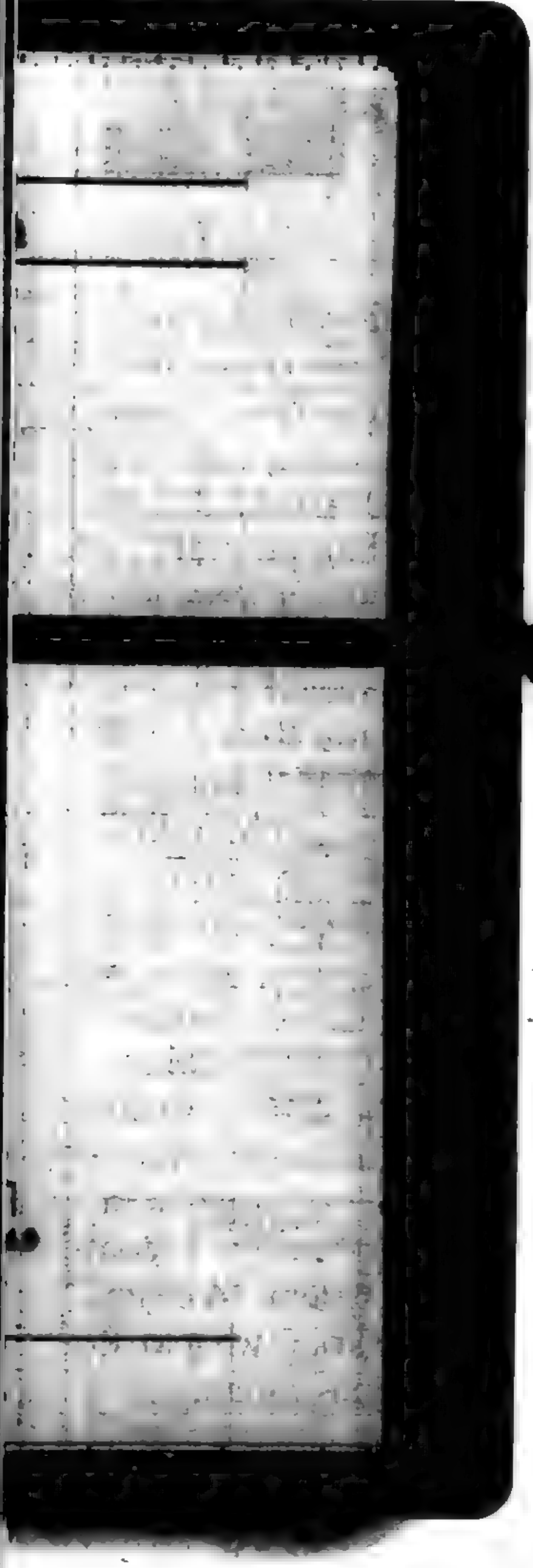

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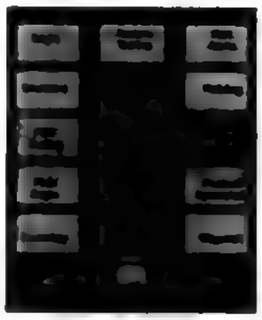

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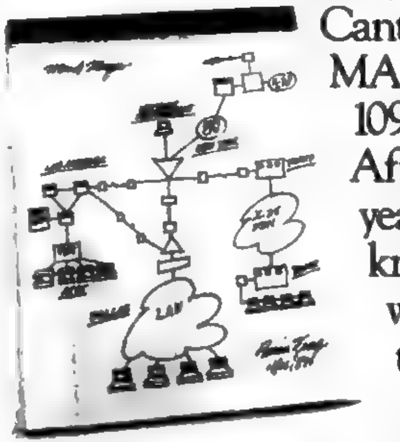

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NETWORKING

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LAN vendors linking up

As users move from standalone departmental local-area networks (LAN) to companywide communications systems, traditional LAN vendors are increasingly turning to mergers and strategic alliances as a way to meet their customers' complex needs.

Corporate networks often consist of multiple interconnected LANs that provide enterprisewide connectivity services, including access to telecommunications networks and corporate hosts. This requires integration of a wide variety of products, including IBM Personal Computer LANs, Transmission Control Protocol/Internet Protocol networks that connect multiple hosts, micro-to-mainframe links and telecommunications gateways.

But until recently, vendors specialized in one or two of the above products. As a result, LANs that were generally billed as solving all of the corporation's ills more often than not contributed to MIS headaches. Even when they worked smooth-

Continued on page 43

Banks moving toward EDI services

Aim to capitalize on investments in corporate communications links

BY MITCH BETTS
CW STAFF

The nation's largest banks are preparing to stake out positions as vendors in the blossoming electronic data interchange (EDI) industry.

The banks want to provide EDI services for their corporate customers during the next two or three years, according to Michael T. Manion, manager of treasury services in the Chicago office of Coopers & Lybrand, an accounting and consulting firm.

Some banks view the move into EDI as a defensive strategy necessary to retain their role as intermediaries for corporate financial transactions. Others may develop EDI products as part of an aggressive strategy to offer a variety of computer-based business services, Manion said.

Twelve major banks recently hired Coopers & Lybrand to study the EDI market, which uses the ANSI X.12 data communications standard to exchange orders and invoices as well as handle other transactions between companies.

"The main thrust of the study is to determine what corporate customers' requirements are in EDI, what opportunities there are for banks to provide EDI services and then to give bankers the information they need for product planning and development purposes," said Manion, who is coordinating the study.

Due Sept. 3, the report will be

Continued on page 46

CORPORATEWIDE NETWORKS

Sears cashes in with SNA

BY JEAN S. BOZMAN
CW STAFF

In the light of IBM's Systems Network Architecture (SNA), Sears, Roebuck and Co.'s Communications Network has done everything right. During the last three years, the Chicago-based company forged a private network throughout the continental U.S., Hawaii and Puerto Rico using state-of-the-art IBM architecture.

Key elements of the network seem as up-to-date as IBM's June announcements on network architecture. IBM's Netview is the glue that links 60,000 devices nationwide, including 50 IBM 3720s, 105 IBM 3725s, 2,000 Series/1s in 800 Sears stores and 100 host computers in 35 data centers. Eighteen months ago, before IBM's strategic alliance with Network Equipment Technologies Corp. (NET) was announced, Sears began to add T1 multiplexers from NET to its network. There are now 18 such sites nationwide.

Sears' Weis

In fact, the network could not have been built without IBM's active cooperation, say those who designed it. "We have a partnership relationship with IBM," says Gerard Weis, vice-president of data communications and software services at Sears. "IBM and NET worked with us in 1986 to facilitate our connection of the NET multiplexers with IBM's network manage-

Continued on page 45

Gateway opens up to Novell

BY PATRICIA KEEFE
CW STAFF

IRVINE, Calif. — In an effort to widen its market, Gateway Communications, Inc. recently backed off from its proprietary network foundation and opened up its gateway and bridge products to support Novell, Inc. Advanced Netware-based networks.

Gateway's G/Net network utilizes a customized version of Netware and supports a set of protocols used by the core Netware product. G/Net users will now be able to communicate with versions of Netware customized for an estimated 37 local-area networks, as well as gain access to more than 4,000 Netware-compatible multiuser applications, the company said.

Gateway further buttressed its personal computer network family by announcing modular products designed to provide wide-area networking and net-

Continued on page 42

Inside

- Network Software Associates migrates software packages to IBM PS/2. Page 42.
- A group of vendors studies the possibility of standardizing IEEE 802.3 twisted-pair Ethernet. Page 44.

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BIT BLAST

Network Software migrates packages to PS/2

Network Software Associates, Inc. in Laguna Hills, Calif., recently migrated all nine of its software packages to IBM's Personal System/2, reportedly allowing IBM Personal Computers to communicate with one another and with IBM hosts via IBM's Systems Network Architecture software. The company claims to offer the first PS/2-to-PS/2 link based on Synchronous Data Link Control and the first LU6.2 and RJE packages for PS/2s attached to an IBM 3274 or 3174 controller. The packages were designed to run on a variety of modem and terminal emulation boards.

Micom Systems, Inc.'s Interlan division has signed an OEM agreement to use **Network General Corp.**'s Sniffer Protocol Analyzer. The Sniffer reportedly pinpoints network bottlenecks by monitoring packets as they travel over the network. Under the terms of the agreement, **Micom-Interlan, Inc.** will remarket Sniffer as part of its Ethernet local-area network (LAN) product line under the name LAN Detector.

Data Switch Corp. in Shelton, Conn., has joined the throng of companies supporting IBM's Netview network management system. The company recently announced plans to link its communications switching and control products up with IBM's Netview, via the firm's Netview/PC interface. The first product with Netview/PC support will be available by this fall, Data Switch said.

About a third of the companies that have gotten beyond the starter-kit stage with Manufacturing Automation Protocol (MAP) are slowing down their MAP plans, according to **Advanced Manufacturing Research**. The Salem, Mass., company surveyed approximately 30 firms that have MAP networks with more than two or three nodes and found that 35% of these installations were taking longer than expected. Companies behind schedule cited late vendor shipments as the cause of delay in 55% of the cases; waiting for MAP Version 3.0 in 30%; and other reasons, such as lack of conformance testing and internal implementation problems, in 15% of the cases.

Network Research Corp. has added a Netbios interface to its Fusion Network Software, permitting applications written for the IBM PC Network program to run across a Transmission Control Protocol/Internet Protocol network. The option is scheduled to be available during the fourth quarter.

Gateway

CONTINUED FROM PAGE 41

work performance capabilities. Gateway unveiled three products — its first Ethernet offering, the G/Ethernet adapter card, a board-level network server and a data base server.

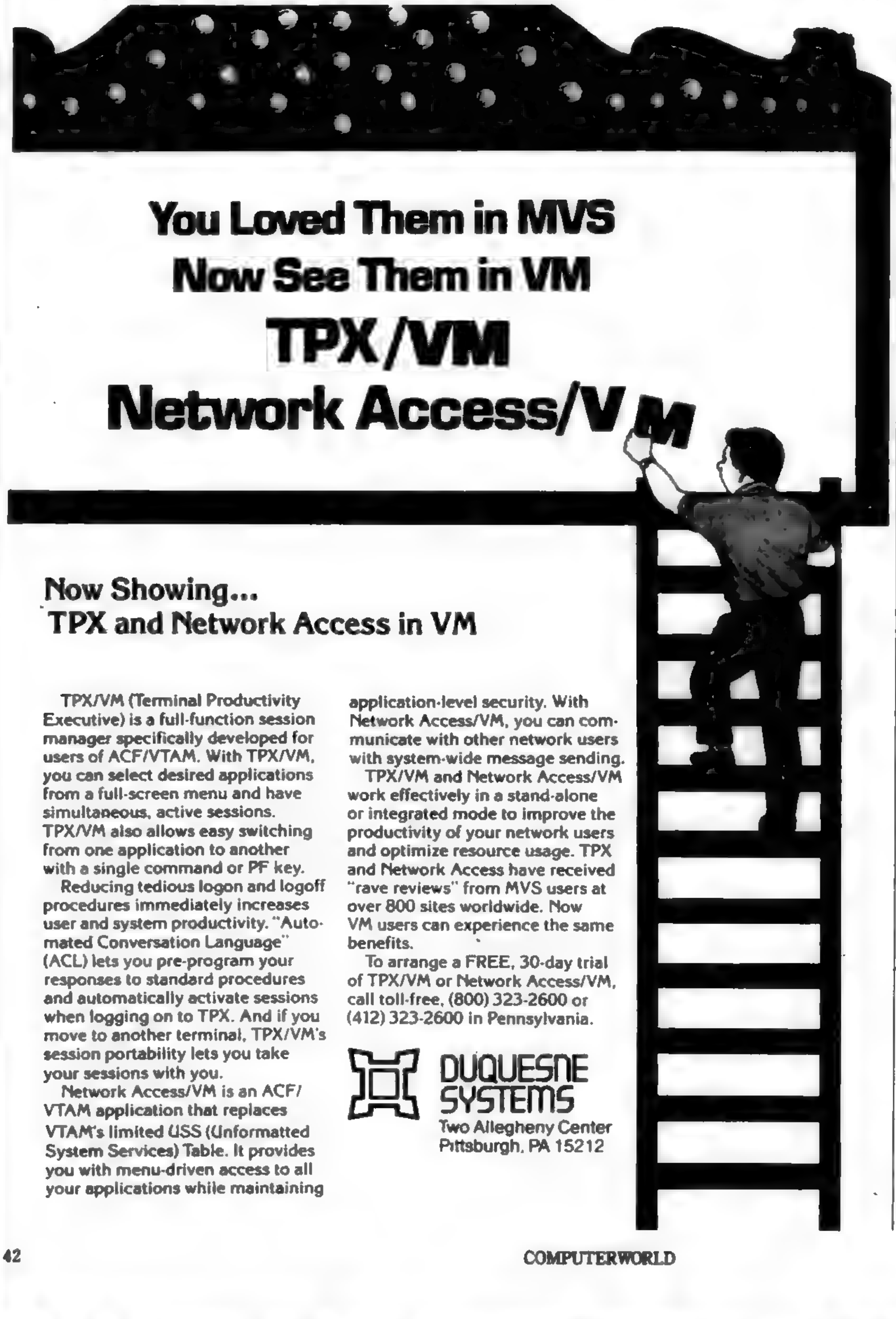
Gateway has introduced Netware-compatible versions of its IBM Systems Network Architecture, asynchronous and CCITT X.25 gateways and bridge wide-area links. The products are said to create session-transport protocols in a Netware environment to allow shared network access to communications facilities.

The IEEE 802.3-compatible G/Ethernet is cost-competitive at $395 and features 32K-byte random-access memory (RAM). "The effect of the increased memory will provide our G/Ethernet customers with a significant increase in network capacity under heavy work loads," said Walter Schramm, Gateway's vice-president of sales and marketing.

The initial release supports Netware on the file server side, as well as Transmission Control Protocol/Internet Protocol. The networking devices will work with RG-59, IBM 3279-style and conventional Ethernet coaxial cables.

Both the G/Server Engine, said to be the first high-speed file server on a card, and the G/Database Engine, which enhances data bases' performance, feature an on-board Intel Corp. 80196 coprocessor with 1M byte of RAM, 64K-byte buffer memory and dynamic bad-sector remapping. Each engine supports up to two 140M-byte disks, or 280M bytes per engine. Users have the option of configuring the engines to support disk mirroring, which provides continuous disk backup. The engines operate independently of the host PC, allowing the PC to run its own applications.

The server and data base engines each cost $2,150 and are slated to ship next month, Gateway said.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LAN vendors

CONTINUED FROM PAGE 41

ly, LANs seldom provided all the features users really needed or wanted.

So, with competition heating up in the corporate networking market and expertise at a premium in key areas like IBM's Systems Network Architecture (SNA) and telecommunications, a growing number of network vendors are taking the merger or strategic alliance route as a way to acquire key networking products without having to develop them from scratch.

In the last six months, more than a dozen communications companies have struck deals designed to extend and augment their product lines. The most recent is the proposed merger between Bridge Communications, Inc., a terminal-to-host vendor, and oft-engaged but never wed 3Com Corp., a leading LAN vendor.

Other recent linkups of note include Novell, Inc.'s purchase of both micro-to-mainframe vendor CXI, Inc. and LAN software developer Softcraft, Inc.; Excelan, Inc.'s acquisition of Kinetics, Inc.; and the purchase of Centram Systems West, Inc. by Sun Microsystems, Inc. Even IBM has chosen to buy — rather than develop — technology, signing a joint development and marketing agreement with T1 supplier Network Equipment Technologies Corp. in June.

Crucial to success

Partnerships have become crucial to success in the communications marketplace. Users now realize that no one company — not even IBM — can supply all the communications products and links required to create a large corporatewide network. To be competitive, users need, and vendors should supply, the following key connections:

- LANs: This capability should range from small department-size LANs to utility LANs capable of linking departmental LANs into a large companywide backbone network.
- SNA: With more than 25,000 SNA networks in Fortune 2,000 corporations, the ability to supply an SNA gateway between disparate networks and processors is necessary. Agreements such as Tandem Computers, Inc. 's minority stake in Netlink and Altos Computer Systems' purchase of Communications Solutions, Inc. late last year are attempts to address this niche.
- Major vendor compatibility: At a minimum, communications vendors will be required to support products from IBM, Digital Equipment Corp. and Apple Computer, Inc. Northern Telecom, Inc. is a leader in this area, having signed deals with Apple, DEC and Banyan Systems, Inc. for wide-area networking products.
- Telecommunications support: Corporate short-term requirements call for supporting packet data switching and T1 connections. Long-term support will encompass support for Integrated Services Digital Network.

Given the current communications climate in most major corporations, it has become increasingly clear that while having a viable LAN is still good, sold alone, it is just not good enough.

Fleig is director of systems research specializing in local-area networking and IBM communications for International Technology Group in Los Altos, Calif.

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IEEE builds new Ethernet standard

Group envisions 10M bit/sec. version of twisted-pair wiring protocol

BY ELISABETH HORWITT
CW STAFF

PALO ALTO, Calif. — As rival vendors race to develop a 10M bit/sec. Ethernet that runs over twisted-pair wiring [CW, Aug. 3], a study group formed by members of the Institute of Electrical and Electronics Engineers, Inc. (IEEE) 802.3 standards committee is taking the first step toward standardizing the protocols for such offerings.

The group, which consists of more than a dozen vendors, was formed during the July meeting of the IEEE 802.3 standards committee.

The new group's purpose is to look into the possibility of a 10M bit/sec. version of the IEEE 802.3 twisted-pair Ethernet standard, sometimes called Starlan.

The group, which will have its first meeting next week, includes representatives from Hewlett-Packard Co., AT&T, Retix Co., Texas Instruments, Inc., Ungermann-Bass, Inc., Unisys Corp., Xerox Corp., Digital Equipment Corp., National Semiconductor Corp., Intel Corp. and Honeywell Bull, Inc.

The study group will entertain proposals from members, several of which are said to be already working on 10M bit/sec. Starlan implementations of their own.

HP technology ready

HP, for example, has developed the technology for implementing 10M bit/sec. Ethernet on unshielded twisted-pair wiring that is bundled with other telephone wiring, according to Willem Roelandts, general manager of the company's Information Networks Group.

HP's implementation is plug compatible with the 1M bit/sec. Starlan standard and supports the same distances between workstation and wiring closet, so that users can install either the 1M or the 10M bit/sec. network in a given installation, Roelandts said.

The importance of a 10M bit/sec. Starlan, Roelandts said, is that it allows businesses to use existing building wiring schemes to support high-speed networking, which will become an important consideration for users of the new Intel Corp. 80386-based generation of microcomputers.

HP hopes to win industry acceptance for its 10M bit/sec. Starlan specifications as part of the standard before making a formal product introduction, Roelandts said.

Needs support

The question remains, however, as to whether HP can win over vendors like 3Com Corp. and AT&T, which are also said to be working on 10M bit/sec. twisted-pair networks.

HP and 3Com are currently discussing how their respective offerings might fit together, according to Roelandts.

Although 3Com did not attend the July IEEE 802.3 standards committee meeting, the company does plan to send representatives to the study group's meeting this month, according to Andrew Verhalen, 3Com's director of marketing for hardware.

"We're very interested in helping establish a 10M bit/sec. twisted-pair wiring standard, and we hope that our own product will be compatible," he added.

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Sears

FROM PAGE 41

ment software."

Outside observers say there is, indeed, a special relationship between IBM and Sears, which is virtually an all-IBM shop. "The Sears integration of NET and Netview was done under an agreement with IBM's Federal Systems Division in Maryland," notes Francis Dzubeck, president of Communications Network Architects, Inc. in Washington, D.C. "It's common knowledge in the industry that Sears has a commitment to IBM and that IBM has a commitment to them. IBM has also used Sears as a test site for various products in the past."

The network is Sears' attempt to put in place a backbone network that could serve all the business groups within the corporation. The single, integrated SNA network supports the communications needs of Sears' merchandising group, its Allstate Insurance Co., Dean Witter Reynolds, Inc. brokerage business and Coldwell Banker Real Estate Group, Inc.

Together, the combined Sears businesses generate about $45 billion annually, of which $27 billion comes from Sears' retail store operations. The same communications network also routes transactions from 15 million users of the Discover card, a subsidiary operation within Dean Witter, to two DP centers for processing.

Competitive edge

But while it serves a strategic purpose, Sears is willing to talk about this internal SNA network. That is unlike other IBM-only operations like United Airlines, which has repeatedly rebuffed inquiries into the details of its Apollo Computer, Inc.-related network architecture.

United, like Ford Motor Co., is using its technology to gain greater market share in a highly competitive market. Sears is also competing for market share, but the merchandising of its goods plays a strong role in its overall competitiveness, says Walter Loeb, a senior analyst with the New York investment firm of Morgan Stanley Group, Inc.

"I think Sears has a sophistication in technology that few people in their industry recognise," Loeb says. "But it doesn't necessarily reflect in their bottom line because the merchandising aspects are so important."

Business practices and technology are, however, inextricably tied together. Sears' new chairman, Michael Bozic, is trying to modernize Sears' aging distribution system, which reportedly costs Sears 8% of sales. Competitors K-Mart Corp. and Wal-Mart Stores, Inc. average only 3% of sales for distribution costs, and both of them have chosen a different communications technology — very small-aperture terminal — for internal communications.

SNA was chosen by Sears because it was the common denominator for most of the company's divisions in the late 1970s and early 1980s. SNA is credited with allowing Sears to create a wide-area network that prevents a high volume of local traffic from interfering with traffic routed to host computers.

"We are very satisfied with SNA," Weis adds. "It allows any terminal in the network to connect with any mainframe, regardless of location. To support an additional computer anywhere in the country, all we do is change a software table at our network control center." The network does not have to be turned off to add new components, he says.

The SNA-only design also eliminates the need for statistical multiplexing, Weis says. Instead, a hierarchical top-down system was put into place with low-end IBM 3720s filtering local traffic up to front-end IBM 3725s and IBM host computers.

"All the polling is contained within a locality," Weis says, "so that none of the interlocal access and transport area circuits are congested with that traffic. The IBM 3720s only send valid data upstream." The only multiplexing of any consequence occurs in the 50 T1 intercity lines, which combine voice and data messages.

'Essential product'

IBM's Information Management software package is another important element of network management.

"Information Management provides problem-and-change management," Weis says. "When you try to keep track of as many things as we do, it's an essential product to maintain operations." The dozen or so staffers per shift at Sears' network control center in Chicago use Information Management to help resolve network faults before they escalate into a crisis.

> SEARS' NETWORK has grwn by nearly 30% in each of the last two years, reflecting an increase in the number of connections to cluster controllers from 5,384 to 8,980 between 1985 and the end of this year.

In size, the Sears network is third only to IBM's internal SNA networks, Weis says. Those two IBM networks are the IBM Information Network in Tampa, Fla., and another network that serves internal IBM operations. Sears' network has grown by nearly 30% in each of the last two years, reflecting an increase in the number of connections to cluster-controllers from 5,384 to 8,980 between 1985 and the end of this year.

Netview is critical to the smooth operation of a vast nationwide network, Sears managers say. "I don't think you could build a network of this size without Netview," says Weis, who oversees the integrated network that his organization designed four years ago.

Before then, Sears' divisions had been using more than 10 separate SNA networks to support their separate business functions.

Creating a single voice/data network in 1984 gave Sears several leverage points, Weis says. Among them were central control of the network utility, the ability to buy network components in volume at discounted prices and improved vendor management with suppliers such as IBM, the regional Bell holding companies and U.S. Sprint Communications Co., the principal interstate carrier for the wide-area network.

In addition, Sears is converting most of its AT&T leased lines to others provided by the regional Bell operating companies. Sears says the reason for doing this is that the holding companies are providing shorter delivery times for new installations. Sears uses voice lines to send analog data from thousands of modems and has no plans to substitute digital signals from the scattered modems.

IBM's Netview is at the heart of this unified Sears system. Netview supports central management of the far-flung network by creating a single list of all system alerts and providing real-time monitoring.

"Systems management functions have now been folded into Netview, giving it the ability to handle automated responses to network alerts and providing centralized automated control," Weis says.

The NET multiplexers are also capable of automatically rerouting traffic around a damaged portion of the network. As yet, there are no IBM 9370s in the field, but Weis says Sears was evaluating two units. "We will use the 9370s as remote network servers," Weis says, "and that will allow in-house printing to be done at distributed sites, close to the end users."

The engine driving the network is a single IBM 3090 Model 200 with 256M bytes of expanded memory. Tucked away in a northwestern Chicago suburb, the 3090 mainframe has been dedicated to running the Sears network. Adjacent to the computer room that houses the network's central mainframe is a Network Control Center that monitors all system alerts and issues all system commands to repair network faults.

A mirror-image site in Dallas is also in place, prepared to take over command of the network in the event a tornado, power failure or other catastrophe hits the Chicago center. The Dallas center is manned but has no telecommunications staff. An IBM 3090 Model 200, just like the one in Chicago, sits idle, waiting to be placed on-line in an emergency.

The Dallas mainframe is tested every week, and Chicago personnel visit from time to time to practice network-control functions at the Dallas site. Although both the Chicago and Dallas network centers have diesel generators, the ones in Dallas could run indefinitely if the Chicago center ever became severely damaged.

Since the communications network is so large, it is considered a resource to all divisions within Sears. An advisory board made up of DP managers and senior managers from each Sears business group meets regularly to discuss network planning and management with Weis and his Chicago staff.

Sears recently decided that its network and networking expertise is extensive enough to support a profitable business as a value-added reseller.

The company created a wholly owned subsidiary, Sears Communications Co., to sell communications services to end users who did not have private networks of their own.

"We feel that we can leverage this new business off the experience we've gained in designing, implementing and operating a very large SNA network," says Weis, who also acts as president of the new venture.

The company, which has fewer than 20 major accounts right now, is expected to be a profit area for Sears, says Larry Jellen, vice-president of marketing and sales for Sears Communications. "We're selling an end-to-end service for companies with at least 20 to 30 remote locations," Jellen says, "and we're guaranteeing the amount of network availability and response time by contract. Users don't have to pay for downtime."

The Sears Communications end-user service does not reflect excess capacity within the Sears network, Weis says. And Sears will not run a user's applications — users must supply their own host computers to do the processing.

The selling point is Sears' experience with SNA and with IBM communications architecture, something Sears feels has been proven by IBM's recent product announcements and statements of direction. They are, in fact, statements about Sears' own direction in SNA design.

Sears communications network

Network Equipment Technology switches coordinate voice, SNA connections among multiple U.S. sites

INFORMATION PROVIDED BY SEARS, ROEBUCK AND CO.
CW CHART

Banks

FROM PAGE 41

based on a survey of chief financial officers, DP managers and EDI coordinators within Fortune 1,000 corporations as well as in-depth interviews with executives at corporations using EDI. Electronic Cash Management, Inc., a Marietta, Ga., consulting firm, and the Bank Administration Institute, a research institute in Rolling Meadows, Ill., are assisting with the research.

Study sponsors include Bank of Boston Corp., Bankers Trust Co., The Chase Manhattan Bank NA, Chemical Bank, Continental Illinois National Bank & Trust Co. of Chicago, First Interstate Bank, Ltd., First National Bank of Maryland, Irving Trust Co., Manufacturers Hanover Trust Co., PNC Financial Corp., Security Pacific Corp. and Shawmut Corp.

> "BANKS HAVE discussed . . . the possibility that a bank might serve as a local value-added network."
>
> JACK SHAW
> ELECTRONIC CASH
> MANAGEMENT, INC.

Cashing in

The banks are eager to capitalize on their previous investments in communications links with major corporate customers for electronic payment and cash management services, Manion said. "Banks have established 'electronic shelf space' in so many companies already, it makes sense for them to offer products that allow companies to communicate with other companies using bank networks," he added.

Manion said the banks could either handle all of the financial and network services themselves — and in doing so, compete against existing EDI network vendors such as GE Information Services in Rockville, Md., and McDonnell Douglas Electronic Data Interchange Systems Co. in St. Louis — or form alliances with those value-added network vendors.

Thomas Tucker, the Bank Administration Institute's director of operations and technology, said the first EDI service that banks are likely to offer is the transmission of detailed remittance data to go along with intercorporate payments.

An EDI pilot project involving General Motors Corp. and eight banks is already proving the feasibility of having the auto maker send payments and remittance data to its suppliers, with the banks as intermediaries, Tucker said.

However, the banks are not fearlessly rushing into the EDI industry, according to Victor Wheatman, an analyst with Input, a research firm in Mountain View, Calif.

Some banks are reluctant to go beyond the familiar service of handling electronic payments, either because EDI is not part of their strategic business plan, or because they fear security problems or new liabilities if incorrect data is sent with a payment, he said.

In the short term, banks will want to make their existing electronic payment and cash management services compatible with the EDI standard X.12 and then move on to intercorporate transactions, according to Jack Shaw, president of Electronic Cash Management.

"One idea that a number of banks have discussed is the possibility that a bank might serve as a local value-added network or perhaps as a port to the big, national value-added networks," Shaw said.

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NEW PRODUCTS

Local-area network hardware

A multirate data service unit/channel service unit (DSU/CSU) for digital data service networks has been announced by **Universal Data Systems.**

The **Model DDS/MR** is said to operate at 56K, 9.6K, 4.8K or 2.4K bit/sec. over the network in point-to-point and multipoint applications. It combines the functions of a DSU and a CSU into a single unit directly compatible with Bell 500 Series equipment.

The unit costs $695.

Universal Data Systems, 5000 Bradford Drive, Huntsville, Ala. 35805.

Customer-premise equipment

A **Multiplexer Interface Panel** and a **Data Distributor** designed for use with **Micom Systems, Inc.'s** Instanet6000 Series 40 Data private automatic branch exchange has been announced by Micom.

The Multiplexer Interface Panel is an interface backplane that provides five scan shelves of 128 channels each.

The Data Distributor Model M64321 is a single plug-in module that provides 32 channels multiplexed over twisted-pair wires to a connector panel.

The Multiplexer Interface Panel costs $3,500. The Data Distributor costs $2,250 for the data-only version and $3,250 for the modem-control version.

Micom Systems, 4100 Los Angeles Ave., Simi Valley, Calif. 93063.

Links

A communications program said to allow a microcomputer to emulate the AT&T 5425/4425 buffered display terminal has been introduced by **Telexpress, Inc.**

The software, called **EM4425**, provides support for the AT&T 5425/4425 modes of operation, such as set-up screens compatible with the terminal; scroll mode that supports a memory-access screen of 78 rows by 80-col. support for up to four simultaneous windows; and support for 26- and 27-line keyboard labels.

EM4425 costs $150 per license.

Telexpress, P.O. Box 217, Willingboro, N.J. 08046.

File servers

Solana Electronics has introduced a communications server said to enable remote Apple Computer, Inc. Macintosh users to access that company's Appletalk network and its resources directly from dial-up telephone lines.

R-Server with a modem connects as the data path into a local Appletalk network to manage data traffic between the remote Macintosh with a modem and any resource on the network.

R-Server costs $495.

Solana Electronics, Suite A, 7887 Dunbrook Road, San Diego, Calif. 92126.

Cabling

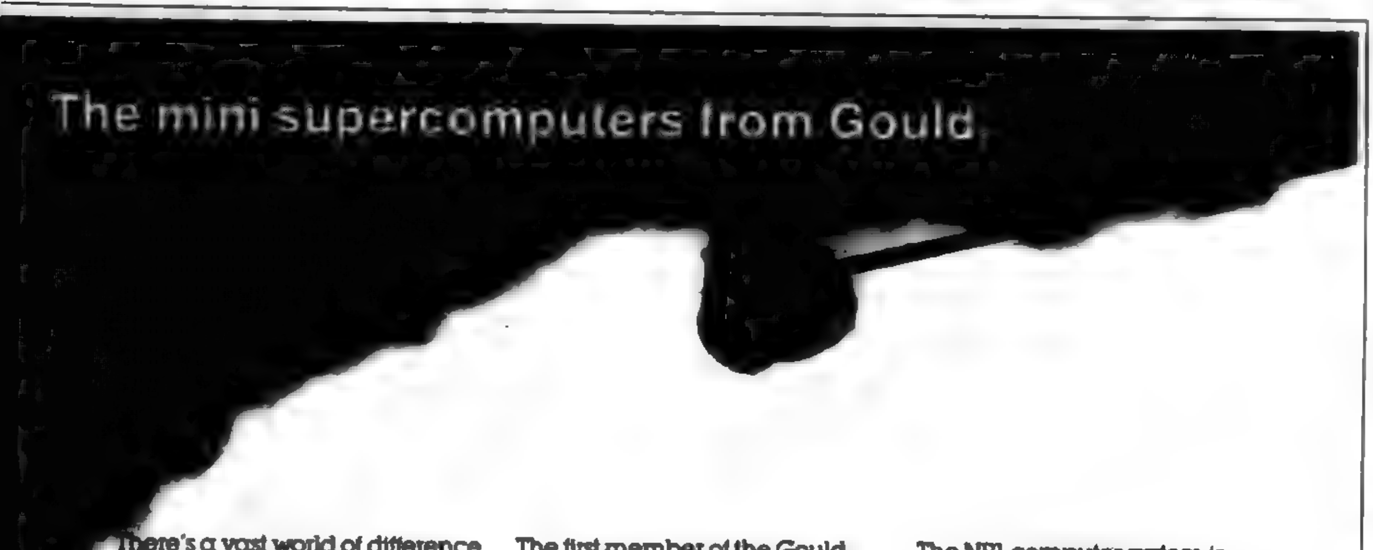
A four-pair shielded plenum transceiver cable that meets IEEE 802.3 requirements for compatible local-area networks has been introduced by **Belden Wire and Cable.**

The **Belden 89901** pair shields are electrically isolated from the outer shielding with an overall polyester isolation tape and Duofoil shield.

The Belden 89901 costs $1,782 per 1,000 ft.

Belden, P.O. Box 1980, Richmond, Ind. 47375.

The mini supercomputers from Gould.



There's a vast world of difference between the power of a super minicomputer and the power of the new Gould NPL™ family of mini supercomputers. It's a whole new category of compatible Gould computers that bridges the gap between giant supercomputers on the one hand and superminis on the other. The Gould NPL family offers you the power and advantages of supercomputers at the cost of superminis.

Introducing the NPL Firebreathers.

Supercomputers are characterized primarily by their parallel architecture and high speed vector processing capabilities.

The new Gould mini supercomputers provide both. But they eliminate the supercomputer disadvantages of high initial and ongoing costs, expensive environmental controls, specially trained programmers, nonstandard operating systems, nontransportable software development tools and applications. All these factors have limited the use of supercomputers to a few large corporations, government agencies and research laboratories.

The first member of the Gould NPL family of Firebreathers, NP1, delivers performance equal to first generation supercomputers — at the cost savings of a supermini.

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No longer are you limited by computer technologies that haven't kept pace with your imagination.

The multiprocessor parallel architecture of the Gould NP1 gives you the availability of both high performance scalar and vector processing, simultaneously. Real memory is expandable to a mammoth 4 billion bytes.

Moreover, unlike supercomputers (and most minisupers), Gould NP1 is designed to support the concept of open system architectures — especially with regard to languages, operating systems, I/O interfaces and communications.

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SYSTEMS & PERIPHERALS

HARD TALK

James Connolly

Supermini battle rages

Most discussions of what people call "the mid-range" focus on the computer market served by systems such as the IBM System/36 and 9370 and Digital Equipment Corp.'s VAX 8250. That is a performance range in which IBM and its minicomputer rivals are knocking heads.

But there is another, sometimes forgotten, group of mid-range systems that have been the subjects of heated marketing battles lately. Those are the systems in the high-end superminicomputer and small mainframe class, such as IBM's 4381 and 3090 Model 120E, DEC's VAX 8700, Prime Computer, Inc.'s 6350 and Hewlett-Packard Co.'s HP 3000 Series 930.

As with the smaller systems, the activity in the upper mid-range has generally involved product introductions, enhancements and repricing.

In May, IBM introduced four models of the 4381, featuring twice the memory and 30% performance gains in comparison with older 4381s. The simultaneous introduction of the 4381s and the 3090 Model 120E represented not only moves against IBM's competitors, but, in effect, competition among IBM's own products as the performance of the 4381 and 3090 overlapped for the first time.

Continued on page 52

DEC preps faster Microvax

Q-bus-based mini seen out-gunning low end; September intro eyed

BY DAVID BRIGHT
CW STAFF

Digital Equipment Corp. is ready to introduce a Microvax that outperforms some larger and more expensive VAX 8000 series systems and is based on DEC's Q-bus rather than the faster VAXBI bus.

The Microvax III is expected to debut at the Decworld exposition to be held in Boston from Sept. 8-18.

According to a beta-test user and a third-party developer, the new Microvax will perform more than 2 million instructions per second (MIPS) and will surpass the performance levels of machines like the VAX 8250.

However, because the two lines use different buses, Microvax users will still be unable to upgrade to the VAX 8000 series.

In addition to the Microvax III, observers said they expect DEC to introduce a more powerful Vaxstation, an improved gateway to IBM's Systems Network Architecture (SNA) and possibly a 3-MIPS VAX 8400 to fill a performance gap in the VAX 8000 line.

The Microvax III is intended to leapfrog the performance of competing departmental systems, such as Prime Computer, Inc.'s recently announced 1.6-MIPS 2455. The Vaxstation, which is based on the Microvax series, will compete in the hotly contested technical-workstation market against machines from Sun Microsystems, Inc. and Apollo Computer, Inc.

Priced in the same range as the Microvax II, the Microvax III uses a CMOS microprocessor to more than double perfor-

Continued on page 52

Cards jog 4381 memory

SAN JOSE, Calif. — Locom Corp. recently introduced memory cards designed for use in the third-generation 4381 models that IBM announced in May.

The 2M- and 4M-byte LCM-400 cards use 1M-bit memory technology and were designed to function in the IBM 4381 Models 21 and 24, which are due for shipment in early 1988, or in the seven older 4381 models.

Locom officials said the memory cards, which are available now, are needed because the new 4381s do not support the company's existing 16M-byte modules.

The company also claimed that the cards are, electronically, pin-for-pin identical to IBM cards but are faster and dissipate 25% less heat than the IBM products.

Speed edge claimed

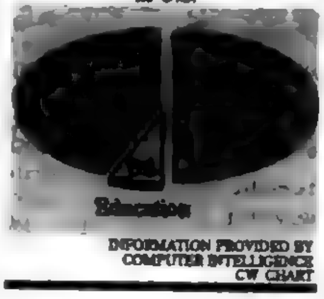
A company spokesman said the Locom card is typically more than twice as fast as an IBM card during a write cycle. He said the LCM-400 cards are mechanically identical in dimension to the IBM cards and that they use edge-card connectors that are compatible with IBM card-cage connectors.

When a 4M-byte card is installed in an older 4381 model, the card functions as two 2M-byte cards.

Locom said 8M bytes of memory cost $20,000, 16M bytes cost $30,000, 24M bytes cost $45,000 and 32M bytes cost $55,000.

Data View

VAX/Microvax markets
Percent of dedicated sites using Digital Equipment Corp. systems in U.S.



INFORMATION PROVIDED BY COMPUTER INTELLIGENCE
CW CHART

NCR services System/36s

Says banks, retailers to form bulk of market

BY STANLEY GIBSON
CW STAFF

DAYTON, Ohio — NCR Corp.'s Third-Party Services recently announced that it will provide maintenance for two models in IBM's System/36 line.

NCR said it will service the Model 5360 and Model 5362 as well as peripherals throughout the U.S.

"Banks, in particular, often have NCR sorters with System/36 processors. It's a natural fit that way," said Jeff Sugheir, NCR's Third-Party Services manager of marketing services.

Other users likely to have both NCR and IBM equipment are retail stores that have NCR point-of-sale equipment and a System/36. However, NCR does not require an IBM user to have NCR gear in order to obtain

Continued on page 56

McDonnell Douglas adds minis

IRVINE, Calif. — McDonnell Douglas Computer Systems Co. recently expanded its line of relational data base minicomputers with six systems featuring greater main memory and disk storage capacities than those of earlier models.

Like the older models, the new systems run McDonnell Douglas's Reality relational data base management operating system, which is based on Pick Systems' Pick operating system.

The company replaced its four 3-year-old Series 9200 systems with five models that it said feature up to four times the disk capacity as well as more memory capacity and user ports at the low end.

The new low-end 9225 supports 2M to 4M bytes of memory, up to 780M bytes of disk storage and up to 96 users, compared with 1M to 2M bytes of memory, 520M bytes of disk storage and a maximum of 64 users on the older 9220.

At the high end now is the 9265, with a disk capacity of 4.16G bytes. Like the earlier 9250, which had a disk capacity of 1.04G bytes, the 9265 supports up to 8M bytes of memory and 208 users.

The company also added high-end models to the 2-year-

Continued on page 56

[illegible]

Utility's MIS weathers climate shift

BY JAMES CONNOLLY
CW STAFF

PROFILE

SAN FRANCISCO — For two decades, Pacific Gas & Electric Co. (PG&E) has been a company to watch in terms of computer use.

PG&E was on the leading edge in the 1960s, when it established an information systems project and began bringing its commercial data processing and technical computing resources under a common management. The utility, which serves Northern California's energy needs, became an early user of IBM plug-compatible mainframes made by Amdahl Corp. and National Advanced Systems Corp. (NAS) in the 1970s. During the 1980s, PG&E has standardized on the IBM Personal Computer and was among the first firms to negotiate site licenses for PC software.

A. W. Simila

Now, with IBM and IBM-compatible standards at the mainframe and workstation level, PG&E officials are looking at their options for the middle level in a three-tiered computer hierarchy, as the MIS group and the corporation adapt to major changes in the utility industry. It is a search that may prove futile, at least in the near term, according to A. W. Simila, manager of PG&E's information systems department.

"Currently, the technology is very strong at the mainframe level and at the desk top. We're just beginning to get that middle tier defined," Simila says, adding that it is difficult to specify PG&E's middle-tier needs. "We don't have that fully rationalized because we are still waiting for the industry to settle down."

PG&E is evaluating the offerings of various hardware vendors, including the IBM 9370 and Digital Equipment Corp. VAX minicomputers, and has used local-area networks in the middle tier for specific applications. "But the major thrust is still at linking workstations directly to the mainframe," reports Simila, an industrial engineer who has been involved with computers in utilities for 20 years.

Continued on page 56

Supermini

CONTINUED FROM PAGE 51

In April, Prime positioned its 9350 and 9550 against the lower part of the 3090 line. Meanwhile, DEC has continued its well-documented drive of its VAX line from the middle of the IBM 4300 performance range into the 3090 scale, HP is preparing to ship its first production versions of the HP 3000 Model 930 reduced instruction set computer and National Advanced Systems Corp. has brought its AS/VL systems to the U.S. market.

It is obvious that these vendors and others are accelerating their efforts in the mid-range. As usual, users benefit from such competition if only because of the price pressure created, particularly when a user leverages the threat of changing vendors.

Dealers pushing harder

But there also is an accelerated competition on the part of another group — the lessor and used computer community. Those dealers appear to be pushing harder now than they have for about a year when it comes to promoting used IBM 3080s and 4300s over new 4300s and 3090s.

The most recent example was that of Computer Merchants, Inc. promoting used IBM 3083s and 4381s as alternatives to the newer 4381 Models 21 to 24 and the 3090 Model 120E.

Computer Merchants bluntly calls the 3090 Model 120E a "typical entry-level trap" designed to draw customers into the 3090 family. Jumping for the low-end 3090, with a bare-bones price of less than $1 million, may make sense for the user who sees the potential for a relatively short-term need for features such as expanded storage — available only on a 3090 — or 4.5M bit/sec. channels, available on the 3090 when IBM gets around to announcing it.

Some don't need leading edge

But dealers like Computer Merchants and its competitors, including Comdisco, Inc., have a valid point if they argue that many people may not want those leading-edge functions.

Computer Merchants makes a case that is hard to dispute. The dealer says a user who needs a mainframe in the range of 7 to 8 million instructions per second (MIPS) can get a used IBM 3083 Model J for $425,000, compared with the $900,000 or more for a 7.5 MIPS 3090 Model 120E or 8.1 MIPS 4381 Model 24. The dealer makes similar arguments for used 4381s over the new 4381 models.

Such used machines may not be for everyone. However, their presence in the market serves a purpose. Like the threat of jumping to other vendors, the option of buying a used computer does its part in keeping new system prices in check.

Connolly is *Computerworld's* senior editor, systems & peripherals.

Faster Microvax

CONTINUED FROM PAGE 51

mance to at least 2 MIPS. That compares favorably with the VAX 8250's estimated capability of about 1.3 MIPS, but the Microvax III retains the Q-bus used in the Microvax II. The VAX 8250 uses DEC's VAXBI bus. The CMOS microprocessor includes a subset of the VAX's CPU instruction set.

A third-party hardware developer who said he has seen the new system said the chip can ultimately operate at 3 MIPS, but that DEC cannot yet produce the faster versions in quantity.

According to the source, the only incompatibilities between the Microvax II and the Microvax III are that a new memory interconnect scheme is used. "If you had a Microvax II on your floor right now, and you wanted to make it a Microvax III, you'd not only need a new CPU, but also new memory boards," he said. "I believe the memory boards that will run on a Microvax III are identical to those memory boards that are now being used in the MicroPDP-11/83." He said he was told that DEC will offer upgrade kits for moving up to a Microvax III.

Early user makes plans

One Microvax III beta-test user said he is pleased with the system and claimed it runs faster than 2 MIPS. Since the VAX 8000 systems offer higher I/O speeds than the Microvax III, he said he does not expect the new systems to replace VAX 8000 machines. Instead, he said his organization plans to cluster the higher-end machines as file servers.

John McCarthy, research manager at Forrester Research, Inc., said the Microvax III will run at 2.5 MIPS. He said the VAX 8400, which is generally believed to use a Microvax III-related chip set on the VAXBI bus, is also definite.

Microvax II prices, including a DEC VMS license, currently start at $18,400, while the base price of a VAX 8250 with a VMS license is $92,000.

Analyst Myron Kerstetter of the Gartner Group, Inc. in Stamford, Conn., said he expects the new system to carry the same price as the Microvax II. In addition, Kerstetter said DEC should use Decworld to introduce an aggressively priced Vaxstation based on the new chip.

He added that DEC will introduce a more powerful gateway linking DEC systems to SNA, but the software may not be available until much later. The gateway's PDP-11 will be replaced by a VAX, he said.

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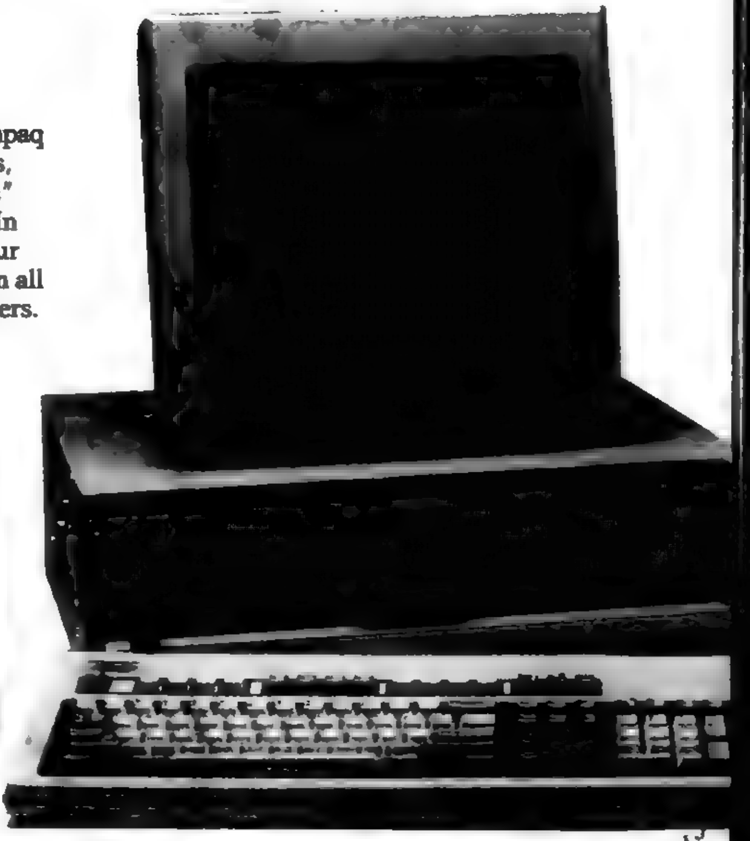

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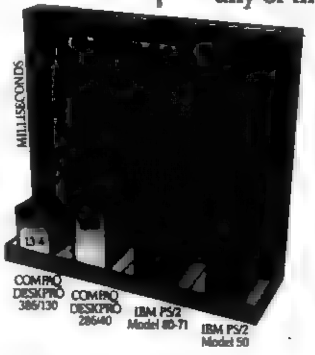

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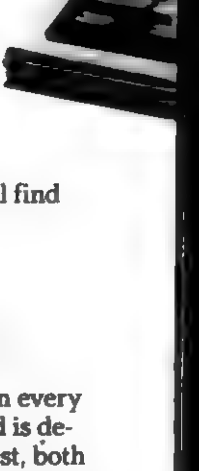

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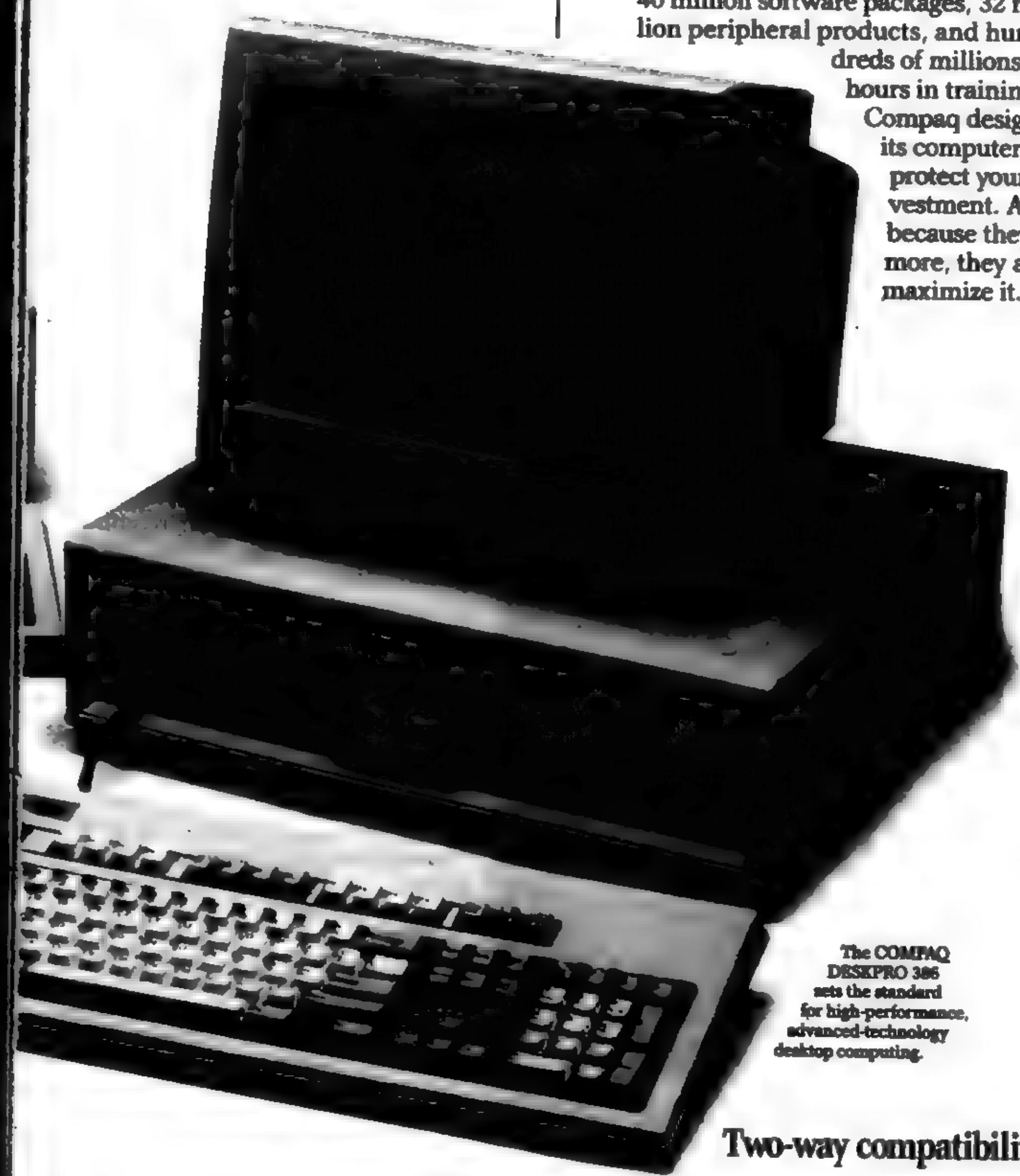

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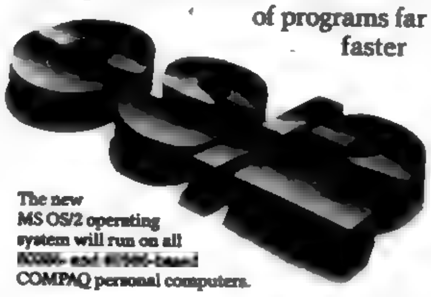

The new MS OS/2 operating system will run on all 80286- and 80386-based COMPAQ personal computers.

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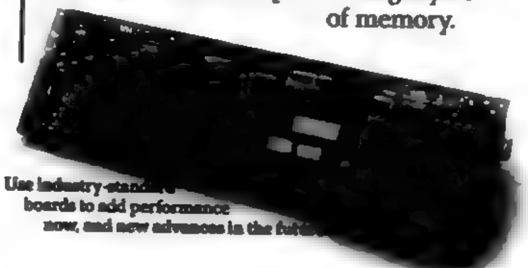

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COMPAQ computers will also allow you to run all the applications developed for OS/2™. Again, much faster.

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Utility's MIS

CONTINUED FROM PAGE 51

Reflecting on the technological and business changes of those two decades, Simila says a move into a commodity era in terms of departmental computing and simpler operating systems would make his job easier. "The hardware is giving us as much as we can use. There is still that balance between hardware and software, and it always seems that software is tougher to solve," he says. But rather than becoming easier to use, system software and data management software is becoming more complex and technically oriented, he notes.

The lack of middle-tier products has slowed PG&E's progress toward a goal of networking all knowledge workers' workstations and means the project will take "a little longer" than the target time of five years from now, Simila says.

PG&E projects continued 25% to 30% annual growth in computing power at both the mainframe and the microcomputer level. Those microcomputers, which now number about 8,300 in the 28,000-employee company, are used in both stand-alone and terminal-emulation modes. Simila says he sees the PC's role as one where it complements the mainframe rather than replaces it.

To support the growth of the PC population, PG&E became one of the first corporations to receive site licenses four years ago, when it acquired such a license for Lifetree Software, Inc.'s Volkswriter. Simila says the growth is a result of fundamental changes in the way energy utilities do business in an era of deregulation.

"Banking had to face the market earlier . . . In our industry, MIS is just now emerging more and more from being a backroom support-type function. We are focusing more and more on the outside," Simila says. The company's MIS group is working on strategies to link technological developments to the changes in the business environment.

Customers hungry for more

With deregulation, PG&E's customers are looking for more individualized and varied services. Those changes mean new approaches to sales support and billing as well as accounting.

"Billing becomes more and more complicated all of the time," Simila says, noting that customers want more details in their bills and that public utility commissions require power companies to provide more detail in justifying rate requests.

In conjunction with providing more information to customers and holding onto PG&E's position as the "preferred supplier of energy services," PG&E has used computer technology to get greater production out of more than 3,500 customer service representatives, Simila says.

PG&E also has more than 730 MIS employees supporting data centers in San Francisco and Fairfield, Calif., and at the Diablo Canyon nuclear power facility in San Luis Obispo, Calif.

The data centers house a variety of mainframes, including two IBM 3090s, an Amdahl 5890, several Amdahl 5860s, multiple NAS AS/9080s and AS/9060s and several IBM 4300 series processors. In addition, PG&E uses large disk drives from IBM and three plug-compatible manufacturers.

PG&E was one of the early users of Amdahl equipment and has kept a mix of IBM and plug-compatible manufacturers' systems for more than a decade. Simila reports that the company's size makes PG&E a "cherished account" for the various vendors and eliminates the possibility of a vendor punishing the utility by cutting back on service when another vendor wins a contract.

NCR services

CONTINUED FROM PAGE 51

third-party service, Sugheir said.

Although he declined to name a specific discount rate, Sugheir said NCR is "prepared to discount on an individual basis in relation to IBM's Corporate Service Amendment (CSA)." IBM's CSA, introduced last year, offers discounts from 4% to 33% to customers who manage some of their own maintenance.

NCR also offers a discount program called Partnership Maintenance, under which a customer may receive a service discount for establishing a means to track problems themselves, such as a help desk. But this discount is offered only on NCR equipment, Sugheir said.

NCR Third-Party Services has 6,300 field personnel in 400 locations in the U.S., the vendor said.

McDonnell

CONTINUED FROM PAGE 51

old Series 6000 small-business systems.

The 6460 is the new high-end model in the Tower portion of the 6000 series and features up to 4M bytes of memory, 420M bytes of storage and support for 64 users, compared with 1M byte of memory, 225M bytes of storage and support for only 32 users offered by the earlier 6425.

In the Low Boy portion of the 6000 family, the company added the 6680 with support for 4M bytes of memory, 1.5G bytes of storage and 96 users. The earlier 6655 supported 2M bytes of memory, 486M bytes of disk storage and 64 users.

The 6260 costs $62,500, and the 6680 costs $115,500. Prices for the Series 9200 range from $98,500 for the 9225 to $253,000 for the 9265.

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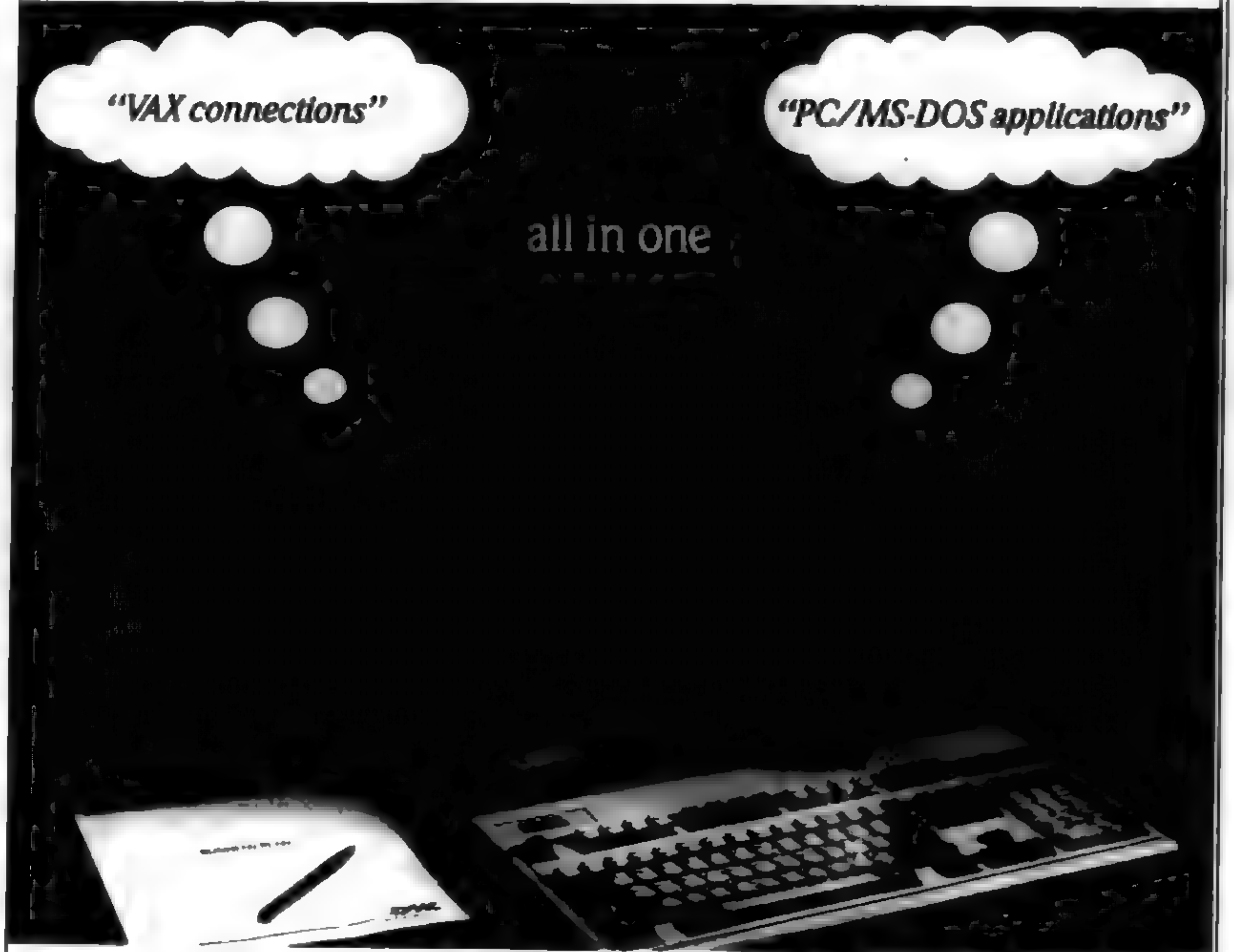

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NEW PRODUCTS

Processors

A series of Sun Microsystems, Inc. Sun 3-compatible memories said to occupy one slot have been announced by **Clearpoint, Inc.**

The **SNXRAM** frees up four slots in the Sun 3/160 and 3/180 for VMEbus expansion options. It is available in 16M- and 24M-byte capacities using 1M-bit DIP switch dynamic random-access memories (RAM). The 4M-, 8M- and 12M-byte density SNXRAM models use 256K-byte DIP switch dynamic RAM.

The SNXRAM/24M bytes is priced at $10,000, and 16M- and 12M-byte capacity boards cost $7,825 and $5,500, respectively.

Clearpoint, 99 South St., Hopkinton, Mass. 01748.

Graphics systems

A preconfigured color graphics seismic display station has been introduced by **Raster Technologies, Inc.**

The **Entry Level Model One/80S** offers 1,280- by 1,024-pixel resolution with a 60Hz noninterlaced refresh rate. Seismic features include filled/unfilled variable-area display with selectable fill and overlap, variable density and horizon flattening.

Standard interfaces supported include four RS-232 serial ports and a DR11-W high-speed parallel direct memory access interface. Digital Equipment Corp. VT100 terminal capability, Tektronix, Inc. 4014 emulation, transformation, hidden surface removal and interactive device support are all standard features.

With a 19-in. monitor, the system costs $17,500. With a 16-in. monitor, it costs $15,500.

Raster Technologies, 2 Robbins Road, Westford, Mass. 01886.

Data storage

Two ½-in. reel-to-reel tape drives for both high-performance and mid-range system backups have been announced by **Hewlett-Packard Co.**

The **HP 7980A** is a 6,250 or 1,600 char./in. tape drive designed for systems with disk backup requirements of more than 400M bytes.

The **HP 7979A**, offering 1,600 char./in. only, provides for systems with disk backup requirements between 100M and 500M bytes. Both formats are compatible with ANSI standards to allow data interchange between HP and non-HP formats.

Features include automatic tape loading, seven-character alphanumeric front-panel display and performance of Read and Write operations at 125 in./sec.

The HP 7980A costs $22,400; the HP 7979A costs $13,000.

HP, 1820 Embarcadero Road, Palo Alto, Calif. 94303.

Terminals

Eastman Kodak Co. has introduced its line of **Kodak Datashow** products for computer-image overhead projection.

The Kodak Datashow system includes the Datashow projection pad, a remote control and Showmaker software. Options include paging, blinking, on-screen pointer, split-screen, random-access and automatically timed, preprogrammed sequence. The Kodak Datashow system costs $1,270.

The Kodak Datashow composite video adapter is a plug-in component that makes the transparency system usable with computers that have composite video signals, such as the Apple Computer, Inc. Apple II family. It costs $159.

The Datashow projection pad is a version of the Datashow system designed for real-time use through a personal computer keyboard. It costs $1,095.

Eastman Kodak, 343 State St., Rochester, N.Y. 14650.

Printers/Plotters

The **4/62** color dot matrix printer has been announced by **Honeywell Bull Italia.**

The 4/62 offers automatic switching from cut sheet to fanfold. It operates at 120 char./sec. in letter-quality mode with a print quality of 60 by 18 dot/char. matrix. Other features include 180 char./sec. print speed in near-letter-quality mode and 250 char./sec. in draft mode. Seven colors are standard and up to six fonts can be used on a page at one time. Print width is up to 15¼ in.

The 4/62 is priced at $2,160.

Honeywell Bull Italia, Suite 800, 120 Howard St., San Francisco, Calif. 94105.

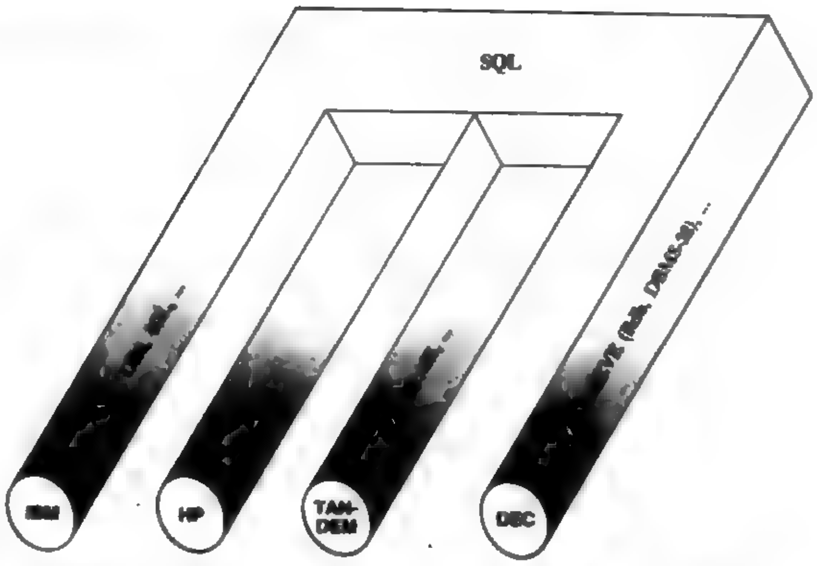
Power supplies

An off-line uninterruptible power system (UPS) that provides the protection of an on-line system has been announced by **Topaz, Inc.**

The **Powermaker UPS** consists of an internal power conditioner, a battery charger, a battery, an inverter, a static transfer switch and a surge-suppression network. It provides 100 db of common-mode noise attenuation. If the power fails, the Powermaker UPS begins supplying AC power to the protected equipment in less than one msec, the vendor said.

Powermaker prices start at $2,500.

Topaz, 9192 Topaz Way, San Diego, Calif. 92123.



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End users drive benefit analysis

They get to nominate a project 'Most Likely to Succeed'

BY HOWARD MILLER

No one would dispute the fact that it costs something to implement a computer-based information system. Nor would anyone argue that a substantial benefit from that investment is expected.

Benefits, however, can range from the quantifiable to the intangible. Further, the risk of attaining these benefits can vary from very low to extremely high. Determining the cost of installing a computer-based information system is relatively easy, but quantifying benefits can be a real stumbling block.

Whereas a cost analysis for a computer-based system develops as the logical outgrowth of a feasibility study, a benefit analysis is something that can only be user-driven. The user best understands the form the benefit will take. However, because the user also understands that there is a risk associated with attaining that benefit, he has a natural hesitancy to express this benefit in terms of dollars.

Step-by-step analysis

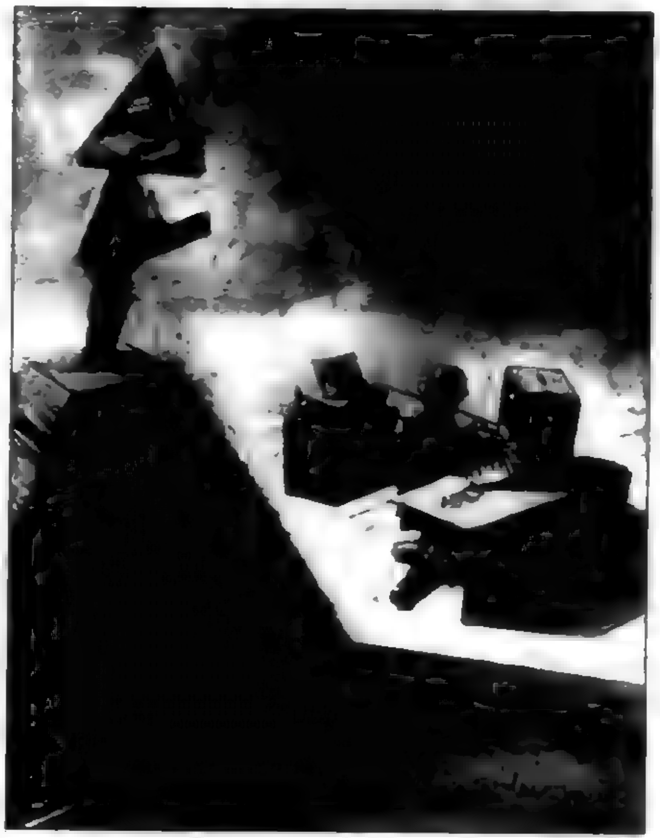
This article focuses on a method to facilitate the user-driven benefit analysis. Little will be said about cost analysis; for purposes of this article, it is assumed that cost numbers are readily available.

The following benefit analysis process is a multiple-step procedure based on the theory that a similarity exists among the kinds of benefits derived from a computer-based information system and that similar benefits can be grouped into classes. However, recognizing that there is a risk associated with achieving any benefit or benefit class, a risk-of-attainment factor should be assigned to the benefit classes.

The risk of attainment quantifies the risk associated with achieving the benefit. In this way, one may develop a comfort level for the results of the financial analysis calculations. A comfort level is an objective index indicating how assured the user is that the benefits described are achievable. The benefit analysis process consists of the following five steps:

- Identify the benefit classes.
- Establish risk of attainment.
- Complete benefit analysis forms.
- Summarize the benefits.
- Perform a financial analysis.

The ability — or lack thereof — to quantify a benefit does not always reflect its importance to an organization. For example, a new computer-based information system may be required to provide a service that is already available from the competition. The consequence of not installing the system may be loss of market share or even having to go out of business. Quantifying the benefit of implementing this computer-based information system may be difficult — what would be the cost of the lost market share or the cost of going out of business?



WILLIAM CONE

Conversely, installing a system that reduces material and labor costs may be easy to quantify and yet may have little impact on the strategic performance of a company. Therefore, benefits can be grouped in the following categories from highest to lowest according to their impact on the business:

Improved strategic performance. This is the benefit area that is most difficult to quantify and achieve due to the esoteric nature of such things as improved employee morale and better utilization of management talent. Business survival is just as likely to create new dilemmas as they are to resolve existing problems. The opportunity for excellence is there, but it is muted.

Improved management control. This area is one of subjective quantification. After implementation, the benefits of improved management control are measurable and directly attributable to the computer-based information system. Prior to implementation, the benefits can only be estimated.

Improved business resulting from a direct order-taking system is something that can be accurately measured after the system is implemented but not before installation. Examples of improved management control

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Miller is responsible for administrative computing at Boston University. He has held senior-level positions in systems management for more than 20 years.

……

• Assigning a dollar value to benefits

• Multiyear analysis

• Cost avoidance vs. strategic advantage

Benefit/comfort index table

Having end users rate a project in terms of its risk or likelihood to succeed is not enough; MIS must then superimpose this scale to reflect that cost displacement benefits are easier to achieve than strategic advantages

CW CHART

include increased business volume and improved resource management.

Improved cost displacement or avoidance. This benefit area is the easiest to quantify and has the greatest likelihood of achieving its stated results. Improved cost displacement or cost avoidance is the elimination of staff and/or materials used directly or indirectly to create a product or service.

What is the risk?

To complete the benefit analysis, each benefit within a benefit class is assigned a risk of attainment (see chart above).

The risk of attainment categories are defined as follows:

Assured: Very high probability that the benefit is achievable (70% to 100% chance).

Likely: Moderate chance that the benefit is achievable (31% to 69% chance).

Maybe: Very low probability that the benefit is achievable (0% to 30% chance). Each benefit is also assigned a comfort index based on the benefit/comfort index table. The comfort index is a weighting factor, with cost displacement or avoidance given the highest weighting while improved strategic performance is given the lowest weighting.

The theory is that cost displacement or avoidance is much easier to achieve than improved strategic performance, and, therefore, improved strategic performance must have a much higher return to offset the inherent risk. However, by its very nature, improved strategic performance typically has a much higher potential return.

Benefits on paper

Benefit analysis is the meat of the process. MIS assists the user in identifying each benefit derived from the computer-based system. Each benefit is described, quantified, classified and assigned a risk factor (Assured, Likely, Maybe). Benefits are quantified by year, from one to nine, so it is necessary to establish the time span for the analysis. The benefit analysis form documents the benefits. Note that the organization of this form corresponds to the benefit/comfort index table. The benefit classes run down the vertical axis; risk factors run across the horizontal axis. The bold numbers in the boxes are the comfort indexes. The benefit analysis form is completed as follows:

- Enter the benefit area (such as "reduce staffing by one clerk"). Use a very descriptive title.
- Enter an explanation of the benefit area, if necessary.
- Enter the savings (in dollars) per year in the appropriate benefit class under the appropriate risk of attainment level.
- Enter an X in each block for the year or years that the savings will be realized. For example, if the benefit is described as a $5,000 cost displacement likely to occur in Year 2 and is assured of also occurring in Years 3 and 4, then $5,000 is entered in the likely cost displacement box; an X is placed in Year 2; $5,000 is entered in the assured cost displacement box; and an X is placed in Years 3 and 4.
- One benefit analysis form is completed for each benefit identified.

To clarify this procedure, let's apply this process to a system that improves productivity sufficiently to reduce a clerical staff by one person ($12,000 per year). The user is confident the position will be eliminated, and the job is targeted for eradication during the second year of operation. Finally, the organization has agreed it will track only the benefits for three years from the point of implementation. In this scenario, the following is entered on the form:

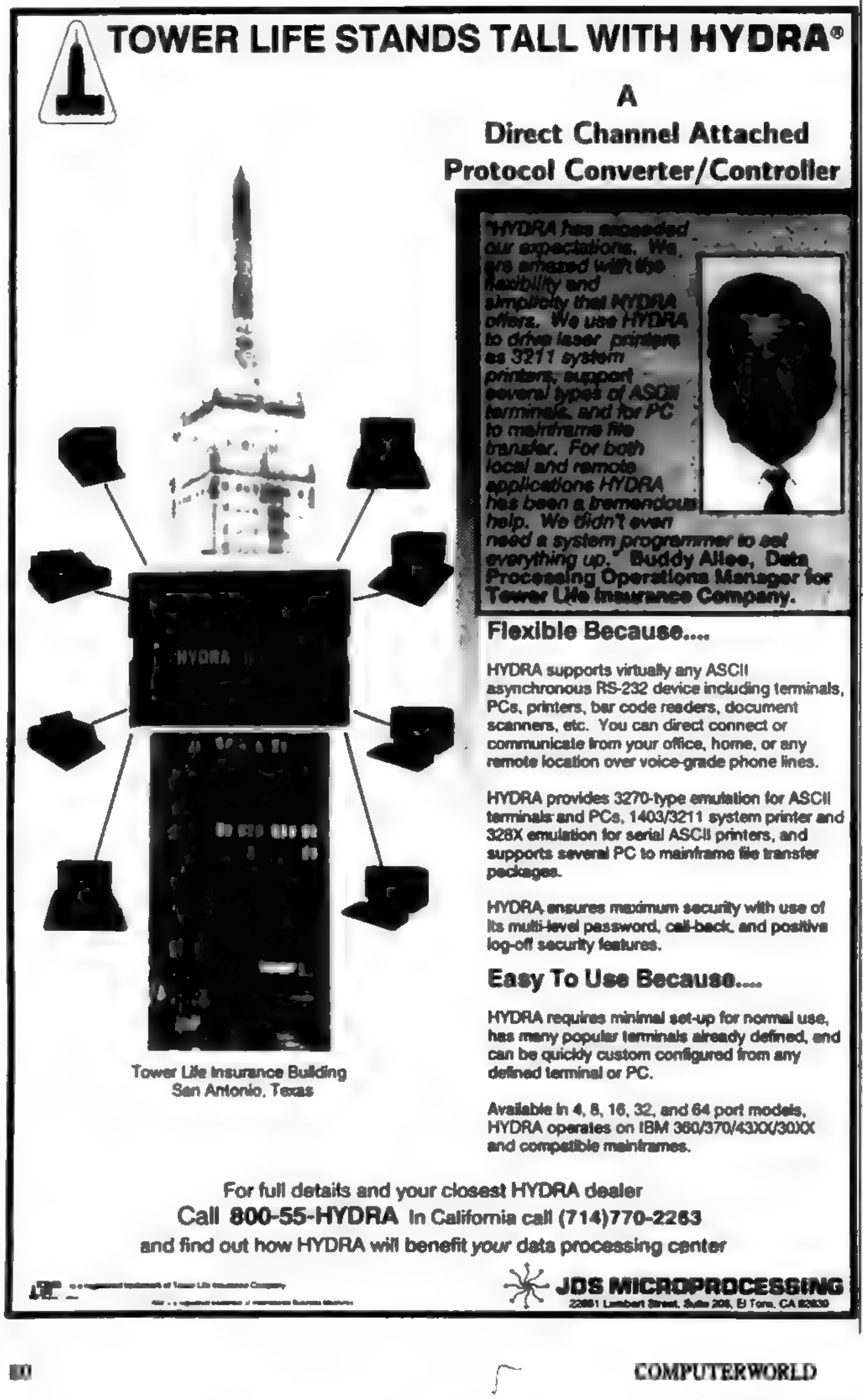
Benefit area: Eliminate one clerk.

Explanation: System improves productivity of clerical staff sufficiently to reduce staff by one person. The learning curve associated with the new system makes this possible in Year 2.

Benefits: $12,000 is entered in the cost displacement or avoidance area in the assured column, and an X is placed in 2 and 3 to indicate the savings started in Year 2 and continued through Year 3. (Had the firm agreed to track savings for five years, an X would also have been placed in Years 4 and 5.)

The benefit summary (see chart page 62) is a recap of the details found in the benefit analysis form. One benefit summary is compiled for each year in the following manner:

- List the benefit area from the benefit analysis form on the left side of the form.
- Enter the benefit dollars in the correct comfort index column based on the comfort index numbers listed on the benefit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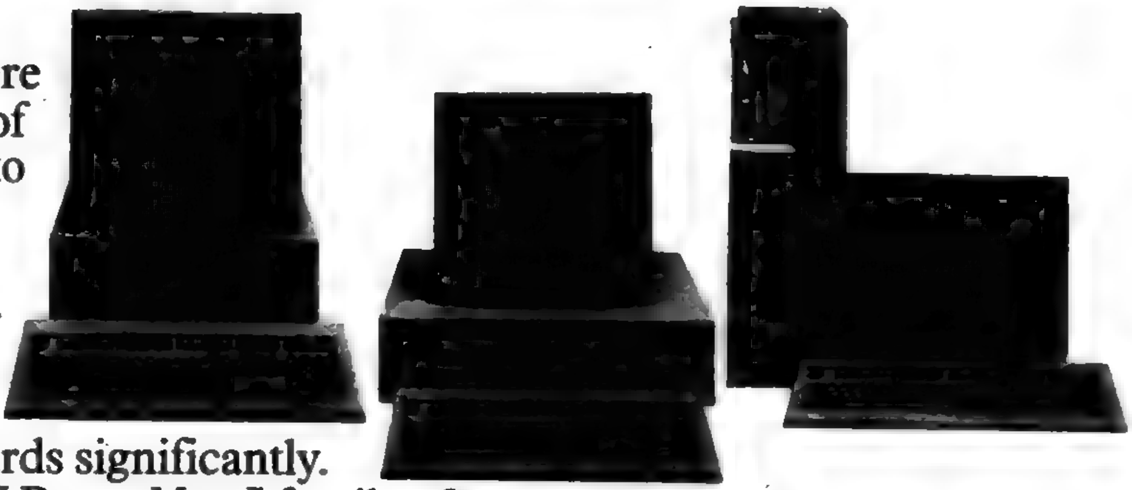

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analysis form. Repeat the process for each benefit until all benefit dollars for that year are entered.

- Total and enter the comfort index columns at the bottom.
- Calculate a cumulative total (one through nine as applicable).
- Repeat this process for each year with benefits, preparing one summary sheet for each benefit year.

What does it cost?

The bottom line is the financial analysis, which consists of three items: a bar graph, a payback period calculation and an internal rate of return calculation. To develop the bar graph, first take all of the annual costs for developing the project and for its postimplementation operation. Then plot the project costs by year below the horizontal axis. Cumulative benefits for comfort levels 1 through 3, 4 through 6 and 7 through 9 (see chart this page) are plotted above the horizontal axis. The result is an informative graphic representation of both the cost and the return at the three points.

A payback period is then calculated by dividing cumulative benefits for comfort levels 1 through 3, 4 through 6 and 7 through 9, respectively, by the total cost for the project. The result is the amount of time it will take to recover the investment.

Next, calculate an internal rate of return for the cumulative benefits at comfort index levels 1 through 3, 4 through 6 and 7 through 9 using standard calculations. The results can be interpreted as follows:

- Computer-based systems offering rates of return in excess of the opportunity costs of capital for comfort levels 1 through 3 are always considered a very good investment.
- Systems that do not offer a rate of return in excess of the opportunity cost of capital for comfort levels 1 through 3, but do so for comfort levels 4 through 6, are a marginal investment.
- Systems that do not offer a rate of return in excess of the opportunity cost of capital for comfort levels 1 through 3 or 4 through 6, but do so for comfort levels 7 through 9, are always a poor investment.
- Never invest in projects that do not offer a rate of return in excess of the opportunity cost of capital for comfort levels 1 through 3, 4 through 6 or 7 through 9.

Making this process easy to use is key to employing the benefit analysis process effectively. The procedure described here lends itself well to a personal computer spreadsheet application. If you take the time to initially set up the forms and calculations, a significant amount of drudgery can be removed from the process in successive iterations or in successive applications.

Sit down with the potential user of the computer-based information system and go through each of the benefit areas. Assist the potential system user in establishing a dollar value for the benefit.

Finally, I suggest incorporating this process into a formal or structured development methodology for projects that are projected to exceed some targeted investment level, such as $25,000 to $50,000. It is hard to justify the manpower investment required to go through the benefit analysis process for smaller projects.

Remember the proper role of an information services professional is to act as a facilitator in the benefit analysis process. The system user understands the system's benefits. The information services professional, who understands the process, can reduce bureaucracy and alleviate hesitancy. •

Benefit summary form

Calculate the dollar value of benefits for a single year in each benefit area and then rate that value based on how certain users are to achieve it

	Comfort index								
Benefit area	1	2	3	4	5	6	7	8	9
[illegible]									
Keypunch operators	$120								
Warehouse-ordering clerks	$180								
Keypunch/data transmission equipment	$114								
Indirect cost displacement									
Reduce inventory-carrying cost	$45		$30			[illegible]			
Absorb growth/Cost avoidance									
Headquarters administrative personnel					[illegible]				
Increase productivity/efficiency									
Buyers					$25			[illegible]	
Better control through earlier measurement									
Reduce inventory write-offs		$878			$475				
Power plant changeovers		$150			$150				
[illegible]		$240			[illegible]				
Improve customer service									
Product availability knowledge				$140			$280		$320
Total benefit dollars	$439	[illegible]	[illegible]	$140	$930	$5	[illegible]	[illegible]	$330
Cumulative total	$439	$1,684	$1,714	$1,854	$2,784	$2,789	[illegible]	$3,120	[illegible]

▨ Cost displacement or avoidance ■ Management control ☐ Strategic performance

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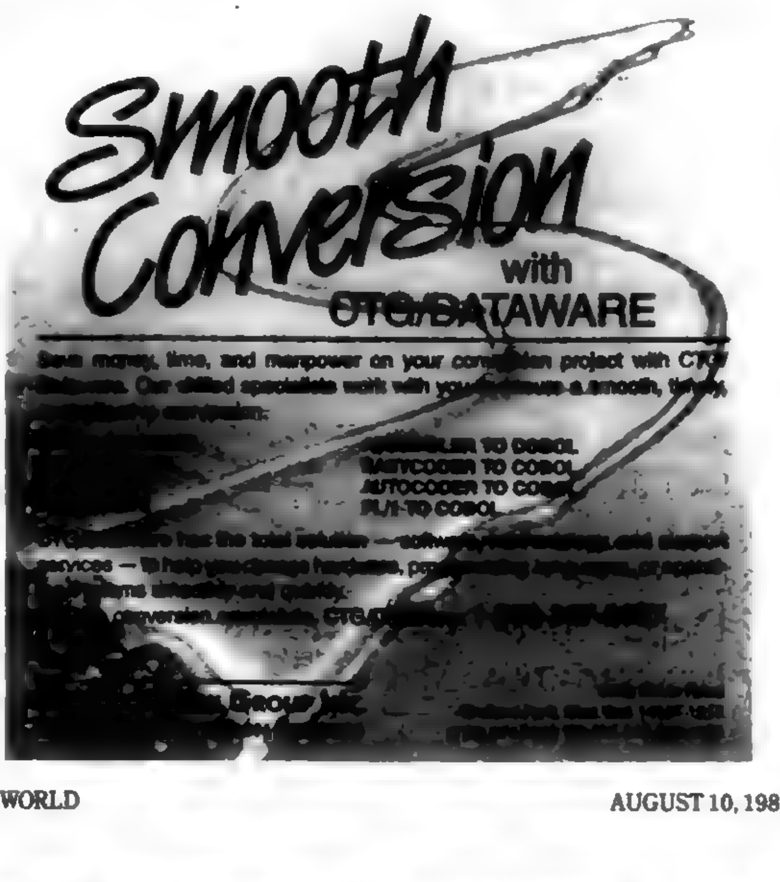

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TAKING CHARGE

David Ludlum

Stopping the buck

As information systems managers aspire to broader business roles — or find themselves forced into them — one of the most crucial challenges they face is the need to effectively delegate responsibility. The same has always been true of information systems professionals moving into management.

That need presents upwardly mobile professionals and managers with the opportunity to garner some practical lessons from the partial paralysis inflicted on the Reagan administration by the exposure of the National Security Council's efforts to run guns to Iran in exchange for hostages and to divert proceeds to arm Nicaraguan rebels.

Analyses of the Iran-Contra affair have repeatedly pointed to a breakdown of Ronald Reagan's characteristic hands-off management style as one of the major reasons that the program was allowed to gather momentum until it spun out of control.

Since his days as governor of California, Reagan has been known for a management style characterized by delegation — avoiding operational details while concentrating on a handful of fundamental principles. Obviously, the philosophy worked well, as Reagan was elected to a

Continued on page 70

Guide scouts end users, CIM

Telecommunications, DB2 are also major concerns, president says

John Nack, manager of the processing network division at Caterpillar, Inc. in Peoria, Ill., is the only person to have been elected to two terms as president of Guide International, Inc., the organization for users of large IBM systems.

Nack, whose second two-year term ends in November, was interviewed recently by *Computerworld* staff members Stanley Gibson, Michael Sullivan-Trainor and David Ludlum in Boston at Guide's 68th meeting, which was attended by some 4,600 representatives of the group's corporate membership.

John Nack

For Guide members, is this really "The Year of the Customer?"

I don't think this is the year of the customer any more than previous years, other than in the use of the phrase. We are not getting a whole lot more attention because it's the year of the customer, because we were getting a lot of attention in the first place and we had been getting attention for a number of years.

IBM seems to be a little more open these days, with regard to the press and analysts, about future products. Is your company getting more information than you did in previous years?

No. There still are no preannouncements at all. But there has been a very open dialogue in recent years. In the last four or five years, it has been getting more and more open.

Your view is that IBM is now trying to bring some of that openness to groups other than Guide?

Yes. I believe that they are now sharing more openly with the press and other customer groups things they used to share with us. However, with us, it has never reached the point where we believe we are seeing their entire strategic plan and product announcements in advance of the public.

With regard to the recent creation of the Application Systems Division, I had not heard any rumors about it until we came here. It was a closely held secret from us.

What do you think of the creation of the new division?

It is hard to tell what to think about it yet. I haven't sorted it all out yet, but it would seem to me that anything they can do to emphasize applications development — organizationally or whatever — is good news for all of us.

Are there any hot topics that seem to be coming up among members?

No more and no less than usual. This is not an event. This goes on continuously, this process. Three times a year we get together, and we exchange information.

However, one of the things we are doing now is putting an emphasis on CIM [computer-integrated manufacturing], trying to get our organization to have a better representation among those who work with CIM, such as manufacturing engineers —

Continued on page 69

INTERNATIONAL BANKING

MIS profit, Swedish style

BY JANET FIDERIO
CW STAFF

When employees receive their salaries by direct deposit in Stockholm, chances are their money won't stay in their checking accounts for long.

Because of aggressive management of information technology, Swedish banks can offer to deduct customers' checking account funds and transfer them directly to creditors. The banks do this to pay not only monthly bills such as mortgages but also anything from purchases of stocks and bonds from the Swedish stock exchange to child-care expenses.

For example, if you worked in Stockholm and banked with Skandinaviska Enskilda

Continued on page 68

PETER PERRY

Inside

- Book review: AI, robotics gurus look to the future. Page 64.
- Calendar: Conferences, exhibitions, meetings. Page 66.

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BOOK REVIEW

The brave new world of thinking machines

BY CHARLES P. LECHT
IDG NEWS SERVICE

The Tomorrow Makers
By Grant Fjermedal
Want some fun summer reading? Subtitled *A Brave New World of Living Brain Machines*, this book chronicles the author's visits with people who work on the frontiers of the computer world.

Fjermedal traveled extensively in the U.S. and Japan to write this book, visiting such erudite places as MIT, Harvard University, Carnegie-Mellon University, the U.S. Naval Research Laboratory, The Smithsonian Institution and Japan's Waseda, Tsukuba and Tokyo universities.

The author also visits lesser known scientists, like those working in the back rooms of our most advanced laboratories — and even hackers working at home. This makes *The Tomorrow Makers* a refreshing work unburdened by stale statements from the often quoted.

The book is divided into three parts: The Download Factor, Educating Baby and Outrageous Worlds.

1. The Download Factor. At the outset, we are offered the concept of downloading as posited by Hans Moravec of Carnegie-Mellon's world-class robotics laboratory. This involves a process not unlike cloning in its final effect but different in its method. It does not involve creation of the "copy" through the use of biogenetics; rather, a computer simulation of the original is achieved by both medical and computer scientists.

If the simulation were good enough, the prospect of downloading our functional selves into the distant future would be possible. The issue of whether the series of man-made replicants could constitute a self-conscious continuum of the original is unresolved.

As dogmatic as theologians may appear in disputing the ideas that arise through consideration of this, so do our scientists appear to say it is possible.

From here on, we begin an exploration of the world of robotics, computer simulations of intelligence, awareness, motor control — you name it. A virtual smorgasbord of artificial intelligence hardware and software is offered. Dessert comes in the form of the speculations and ruminations of scientists. True, they seem a bit possessed by the technological fare they so gleefully describe, but their enthusiasm is refreshing. What's the good of it all if we cannot dream?

2. Educating Baby. This section presents us some classic and not-so-classic arguments on the feasibility of creating thinking machines and the impact such machines could have on our future. Dialogues with current thinking machines and a potpourri of opinions on what these dialogues mean are offered.

What is particularly compelling about this section of the book is the very human emanations of those machines — not to undervalue the scientific fare.

It is natural that the thinking machine issue be accompanied by a religious one. St. Thomas, a world-class logician and perhaps the greatest Catholic scientist/cleric, deposited the human soul in the intellect and said man possessed it. But thinking takes place in the intellect.

Accordingly, if we say that machines think, some feel that this may lead to the conclusion that machines have a soul — or worse, that man has none. The theological issue regarding man and machine is widely and wildly covered in this fascinating section of Fjermedal's book.

3. Outrageous Worlds. The name of the last part of *The Tomorrow Makers* just begins to hint at the really way-out stuff it holds. Here, we forget about the upsides and downsides of whether or not machines think. The present time is what it is. The question is, Where are we going?

Are biological computing devices possible? And what about androids, like those found in science-fiction movies like *Blade Runner?* Or HAL, Stanley Kubrick's master control computer in his film interpretation of Arthur C. Clarke's *2001: A Space Odyssey?*

Will computer technology ultimately become so advanced that we can expect it to replicate earth-based factories on distant planets without human help? And that they will await our arrival? Can we become pure mind?

On the last page of the book, Fjermedal writes, "There would come a point when we could leave the technology behind and step into the spiritual, perhaps wrapping ourselves into the gentle folds of Einstein's space-time continuum. But even short of that, long before we learn to breathe deeply and pass through time, we may be able to deploy such an array of self-replicating robots for terraforming that we will be able to pass through the stars, leaving in our wake newly formed cradles of life."

Hardcover, $18.95, 261 pages, ISBN 0025385607, by MacMillan Publishing Co., New York, 1987.

Publishers wishing to have their books considered for review can direct books, prepublication galleys, press releases, catalogs or other information to George Harrar, Book Review Editor, Computerworld, P.O. Box 9171, 375 Cochituate Road, Framingham, Mass. 01701.

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AUG. 16-22

The Tenth Annual McCormack & Dodge User Conference. Chicago, Aug. 16-20 — Contact: M&D, 1225 Worcester Road, Natick, Mass. 01760.

National Computer Graphics Association CAD/CAM '87 Conference and Exposition. Boston, Aug. 17-20 — Contact: NCGA, Suite 200, 2722 Merrilee Drive, Fairfax, Va. 22031.

1987 International Conference on Parallel Processing. St. Charles, Ill., Aug. 17-21 — Contact: Sartaj K. Sahni, Department of Computer Science, University of Minnesota, 136 Lind Hall, Minneapolis, Minn. 55455.

Techdoc Eleven: Graphic Communications Association's Eleventh Annual Conference and Exhibition. San Francisco, Aug. 18-20 — Contact: GCA, Suite 604, 1730 N. Lynn St., Arlington, Va. 22209.

Information Forum for Local Government. Dallas, Aug. 19-20 — Contact: Infomart, Administrative Offices, Suite 6308, 1950 Stemmons Freeway, Dallas, Texas 75207.

AUG. 23-29

Image Scanning and Processing. Monterey, Calif., Aug. 23-25 — Contact: Gail Montgomery, Institute for Graphic Communication, 375 Commonwealth Ave., Boston, Mass. 02115.

Share 69. Chicago, Aug. 23-28 — Contact: Share, Inc., 111 E. Wacker Drive, Chicago, Ill. 60601.

Tex Users Group's Annual Conference. Seattle, Aug. 24-26 — Contact: Tex Users Group, c/o American Mathematical Society, P.O. Box 9506, Providence, R.I. 02940.

The Omni User Second Annual Technical Conference (on IBM's System/34, 36 and 38). Chicago, Aug. 25 — Contact: The Omni User, P.O. Box A 3031, Chicago, Ill. 60690.

The Computer and Automated Systems Association of the SME clinic on Voice Recognition Applications in Manufacturing. Chicago, Aug. 25-26 — Contact: Nancy A. Loerch, Society of Manufacturing Engineers, P.O. Box 930, One SME Drive, Dearborn, Mich. 48121.

First Conference on Speech Technology in Healthcare. San Francisco, Aug. 26-27 — Contact: Registrar, Institute for Medical Record Economics, 121 Mount Vernon St., Boston, Mass. 02108.

Software Contracts. Seattle, Aug. 27-28 — Contact: Registrar, Batelle Seminars Program, P.O. Box C-5395, 4000 N.E. 41st St., Seattle, Wash. 98105. Also being held Sept. 14-15 in Boston and Oct. 5-6 in Chicago.

AUG. 30-SEPT. 5

The National Conference on Network Publishing. Dallas, Aug. 31-Sept. 2 — Contact: Interactive Features, Inc., 28½ Cornelia St., New York, N.Y. 10014.

Show CASE Conference II. St. Louis, Sept. 1-2 — Contact: Center for the Study of Data Processing, Campus Box 1141, Washington University, One Brookings Drive, St. Louis, Mo. 63130.

Computer Aided Publishing CAP'87 West. Los Angeles, Sept. 1-3 — Contact: Computer Aided Publishing CAP, Suite 200, 90 W. Montgomery Ave., Rockville, Md. 20850.

5th Anniversary PC Expo. New York, Sept. 1-3 — Contact: PC Expo, 333 Sylvan Ave., Englewood Cliffs, N.J. 07632.

Thirteenth International Conference on Very Large Data Bases. Brighton, England, Sept. 1-4 — Contact: VLDB 87, The Conference Department, British Computer Society, 13 Mansfield St., London, UK W1M 0BP.

SEPT. 6-12

Banque '87 — The 6th European Trade Fair for Techniques and Organization in Banking. Copenhagen, Sept. 7-9 — Contact: Bella Center A/S, Center Blvd., 2300 Kobenhavn S, Denmark.

SIBOS: SWIFT's International Banking Operations Seminar. Montreal, Sept. 7-11 — Contact: Society for Worldwide Interbank Financial Telecommunication S.C., Ave. Ernest Solvay 81, B-1310 La Hulpe, Belgium.

Decworld '87. Boston, Sept. 8-18 — Contact: Public Relations Department, Digital Equipment Corp., 200 Baker Ave., Concord, Mass. 01742.

1987 Capital Microcomputer Users Forum. Washington, D.C., Sept. 9-10 — Contact: Jackie Voigt, National Trade Publications, Inc., Suite 400, 2111 Eisenhower Ave., Alexandria, Va. 22314.

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9:15 a.m - 12:30 p.m.

T-1 Introduction to CD-ROM Industry, Markets, Futures
This panoramic overview will introduce you to the technology, applications, markets, participants and trends in the CD-ROM industry. You will learn about key hardware and software elements needed to successfully utilize the technology, and criteria to evaluate the cost-vs-payoff equation of CD-ROM applications. **For:** Beginners, users-to-be, and others who want an overview of CD-ROM basics.

T-2 Preparing Databases for CD-ROM, including catalogs and lists
End users or vendors planning a CD-ROM application will find this session invaluable for exploring database formats, indexing, searching systems, display formats and other practical issues. Also included will be the role of consultants and turnkey package suppliers, and problems of maintaining quality and timeliness of information once released. **For:** Publishers and user information systems and records management executives.

T-3 CD-ROM Technology: Hardware
This session covers the equipment technology side of CD-ROM, in the context of information storage sub-systems including magnetic storage, optical discs, erasable discs, CD/I and WORM. Discussions will include laser reading/recording methods and reading and error checking/correction. Drive topics will include standalone, ganged, networked and cartridge operations; production of discs; and aspects of implementing multi-drive, multi-user applications, including interface and service questions. **For:** Technically and product-oriented professionals interested in a systems-level understanding of CD-ROM.

T-4 CD-ROM As An In-House Publishing Application
Attend this tutorial to examine the suitability of CD-ROM as a replacement for paper and microfilm/fiche methods of publishing catalogs, parts lists, service and software manuals, directories and databases of all sorts. Attendees will discuss questions of economics, frequency of updating, transmission costs, security and access, training and equipment/viewer implementation. The session will also compare in-house production versus outside consultants and implementors. **For:** MIS, records management, field support and training professionals.

1:30-4:30 p.m.

T-5 CD-ROM Technology: Software
This session will look in detail at each step of CD-ROM usage via software, beginning with the user interface, indexing techniques, interaction with applications software including MS-DOS Extensions, and implications of standards issues (i.e., file formats, High Sierra, and others). Discussions will include problems of off-CD-ROM use of data and unauthorized reproduction. **For:** Professionals interested in the effect of software on the flow of information from disc to application.

T-6 Authoring Systems Workshop
Register for this session for detailed exposure to the tools needed to create the CD-ROM database, starting with a mass of data and ending with a useable application. You will learn about premastering, mastering, and service/equipment/programming approaches, including alternatives such as in-house and out-of-house consultants and turnkey suppliers. **For:** Professionals with expected responsibilities for managing CD-ROM product development.

T-7 MIS Applications for CD-ROM and Optical Memory
This session examines where CD-ROM fits in the MIS chain. You will become familiar with CD-ROM's suitability for different types of databases, including financial and other numerical bases, with attention to record length, speed, frequency of access, update scheduling, security/integration and backup requirements. Discussions will also include networking of drives, personal computers and other workstations/mainframes. **For:** MIS-experienced and systems/database management professionals.

T-8 Using CD-ROM in Expert Systems
The massive storage potential in CD-ROM, along with its low cost and reliability, make possible advanced expert or artificial intelligence applications ranging from emergency medicine to point-of-sales retail. This session will introduce some of the applications and the problems providers face with CD-ROM equipment in public or severe environments. **For:** Professionals who work with intelligent, educational, or decision-support systems and who plan to use CD-ROM technologies.

ence. Santa Clara, Calif., Sept. 9-12 — Contact: Seybold Seminars, 6922 Wildlife Road, Malibu, Calif. 90265.

Distribution/Computer Fall Expo '87. New Brunswick, N.J., Sept. 10-11 — Contact: C. S. Report, Inc., P.O. Box 453, Exton, Pa. 19341.

SEPT. 13-19

Vaulting the Barriers to EFT Success. Washington, D.C., Sept. 13-15 — Contact: Linda Munday, Electronic Funds Transfer Association, Suite 1000, 1726 M St. N.W., Washington, D.C. 20036.

13th National Conference of North American Honeywell Users. Cincinnati, Sept. 13-17 — Contact: Les Pacca, NAHU, P.O. Box 2037, Willingboro, N.J. 08046.

The First Annual Conference on Expert Sytems in Financial Institutions. New York, Sept. 14-15 — Contact: Conference Administrator, Institute for International Research, Inc., Suite 600, 9301 Wilshire Blvd., Beverly Hills, Calif. 90210

Atre Annual Forum on Data Base. New York, Sept. 14-16 — Contact: Atre International Consultants, Inc., P.O. Box 727, 16 Elm Place, Rye, N.Y. 10580.

Data Storage 87. Santa Clara, Calif., Sept. 14-16 — Contact: Forum Management, Cartlidge & Associates, Inc., Suite M-259, 1101 S. Winchester Blvd., San Jose, Calif. 95128.

7th Annual Conference on Control, Audit & Security of IBM Systems. Chicago, Sept. 14-17 — Contact: MIS Training Institute, 4 Brewster Road, Framingham, Mass. 01701.

Integrated Manufacturing Solutions '87. Long Beach, Calif., Sept. 14-18 — Contact: Intertec Communications, Inc., Building 33-34, 2472 Eastman Ave., Ventura, Calif. 93003.

1987 Electronic Printer and Publishing Conference. Miami, Sept. 14-18 — Contact: Jean O'Toole, CAP International, Inc., One Snow Road, Marshfield, Mass. 02050.

ICCC-ISDN '87 . . . Evolving to ISDN in North America. Dallas, Sept. 15-17 — Contact: International Council for Computer Communication, c/o Bell Communications Research Corp., Room 1B349, 290 W. Mount Pleasant Ave., Livingston, N.J. 07039.

CAM-I Industrial Automation Standards Conference & Workshop. Chicago, Sept. 15-18 — Contact: Annette Van Hauen, Computer Aided Manufacturing-International, Inc., Suite 1107, 611 Ryan Plaza Drive, Arlington, Texas 76011.

The National Association of Bank Servicers' Annual Meeting. Seattle, Sept. 15-18 — Contact: NABS, Suite B, 5008 Pine Creek Drive, Westerville, Ohio 43081.

Workshop on Computer-Assisted Map Analysis. Corvallis, Ore., Sept. 16-17 — Contact: Joseph K. Berry, School of Forestry and Environmental Studies, Yale University, 205 Prospect St., New Haven, Conn. 06511. Also being held Oct. 24-25 in Berkeley, Calif.

Information Systems Consultants Association's Second Annual Conference and Consultants Market. Atlanta, Sept. 18-19 — Contact: ISCA, Inc., P.O. Box 467190, Atlanta, Ga. 30346.

SEPT. 20-26

Interex North American Conference of Hewlett-Packard Co. Business Computer Users. Las Vegas, Sept. 20-25 — Contact: Interex Conference Department, 680 Almanor Ave., Sunnyvale, Calif. 94086.

Management Information Systems for Strategic Advantage. Philadelphia, Sept. 20-25 — Contact: Registrar, Office of Executive Education, 200 Vance Hall, The Wharton School, University of Pennsylvania, Philadelphia, Pa. 19104.

Systems Integration in Multivendor Environments: Dataquest, Inc.'s Business and Office Systems Conference. Littleton, Mass., Sept. 21-22 — Contact: Dataquest, 1290 Ridder Park Drive, San Jose, Calif. 95131.

Integrated Services Digital Networks. San Francisco, Sept. 21-22 — Contact: Customer Service, Frost & Sullivan, Inc. 106 Fulton St., New York, N.Y. 10038.

CD-ROM Expo. New York, Sept. 21-23 — Contact: IDG Conference Management Group, 375 Cochituate Road, Box 9171, Framingham, Mass. 01701.

Corpcon Corporate Microcomputer Exposition and Technical Conference. Los Angeles, Sept. 21-23 — Contact: Corporate Expositions, Inc., P.O. Box 3727, Santa Monica, Calif. 90403.

Office Technologies Conference. Los Angeles, Sept. 21-23 — Contact: Corporate Expositions, Inc., P.O. Box 3727, Santa Monica, Calif. 90403.

Engineering Workstations Confer-

Continued on page 70

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Days Two & Three

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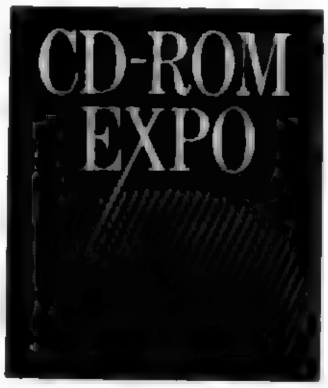
- Systems specifications
- Organizational implications



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CW7

Swedish MIS

FROM PAGE 63

Banken, or S.E. Banken — the largest bank in Sweden — the deposit of your salary could, if you wished, trigger a series of transactions.

First, funds from your personal checking account could be transferred immediately into a family account that both you and your spouse could access. Second, a certain percentage of those funds could once again be automatically transferred to a separate "budgeting" account from which bills could be paid.

But you wouldn't need to pay your bills by writing individual checks. A third transaction, triggered by the arrival of funds in the budgeting account and the date, would transfer budgeting funds to your mortgage, car loan or utility creditors. The only payments you would need to make manually would be those that you didn't expect.

S.E. Banken provides these services for individuals along with a slew of commercial services for its business clients — everything from small business cash management programs to foreign exchange. The institution is one of the 15 largest banks in the world in foreign exchange. From its 360 branches, it serves 1.3 million customers, almost one-sixth of Sweden's 8.3 million citizens.

This Swedish banking customer *can buy stock at his local branch.*

DP on its own

What is unusual about S.E. Banken is not just its level of customer services, compared with American standards, but that it recently set up its DP department as an independent business unit.

SEB Data, as the unit is called, is managed strictly as a commercial profit center for the bank. What this means, says SEB Data's Chief Executive Officer Thomas Gluck, is that S.E. Banken is committed to using technology to automate bank functions — in part to cut down on labor costs, but also to attract customers with creative services such as direct payments. It is seeking to sell applications to other banks as well.

But what fuels SEB Data's competitive management spirit? According to Gluck, there is one simple drive behind every move that Swedish bankers make, and that is a very sensitive approach to costs. "Sweden is a cost-intensive society," he says. "Labor is expensive in Sweden. It makes a difference to us if we can run a branch with 10 people instead of 40. Taxes are high. This means that in order to offer anything to our people, bankers are forced to improve cost efficiency."

Gluck adds that while there is a very strong competitive drive in Sweden, there is also a great interest in cooperation where it can increase the sophistication of services.

For instance, Swedish banks cooperate in a check truncation system that allows any customer to cash a check in any bank, regardless of whether his account is with another bank.

Mother of invention

"We do that for cost-efficiency reasons," Gluck says. "Otherwise, we would have to open so many more branches to handle our customers, [and] we can't afford it." The goal, he claims, is to keep building new levels of competition on these layers of cooperation.

But SEB Data is not relying solely on its relationship with S.E. Banken for its revenue. Not only are SEB Data managers constantly looking for additional revenue-producing services to offer old and new banking customers, they also aim to become a supplier of vertical-market banking applications. They are actively courting banks in Scandinavia, Europe and even the U.S. that might be interested in buying their proprietary systems.

To do this, the SEB Data managers set up a joint venture with Enator AB, a large high-tech consulting firm in Stockholm. SEB Data provides the applications and know-how; the new venture, named Senator AB, provides the systems, consulting and maintenance.

> WHAT IS unusual about S.E. Banken is not just its level of customer services but that it recently set up its DP department as an independent business unit.

In effect, the SEB Data management team is reselling the proprietary software that helped the firm become the largest banking group in Scandinavia. However, it has brought in a partner to help handle the sales, setup, consulting and maintenance, so it doesn't have to develop its own support structure.

Looks out for No. 1

SEB Data keeps its primary client competitive with a centralized system consisting of three IBM 3090s, IBM Systems Network Architecture (SNA) networks and proprietary custom-designed software.

The bank's branch office network is based on IBM 4700 financial products. Through SNA connections, almost 6,000 IBM 3270 terminals communicate with host systems located in Stockholm. Every terminal can reach every system. There is no distributed processing.

There are four cornerstones to the SEB Data information system strategy, according to Anders Lindqvist, managing director of Senator AB.

First, SEB Data provides its S.E. Banken customers with a real-time operating environment. "The world is real-time," Lindqvist says, "therefore, all systems should be real-time."

S.E. Banken set the real-time goal in 1972. Now it is possibile, for example, for a customer to walk into any office, ask a teller the current price of a certain stock and, based on that information, place an order that can be confirmed on the spot.

This is possible because the central system keeps up-to-the minute quotes on share prices and because customer transactions are also updated in real-time.

Share alike

In addition, SEB Data maintains a common data resource for its banking system. "All information should be accessible to anyone and any application in the total system," Lindqvist says. S.E. Banken went with a centralized system, he claims, because it still has not found the technology that will allow it "to truly share all data within a distributed system." The data center system, therefore, is based on IMS and DL/I, with all files centrally located.

"There is no local intelligence whatsoever," Lindqvist asserts. "We have an integrated system with a common data resource that operates in real-time — there is no update afterward."

SEB Data's third goal is to ensure that all applications are able to communicate with one another — application to application. In other words, everything that can be automated should be automated. Currently, 60% to 70% of all transactions done in the bank are never touched by human hands.

To help banking officials make quick decisions, SEB Data's fourth strategy is to keep production and management information systems data apart. The reason: The information needed for executive decision making is not common data but extracts taken from the production data — aggregates and the like.

Gluck says the company's management has concluded that it should take on the challenge of promoting use of the system by others.

"I spent a couple of days in Rome, in Paris, in the U.S., and I met many banking people," he says. "If they can understand the potential of our system, they will invest in our system rather than developing their own, but what we have to learn is how to market it."

Fiderio is a *Computerworld* senior editor.

Betting on exports

"We import micro technology from you, now we would like to export macro technology back to you — applications," says Thomas Gluck, chief executive officer of SEB Data, the MIS arm of Swedish banking giant Skandinaviska Enskilda Banken, better known as S. E. Banken.

IBM, Digital Equipment Corp., Honeywell Bull, Inc., Prime Computer, Inc. and other U.S. vendors may be big providers of technology to Sweden, but Swedish companies are betting that they have something to offer back to the U.S. and to the rest of Europe.

In fact, Sweden has a growing high-tech presence. Not only is it the home of Asea AB, one of the largest robotics manufacturers in the world, but 10% of the world's industrial robots are installed in Swedish manufacturing facilities, according to the Stockholm Information Service.

Sweden exports roughly half of its manufactured goods and, of that, no less than 46% consist of engineering products, according to S. E. Banken. Currently, the segments of the engineering markets that have grown the most dramatically are information-intensive areas such as communications and electronics. The support industries for these markets have also grown dramatically.

Sweden, in fact, harbors a growing number of computer and telecommunications firms. Perhaps the best known is the $4.6 billion-a-year Ericsson Group, which designs and manufactures private branch exchanges and other telecommunications equipment and is nurturing a struggling Information Systems division.

Many of the Swedish computer industry vendors are known for hardware that reflects close attention to ergonomic design and for software with elegant human interfaces.

JANET FIDERIO

Guide

CONTINUED FROM PAGE 63

people who are trying to put together a CIM program.

We are also trying to reinforce two other areas that grew up in the last four years. One of these is automating the end user. That encompasses office automation and business graphics and that sort of thing.

The third area is telecommunications. We have not yet crossed over the bridge where we are attracting enough telecommunications experts, such as telecom managers. We are getting some, but we are not getting as many as we would like.

Do many Rolm Corp. users attend Guide meetings?

Rolm users only come if they meet the Guide membership requirements. However, at this meeting we had the president of the National Rolm Users Group here for the first three days. Typically, what happens is the telecommunications manager goes to the Rolm users group, and the data processing manager goes to the Guide users group. We are trying to cause that to come together a little bit. We are considering having a joint meeting in Chicago in July of next year.

With regard to CIM, do you perceive IBM making a strategic thrust into this field?

Oh, yes. I think there's a big emphasis on the manufacturing end of the business on the part of IBM. They are really behind most other companies in shop-floor technology. It's going to be hard to judge whether or not they're going to be successful.

Is there much discussion about the Personal System/2, particularly since there is the perception that it is a machine for MIS?

We're typically a little slow in reaction to new product introductions. We will hear an awful lot from individual members, but the organization hasn't yet really focused on them. In general, I would say that it's a good offering. It's an attempt to put an intelligent workstation on a network. But until we get some population of PS/2s and some hands-on experience with them, there won't be a focal point at Guide where we can get together and say what's good and bad about them.

Is the same true for 9370s?

Yes. There's a lot of talk about 9370s but nothing really solid. Our users like to hear stories about people who have PS/2s and 9370s, not just that someone plans to get one. That won't even buy you a drink. Maybe next year we will hear more.

At every Guide meeting, the group submits a list of "requirements" to IBM. What major requirements have kept coming up?

One of them has been a common architecture across IBM's product line. IBM announced Systems Application Architecture, which was in answer to what was, in one form or another, a requirement for the last 10 years.

Would you also consider the 9370, which is extending the 370 architecture to the mid-range, an answer to your requirements?

I suppose so, but we have not had any top 10 requirement in the last 10 years that had to do with IBM's hardware — that it be faster, smaller or whatever. We have been reasonably satisfied with their hardware.

We're after better management tools to manage the hardware; better software tools, so it can be used more quickly and better. We have a major effort in applications development productivity. That has been one of the top 10 requirements for the last 14 years. And we are emphasizing it again this year.

What do you think about the Solutionpac concept — putting together software packages for specific vertical markets?

The Solutionpac concept is a good concept. I'm not sure how successful it's going to be. But I believe there are a large number of small to mid-range computer installations where Solutionpacs could be a good answer to reducing application development problems.

Another thing IBM is emphasizing on the software side is DB2, isn't it?

DB2 is one of the very active projects that we have. There is a lot of interest and a lot of energy going into DB2; in how to tune it and how to better understand what its requirements are for higher speeds. We don't have any reliable statistics about the use of DB2 among our members, but my sense is that there is a real groundswell of usage.

Guide is planning a major symposium in San Francisco in September. What do you hope to accomplish there?

We are inviting a large number of well-known speakers in order to attract members of the boards of directors of other users groups throughout the world.

That is the public part of the meeting. But there is a private part that will go on afterward.

To my knowledge, this is the first time we will have brought together all the worldwide users groups in one place. There is no hidden agenda there. We are just trying to get users together to exchange ideas. We will talk about how to better manage users groups to get the most out of them.

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Stop the buck

CONTINUED FROM PAGE 63

pair of landslide presidential victories. His management style was often praised as he appeared likely to become the first president since Dwight D. Eisenhower to successfully serve two full terms.

In particular, Reagan's style was contrasted with that of his immediate predecessor, Jimmy Carter, a president whose immersion in the details of White House doings (including the schedule for the tennis court, critics were fond of noting) was often attributed in part to his training as an engineer.

Observers of the White House scene have noted that Reagan's "Look, no hands" management style served him well during his first term, when he enjoyed the services of three loyal, dispassionate top aides of the sort necessary to succeed with such a management approach. James A. Baker III, Edwin Meese III and Michael K. Deaver all met with the president frequently and often presented him with opposing views on major issues.

But observers like former Sen. Paul Laxalt (R-Nev.), a close friend of Reagan, and Brent Scowcroft, a Ford administration national security adviser and a member of the Tower commission that investigated the Iran-Contra affair, have said in interviews with *The New York Times* that the system broke down when the three aides left the White House after Reagan's first term and their counsel was replaced by one voice: that of Chief of Staff Donald T. Regan, who they said sometimes shielded the president from opposing points of view.

Management guru and Claremont Graduate School professor Peter F. Drucker concurs with this view. "The first job of a chief of staff is to make sure that the chief executive officer gets all dissents, conflicting points of view and alternatives," Drucker wrote in commenting on the Iran scandal in *The Wall Street Journal* earlier this year. He underlined the need for a chief of staff to be independent of the competing interests that he is supposed to relate to his boss.

Drucker also underscored the need for the chief executive to clearly define delegated tasks in terms of scope, measure of results and method of reporting and to carefully monitor progress or lack thereof, citing Franklin D. Roosevelt as the greatest delegator in recent American history.

Similarly, Scowcroft cited a need for an executive delegating duties to maintain an inquiring style, which Reagan lacked and which became conspicuous when top aides no longer volunteered a variety of views on issues.

So the Iran-Contra imbroglio points not to the virtues or vices of particular management styles, which may be more or less appropriate for different individuals and situations. Rather, it underscores the need for effective implementation of a given style, incorporating the necessary elements that the style assumes or whose need has been demonstrated by experience.

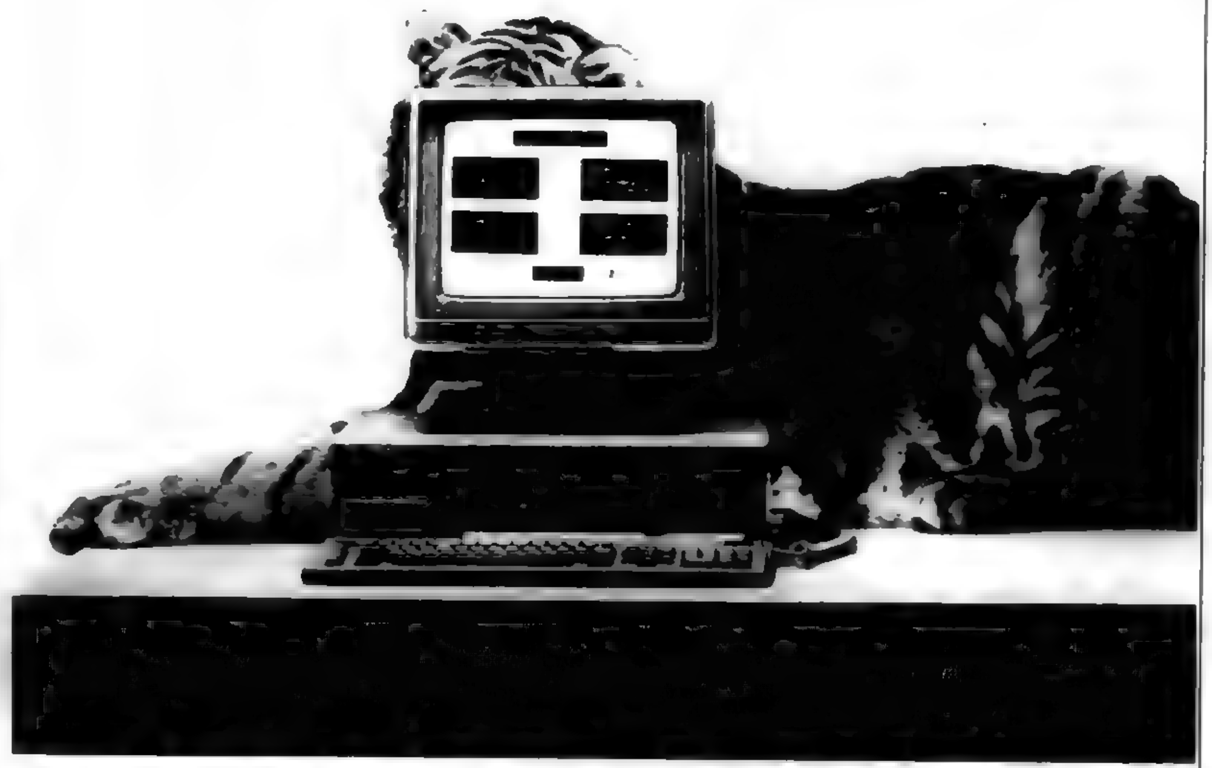
It's a telling illustration of the need — on the part of both executives and subordinates — for effective interpersonal skills of the sort that aspiring business people, particularly those with technical backgrounds, are constantly being urged to develop.

The executive must encourage and accommodate subordinates' expressions of conflicting points of view. He also must effectively communicate delegated tasks and then maintain control over them while not getting in the way.

In perhaps a greater challenge, subordinates should be willing to test the boss's willingness to hear conflicting advice and must communicate the progress, and any problems, with delegated tasks before they become the talk of the town — or worse.

Ludlum is *Computerworld's* senior editor, management.

Nixdorf tames the data entry tiger.



There was a time when it was enough just to be able to capture data. Now, the premium is on speed, flexibility and easy maintainability.

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ence. Los Angeles, Sept. 21-23. Contact: Corporate Expositions, Inc., P.O. Box 3727, Santa Monica, Calif. 90403.

CSM '87: Conference on Software Maintenance. Austin, Texas, Sept. 21-24 — Contact: The Computer Society of the Institute of Electrical and Electronics Engineers, 1730 Massachusetts Ave. N.W., Washington, D.C. 20036.

10th National Computer Security Conference. Baltimore, Sept. 21-24 — Contact: Linda Muzik, Attn: C421, National Computer Security Center, 9800 Savage Road, Fort George G. Meade, Md. 20755.

Ninth Annual Satellite Communications Users Conference. Dallas, Sept. 22-24 — Contact: SCUC '87 Satellite Communications Magazine, Suite 650, 6300 S. Syracuse Way, Englewood, Colo. 80111.

5th Annual 1100 Data Center Management Conference. San Diego, Sept. 22-25 — Contact: Datametrics Systems Corp., 5270 Lyngate Court, Burke, Va. 22015.

Fifth Annual NCR Users Eastern America Conference. Fort Washington, Pa., Sept. 24-25 — Contact: Frank Whalon, c/o Tinius Olsen Testing Machine Co., P.O. Box 429, Willow Grove, Pa. 19090.

COMPUTER INDUSTRY

INDUSTRY INSIGHT

Clinton Wilder

Rumor mill grinds on

"Control Data Corp. stock soars on rumors of an offer for the firm or a leveraged buyout."

"NEC Corp. stock plummets on Japanese newspaper report that it may be investigated for illegal technology exports."

"IBM shares drop as second-quarter earnings fall short of analysts' estimates, which were raised in the last few days on rumors of higher profits."

Welcome to Wall Street, 1987 — one of the worst places to go for reliable information about developments in the computer industry. The above three news items from recent weeks illustrate the enigmatic relationship between stock market activity and reality.

Market gyrations based on rumor and hearsay are as old as Daddy Warbucks' paper stock ticker. And the follow-the-crowd mentality of investors certainly dates back to the Crash of 1929.

But this year, the computer industry seems particularly susceptible to such rumors, for a variety of reasons.

Oscillating moods

First and foremost, high-tech investors are in that most unpredictable of moods: They are nervous. Having suffered through the industry downturn of 1985 and 1986, they are understandably skeptical about boom computer stocks. And they have been badly burned by a number of companies, such as Daisy Systems Corp. and Floating Point Systems, Inc., whose rosy pictures of financial health had some hidden, and very dark, clouds.

Earlier this year, riding a raging bull market combined with high tech's own recovery, investors went on a small buying binge that boosted the share prices of a wide range of vendors' stocks. Although the market surge was real, it made some people skittish — ready to cash in their profits and move to greener pastures at the first

Continued on page 74

New blood pumps TRW service

BY ALAN ALPER
CW STAFF

FAIRFIELD, N.J. — As tumultuous as the computer maintenance business has been recently, it is a wonder that an outsider would be willing to enter the fray. But Paul Snyder, the recently appointed vice-president and general manager of TRW, Inc.'s Customer Service Division, seems generally unperturbed.

Snyder, an affable, 49-year-old executive, recently succeeded longtime division head Maynard Smith, who retired earlier this year. Snyder, an 11-year TRW veteran, most recently headed the firm's Electronic Assemblies Division.

Snyder seeks to build on the Customer Service Division's equipment reconditioning and servicing strengths while expanding into software maintenance, consulting and remote diagnostics services. The TRW division and Bell Atlantic Corp.'s Sorbus unit are the industry's largest providers of third-party computer maintenance.

"We've been fixing hardware as opposed to fixing customers," Snyder says. "Our business has moved to become one of asset management for our customers."

Because of the heavy capital investment its customers have made in hardware and software, asset management means making sure customers' equipment is up and running nearly 100% of the time. Anticipating problems through remote diagnostics linked to customers' equipment via modems is a service TRW will continue to evolve, Snyder says.

The division also hopes to beef up its presence in IBM processor maintenance and its servicing of products sold through resellers, he notes. IBM's recent Customer Service Amendment (CSA) overhaul, effective June 1, gave customers 24-hour, seven-day-a-week service and a variety of discounts and will make IBM a tougher competitor, analysts say.

TRW is responding with a program called Service Plus, offering reductions of 10% to 20% on maintenance charges, a price guarantee of two years and 24-hour, seven-day-a-week service at no extra charge.

Snyder says he believes IBM's CSA program is purely a discounting ploy and that little else, in terms of quality of service, has changed. While acknowledging the importance of price, Snyder fervently says that response time and quality of service are just as important.

"The building of a partnership is important," he states.

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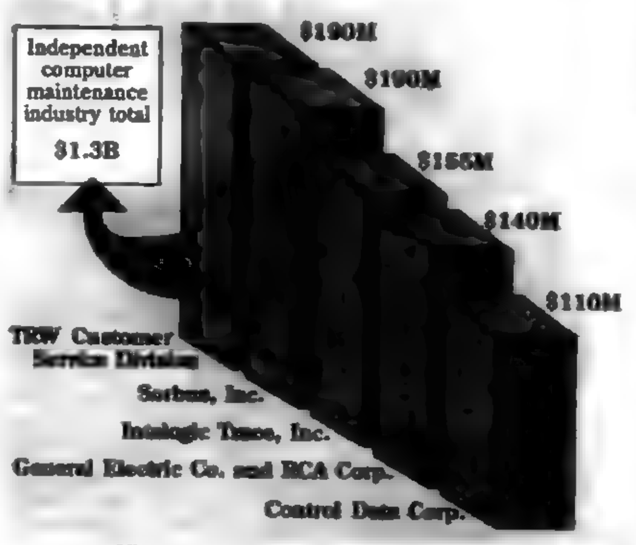
TRW, Sorbus lead top five

Estimated 1986 revenue of leading U.S. third-party maintenance providers



INFORMATION PROVIDED BY BUSINESS DEVELOPMENT INTERNATIONAL
CW CHART: MITCHELL J. HAYES

Industry battling parts tariff

BY MITCH BETTS
CW STAFF

WASHINGTON, D.C. — The computer industry is waging a battle against a U.S. Customs Service ruling that classifies printed-circuit boards containing a CPU as "data processing machines," which are subject to import tariffs as high as 100%.

As a practical matter, the recent Customs Service ruling categorizes a CPU board as an independent computer rather than a computer part. The distinction is important because tariffs on computer parts from Canada and Japan were eliminated by a 1985 trade agreement, while tariffs on independent computers are still enforced.

The import tariff on computers is generally a modest 4.3%, but 16-bit microprocessors imported from Japan are slapped with 100% punitive tariffs as a

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Inside

- Televideo to acquire Zentec for $30.8M. Page 72.
- Motorola settles French breach of agreement suit out of court. Page 72.
- Tandon President Wilkie relinquishes title to firm's founder. Page 73.

Intellicorp seeks commercial markets

Will port AI software to Sun, DEC, Apollo systems; cuts staff by 10%

BY STEPHEN JONES
CW STAFF

MOUNTAIN VIEW, Calif. — Caught in the throes of a sluggish artificial intelligence market, Intellicorp, Inc. is trying to tap a broader list of customers by porting its AI development software from Symbolics, Inc.'s LISP computers to conventional hardware from companies such as Sun Microsystems, Inc., Digital Equipment Corp. and Apollo Computer, Inc.

To make the transition, Intellicorp has shaken up its staff of 200, laying off about 20 and moving some high-level employees from research and development positions to marketing jobs. The company is also starting a vertical marketing push in an effort to cozy up to Fortune 1,000 end users.

"This is an opportunity to structure the company for profitability by simply trying to reach for larger markets for our software," said Thomas Kehler, chairman and chief executive officer of Intellicorp.

In the past, Intellicorp's Knowledge Engineering Environment system, which helps users with little programming experience develop knowledge-based systems, has run only on unconventional LISP computers from Concord, Mass.-based Symbolics. That powerful hardware was needed to handle the many tasks associated with AI, but it failed to attract a large group of customers.

Platforms from companies like DEC and Sun, meanwhile, have reached the power and performance levels needed to develop knowledge-based systems. With those machines accepted as standards in the general-business workstation market, industry analysts agree that portability is the key to the success of AI software.

"If Intellicorp is going to be successful, it's going to have to bridge into the real world," said Charlotte Walker, a senior vice-president with L. F. Rothschild, Unterberg Towbin. "It has to get out of the R&D shop and into the commercial marketplace."

Though the strategy may pay off in upcoming quarters, Intellicorp's sagging bottom line is expected to take a big hit for the year ended June 30. Flat revenue and a series of one-time charges from the new plan — including about $1 million in write-offs for scrapped LISP computers — will result in a loss of up to $4 million on sales of about $22 million for the year, Walker said.

Sales for the fourth quarter, which Intellicorp is expected to report on today, will be about $6 million with a loss of $2 million, Walker estimated.

Sample applications

Instead of selling primarily to LISP developers that are interested in experimental R&D work, Intellicorp said it plans to target developers that want to write programs for general-purpose commercial markets on conventional hardware. Such applications include systems that help run computer-integrated manufacturing and programs that diagnose and repair telecommunication systems.

Continued on page 72

Televideo to acquire Zentec for $30.8 million

Purchaser achieves long-time quest, hopes for revival of OEM business

BY JULIE PITTA
CW STAFF

SUNNYVALE, Calif. — Televideo Systems, Inc. said last week it had signed a letter of intent to acquire fellow terminal maker Zentec Corp. in Santa Clara, Calif., for approximately $30.8 million in cash and stocks.

Under the proposal, Televideo will exchange 8.7 million shares of newly issued stock for all outstanding shares of Zentec stock. The merged company will retain the Televideo name. Additionally, Televideo will acquire all outstanding shares of Zentec preferred stock for $9 million in cash.

Zentec's base of OEM business proved attractive to Televideo, which has been frustrated in its attempts to penetrate that market. "We definitely need that OEM business," explained Robert Sheffield, Televideo financial vice-president. "And their terminals offer a lot of emulations we don't have. They bring to us a little different technology."

About 70% of Zentec's $27 million in revenue last year was the result of OEM sales. Televideo's OEM business has been virtually nonexistent, and the company has suffered from flat sales in recent months. For the quarter ended May 1, Televideo reported earnings of $341,000 on sales of $21 million.

Subject to shareholders' approval Sheffield said the merger is expected to be finalized before the completion of the fiscal year, which ends Oct. 31. It must be approved by the shareholders and boards of both companies.

Production of Zentec's line of display terminals eventually will be transferred from its leased plant in Mexicali, Mexico, to Televideo's wholly owned production plant in Korea, Sheffield said. However, a schedule for that transition has not been set.

K. Philip Hwang, Televideo's chairman and chief executive officer, will be chairman of the merged entity, while Zentec President William Parker will become president. No chief executive officer will be named, Sheffield said.

Cash-rich Televideo, with about $65 million in reserves, has been seeking an acquisition for more than a year. Its proposed acquisition of Alpha Microsystems, Inc. last year fell by the wayside after a letter of intent was signed [CW, Oct. 27, 1986].

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Motorola settles technology suit

PARIS — Semiconductor maker Motorola, Inc. recently said it has settled a breach of agreement suit filed by the Thomson-CSF division of French defense and electronics company Thomson SA earlier this year.

Thomson had sought damages of about $525 million. The financial terms of the out-of-court settlement were not disclosed.

Filing in the Tribunal of Commerce in Paris Feb. 2, Thomson alleged that Motorola had "anticipatorially" breached a technology transfer agreement relating to Motorola's 16- and 32-bit microprocessors.

Under terms of the out-of-court agreement, Motorola is expected to transfer certain technology to Thomson-CSF in exchange for payment from Motorola.

After that technology transfer is completed, Thomson will reportedly dismiss the suit.

Intellicorp

CONTINUED FROM PAGE 71

Intellicorp has started shipping development programs that run on the DEC Vaxstation and the Sun 3. That has helped the firm win over customers such as McDonnell Douglas Corp. in St. Louis, which has reportedly purchased 30 of Intellicorp's Knowledge Engineering Environment systems to run on Sun workstations.

Intellicorp expects to announce similar products for the Apollo DN300 and 570 series this quarter and for the IBM RT Personal Computer next year, said Lisa Sheeran, an Intellicorp spokeswoman.

While Intellicorp CEO Kehler emphasized that LISP users will not be abandoned, he said that within a year, software for Sun and DEC machines should make up 75% of sales.

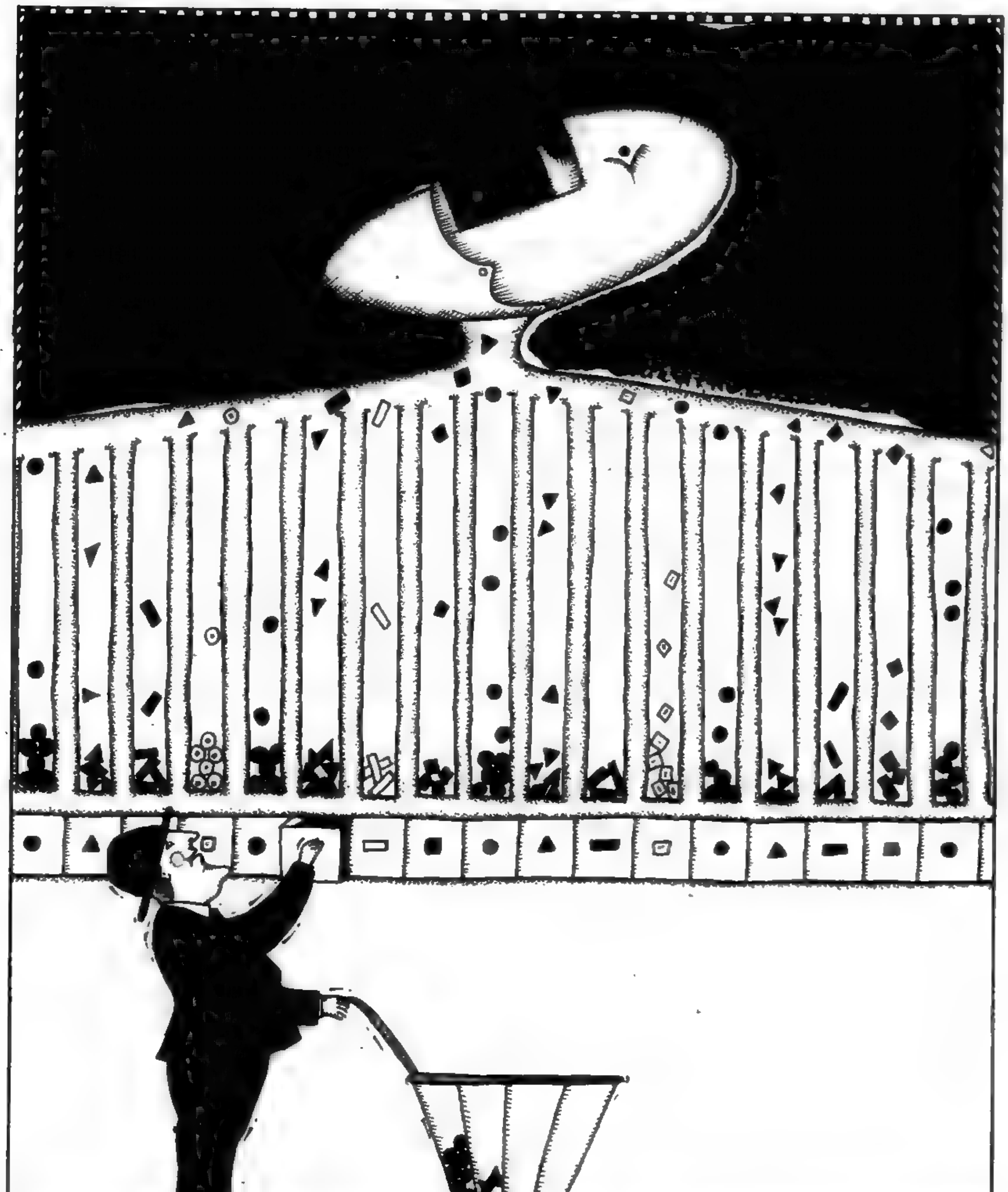
William Higgs, director of software research for Cupertino, Calif.-based Infocorp, said waning customer interest in the AI industry is forcing firms such as Intellicorp and Teknowledge, Inc. to make the move to mainstream applications.

"Most companies in the AI industry haven't experienced the growth they anticipated," Higgs said. "Emphasizing the practical elements of AI and its practical payoff is the first necessary step toward success."

COMPUTERWORLD

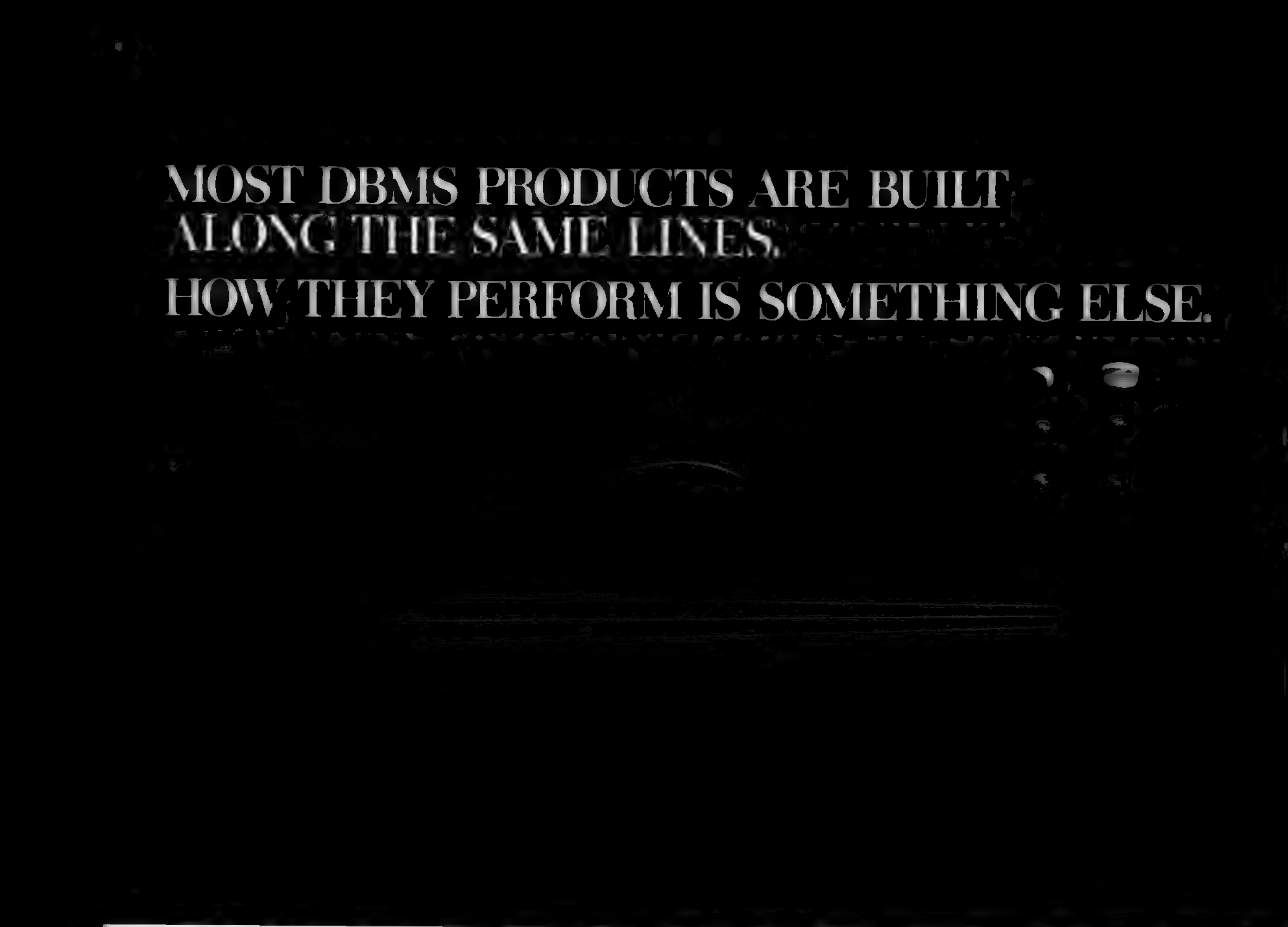
SPOTLIGHT

DBMS: MEDIUM AND LARGE SCALE



The search for flexible and nonthreatening data base management systems has led to relational technology. The approach isn't new, but now the times and the tools are right.

AUGUST 10, 1987 • SPOTLIGHT NO. 17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Product Face-Off

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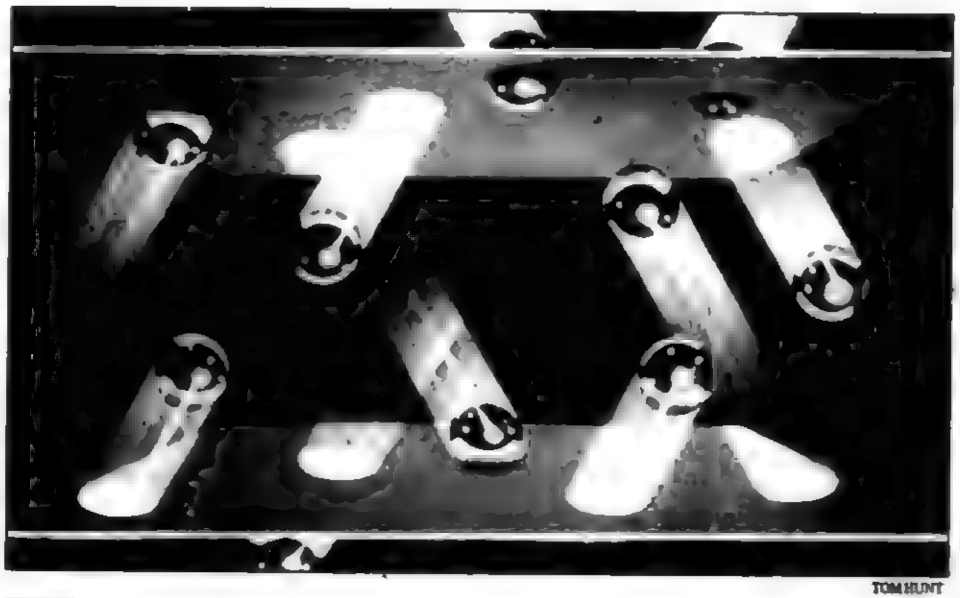
In a climate of open exchange and peaceful collaboration, applications would move freely among competing systems.

THE IMPERATIVE OF COEXISTENCE

BY RICHARD SKRINDE



TOM HUNT

Peaceful coexistence is a subject very much on the minds of many data base-dependent organizations. Their concerns do not have anything to do with armament policies, trade negotiations or relations between the superpowers. It is system compatibility, not diplomacy, that is preoccupying users of medium- and large-scale data base management systems technology.

The task these users are faced with is one of reconciling the present with the future. A new generation of relational DBMSs has emerged, which promises many benefits — but only if it can be successfully linked with existing application architecture. Technology coexistence is the term being applied to the goal of merging new technology into traditional system structures and, like global issues of collaboration, the desired end is a lot clearer than the necessary means.

Security Pacific National Bank is an example of an organization stationed at the forefront of DBMS technology and trying to deal with the issues of technology coexistence. Security Pacific has been a traditional IBM IMS hierarchical data base shop and has developed many ambitious IMS-based applications.

Its Host Authorization System, for example, supports a large network of automated teller machines and bank card readers that are used to check payment authorizations. It was developed utilizing IBM's IMS Fastpath and took advantage of every availability and performance feature of this development system. Response time is 0.1 seconds, with hit rates on the system of 15 transactions per second. Bank ATMs have an uptime in excess of 99%, including the time the operator shuts down the ATM for daily service.

Another Fastpath application, a bulk filing system called Total On-us Processing and Services (TOPAS), keeps every transaction for every customer checking and savings account on-line for 65 days. Using advanced facilities such as the multiple-area concept, TOPAS processes four million transactions in less than one hour every night.

In 1985, however, the bank set aside IMS products and switched to relational technology with IBM's DB2. This was a major shift for an organization committed to, and successful with, IMS applications.

Ka-yiu Yu, manager of data base services at Security Pacific, says that as far as the bank is concerned, relational technology is the progressive path. "DB2 or dedicated relational machines like Tandem Computers, Inc.'s Nonstop SQL are the future for us. We have completed nine applications in DB2 and have had such good results that we plan to look at DB2 for every new application. Right now, we are stress-testing the product to see how far you can push it before it quits," he says.

Making the worlds meet

For the moment, Security Pacific is maintaining a strict separation between the two DBMS environments. No relational applications currently have to access any of the data in the older IMS applications. Integration, however, is inevitable. "We know that it will only be a matter of time," Yu says, "before we must develop an application that will have to access both data bases. It is a difficult problem, and we are studying the best way

---

Skrinde is a data base management consultant based in Alameda, Calif. He specializes in fourth-generation language-based business applications and practices.

Coexistence

FROM PREVIOUS PAGE

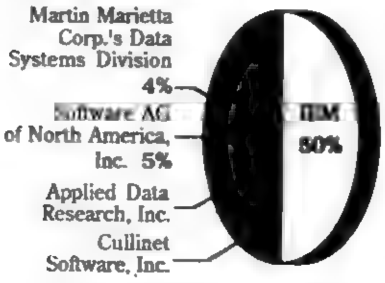
to handle it."

The effort involved in adopting the new technology is substantial, according to Yu, but the advantages are even more significant.

"Applications can be developed much faster," he says. "The cost of maintenance and enhancements is much lower. And, most important, relational technology will support distributed data bases. Transaction processing can be accomplished at many sites, rather than having to ship all of the data to one central site and then attack it with a giant mainframe and IMS Fastpath."

The distributed data base is the ideal response to the expansion that has resulted from the deregulation of the banking industry, Yu explains. "A new node could be set up in the system for a new site without having to do major rework on the applications," he claims.

Large-scale DBMS software
1986 market share



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Expanding the skies

Security Pacific is not alone in its migration of data base architecture. American Airlines maintains one of the largest computer networks in the world. The firm's real-time reservation system supports approximately 100,000 terminals and processes an average of 1,500 transaction/sec., with a three-second response time.

A second real-time system supports flight operations. That system is connected to 20,000 terminals and interfaced to a computer on every American Airlines aircraft to monitor when each plane leaves the gates, takes off or lands. These real-time systems run on IBM 9091 Model 400 mainframes and are tightly coded in Transaction Processing Facility Version 2 (TPF2), an outcropping of Airline Control Program. A third system is a large online system called the commercial complex, which supports all corporate business and management activities with applications built using IMS.

American Airlines has a two-stage plan for technology coexistence. For the first stage, the company has developed hardware and software linkages between its on-line and real-time systems.

These linkages have greatly enhanced the airline's ability to manage the information stored in its two massive real-time systems. For example, an agent enters all of the tickets collected for a particular flight into the real-time system. An IMS-based application in the commercial complex extracts this information from the real-time application that has been written in TPF2. This information is then collated by the IMS application to provide American Airlines management with same-day information about the total number of people flying in and out of that airport, as well as all other airports, via a trend line and other reporting formats.

The second stage is to incorporate an aggressive development program that will connect a large relational data base system to the on-line system. That linkage will allow a manager to access the IMS with a relational query, such as, "How many people flew from New York to Boston between noon and 6 p.m. today?" The manager would not need to understand much about computers and could get the information immediately by using a format that could be transferred directly into his word processing or spreadsheet package.

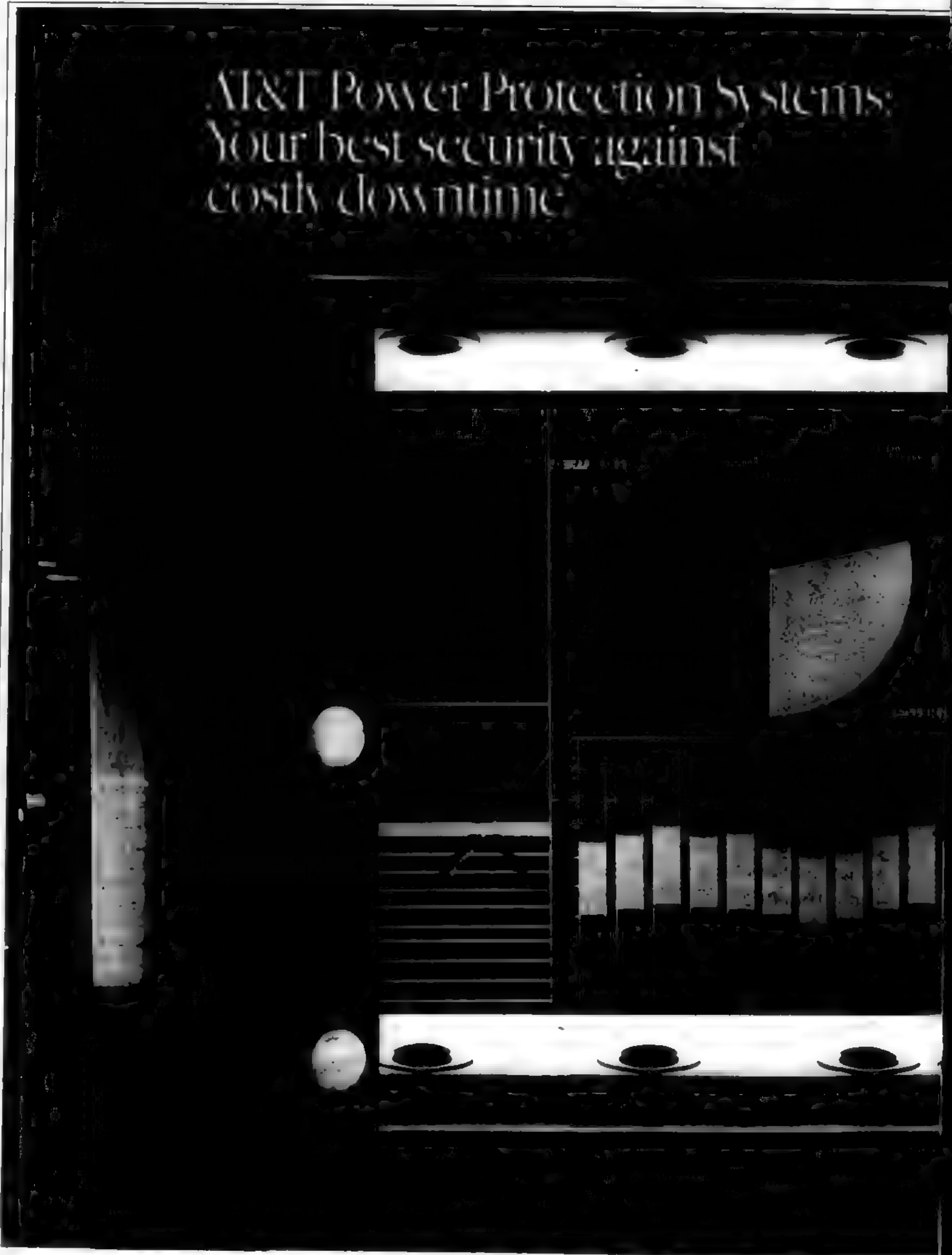
American Airline's goal is to put the tools for managing the critical information contained in the on-line system directly in the hands of managers rather than have them make requests for reports through the DP department.

Joyce Wren, assistant vice-president for American Airline's Data and Application Services, says, "We must do everything possible to help our clients become more productive. Our current project to create a decision-enabling store that will allow users to manipulate data directly is an example of that commitment. We selected a relational approach in order to gain rapid development capabilities and to decrease maintenance and enhancement costs as well."

The project will take several years to fully implement, according to Wren. "It is important to move slowly when converting to relational technology," she states. "Systems people, maintenance people and operations people all have to adjust and accept it culturally."

Removing IMS's blinders

Moving to new technology also involves the major effort of selecting a vendor, as is evidenced by the city of Boston's 1½-year search for an alternative to IMS. Since the city's computer operation was a Cobol VCM shop with a couple of applications created in IMS, initial consideration was given to Cobol productivity tools — screen painters, report writers and code generators. Rather than buy all of these



products from different vendors, however, city officials decided that obtaining a relational data base and getting all of the productivity tools from one vendor made the most sense.

MIS personnel evaluated a lot of vendors, saw a lot of slide shows and talked with a lot of salesmen before selecting CA-Universe from Computer Associates International, Inc. It was, according to Mike Hernon, chief analyst in Boston's MIS department, a tiring process. "It takes a lot of energy," he says, "to drastically change your life, even if it is hopefully for the better."

The process was particularly difficult, Hernon adds, because there were so many close contenders. "There are so many good products out there," he says, "that the MIS shops that are married to IBM and that will only move from IMS to DB2 without ever doing this type of evaluation are really missing something."

The road behind us

Technology coexistence is a complex realm encompassing a wide range of activities, including the creation of new strategies, interface gateways, conversion algorithms and administration philosophies, all of which are aimed at incorporating new relational systems with existing DBMS applications. It is a major issue that vendors, driven by user requirements, are trying to solve, often on a case-by-case basis.

To fully understand all that is involved in achieving technology coexistence, it is necessary to look at the forces behind the evolution of DBMS. Punch cards and magnetic and paper tapes were the sequential devices used to store data in early computers, making information management a sequential process. Update transactions had to be sorted and grouped into batches that could be processed in one sequential pass of the data.

Random-access storage devices advanced the state of information management. One record could contain pointers to any other record, and the storage device could access the records in that order. However, each read or write operation had to be programmed uniquely and at a very low level. A hodgepodge of approaches was implemented.

Access methods such as IBM's VSAM were developed to handle I/O in a general-purpose manner that relieved one level of complication but created another. Low-level I/O constructs no longer had I/O recoded in each application, but the application architecture was so undisciplined that systems would store each piece of data in several formats, and, many times, each new application would result in a new copy of the data. Much development effort was still required to improve data storage and retrieval techniques.

IBM, working jointly with major aerospace firms, developed a pilot DBMS project to oversee the tracking of the many components required for the Apollo space program during the mid-1960s. This pilot program was the original development work that created the hierarchical data model-based IMS product line.

The hierarchical model allows one parent to support multiple children on any node. This tree-like structure forced designers to model applications very carefully, because any design change put application development back to square one.

> "THERE are so many good products out there that the MIS shops that are married to IBM and that will only move from IMS to DB2 without ever doing this type of evaluation are really missing something."
>
> MIKE HERNON
> THE CITY OF BOSTON

The Codasyl Committee was responsible for the first DBMS standard. A data base task group was formed that, by 1971, had convinced the committee to endorse an improved version of the hierarchical model. The new network data model allowed designers to define relationships between any of the nodes without having to navigate back up the tree and down another branch.

An early development project based on the network model was undertaken at B. F. Goodrich Co. It was called IDMS and was ultimately purchased by Cullinet Software, Inc.

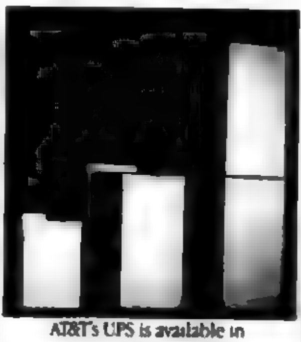
Breaking tradition

Traditional DBMS technology had a downside, however. MIS departments were strapped with maintaining and enhancing hierarchical or network-based DBMS applications as corporate needs grew. Programmers likened this effort to having to move boulders.

Enhancement products such as IMS Fastpath were introduced to increase transaction processing capacities for the banking industry. Performance did, indeed, improve, but the already-stressed programmers almost buckled under the even heavier maintenance load.

Existing DBMS technology also repelled many users, who regarded it as hostile and unusable, feeling that their applications could not be expressed by a model that looked like a tree (the hierarchical model) or a spiderweb (the network model).

IBM again went to work, this time on creating a relational system at its San Jose, Calif., research center. The pilot



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development that emerged, System R, would later become DB2 and SQL DS.

A start-up company, Oracle Corp., influenced by that development, introduced a product that maintained compatibility with DB2 and differentiated itself with a superset of the SQL user interface. Before long, another relational development project at the University of California at Berkeley resulted in two commercial products, Ingres from Relational Technology, Inc. and CA-Universe from Computer Associates. Following that, the infant Unix marketplace contributed Informix from Informix Software, Inc. and Unify from Unify Corp. Between 1980 and 1982, relational products were released in a steady stream.

Relational-based DBMS products initially promised much but often delivered little. Products ran slow, and file systems crashed. Users gritted their teeth and hung on. By 1985, only five years after their introduction, relational products rapidly matured, becoming quite dependable for decision-support applications. However, traditional DBMS architectures with nearly three times the market maturity still provided better performance and enriched integrity features and retained most of the lucrative on-line transaction processing sector of the marketplace.

Straddling old and new

The latest versions of relational products have now matured to the point at which they are more powerful than traditional data base products in every aspect.

Even vendors that have well-established hierarchical or network products seem to take it for granted at this point that their customer base for those products will want to integrate relational capabilities, if not convert totally to a relational DBMS.

IBM, cognizant of the fact that large investment in traditional technology cannot simply be cast by the wayside, is offering its IMS customers assistance in bridging traditional technology with relational innovation by means of synchronization and automation of critical systems-administration functions. "We are not going to abandon our IMS users," says Donna Vanfleet, senior DBMS product manager for both IMS and DB2. "Our IMS user base influences our development efforts. They know exactly what they need in terms of enhancements, and we work very closely with them."

Cincom Systems, Inc. is also trying to satisfy existing users, who are wedded to the traditional approach, while moving itself decisively into the relational fray. Although active marketing for Total, Cincom's hierarchical product, has been discontinued, the company is still supporting its users, according to Tom McLean, vice-president of marketing and product planning.

"We no longer actively market Total, and I'm sure that IBM's IMS user base has stopped growing as well," he says. "We continue to service the requirements of our Total users, but our emphasis and resources are pushing Supra, our relational data base product."

One notable exception to the "relational-is-better" trend is a product from Officesmiths, Inc. in Ottawa. It is a unique DBMS implementation designed to automate office information. Officesmiths' DBMS incorporates text processing within a hierarchical model. Documents are structured so that each separate heading and paragraph is defined as a text field of unlimited length.

"Relational models are not best for everything," says Officesmiths President Glenn McInnes. "The hierarchical model is the most efficient way to build a data base for documents. This is because documents are inherently hierarchical in nature."

Installed base for medium- to large-scale DBMS software

Projected growth by equipment category, 1987 to 1991

	1987	1988	1989	1990	1991
Minis	834,100	1,068,000	1,343,400	1,634,400	[illegible]
Superminis	89,100	124,600	170,100	227,000	297,200
Mainframes	168,000	202,300	247,000	299,200	365,400
Minisupers/ supers	4,620	6,140	7,920	9,840	11,740

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The standards trend

Open architecture designs allow connection of different manufacturers' systems to build computer networks. Standard network protocols, standard communications protocols, the Posix operating system standards and the X-Open standards all support distributed environments.

Users benefit because their applications can be moved from one environment to another with little reprogramming. Chrysler Corp., for example, has utilized computing based on open architecture standards to help build a competitive edge, and DBMS plays a crucial role

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in that effort.

The Detroit-based Outer Drive Manufacturing Technical Center (ODMTC) has implemented a relational DBMS to support loading, cost estimation, equipment scheduling and tracking and the establishment of manpower standards. The relational DBMS selection team looked for a system that would allow applications to be developed quickly and easily, be flexible enough to allow development on a module-by-module basis and allow end users to analyze their data.

Joe Bulat is the manager of computer-integrated manufacturing (CIM) at the Chrysler ODMTC. "We want to spend our energy building cars, not data base applications," he says.

"Ingres from Relational Technology gives us an open-architecture solution that provides us with three key features: distributed access, application longevity and portability. Portability means freedom from hardware vendors and the ability to finally distribute our information management. We look to our vendor to provide the gateways required to connect our new relational DBMS technology to older information systems," he explains.

The hardware glove

Hardware has actually leapfrogged software, with advances like very large-scale integration circuit technology, high-density memories, communications controllers and video controllers.

Users have become accustomed to the polished look of bit-mapped graphics interfaces and to the instant response time of local processors.

"Accessing data using a character-based terminal attached to a DBMS residing on the corporate mainframe is like a time warp into the previous century for these users," says Carol Adams, office automation product manager for Sun Microsystems, Inc.

What the power of relational DBMS systems demands, according to Sharon Weinberg, president of Codd and Date Consulting Group, is the complementary power of parallel processing.

"Parallel processing is the computing architecture of the future, and relational technology fits it like a hand in a glove," Weinberg remarks. "A single relational request will execute a stream of instructions to perform many tasks that can be done in parallel. This is a lightning-fast operation when a CPU can be assigned to each task."

Contemporary supermicrocomputer architecture can provide millions of instructions per second (MIPS) for a price fifteenfold better than a mainframe, according to Kent Godfried, marketing manager for Sequent Computer Systems, Inc. "Our parallel processing computers use tightly coupled parallel processing techniques that consist of banks of low-cost 32-bit microcomputer modules. These banks can be expanded linearly to make systems grow with customer needs."

Sequent offers a range of tightly coupled parallel processing systems that incorporate up to 30 CPUs, providing close to 100 MIPS of processing power in a single computer that can support more than 400 users.

Also targeting this market is Tandem, which is just completing beta testing of its Nonstop SQL, a parallel-architecture relational DBMS machine.

Data base machines
1986 market share

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The entry-level system can handle 200 transaction/sec. and, because of parallel architecture, can be expanded to more than 1,000 transaction/sec. Tandem supports distributed data bases with its Network Transaction Management Facility. Rollback and Rollforward recovery as well as two-phased Commit and Presumed Abort allow distributed users the transparent ability to perform updates across multiple nodes with high data integrity.

Another interesting relational product targeting the same market is Sybase from Sybase, Inc. in Berkeley, Calif. Significant architectural improvements from a multithreaded data server and stored procedures have given this SQL-based system the speed to handle aggressive applications such as on-line transaction processing.

Caterpillar, Inc. has a large MIS shop, which has been a cornerstone of the IBM IMS community, having been involved in the initial development of IMS. In 1986, the CIM group at Caterpillar made a decision to adopt relational technology for future application development.

A distributed hardware architecture is now in place, using DB2 running on a mainframe and linked to a network of Digital Equipment Corp. VAXs and Apollo Computer, Inc. workstations using Oracle SQL Star technology. Development is performed in the VAX and Apollo environments using Oracle, and completed applications access data stored on the mainframe. About 400 tables have been completed since the beginning of this year, with the largest having about 12 million rows.

The purpose of the relational DBMS system, according to Dick Lenz, senior

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CINCOM
"What we used to call competition, we're now calling prey."

technical support specialist at Caterpillar, is to store manufacturing and design control information. The shift to relational will, it is hoped, provide a dynamic environment more suited to the changeable nature of manufacturing information and will allow the Caterpillar CIM group to manage and control information more easily than they could with IMS, Lenz says.

Lenz claims he is pleased with the outcome of the change. "Oracle solved our heterogeneous hardware problem. It is the kind of thing that you read about but don't really believe works. We wanted to do this project properly, so we took our time and developed a logical design of data within the organization. Our technology coexistence strategy, and major hurdle, is to be able to develop transition programs that access both our IMS data and our relational data."

There is no way users can do this on their own, according to Lenz. "We have to look to the vendors for support," he says. "We are looking to IBM or Oracle to provide us with key tools, such as an SQL interface to IMS."

Another example of the trend toward the migration of data base management from mainframes to minicomputers is provided by Boeing Computer Services Co. in Seattle. Boeing recently commissioned Integrated Automation, Inc. to develop a drawing and document storage and retrieval system. The system, which has the Ingres DBMS as its heart, runs on a network of DEC VAXs with 700M bytes of magnetic storage devices and 64G bytes of optical-storage devices.

Operators use high-resolution displays to check the quality of engineering and documentation drawings fed in by many types of high-speed scanners. Once a drawing has been successfully input, it can be called back from the data base at will and examined or revised. Laser printers or plotters are able to give users hard copy, if desired.

Integrated productivity tools

Fourth-generation languages and related productivity tools such as report writers, screen painters and code generators all help developers speed applications from concept to final product.

With the upsurge of interest in application productivity and portability, such tools have also become important for the buffering they provide between the application and the hardware and operating system. "The key to solving the technology coexistence issue," says Ron Hank, senior manager for corporate relations at Cincom, "is to have a language integrated into the DBMS so that the combined product completely handles all interfaces. Users can then move their applications from one environment to another, without having to change a single line of application code."

Amex Life Assurance Co. in San Rafael, Calif., which is using Cincom's Supra relational DBMS on an IBM mainframe with Cincom's Mantis application development language, has found that, with the productivity of these tools, more time can be spent on the philosophy behind the application rather than on the details of the implementation architecture and application coding.

Amex spent one year developing a strict entity relationship model of the company. The entity relationship model was developed in conjunction with a business model that defined the business rules of the company, and groups of users were interviewed by the MIS data designers in two-day joint application development meetings.

> "THE KEY to solving the technology coexistence issue is to have a language integrated into the DBMS so that the combined product completely handles all interfaces."
>
> RON HANK
> CINCOM SYSTEMS, INC.

After these models were completed, a processing model was developed that showed which applications were on-line, which were to be batched and how data flowed between procedures. Finally, a technology model was developed that defined the hardware and software that would be used to implement the systems.

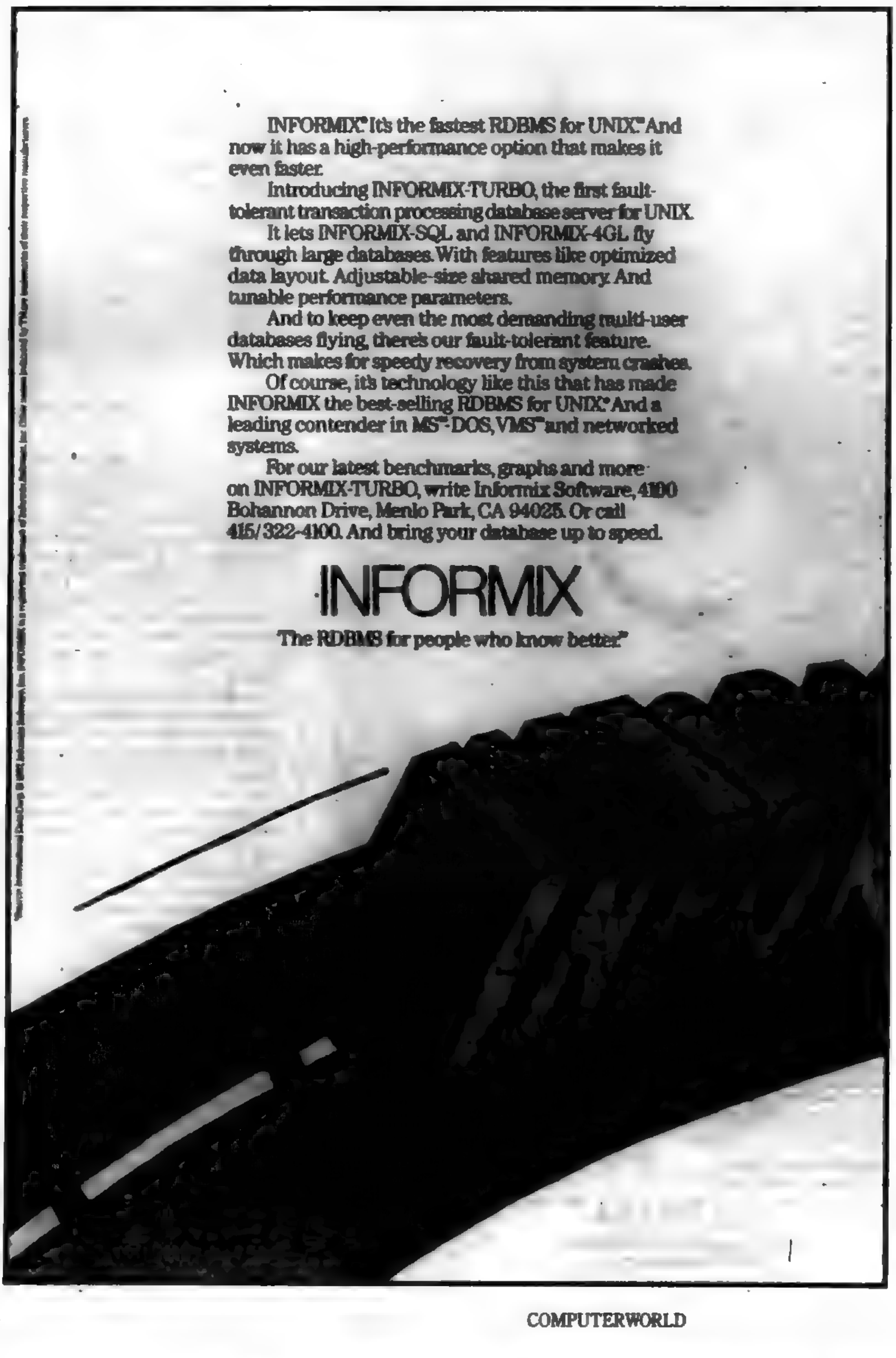
"It was a very interesting process to witness," says Lee McGee, data analysis specialist. "My senior management took the time to sell the other executives in the company on the importance of the process. Interacting with people and watching their reactions as they learned to think about our business from a modeling point of view was very worthwhile."

As Amex's time investment indicates, data modeling, once regarded as an academic exercise, is now considered a crucial step in the development process, largely because of the increased complexity of data base projects.

"Data modeling is not an esoteric pastime," says Chris Turnbull, president of Zanthe Information, Inc. in Nepean, Ont., "but a very effective tool that helps data base designers to better solve real-world problems.

"In 1977, Peter Chen of MIT published a paper describing the entity relationship model, which constituted an important extension to the relational model. The model views the real world as being composed of groups of 'things' called entity sets and the relationships that we know

Continued on page S8



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INTERVIEW

RELATIONAL COMES ON-LINE

Robert Epstein, 34, is executive vice-president and cofounder of Sybase, Inc., as well as chief architect of the Sybase System. Previously, he was vice-president of development at Britton Lee, Inc. and principal architect of its data base machines. In the late 1970s, he served as project manager for the Ingres project at the University of California at Berkeley. Epstein recently spoke with Richard Skrinde about the direction he expects the market for relational data base management systems to take.

Sybase claims to provide the first relational DBMS for on-line applications. What is the market response?

People are moving toward more aggressive, more interactive applications. And often, they are finding they must move toward new technologies to support those applications.

We're finding essentially two types of customers. The first type is the existing relational DBMS user. These people are now looking at building applications with stringent performance, integrity and availability requirements not provided by current relational DBMS products.

We also see new users who have never used a relational product before because all their applications require a level of function, speed and support that were previously not provided by relational DBMSs.

Hierarchical and network data base systems provide the performance, availability and reliability required for on-line transaction processing. So why use relational DBMSs?

This gets back down to the inherent benefits of relational systems — productivity, flexibility and maintainability, as well as built-in decision support capabilities.

Your data base is a mirror of your business. And, as things change in the external world as well as in corporate policies, your data base and applications must reflect those changes.

Relational DBMSs allow you to make those changes much more easily than with hierarchical or network systems. Also, when users need to run ad hoc queries on data, they don't need to transfer it to a relational system; they can actually have the decision support component built right in.

What does it take for a relational DBMS to support on-line applications?

The three primary distinguishing features between on-line and decision support ad hoc applications are performance, availability and data integrity. There is no inherent reason why a relational DBMS cannot provide these capabilities. But the emphasis on relational systems up to this point has been on productivity and ease of use.

The founding of Sybase was oriented toward the vision that the market would evolve and start to demand that SQL be the only data base framework. Well, this couldn't happen if the product didn't have the ability to provide on-line support. And to achieve that, you have to build a new architecture from the ground up.

That architecture had to incorporate some of the things that worked with the hierarchical and network products, which are known for their high-volume performance and operational features.

What relational DBMS software architecture is required to support on-line applications?

What we've got is a requester-server architecture. Requester-server architecture is a term that is beginning to be used quite a bit, so let me explain the three fundamental concepts behind it.

The first is the clear separation between the front-end application and tools and the data base engine. The second component is that the data base engine itself, rather than the operating system, has to manage multiple users and multiple processes. We call this multithreaded server architecture. Finally, the third fundamental component of requester-server architecture is the notion of moving transaction-integrity logic, or programming intelligence, into the data base itself.

Some of this we've taken from the mainframe world.

Multithreaded server architecture is a good example. This concept comes from the fact that, in the mainframe world, the data base, not the operating system, handles multiple users concurrently. Moving the data integrity from the application into the data base was done with the notion of adding procedural logic in the data base, and products like IMS and IDMS provide capabilities like this.

Is Sybase going to support users trying to migrate out of hierarchical and network data bases?

The first goal for aiding conversion is coexistence. Applications are not static; they grow and change. Our goal is to use Sybase's distributed technology and open architecture to allow people to complement existing applications with new functions in Sybase. Sybase then acts as an application driver in existing application environments to insert and retrieve data.

To provide coexistence, you have to provide gateways to machine environments where you can send transactions to those machines and have them translate it into IMS, IDMS or whatever application environment they are currently running under. And then it must be possible to pull that data and extract it back into a Sybase environment as part of a full transaction or report.

What about distributed data bases?

There are a lot of issues with distributed. Right now, it's a technology in its infancy. And there are a few vendors who are attempting to provide a distributed solution — Sybase is one of those companies. Ultimately, it is our belief vendors will have to work together to provide a solution that is totally distributed.

Today, we are providing transparent distributed update capabilities, complete with a two-phase commit protocol. We've implemented this first because in on-line applications, update capabilities are much more crucial than retrievals.

The requester-server architecture is especially important in distributed architecture. The ability to store data integrity in the data base allows for multisite integrity. This is key in establishing distributed data bases across multiple sites.

Robert Epstein

ALAN WITSCHONKE

Imagine the reaction of a person responsible for a data base in one city to the possibility that someone else, in a city he has never heard of, will be able to update his data base. There is no way that first person will allow that to happen unless he can control the kinds of updates that will be made.

What environments are you planning to support?

We've identified several strategic hardware environments we intend to support. Our strategy is to remain focused on those hardware environments. Because we are so oriented to performance, we can't afford to trade off performance in order to support a wide range of systems.

Currently, our system runs on VAX/VMS and Sun Unix, and we support the networks that are used to tie these hardware systems together. Our focus is on VAX, on the IBM mainframe, on a few key Unix systems and, of course, the personal computer. ●

Coexistence

CONTINUED FROM PAGE S6

exist between these things." Zanthe has created a data base product, called Zim, that allows data base designers to define a data base in terms of the entity relationship model, saving them the chore of having to convert a model into relational or traditional data base format.

Many vendors are focusing on speeding the process of developing a data model into a finished application. Data Language Corp. has specialized in this integrated language and DBMS approach with a product called Progress, which has received much critical acclaim. It was selected by NCR Corp. to be the vehicle for all future in-house development.

Applied Data Research, Inc., developer of the powerful Ideal language environment, was impressed enough with Progress to purchase the source rights to integrate it into its product line. Data Language Corp. is just releasing an application generator that will help speed application development with Progress.

Another developer, Unify Corp., has opted to create a relational DBMS application development tool for the Unix and DOS environments. The product, called Accell, is said to help developers build transaction-oriented processing systems faster by using an event-driven system in which users fill out prompts and select items from menus. The resulting application is then linked to the data base.

Focus from Information Builders, Inc. is a strong product that is gaining momentum as it is migrated to more and more machine environments.

It is SQL, however, that is destined to become the Cobol of the data base world. SQL is a key component in linking disparate data base architectures. It is the only language interface to a data base that offers any kind of standard across manufacturers. This is very important to large organizations trying to tie many data base systems into a network as well as to value-added resellers (VAR) that are interested in moving applications from one data base product to another.

Natural language interfaces are a specialized subset of the category of productivity enhancement tools. Natural language products, available from companies such as Intellicorp or Natural Language, Inc., serve as front ends for query languages and provide a conversational means of accessing and retrieving data.

Technology brought to life

Data base technology has reached a plateau at which the tools exist to create extremely sophisticated applications. A shortfall occurs in the supply of skilled people who have sufficient understanding of how these new tools can be applied. To some extent, this gap is being filled by a growing cadre of VARs who are working to integrate relational DBMS technology into existing applications.

One example of this activity is provided by McDonnell Douglas Corp., which is acting as a VAR for Oracle in the computer-aided design (CAD) market. Recently, McDonnell Douglas interfaced the Oracle DBMS to its Graphics Design System (GDS) CAD system and created an interface product called SQL CAD.

> "HAVING superior technology is no longer the trump card in this business. . . . The relational DBMS vendor that flourishes will be the one that provides the best support."
>
> PETER TIERNEY
> ORACLE CORP.

Paul Scarponcini, product manager for DBMS and knowledge-based products at McDonnell Douglas Information Systems Group, explains what the addition of relational data base capability contributes to the product. "Users are now able to do some extraordinary things," he says.

"For example, the blueprint of a building could be created in GDS, and then a set of tables defining the attributes of the critical objects within the blueprint could be created with Oracle," he continues. "A query requesting the location of all fire extinguishers within the building could be entered into the system using SQL CAD, via its graphical interface. And the GDS would display all of the fire extinguisher locations on the blueprint as a graphic illustration."

Oracle has determined that, before the DBMS market evolves any further, there must be a period of integration and absorption. "Support training and education have been our marching orders," says Peter Tierney, vice-president of marketing at Oracle, adding that the funds raised by making the company public last year were not pumped into technology development or marketing as might have been expected but into the training of more than 250 consultants, the development of a network of 120 VARs and a beefing up of the education and support staff.

"Having superior technology is no longer the trump card in this business," Tierney says. "Before long, every surviving relational data base vendor will have a similar technology, and they will all be excellent. The relational DBMS vendor that flourishes will be the one that provides the best support. Even the largest MIS shops must rely on the vendor for support. Helping users achieve technology coexistence is, at the center, a support issue." ●

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Developers can't afford dependence on magic

BY STEVEN CANIANO

There's a scene being played out with increasing frequency between application developers and data base managers. It is a confrontational one about false expectations that has its roots in the mythology surrounding relational data base management systems. The dialogue usually goes something like this:

Application developer: "I'm having problems with my system."

Data base manager: "What sort of problems?"

Application developer: "Response time is just terrible. I think it's the DBMS."

Data base manager: "Why is that?"

Application developer: "Well, it just isn't a good product, and, besides, everyone I've ever spoken to says it's a real dog. I think we should convert to another product. I know of a better one."

Data base manager: "Well, before you do that, how about if we get together to discuss your logical and physical data base design?"

Application developer: "My what?!? This is a *relational* system!"

In simpler times, when there were only two kinds of data bases — hierarchical and network — scenes like this were unknown.

The freedom of relational DBMS

In the modern world, there is another technology available to the application developer known as the mystical and magical relational DBMS. As everyone now knows, this wonderful invention frees the application developer from the necessity of undertaking the laborious and highly iterative (and, in most cases, uninteresting) tasks of planning and verification. It is now possible to build applications without even considering what used to take many months of effort. The relational systems allow us to define an application, throw the data base up and enter the "select where" world of data access routines.

Best of all, because so little time is required to build a system and because there are so many other products available on the market, if we get stuck with a lemon it would be a relatively small effort to rewrite the entire application using a new product.

How is it that the relational systems have become immune to the plagues that tormented their forefathers? Well, the truth is that they haven't, and anyone who believes otherwise will more than likely exhaust their fiscal year's software budget faster than you can say "fourth-generation language."

A relational DBMS is really not magic, regardless of what you've been told. It is merely a sophisticated piece of software, and it is only as smart as you allow it to be. All the issues that existed with hierarchical and network DBMSs are still present in the relational world.

The beauty of a relational data base is that the programmer can be oblivious to the fact that the storage structure of a table has changed. However, this does not mean it is no longer necessary to be aware of storage structures. On the contrary, a data base should be built by a data base designer who has learned the requirements for an application and has carefully made choices by weighing access strategies against key selections, indexing techniques, secondary key selections and file placements.

If accesses are not carefully planned and users are given the freedom to access the data base in any imaginable manner, performance will go flying out the window. This would also be true of a hierarchical or network system. The difference is that while in the latter case people would think twice about traversing many segments and links of a data base because of the enormous complexity involved, the relational model encourages ambitious queries.

So why are so many people blind to the fact that relational data base design is a skill just as network data base design is? Why is it that people who work so hard to write efficient application code allow a piece of software to control the heart of their system? Why is it that when people hear the word "relational," they suddenly believe in magic?

One reason is the undeniable simplicity of the relational model. This is an excellent feature when you want to prototype an application or build a simplistic data base. It is this idea of simplicity, however, that causes many of the relational products to earn bad reputations.

Part of the fault also lies with the vendors of the relational products. In an effort to sell as many systems as possible, they have, at times, done their products an injustice.

Many systems have been sold to unsuspecting end users with no reference to the importance of data base fundamentals. Customers have been led to believe it is the product that performs and that the manner in which you use the product is irrelevant.

Between this misinformation and the fact that the systems are so easy to use that "anyone can do it," it is not surprising that the result has been poor data base designs. The vendors have, in effect, made data base designers of us all, and there are now many people building relational data bases who have never even heard of data normalization.

Even more sophisticated users fall prey to sales pitches that concentrate on the bells and whistles and promises of maximum performance, but leave out details such as what you have to do to achieve the promised efficiency.

The worst part is that there is no screw you can turn, no query you can optimise more efficiently, no turbo engine you can add to the DBMS that will cure a basic case of poor data base design.

A user's first impulse is to point the finger of blame at the DBMS. After all, it was supposed to deliver the best performance without any effort, and it's not performing. The logical conclusion to this, of course, is to go out and buy a better product. And the cycle continues.

So who profits? Certainly not the user. After buying at least two relational DBMS products (which are far from inexpensive) and rewriting an application, probably using the same flawed data base design techniques each time, the user is stuck with a huge software bill, a system that still doesn't perform well and the prospect of having to call in a highly paid consultant to analyze his application and redesign the data base.

What about the vendors? Do they benefit? Possibly, but only in the short term, because eventually the misuse they are encouraging will rebound and blacken the reputations of what may, in fact, be very good products.

What can be done

So what is the answer? Unfortunately, there is no one answer unless we choose to turn our backs on the very real advantages that relational DBMSs offer.

The vendors could help the situation greatly by putting more emphasis on the workings of the relational model and on solid design and maintenance techniques. They should stress that good performance isn't automatic but depends on what a user does with a product.

Much of the application rewriting and data base conversion going on today could also be avoided if developers would look more closely at the relational DBMSs they have before looking for solutions in still another purchase. Chances are, a competent development group could write a successful application using any of the popular packages available today.

The real solution does not lie in DBMS selection but in data base design. Just because relational DBMSs are gifted with great flexibility and adaptability does not mean that we can afford to lose touch with the art of data base design. •

Caniano is a member of the technical staff at AT&T in Piscataway, N.J. He is responsible for the evaluation and recommendation of DBMS products for the Unix operating system within AT&T.

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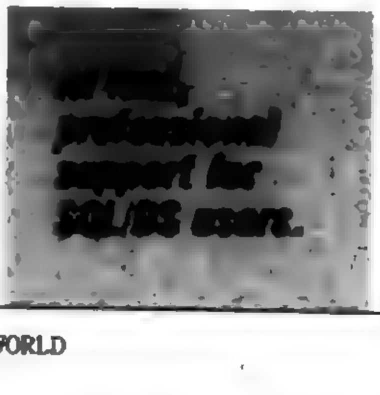

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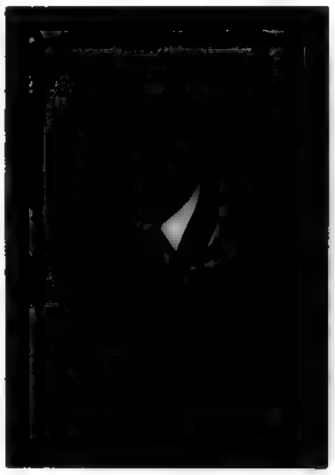

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PRODUCT FACE-OFF

IDMS/R excels at volume, DB2 at complexity

BY JAMES BRADLEY

Two of the most important data base management systems on the market are IBM's DB2 and Cullinet Software, Inc.'s IDMS/R. Perhaps the best way to compare these two systems is to begin with what they have in common, which is that both are fundamentally network systems.

The term "network," first applied to Codasyl systems in the 1970s to differentiate them from hierarchical data base systems, has now become almost synonymous with the approach used by Codasyl systems such as IDMS/R. Unfortunately, this can be confusing, since it does not help distinguish Codasyl systems from relational systems that are also fundamentally network systems, such as DB2, which began to be important in the 1980s.

What exactly does this mean? A data base is basically a collection of files that are related. With a relational data base, the files, as seen by users, are rather restricted in format — no variable-length records and no duplicate records are allowed. In more technical terms, the files are of a restricted type known as relations. With a Codasyl system, the files are not restricted to relations, and variable-length records are allowed, although they are not common; thus, in practice, most files in a Codasyl data base will often qualify as relations. Therefore, from a practical point of view, we can often ignore the fact that relational data bases are made up of a more restricted kind of file than Codasyl data bases.

Network vs. hierarchy

In saying the files of both types of data base form a network, we mean a network as opposed to a hierarchy. If the files of a data base form a hierarchy, we have a pyramid structure, with one file at the top called the root file. Call this File A. At the next level, there could be Files B and C. File A will be the parent of B and C. This means that for one A record there are many related B records as well as many related C records.

In the hierarchy, B will be the parent of some child files at the next level down, perhaps P, Q and R; similarly, C may be the parent of child files W and X and so on through the hierarchy.

In such a hierarchical structure, every file except the root file has a parent, or equivalently, every file has zero or one parent files. It was structures such as these that IBM's IMS was originally designed to manage.

If a structure of related files does not form a hierarchy, it must form a network, for in a network, at least one file will have more than one parent. Both relational and Codasyl systems can handle just about any data base structure and are therefore both network systems.

This last statement needs some qualifying, however. What connects the files in any data base structure is relationships. One-to-many relationships, which are by far the most common in all data bases, generally connect the files of both Codasyl and relational systems in a network.

The methods employed in handling these relationships are, however, quite different.

Codasyl systems handle one-to-many relationships by means of a construct called a Codasyl set, in which each element of the set consists of a parent record together with its child records. Commonly, such sets are implemented by means of pointers embedded in the records of the files, as with IDMS/R.

With relational systems, the one-to-many relationships are handled by a variety of methods that may or may not involve pointers. DB2 does permit the use of pointers, although these never have to be specified by the person defining the data base; in contrast, an IDMS/R Codasyl data base definition requires pointer specifications.

What is common to relational systems like DB2 and Codasyl systems like IDMS/R is that both of the system types can manage data bases that have a network structure, and the files of the network are connected by one-to-many relationships implemented differently in the two system types.

However, there are other types of relationships besides the common one-to-many type.

There are also many-to-many relationships. Again, both relational and Codasyl

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Bradley specializes in data base management at the University of Calgary. He is the author of *File and Data Base Techniques* (1982), *Introduction to Data Base Management in Business, 2nd Edition* (1987) and *Case Studies in Business Data Bases* (1987), all published by Holt, Rinehart & Winston in New York.

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The form can do calculations with the data entered in a given blank and enter the result in another blank. For example, an invoice form can add the sales tax by itself.

The form can automatically pull in data from an existing database. When you put a customer's name on an order form, for example, the form can add the address, phone, account number, billing instructions, whatever you wish. Once on the form, this "imported" data can be modified just like data entered at the keyboard.

When the same information goes on several pages of a form, the legal description of a piece of property in a mortgage document, for example, you enter it only once. The system automatically puts it in all the right places. (A mortgage company went from six sets of documents per person per day to thirty-six.)

Information on one form can trigger the system to pull all the other forms to make up a set. To assemble an insurance policy, for example, the system can key on the state and the insured's age and automatically pull all the proper endorsements.

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How you "teach" your smart form.

To tell the smart form what to do with the data entered in each blank, you create a "form map" with software from Electronic Form Systems. It doesn't require programming skills; it's less complex than a spreadsheet.

You can tell each blank:

- A formula for automatic calculation with that data and where to put the result.
- Other locations where this data should go on the form and other forms.
- What other forms should be included in the set.
- Criteria for valid data: whether it should be letters, numbers, dollars, how many digits, how many decimal places, and so forth.

How the smart form can "teach" the user.

When you tell the smart form what to do, you can also tell the user what to do. You can create individual help windows *for each blank.* When the user gets stuck, a touch of F10 brings up a window with detailed instructions on what the company wants in that blank.

Your forms become the capture point.

Most companies spend money to capture the same information twice: First when someone puts it on a form, and later when someone reads it off the form and enters it into the computer. Electronic forms end this duplication because data entered for the form can be exported to a DOS file for use in all your other applications. Data capture for the form and data capture for the computer are one.

When someone fills out an order form, for example, the sales information could be automatically sent to your inventory application. Travel expenses could be automatically copied from expense reports to a Lotus® spreadsheet in the department head's PC. Billable hours could be sent from individual time sheets into the billing and accounts receivable package.

To tell the system where to send the data, you create an "external data map" with software from Electronic Form Systems. Data can be exported (or imported) in Data Interchange Format, PRN (delimited ASCII), or System Data Format. In addition to Lotus, Electronic Form Systems supports dBase III, communications software and customer-supplied file transfer packages.

A true electronic form will eliminate hidden costs.

The smart form from Electronic Form Systems is more than a better way to make forms. It's a better way to manage information. It lets people work faster. It lets you stop handling the same information twice. And it cuts several other costs associated with paper forms. Some of those costs are visible, but the largest of them are hidden.

Visible cost — Creating forms.

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Visible cost — Inventorying forms.

Your company now leases thousands of square feet to store forms. And money is tied up in forms inventory, probably six figures.

Electronic forms are stored in the

Electronic Form Systems is a division of Computer Language Research, Inc.

systems can handle these, since, even though Codasyl systems were designed specifically for one-to-many relationships, a many-to-many relationship always breaks down into a pair of one-to-many relationships.

A major point of difference arises between the two types of systems when they confront a reasonably common but poorly understood type of relationship called a co-relationship.

Co-relationships can be handled easily by relational systems, but not at all by Codasyl systems. The problem with a co-relationship, as far as data base management systems following the Codasyl model are concerned, is that it has no one-to-many aspect that will allow the Codasyl set structure for one-to-many relationships to be used.

Relational systems, on the other hand, manage relationships by equating field values in related files, so that essentially any kind of relationship can be handled, one way or another.

A richness of relationships

This brings us to the essence of the difference between Codasyl and relational data base management systems. Even though both systems permit the management of network data bases, the network data base in the relational case may be made up of files connected by a richer variety of relationships than in the Codasyl case.

This richness and the resulting flexibility has made it possible to design nonprocedural languages of immense power to manipulate relational data bases. The SQL language for DB2, which has been widely implemented in a variety of other relational systems as well, is the best example. Codasyl systems have no language that can compare.

Cullinet has added a relational front end to its Codasyl IDMS system, calling the hybrid system IDMS/R. However, it does not permit the use of SQL, which is rapidly becoming the standard nonprocedural data base language.

With a nonprocedural language, you specify the processing required instead of constructing a routine to specify how it should be carried out. With relational systems, the required processing routine is generated automatically from the specification in SQL.

If the relational front end of IDMS/R does not permit the use of SQL, what does it do? It permits the use of views, something that is easily possible with relational systems using the nonprocedural language SQL but not with Codasyl systems.

With an SQL expression, you can specify the construction and retrieval of what is essentially a new file formed from data in multiple files of the data base. If this new file is specified as a view (with SQL), it can then be used for further manipulation by SQL. This facility can be useful when a complex SQL expression is needed to construct the view, but only simple SQL expressions are needed to manipulate it afterward. Without the view facility, complex SQL expressions would be needed with every manipulation of the data involved.

IDMS/R provides two facilities for handling views. One is the logical record facility that permits a view to be formed from a Codasyl data base. The other is automatic system facility (ASF), which permits a data base to be defined with files that are relations, with no need for Codasyl set definitions for the one-to-many relationships. This type of ASF-relational data base is manipulated procedurally within a program and can be manipulated nonprocedurally at a terminal in a restricted fashion by Cullinet's Online Query.

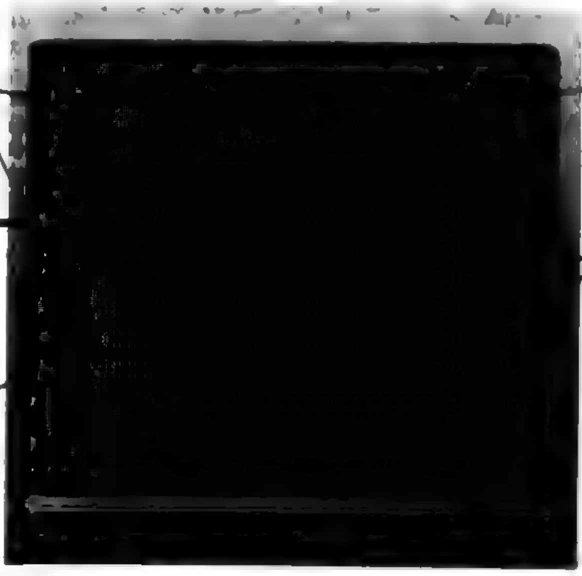
> IDMS/R is fundamentally a Codasyl system with some facilities of a limited nature similar to those commonly found in relational systems. In contrast, DB2 is close to being a true relational system with all the flexibility that that entails.

In summary, IDMS/R is fundamentally a Codasyl system with some facilities of a limited nature similar to those commonly found in relational systems. In contrast, DB2 is close to being a true relational system with all the flexibility that that entails. Nevertheless, both can handle a network-structured data base whose files are connected by common one-to-many relationships.

It might look from this discussion that DB2 is undisputedly the better system. However, "better" is a subjective term, and it would be wise to ask, "better for what?"

There is no doubt DB2 rests on a superior foundation. However, this superior foundation and the powerful facilities in DB2 take their toll when it comes to ordinary transaction processing. For processing simple transactions with only a few data base files connected by the common one-to-many relationships, DB2 is currently significantly slower than IDMS/R, mainly because of the sheer amount of DB2 code that has to be executed per transaction.

Thus, for ordinary transaction processing with ordinary data bases, IDMS/R will do the job and do it very well. DB2 will do things that are either very difficult or even impossible with IDMS/R, such as nonprocedural manipulation involving offbeat relationships. If that is what you require, then DB2 is indeed the better system. ●


When the same information goes on several pages, you enter it only once. The system can automatically fill in standard information like a customer's address.
You can pull data in from other files and export data for use with other applications.
You can create help windows for each blank on a form. Then the F10 brings up a window with instructions on what the company wants in that blank.
You can set criteria for any field. The system alerts the user if the wrong type of data is entered — a letter where a number should be, for example.
The form can do calculations. For instance, it can add total costs on a requisition order and automatically place the sum in the proper space below.
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computer so most of that money goes right to the bottom line. You can store as many as 5,000 different forms on an IBM® microcomputer and an unlimited number on a mainframe.

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Hidden cost — Forms management and enforcement.

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Tracking the nation's trees, bees and bears

BY JOSH BRACKETT

If you work for the National Park Service at any one of its 337 sites in the U.S. and you have termites, you can use the service's central data base management system to get rid of them.

After you log on to Common, as the system is called, and choose Pest Management from the menu, you answer a branching series of questions the system uses to diagnose such problems. After pinpointing the problem, Common suggests an environmentally benign solution, if there is one. If there isn't one, or if the solution suggested doesn't work, you can use the system to request permission to apply a pesticide.

The idea for the Common system, according to Anne Frondorf, program analyst in the Natural Resources and Environment office in Washington, D.C., stemmed from her office's desire to collect all of the valuable management data tucked away in separate files and data bases at Park Service locations.

At the same time, park staff wanted a way to exchange data about their projects, problems and special resources.

Resource roundup

The national data base system Frondorf and others envisioned would provide regional and servicewide data summaries and cross-disciplinary reports combining, for instance, a park's budget information, acreage numbers, plant and animal observation data, visitor statistics and the name of the local congressman.

Parts of the system were prototyped on the Park Service's Hewlett-Packard Co. 3000, using Image, HP's data base management software. It quickly became evident, however, that Image, a transaction-oriented, hierarchical system, was not designed to handle unanticipated, cross-disciplinary queries.

At that time, the spring of 1985, there were not many truly relational DBMSs available for the HP 3000, however. The Park Service quickly narrowed the field to Relate/3000, sold by Computer Representative, Inc. in Santa Clara, Calif.

Richard Thorson, now systems analyst for the State of Virginia, worked as a consultant for the Park Service during the search. He recalls that the specifications called for a report-generation language that would allow users to generate ad hoc reports on-line and store them for future use, a fourth-generation language for quick application development and the capability to access all of the parks' existing Image files.

Relate/3000 was installed in August, and the first two departmental data bases, containing basic park and natural resources data, were up and running by December. It takes about three months to add a new data base module. Although the Park Service does not endorse products, they seem to be well satisfied with Relate/3000.

Recently, the Park Service produced, for the first time, a comprehensive report on the status of flora and fauna in all of its parks — their condition, threats to their well-being and the money and personnel available to address those threats. This report will provide the documentation necessary for future budget authorizations.

Best of all, Frondorf says, "This is not a static, one-time report." The data on which the report is based is being updated constantly. ●

Brackett is a free-lance business and technical writer based in Rockport, [illegible]

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DATA SWITCH

The Data Path Management Company

Visual interfaces: Easy shopping but no browsing

BY JAMES LARSON

Nonprocedural data base languages, such as SQL, allow data base users to describe what data the data base management system should access without having to explain how the DBMS should do it. There are, however, some drawbacks from which nonprocedural data base languages suffer. Users must learn and remember the exact language syntax as well as the names and relationships of the object types in the data base. Browsing through the data base requires repeatedly formulating and executing complete requests.

The possibilities for overcoming these drawbacks include the use of visual interfaces and natural languages.

One method for helping users learn and remember the language syntax and names of data base objects is for the DBMS to display a syntax diagram, a graph whose nodes represent key words and options from the language, and a schema, a graph showing the names and relationships of the types of objects in the data base. A syntactically valid command is formed when a user selects a route through the syntax diagram and one or more of the objects from the schema.

This approach to query formulation is not yet widely available. However, with increased use of sophisticated workstations and bit-mapped screens, it may soon become a viable option.

Query-by-Example

One of the most popular visual interfaces to data bases is Query-by-Example (QBE). With QBE, a user selects the names of the files to be accessed from a menu. The skeleton of a table, containing the name of the file and the name of each field in the file, appears on the screen for each selected file. The user then indicates which records to select, the criteria for joining, or coordinating, records and which fields are to be displayed by entering the values and symbols directly onto the table skeletons.

A popular variation of QBE is a form interface to data bases. A form contains the same information as a table skeleton, arranged in a format similar to paper forms used in many offices.

Users may use a form for either data entry or data retrieval. When entering data, values are inserted into the blank slots of the form. When data is being retrieved, the blanks are filled with values of selected records. Values from each record are displayed on a single form, so the user may page through a set of forms to view multiple records from the data base.

When using QBE or forms systems, it is possible, by moving a cursor across the table skeletons or forms, to enter data-retrieval specifications in any convenient order. There are also fewer syntax conventions to remember than with SQL.

Browsing a data base with QBE or forms is not so simple, however. The user must repeatedly formulate and execute requests rather than navigate through the data base in a smooth sweep.

Browsing consists of four basic operations: structuring, filtering, panning and zooming. Structuring is choosing the organization of the objects to be displayed. In either method, users have little structuring capability because the forms have usually been designed already. In QBE, for example, the user can specify only the columns of the tables displayed.

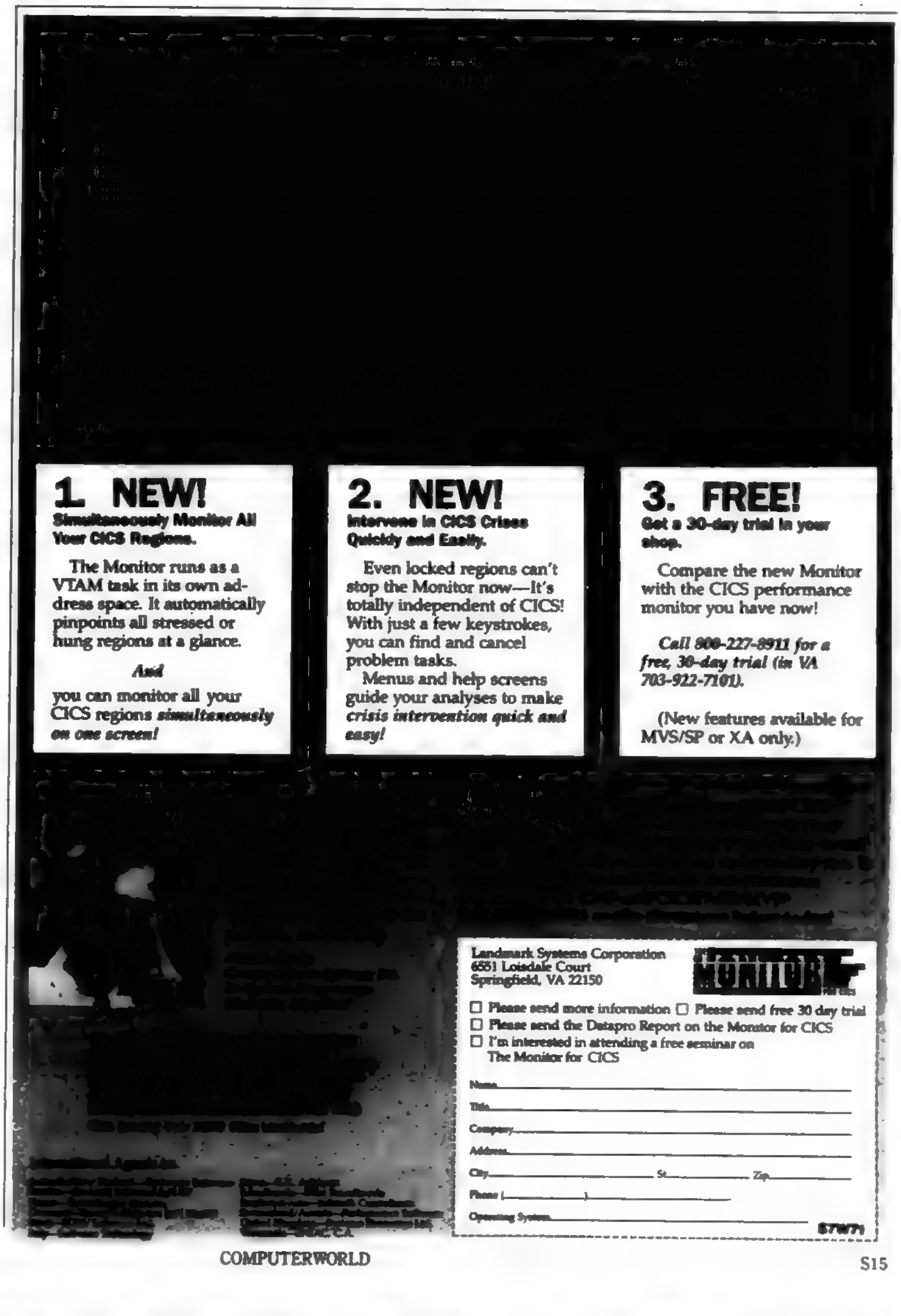
Filtering is the process of selecting instances of the objects to be examined. Form systems can be used to retrieve records containing specified field values, possibly even for ranges of values but seldom for arbitrarily complex conditions. QBE permits users to enter specifications consisting of simple Boolean conditions, but arbitrary combinations of Boolean conditions are difficult to specify.

Panning is the scrolling or paging of object instances onto the screen. Both QBE and forms systems support panning.

Zooming permits the user to proceed from record to record in an ad hoc manner, familiarizing him with the contents of the data base and allowing him to zero in on desired information without repeatedly formulating and executing data base commands. Neither QBE nor forms systems support zooming.

However, several experimental data base interfaces do allow the user to zoom in or out to view object instances at several levels of detail. The fact that approximations of this capability have begun to appear in Apple Computer, Inc.'s Macintosh applications using windows offers hope that true browsing facilities for data base management systems will soon materialize. ●

Larson is manager of a project to build a user interface management system for an engineering information system at Honeywell, Inc.'s Corporate Systems Development Division in Golden Valley, Minn. He is the author of *Tutorial on Data Base Management*, published by IEEE Computer Society Press.



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VENDOR VIEWPOINT

A full house is better than just one of a kind

BY JOHN BIRCH

The major advantage of a relational data base management system is the gain in applications programmer productivity, which has been reported to be two to five times better than with traditional DBMSs. My own experience with relational data bases supports these claims. Not only are these gains found when writing new applications, but they are even greater when modifying existing relational DBMS applications.

What are not often discussed, however, are the particular procedures that must be followed — especially with DB2, the most-publicized relational data base product — to realize a net improvement.

Although most users would like to, few have production on-line transaction processing applications running on IBM's DB2 today. This is because while relational data base systems complement conversational transaction processors such as TSO and CMS very well, they are not a natural match with pseudoconversational transactions such as those in IMS and CICS.

Fundamental differences

Implementing a new CICS transaction processing application for DB2 is easier than implementing the same application for a traditional DBMS, because a relational DBMS truly isolates the application program from the physical organization of the data. There are, however, fundamental differences between a relational data base and a traditional data base.

To begin with, DB2 is set, or multiple-record, oriented, and applications should be designed with sets of records, not single records. If not, poor performance and high-system usage will result, because it will be necessary to introduce complex logic into the application program, and DB2 will unnecessarily repeat a number of data retrievals.

The same principal applies to conversion of existing applications. The worst thing you can do is take an existing application that is single-record oriented and simply replace every VSAM read/write call or DL/1 call with a DB2 SQL statement. The processing overhead described above will take place for each record requested, causing the application runtime to increase enormously.

Instead of trying what many people mistakenly think is the easy way into DB2, it is best to face up to the necessity of a redesign, which may involve changes to data and key structures, as well as application program logic. While you will have to think differently about how you access the data, the net improvement in performance will be worth the effort.

A second major point of difference is that relational DBMSs do not use physical pointers to navigate through the data but use the values in the data fields.

Data modeling is important no matter what kind of data base is used, but it becomes almost mandatory when a relational data base system is used in a transaction processing environment. In the case of DB2, data modeling is critical because DB2 does not currently deal with referential integrity, which is a serious data integrity problem. Until IBM corrects this situation, as it has publicly promised it will in a future release, it is up to the user to remember to build referential integrity checks into the application code.

DB2 does have an optimizer that automatically optimizes data retrieval. However, if the data definition step is not given proper attention, no optimizer can fix inefficient physical data storage.

If you have a traditional DBMS such as IMS already in use, converting its applications to run on DB2 may not be cost effective. A more reasonable strategy is to continue to use the traditional DBMS for high-volume production applications and use DB2 for ad hoc queries and reports, which is a natural fit.

IBM provides a data-extract program that allows users to selectively extract data from IMS data bases, VSAM files and sequential files and copy them into DB2 tables. Once you have put this data into DB2 tables, you can easily write applications that properly use DB2 functions, such as set processing.

Obviously, having two DBMSs is not an ideal situation. However, since DB2 and other relational data bases combine better programmer productivity with high system resource consumption, a two-pronged DBMS strategy may be the only practical approach for installations with high-volume transaction processing applications accessing large data bases. ●

Birch is a corporate vice-president of McCormack & Dodge Corp.

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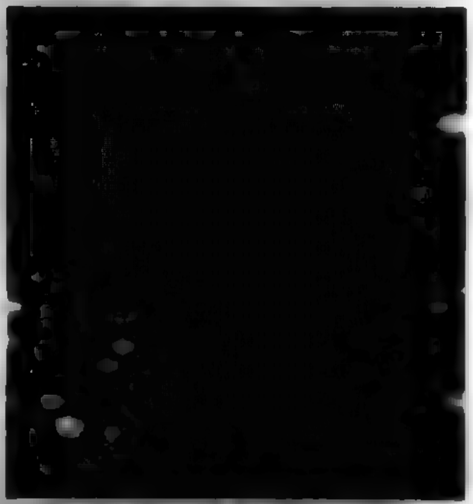

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VENDOR VIEWPOINT

Higher purposes for data dictionaries

BY L. JEANNE FRIEDMAN

The basic purpose of a data dictionary is to inventory and manage corporate data. MIS organizations have long used this structure to tackle such tasks as data control and administration. However, data dictionaries have more to offer than just another level of control or administration. They can be a key to information integrity and productivity gains in application development.

Data dictionaries inherited a new corporate role in the early 1980s when the position of data administrator came into vogue. Managing information as a corporate resource became the new mission, and the data dictionary became the tool for analyzing as well as collecting corporate data.

In order to fill that role and make good on their promise of dramatic gains in programmer productivity, data dictionaries must, however, offer not only an inventory of data elements and tables but also the tools for defining the data and the business or application rules that operate on the data. What is more, they must make this information automatically available to all applications using the data.

A data dictionary holding application-specific information in this manner can lend tremendous power to an application generator. It allows the generator to use the information in generating a customizable prototype of an application while maintaining the integrity of the business rules defined in the dictionary.

If the data dictionary is a vital part of a data base management system, the rules defined for the dictionary can be controlled, managed and optimized for performance by the DBMS. This integration leads to the largest gains in application productivity and data integrity, because the rules are enforced by the DBMS wherever they apply, such as in interactive applications, queries and Cobol programs.

Taking full advantage

In addition to data descriptions — such as data element names, sizes and types grouped by data tables — that have traditionally been collected in data dictionaries, the following information needs to be defined for a dictionary to take advantage of its power:

- **Presentation attributes.** These refer to information on how data is presented to the user in an application, query or report and includes such items as default edit pictures and column headings.
- **Relationship information.** Relational technology allows the DBMS to relate tables by data values. However, additional information regarding the relationship is of extreme value to applications. For example, a data dictionary could contain information describing the relationship between a department and an employee, such as whether the employee is a department member or manager or is on loan to the department. This information sets the stage for an application generator to create a much more intelligent application.
- **Relationship rules or referential integrity.** One casualty of the demise of older data base storage technologies is the data on relationships that was built into the DBMS itself. The data dictionary needs to provide a means for specifying relationship rules, such as "do not allow the department to be deleted if there are related employees" or "keep the employees if the department is deleted."
- **Validation conditions.** The data dictionary should apply the same validation criteria, such as range checks or lists of acceptable values, whenever a data entity is added or updated, regardless of the application. In addition, the data dictionary should allow the user to specify multiple-field validation algorithms within and across tables.
- **Calculations or derived data.** This is an important area for achieving data integrity and productivity in application development and maintenance. Many data fields in a data base are basically holding tanks for calculations. For example, salary in an employee table is usually the result of a calculation involving hours worked and rate of pay, while order amount in a customer-order table is the sum of line-item amounts, which are calculations involving price, quantity and possibly discounts.

The new data dictionary must accommodate such calculations so they are performed consistently every time an application program calls for the result. •

Friedman is senior product manager of data base and decision-support product planning and management at Wang Laboratories, Inc.

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Mini/mainframe DBMS

COMPANY	PRODUCT NAME	OPERATING SYSTEM(S)	TYPE OF APPROACH	QUERY LANGUAGE(S) USED	SUPPORTS CONCURRENT PROCESSING	ACCESS CONTROL TO WHAT LEVEL	INCLUDES A DATA DICTIONARY	DATA BASE ADMINISTRATOR UTILITIES PROVIDED	INCLUDES FACILITY FOR DOWNLOADING TO PCs	PERFORMS DATA TRANSFER WITH WHICH DBMSs	PRICE
Amperif Corp. (818) [illegible]	RDM1100	Unisys 1100 Exec	Relational	SQL	Yes	Data item level	No	Data base dump and load, user identification/authentication, bulk load	No	Yes (with custom program)	$200,000-$300,000
Applications Software, Inc. (714) 891-2616	Interrogate	MVS, IMS DB/DC, CICS	Flat, hierarchical, relational to DB2	Proprietary, SQL	Yes	Value level	Yes	Utilities for archival purposes, nature of tracking for DASD storage and library usage by date and volume, determines active terminals and simultaneous sessions	Yes	SAS, Focus, Ramis	Contact vendor
Applied Data Research, Inc. (201) 874-9000	ADR Datacom	OS, VM/VS, VSE, VM/CMS	Relational	ADR/Data Query/ (proprietary)	Yes	Field level	Yes	ADR/Ideal, ADR/Data Dictionary, ADR/Data Query	Yes	VSAM, Total, DL/1, IMS/DB	From $[illegible]
Bradmark Computer Systems, Inc. (713) 621-2808	DB-General	Any HP 3000 operating system	Relational	Fortran	Yes	Any level	No	Capacity changes, structural changes, performance monitoring	No	Image, Turbo Image	$3,500-$6,500
Britton Lee, Inc. (408) 378-7000	BL8000 series	Hardware-based data base system	Relational	SQL	Yes	SQL level	Yes	25 utilities included	Yes	Standard PC data bases	From $[illegible]
	BL700 series	Hardware-based data base system	Relational	SQL	Yes	SQL level	Yes	25 utilities included	Yes	Standard PC data bases	From $125,000
	BL300 series	Hardware-based data base system	Relational	SQL	Yes	SQL level	Yes	25 utilities included	Yes	Standard PC data bases	From $17,000
BRS Information Technologies (800) 235-1200	BRS/Search	VMS, Unix, MVS, VM/CMS	Inverted file structure	Proprietary	Yes	Field level	No	Add users, create menus, performance monitoring and security	No	—	$20,000-$115,000
CRI, Inc. (408) [illegible]	Relate/DB	MPE, AOS/VS, VMS, Unix	Relational	Proprietary	Yes	User, file, field, record levels	No	—	Yes	Image, Info, others	$15,000-$110,000
Campus America, Inc. (615) 523-9506	Poise DMS-Plus	VMS, RSTS	Relational	Proprietary	Yes	Screen-level security	Yes	Data base creation and modification, screen formating, report generators	Yes	Any	$19,500-$25,000
Century Analysis, Inc. (415) [illegible]	Mimer/9	VRX, VRX/E	Relational	Proprietary	Yes	Record level	Yes	Interactive dictionary creation and maintenance, dictionary analysis by element and subset	Yes	Works with all NCR file techniques, DBS2	$25,000
Cincom Systems, Inc. (513) 662-2300	Supra	MVS/XA, DOS/VSE, VM/CMS	Advanced relational, three-schema architecture	Spectra	Yes	Row level, every attribute within the row	Yes	Normal for automatic logical and physical data base design, DB Aid for view creation and testing, directory maintenance	Yes	VSAM, IMS, Total, Supra PDM	From $196,000
	Ultra	VMS	Relational	Spectra	Yes	Row level, every attribute within the row	Yes	Directory maintenance, DB Aid, Fast Utilities	No	RMS files	From $20,000
Cognos (800) [illegible]	Powerhouse	MVS, VMS, AOS/VS	Relational	SQL, proprietary	Yes	Data item level	Yes	Data base creation, organization	No	VAX/RDB, DGS/QL, Infos, VAX/RMS, KSAM, MPE, Image	Contact vendor
Compuserve Data Technologies (617) 661-9440	System 1032	VAX/VMS	Relational-like	Proprietary	Yes	Field, record, procedural, data set levels	Yes	Record descriptors, security provisions, damage recovery	Yes	—	$3,000-$120,000
	System 1022	TOPS-10, TOPS-20	Inverted file, relational-like	Proprietary	Yes	DBMS, data, value levels	Yes	Accounting, security, host-language interface	Yes	None	$16,000-$72,000
Computer Associates International, Inc. (617) [illegible]-1400	CA-Universe	MVS, DOS, VM	Relational	SQL, QUEL	Yes	Value level	Yes	Restart, recovery, backup	Yes	Through CA-Earl to Adabas, Total, IDMS, DL/1, IMS	$140,000-$170,000
Computer Corp. of America (800) 258-4100	Model 204	MVS/XA, MVS, VM/CMS (including IBM 9370), any OS operating system	Relational	Proprietary	Yes	Field-level security	Yes	On-line performance monitor, add and modify files on-line, backup of files during update	Yes	Any processor running under CICS or VM	$30,000-$200,000
Concurrent Computer Corp. (800) 631-2154	Reliance Plus	OS-32	Relational	SQL	Yes	Field level	Yes	Performance monitoring, asynchronous index restructuring	Yes	NA	$[illegible]
Cullinet Software, Inc. (617) 329-1134	IDMS/SQL	VMS	Relational	SQL	Yes	Data item level	Yes	On-line backup, log-level utilities, logical names creation	No	IDMS/R	$5,000-$110,000
	IDMS/R	MVS/XA, DOS/VSE/SP, VM/CMS	Relational	On-line query, supports forms or SQL syntax	Yes	Record level	Yes	Off-load/restore, roll forward/roll back, performance monitor	Yes	VSAM, Total, DL/1	$67,000-$235,000
Data General Corp. (800) 328-2436	Infos II	AOS/VS	Hierarchical	Present	Yes	Access control by user	No	Interactive data manipulation, incremental dump and load, data base recovery facility	No	Flat files, DG/DBMS, DG/SQL	$815-$3,420
	DG/SQL	AOS/VS	Relational	SQL, Present	Yes	Data item level and/or value level	Yes	Interactive data definition and manipulation, data base administration and performance monitoring utility	No	Flat files, INFOS II, DG/DBMS	Contact vendor
	DG/DBMS	AOS/VS	Codasyl	Present	Yes	Data item level	Yes	Interactive data definition and manipulation, integrity verification, statistic reporting	No	Flat files, INFOS II, DG/SQL	Contact vendor
Digital Equipment Corp. Contact local DEC sales office	RDB, VAX/VMS	VAX/VMS	Relational	Proprietary	Yes	Record level	Yes	Data manipulation, data maintenance commands	Optional	With optional features only	$3,540-$56,050
	VAX DBMS	VAX/VMS	Codasyl	Proprietary	Yes	Record level	Yes	Performance monitoring of statistics, dump facility	Optional	None	$5,460-$86,450

The companies included in this chart responded to a recent telephone survey conducted by *Computerworld*. Further product information is available from vendors.

COMPANY	PRODUCT NAME	OPERATING SYSTEM(S)	TYPE OF APPROACH	QUERY LANGUAGE(S) USED	SUPPORTS CONCURRENT PROCESSING	ACCESS CONTROL TO WHAT LEVEL	INCLUDES A DATA DICTIONARY	DATA BASE ADMINISTRATOR UTILITIES PROVIDED	INCLUDES FACILITY FOR DOWNLOADING TO PCs	PERFORMS DATA TRANSFER WITH WHICH DBMSs	PRICE
Exact Systems & Programming Corp. (914) 285-0444	DNA-4	DG operating systems, RDOS, AOS, AOS/VS	Relational	Proprietary	Yes	Field level	Yes	File and record definition, display of data in data base as utility, development language	No	Infos	$1,250-$36,000
Financial Technologies International, Inc. (212) 912-6300	DB Aid for DBRC	MVS	NA	Proprietary	Yes	—	Yes	Reporting, time-stamp utilities	No	IMS	$15,000
Fulcrum Technologies, Inc. (613) 238-1761	Fulcrum Ful/Text	MVS, Unix, VAX/VMS, AOS/VS	Inverted file structure	None	Yes	Document level	No	Usage monitoring, document collection administration	Yes	NA	$5,000-$50,000
General Data Systems, Ltd. (215) 985-1780	GDX	Any IBM 3000 series, 4300 series and compatible mainframe operating systems	Relational	Proprietary	Yes	Field level	Yes	Full portability, performance monitoring and audit reporting, data dictionary cross-reference	Yes	IMS, VSAM	$20,000-$150,000
Gentry, Inc. (415) 547-6134	PAL	MPE, any operating system running on the HP 3000	Relational	Proprietary	Yes	Beyond field level	Yes	—	Yes	Masmos	$7,700
Harris Corp. (800) 442-7747	Unify	Unix	Relational	SQL	Yes	Data item level	Yes	User security, backup and transaction logging utilities, menu management	Yes	Any DBMS supporting SQL and flat file import utility	Contact vendor
	Oracle 5.0	Unix	Relational	SQL	Yes	Data item level	Yes	Oracle display system, auditing facility, data loader, after-image journaling	Yes (Version 5.1)	NA	Contact vendor
Henco Software, Inc. (617) 890-8670	Info-DB Plus	VAX/VMS	Relational	Proprietary	Yes	Data item level	Yes	Screen-based data dictionary, security, user profile editors, traditional DBMS with unstructured text fields	No	Native file structures	Contact vendor
Hewlett-Packard Co. Contact local HP office	Turbo Image	MPE, MPE XL	Network DBMS	Query language	Yes	Data item level	No	Creates data bases and erases them, shows users of data base, restructuring	Yes	NA	Contact vendor
	HP SQL	HP-VX, MPE, MPE XL	Relational	ISQL	Yes	Data item level	Yes	SQL Util	No	NA	$4,000-$15,000
	Allbase	HP-UX, MPE, MPE UL	Relational, network	ISQL, IQuery	Yes	Data item level	Yes	Data base creation	No	NA	$20,000-$30,000
Honeywell Bull, Inc. (800) 328-5111 ext. 90	Multics Relational Data Store	Multics	Relational	Proprietary	Yes	Table level	No	Restructuring capabilities, decentralized administration	No	None	Contact vendor
	IDS/2	GBCOS	Codasyl	SQL, QRP/PLP	Yes	Physical record level	Yes	Save and restore, analysis utilities, restructuring and reorganization	Yes	I-D-S/2 in a minicomputer environment	Contact vendor
	Interel	GBCOS 8 for Interel	Relational	SQL	Yes	Any level	Yes	Load facilities, optimization utilities, access of nonrelational data with SQL	Yes	None	$8,000-$14,000
IBM Contact local IBM sales office	DB2	MVS/370, MVS/XA, MVS/TSO	Relational	SQL	Yes	—	Yes	Recovery backup, on-line Help facilities, performance monitor	—	IMS, VSAM	Contact vendor
	IMS/VS-DB	MVS/370, MVS/XA	Hierarchical	DL/1	Yes	Field level	Yes	Backup, recovery and reorganization utilities	—	VSAM, DB2	Contact vendor
Information Builders, Inc. (212) 736-4433	Focus	VM, MVS, VAX/VMS, Unix, Wang VS	Shared relational	Proprietary	Yes	Record level	Yes	Report generator, dialogue manager, application development system	Yes	IMS, DB2, SQL/DS	$43,000-$100,000
Information Dimensions, Inc. (800) 328-2648	DM	VAX/VMS, Control Data NOS/VE	Relational	Proprietary	Yes	—	Yes	Report writer, language-independent interface, Cobol and Fortran interface	No	—	$25,000-$43,500
Information Structures, Inc. (303) 283-2011	Base/OE	VAX/VMS, RSX	Hierarchical	Proprietary	Yes	Field level	No	—	No	None	Contact vendor
Informix Software, Inc. (415) 322-4100	Informix SQL	VMS, DOS, all Unix versions	Relational	SQL	Yes	Field level	Yes	Report writer, screen generator, interactive schema editor	Yes	Lotus's 1-2-3	Contact vendor
	Informix 4GL	VMS, DOS, all Unix versions	Relational	SQL	Yes	Field level	Yes	Report writer, screen generator, interactive schema editor	Optional	None	Contact vendor
Intelligent Information Systems, Inc. (312) 986-4400	IIS/Destiny	VAX/VMS	Hierarchical, relational, network	Form-driven	Yes	Field level	Yes	Loader, dictionary report, automatic generation of file-maintenance utilities	No	Any RMS file	$15,000-$60,000
Interbase Software Corp. (617) 649-3977	Interbase	VAX/VMS, VAX-/Ultrix	Relational, distributed	SQL, proprietary	Yes	Field, view levels	Yes	Backup utility, data base maintenance utility	Yes	RDB/VMS	$15,000-$75,000
International Parallel Machines (617) 990-2977	IPDBMS	IPOS (proprietary)	Relational	Proprietary	Yes	Field level	No	Data base library	Yes	ISIS, Ingres	Contact vendor
MAI Basic Four, Inc. (714) 731-5100	MAI Origin	BOSS/IX, BOSS/VS	Relational	Query-by-Example	Yes	User-level security	Yes	Data item where used, file-/program cross-reference, data impact report	Yes	Any via flat file	$995-$10,900
Microforms Trans-Lingual (612) 944-8961	Dcare	VMS, MVS/CICS, VM/CMS, MVS XA, CICS	Relational	Proprietary	Yes	—	Yes	—	Yes	Any DBMS through sequential file listing	$15,000
Must Software International (203) 762-2511	Nomad 2	VM/CMS, MVS/TSO	Relational, hierarchical	Proprietary	Yes	Field level	Yes	Function to build data dictionary, data base check for fragmentation statistics	Yes	IMS, DB2, SQL/DS, IDMS	$45 000-$120 000
National Information Systems, Inc. (408) 257-7700	Accent R	TOPS-10, TOPS-20, VMS	Relational	Proprietary	Yes	Any level	Yes	Performance monitoring, host-language interface	Optional	Through host-language interface only	$4,000-$99,000
Officesmiths, Inc. (613) 235-6749	The Officesmith	Unix	Hierarchical	Proprietary	Yes	Field level	Yes	Report generator, screen generator, 4GL	No	Unify	$5,000-$90,000

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On-Line Software International, Inc. (800) 826-0272	**Ramis Information Systems**	**DOS/VSE, MVS/XA, VM/CMS**	**Relational**	**SQL/DS**	**Yes**	**File level**	**Yes**	**Utilities program included**	**Yes**	**DB2, DL/1, IMS/VS, SQL/PS, Adabas, IDMS/R, Total**	**$40,000-$115,000**
Oracle Corp. (800) 345-DBMS	Oracle	VM/CMS, MVS, VAX/VMS, VAX/Ultrix, Unix System V, 4.2	Relational	SQL, SQLForms, Query-by-Example	Yes	Data field level	Yes	SQLLoader for file conversion, SQLForms 4GL application generator, SQLConnect for interfacing to DB2	Yes	DB2, SQL/DS	Contact vendor
Prime Computer, Inc. (617) 655-8000	**Prime Information**	**Primos**	**Distributed relational**	**English structure for 4GL**	**Yes**	**Subvalue level**	**Yes**	**System tuning, security, backup ability**	**Yes**	**—**	**$5,000-$35,000**
	Prime Oracle	**Primos**	**Relational**	**SQL**	**Yes**	**Value level**	**Yes**	**Import/export for table backup and recovery, ODL for converting flat ASCII files in Prime Oracle tables, performance tuning capabilities; multitable clustering, indexing**	**Yes**	**DB2, SQL/DS**	**$10,000-$80,000**
Public Office Corp. (202) 638-8999	Session	VAX/VMS	Proprietary	Proprietary	Yes	Data value level	Yes	Reorganization of data, evaluates data from foreign systems, reads any fixed-length tape, includes any data base	Yes	Any	$8,200-$50,000
Quadata Corp. (303) 730-6777	**QDMS-R**	**VAX/VMS**	**Relational**	**Proprietary**	**Yes**	**Bit level**	**Yes**	**Report generator, screen-based administrative views**	**Yes**	**Powerhouse, RDB, DBMS/32**	**From $12,000**
Relational Technology, Inc. (800) 4-INGRES	Ingres	Most Unix versions, MS-DOS, VM/CMS, AIX, PC-DOS, VAX/VMS, Ultrix	Relational	SQL, QUEL	Yes	Field, time, data, user levels	Yes	Cojournaling/recovery/audit facilities, query cost, query plans, settable maximum cost query allowable, user-settable concurrency-control mechanisms	Yes	DB2, SQL/VS, RDB, IMS, RMS, Dbase III, Lotus's 1-2-3	$5,000-$140,000
Rhodnius, Inc. (416) 922-1743	**Empress 32**	**VAX/VMS, Unix**	**Relational**	**SQL**	**Yes**	**Field level**	**Yes**	**Automatic data conversion, integration with non-data-base data**	**Yes**	**ASCII, fixed links, delimited files**	**$9,000-$100,000**
Ruf Corp. (913) 782-8544	DMPRS	VAX/VMS, RSTS	Relational	Proprietary	Yes	Record level	No	—	No	—	$10,000-$20,000
SAS Institute, Inc. (919) 467-8000	**Data Management Software**	**OS, CMS, DOS/VSE, NOS, OS-1100**	**Hierarchical**	**Proprietary**	**Yes**	**Field level**	**Yes**	**Accounting log, rollback and receive, report writing**	**Yes**	**DB2, IMS**	**From $12,000**
Saturn Systems, Inc. (800) 328-6145	Saturn-Base	VMS, RSX, TSX, POS, RSTS	Relational	Proprietary	Yes	File level	No	Rekeying, data file extension, password modification	No	Any with ASCII files	$1,850-$14,000
Seed Software Corp. (800) 445-3307	**Seed DBMS, Proseed**	**VAX/VMS, VM/CMS, OS/2, PC-DOS, MS-DOS, Primos**	**Codasyl**	**Proseed, DBQuery**	**Yes**	**Item level**	**Under development**	**Statistics on usage, optimization tool, readable data page dump with all pointers, broken-pointer search, broken-pointer repair**	**Yes**	**None**	**From $995-$78,950**
Signal Technology, Inc. (800) 235-5787	Omnibase	VAX/VMS	Relational	SQL	Yes	Field level	No	NA	No	Britton Lee data bases	$5,000-$55,000
	Smartstar	VAX/VMS, MicroVMS	Relational	SQL	Yes	Field level	No	VAX/RDB	No	Datatrieve, VAX 3GL languages, Oracle, Ingres, VAX RMS programs	$3,500-$5,000
Software AG of North America, Inc. (703) 860-5050	**Adabas**	**All IBM OS, VAX/VMS, Siemens OS**	**Relational**	**Natural, all 3GL access through SQL-based syntax**	**Yes**	**File, field, value within field levels**	**Yes**	**All functions incorporated into base product**	**Optional**	**Any**	**Contact vendor**
Sun Microsystems, Inc. (415) 960-1300	Sun Ingres	Sun version of Unix 4.2	Relational, network	SQL	Yes	Data item level	Yes	Report writer, transaction logging	Yes	None	$2,000-$3,000
	Sun Ingres	Sun version of Unix 4.2	Relational	SQL, QUEL	Yes	Data item level	Yes	Report writer, transaction logging, custom forms	Yes	Unify, Ingres through batch conversion	$2,500-$4,000
Sybase, Inc. (415) 548-4500	**Sybase System**	**Sun Unix, VAX/VMS, VAX/Ultrix**	**Relational**	**SQL, proprietary**	**Yes**	**Any level**	**Yes**	**Data base consistency checker, dump and load, bulk copy**	**No**	**None**	**$10,000-$100,000**
Tandem Computers, Inc. (408) 725-6000	Nonstop SQL	Guardian 90	Relational	SQL	Yes	Value via SQL views	Yes	File utility programs, disk space analysis/disk space compression, backup/restore	Yes	Informix	$3,000-$4,000
The Ultimate Corp. (800) 654-0134	**Ultimate Operating System**	**Ultimate, Pick enhanced**	**Relational**	**Proprietary**	**Yes**	**Value level**	**Yes**	**Restart, recovery, backup, full application development system**	**Yes**	**Any Pick system, RMS**	**Contact vendor**
Unify Corp. (916) 920-9092	Unify	Unix, MS-DOS, Network-DOS	Relational	SQL	Yes	Field level	Yes	Complete set	Yes	Optional	$795-$50,000
Unisys, Inc. (303) 443-7878	**C-Scribe**	**Unix**	**Relational**	**SQL**	**Yes**	**File level**	**Yes**	**All**	**No**	**HP Image**	**$15,000**
Unisys Corp. (215) 542-6911	Universal Data Management System	OS-1100	Combines flat file, Codasyl, relational	SQL	Yes	Field level	Yes	Statistics gathering, recovery, debugging and audit trail	Optional	None	$89,000-$243,730
Userware International, Inc. (619) 745-6006	**User-11**	**RSTS/E**	**Hierarchical**	**Proprietary**	**Yes**	**Block level**	**Yes**	**—**	**No**	**User Base**	**$7,500-$15,000**
	Userbase	**VAX/VMS**	**Hierarchical**	**Proprietary**	**Yes**	**Block level**	**Yes**	**—**	**No**	**Any RMS-based file**	**$7,500-$80,000**
Wang Laboratories, Inc. (617) 459-5000	Pace	VS	Relational	SQL, Query-by-Example for Pace Query	Yes	View level	Yes	Recovery and backup, cross-reference reports, copy tables	Yes	IDMS/R	$13,000-$39,000
Westmoreland Software International, Inc. (305) 360-5858	**Add System**	**IBM 5360, System/36 PC, System/34**	**—**	**—**	**—**	**—**	**Yes**	**Performance monitoring, report generator**	**Yes**	**—**	**$3,600**
Zanthe Information/Unipress Software (201) 985-8000	ZIM	Unix, Xenix, Ultrix, VMS, MS-DOS, PC-DOS, Novell, QNX	Entity relational	Proprietary, SQL	Yes	Field level	Yes	—	Yes	None	$795-$25,000

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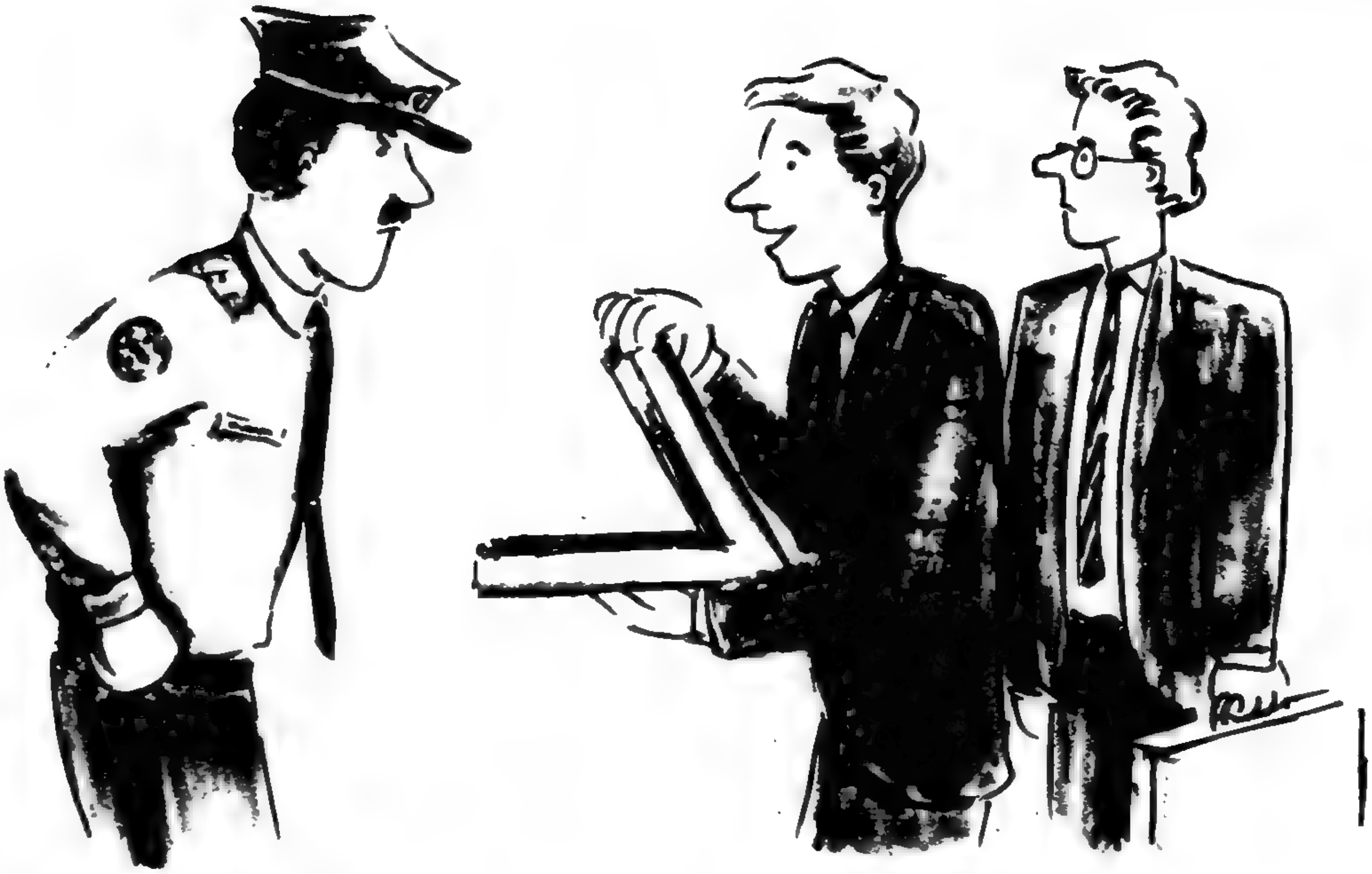

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COMPUTERWORLD
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Tandon exec passes posts to founder

BY JAMES A. MARTIN
CW STAFF

CHATSWORTH, Calif. — Tandon Corp. President and Chief Operating Officer Dan H. Wilkie has resigned that position, relinquishing both titles to S. L. "Jugi" Tandon, the company's founder, chairman and chief executive officer.

Wilkie, who has served as Tandon's president and chief operating officer since December 1985, will remain with the company to oversee its possible spin-off of a third-party service firm. Although plans are incomplete, Wilkie said discussions are ongoing with Tandon's board regarding his appointment as president and chief executive officer of the company's service organization.

"Tandon has wanted to have a more active role, and I've wanted to have more autonomy," Wilkie said. "A pet project of mine has been the customer service area, which I've been wanting to expand to serve non-Tandon products. We decided we would both be better off this way."

Wilkie, a longtime IBM executive before joining Tandon, brushed aside contentions that he resigned because of disputes with top management. "Anytime there's a company with such complexity, there are always differences of opinion," Wilkie explained. "My relationship with Tandon is amiable."

Several analysts expressed surprise at the announcement. "Tandon has just gone through a period of financial difficulty, with their recent quarters showing improvement, so it was a surprise to see Wilkie step aside," said Ray Freeman Jr., president of Santa Barbara, Calif.-based Freeman Associates, a consulting firm.

CEO leaves redone Tigera

BELMONT, Calif. — Former Fortune Systems, Inc. Chairman James S. Campbell resigned last week as chairman, president and chief executive officer of Tigera Group, Inc., the renamed parent company of Fortune Systems' software business.

Campbell had helped orchestrate the recent sale of Fortune's ailing supermicro hardware business to SCI Systems Corp. in Huntsville, Ala. In a statement, Campbell said the completion of that sale allowed him to become a principal in Management Partners International, Inc.

Named to replace Campbell as chairman of Tigera Group was Isaac Gilinski, president of Industries Gilinski, a diversified manufacturer in Cali, Colombia. Susan Espy will continue as president of Tigera Corp., the company's software unit.

In financial results that partially reflected charges from its restructuring, Tigera Group reported a loss of $12.9 million on revenue of $1.3 million for the quarter ended June 30.

Parts tariff

CONTINUED FROM PAGE 71

result of the U.S.-Japan dispute over semiconductor trade [CW, April 27].

"Our member companies are deeply concerned about the ruling because it runs afoul of the 100% tariff," said Charlotte LeGates, a spokeswoman for the Computer and Business Equipment Manufacturers Association (CBEMA), which is based here.

Asked for reprieve

In a July 28 letter to the Customs Service, CBEMA called for a 60-day suspension of the ruling to give the industry time to rebut it. Also, the trade group is urgently seeking an interview with William von Raab, commissioner of the Customs Service, LeGates said.

According to CBEMA officials the ruling, made without a public hearing, is contrary to the long-standing experience of the computer industry and contrary to the letter and spirit of the 1985 trade agreement.

"It creates new, unfounded and unnecessary administrative criteria for determining the tariff status of hundreds of thousands of computer parts," CBEMA's letter to customs added.

The decision

The Customs Service ruling was issued by John T. Roth, the agency's director of classification, who argued that a circuit board capable of performing data processing and arithmetical computations is a data processing machine and, therefore, subject to tariff.

The industry generally refers to the boards as "single-board computers," he said, thereby confirming that they are computers rather than parts.

Roth's legal ruling asserted that even though CPU boards must be plugged into a computer system in order to function, they are distinct commercial products that are ultimately capable of being programmed and executing programs, thus fitting the definition of data processing machines.

Expansion boards and boards used to control peripherals are properly classified as parts, the ruling said.

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Rumor mill

CONTINUED FROM PAGE 71

hint of bad news.

One of those hints, at least for many vendors of microcomputer peripherals, was the IBM Personal System/2. Its potential to rearrange that market niche created a volatile situation that many investors would rather not risk.

In general, the market seems ready to beat down the price of an otherwise solid computer company at the first glitch in growth rates. Two cases in point are Cray Research, Inc. and Alliant Computer Systems Corp. — firms with well-regarded management teams and impressive technology that seem well positioned for the long haul.

But both firms recently announced slower quarters than expected. Now Alliant's stock is hovering in the high teens after peaking at 37; Cray is near 100 after rising higher than 135.

Another factor affecting investors is the torrid pace of mergers and acquisitions in the industry this year. The Broadview Associates index of software and services industry deals is up again for the first six months of the year: 137 deals for $2.1 billion, compared with 130 deals for $1.9 billion in the first half of 1986.

A wave of industry marriages invariably produces an even bigger wave of takeover rumors — thus the laughable phenomenon of CDC's stock rising on such a rumor. This rumor will undoubtedly take its place in the Non-News Hall of Fame, along with AT&T buying Wang Laboratories, Inc., AT&T buying Digital Equipment Corp., Ford Motor Co. and NCR Corp. buying Sperry Corp. and, most recently, Prime Computer, Inc. buying Data General Corp.

In reporting the plunge in NEC's stock last week, one national newspaper wrote, "One trader said that a rumor sometimes has much greater impact on a stock than fact." That line speaks volumes about trying to gauge a company's prospects as a vendor on what happens to its shares in the stock market.

Wilder is *Computerworld's* senior editor, computer industry.

TRW service

CONTINUED FROM PAGE 71

"We want customers to recognize us as an extension of their company."

TRW's Customer Service Division is running neck and neck with Sorbus for leadership in the $1.6 billion third-party computer maintenance business. The division is faced not only with a recommitted IBM but with competition from other hardware manufacturers, such as Digital Equipment Corp., which are expanding their maintenance activity. Both the TRW division and Sorbus claim revenues of around $220 million. Sorbus, however, formerly owned by now-defunct Management Assistance, Inc., counts revenue from servicing computers of ex-sister company MAI Basic Four, Inc. as third-party revenue, which has added considerably to its market position.

No longer 'top banana'

"TRW was always the top banana in the third-party maintenance business over the last couple of years, but now they are sharing the limelight with Sorbus," says D. R. "Mike" MacNaughton, president of Business Development International, a Franklin Lakes, N.J., consulting firm that tracks the business.

TRW's plan to diversify into application and operating software maintenance and consulting services should help it fend off the competition, analysts say.

"Generally, the issue is not just being in the hardware maintenance business, but being able to implement different services," notes Rebecca Segal, an analyst with International Data Corp. "Software support, communications and training are segments that will help grow the business."

TRW's Snyder

Snyder says he is on the prowl for acquisitions that would complement the firm's current business activities. The division is evaluating companies that maintain equipment in the financial services, retailing, resellers, government and medical markets. Through a mix of internal growth and acquisitions, Snyder says he hopes to double the division's revenue during the next three years.

The resources necessary to do these things and more are plentiful at a $6.5 billion conglomerate, Snyder says. TRW recently designated its Information Systems Group as one of the profit centers in which it will invest heavily. Snyder says increasing the technical expertise of his field engineers is among his highest priorities. To accomplish this, the division plans to offer a better training program and incentives to personnel.

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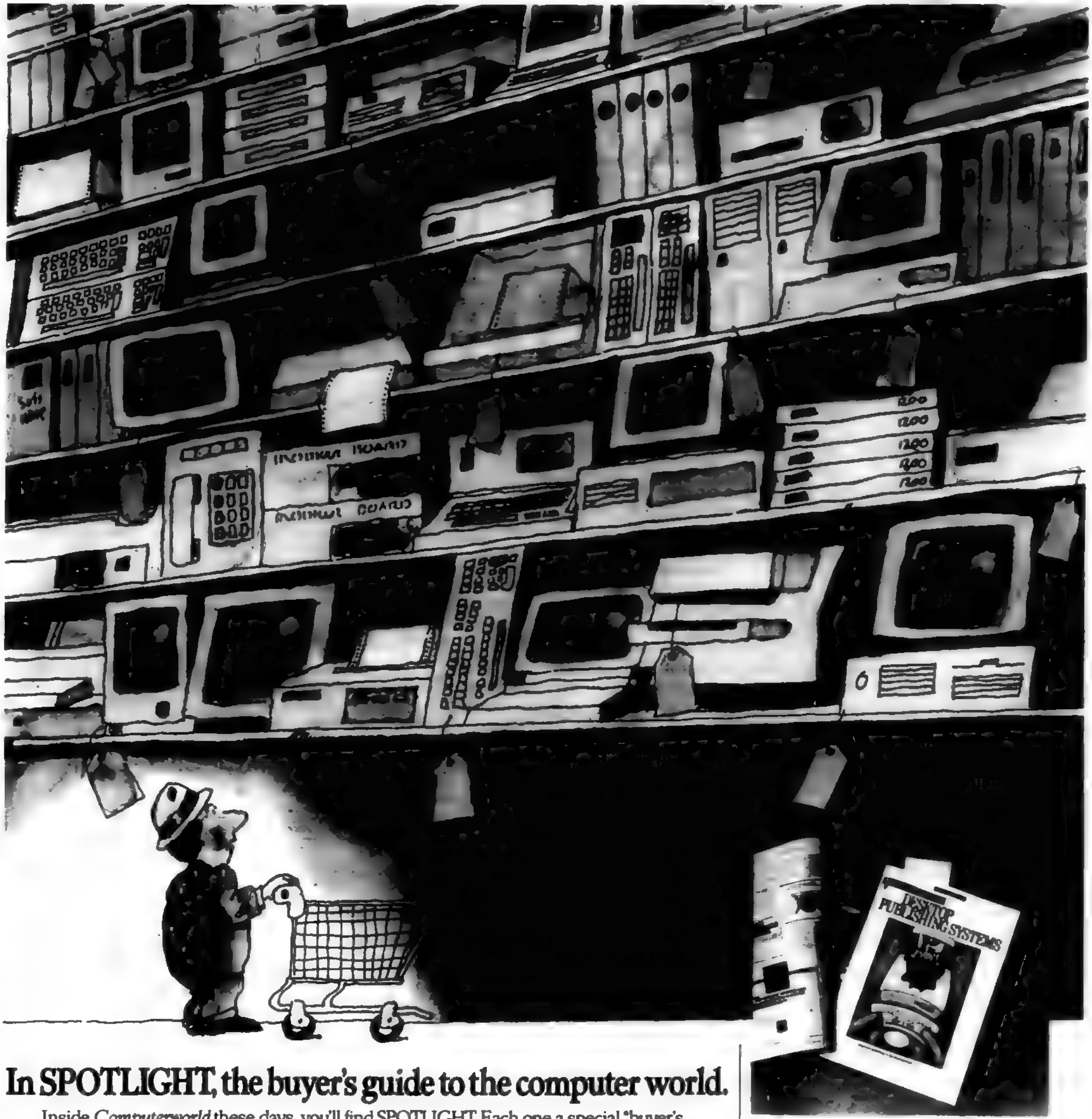

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EMPLOYMENT TODAY

Making the switch to sales

Vendors seek technology know-how for marketing positions

BY STEPHEN BANKER
SPECIAL TO CW

After pursuing an early career in data processing and assembly language programming, Peter Green switched from the technical to the "people" side of the business three years ago when be joined General Electric Consulting Services. Today, at 39, he is marketing and sales manager for the Northeast area, working out of Albany, N.Y.

"I was a machine person, and I said to myself, 'I can have more fun being a people person,' " Green says. That simple statement explains why Green and many DP people like him are jumping from technical positions to sales and marketing.

As computer products become increasingly complex in an era of rapidly changing technology, they are, inevitably, more difficult to explain. In some instances, computer companies are finding that the most effective people to showcase their products — and to differentiate them from those of the competition — are the people who have worked on the original design and implementation.

Superior financial rewards on the sales side are part of the reason for the trend, according to those making the switch. One DP worker who is considering the change says, "Here I am making $40,000 a year, killing myself, helping the salesman make $80,000. Hey, I know as much as him. In fact, I do all his work for him. Why don't I make that kind of money?"

"If I were still in the DP shop," says another worker, who has already made the transition, "my day would be 8 a.m. to 5 p.m., earning 30% to 40% less, and [I would be] underchallenged. Now, I like my job enough so that it's almost like a compulsion, and I frequently work from 6 a.m. to 10 p.m."

Not everybody fits

But the move is not right for everyone. The marketing job requires considerable desire. Despite his overall increase in income and job satisfaction, the individual who changed positions has actually taken a cut in his hourly rate.

"The technical people who move into sales are very customer-oriented to begin with," says Dennis Jolly, director of sales for PC's Limited in Austin, Texas. "There are people who are in technical jobs who are happy where they are and would not be happy in sales, because sales requires some specific personality traits."

What are those traits? "Salesmen are very competitive people," says Harvey Silver of Dunhill Personnel Consultants in Tysons Corner, Va. "Every sale is a conquest. A person finds himself with his ego exposed to the whim of the buyer."

Silver suggests that the government marketplace, compared with the private sector, offers a smoother transition for DP workers and other technically oriented personnel who want to go into sales and marketing.

"In the commercial world, the image of a salesman is different," Silver says. "Even your car has to be nice, in case you have to take a client out to lunch. A technical sort might not have that pin-striped kind of appearance. The government market doesn't demand the classic starched shirt. In government sales, you get down there in the trenches. It's more proposal-oriented."

> "IN THE commercial world, the image of a salesman is different. Even your car has to be nice, in case you have to take a client out to lunch. A technical sort might not have that pin-striped kind of appearance."
>
> HARVEY SILVER
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Tarnish to the glitter

But personal style is not the only obstacle to the transition. "You're going from salary," Silver says, "to a situation in which compensation is based on production. You have the risk of rejection and a series of highs and lows. All of a sudden, that money becomes less glittery."

There is clearly a price to be paid for the extra earnings in terms of hours, aggravation and responsibility. Sales jobs in the computer industry are likely to take a worker away from home a few days every week.

Even the money is deceptive. A typical DP worker, earning perhaps $40,000 a year, is likely, at first, to be kicked down to $30,000 with the prospect of commissions. But before the commissions start coming in, mortgages and other bills remain due every month. The bottom line is that turnover among sales agents is consistently higher than among technical people.

Manny Fernandez, president of Dataquest, Inc. in San Jose, Calif., draws a distinction between types of computer companies. "The best utilization of technical personnel," he says, "is when the marketing of the product is highly technical.

"Take the companies with the newest 32-bit machines, microprocessors and peripherals," Fernandez explains, "that's when a product tasks the computer beyond its normal applications, and you have to become highly involved in the architecture of the machine. You need a design-level understanding to be able to talk to the customer. Then, the chances are that someone from the engineering organization will make a heck of a lot more sense, taking it down to the device level."

On the other hand, Fernandez adds, there is the situation of "a company selling DP equipment into a DP shop to do the same things they have done in the past; there's no necessity for a technical person to be involved in the sale."

The consensus is that for those seeking to make a move, the best place is one's current job. As Silver says, "If the guy knows the product well, they'll give him a shot because he's bugging them to death. The companies aren't going to pay me large dollars to get them people who've had no experience."

Banker is a Washington, D.C.-based writer.

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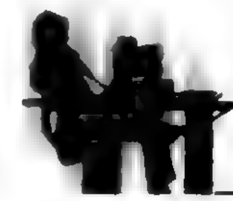

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Must be able to develop software in CHILL (High Level Language) for performing telephonic functions in a Private Automatic Branch Exchange (PABX). Design software to implement U.S. signaling systems and features, specification writing, coding and integrate testing. Bachelor's degree in Electrical Engineering, Computer Science or related degree is required. Must have a minimum of one year experience in job offered. Advanced degree accepted in lieu of experience but must have knowledge of telecommunications software application. Forty hours per week; $33,000 per annum.

Send resumes to:

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PROGRAMMER/ANALYST: Analyze, design, code, test, implement & maint IDMS database programs for a Customer Profile Inform Syst of various Int'l financial co s & install a Co-design in COBOL/VSAM a CASH SWEEP SYSTEM, a syst which allows money to be transferred from IRA funds to high-yielding Alliance funds. Analyze the Subsystem using T ROWE PRICE SYST in order to redesign & process new syst's. Maint prog. reports & all documentation. Design screen layouts for CASH SWEEP INQUIRY in COBOL/VSAM using CICS release 1.7. Test & debug Syst. using EASYTRIEVE. Develop standardization procedures for audit & control, back-up, recovery & restart. Instruct in use of syst. as well as in OS Utilities. 2 yrs exp. Bach degree in Math, Physics or Computer Sci. Must have the following exp in database programming: OS/MVS, VSAM, EASYTRIEVE, COBOL, TSO/SPF, LIBRARIAN, IDMS, QUICKJOB, CULPRIT, PANVALET, CMS, IBM 4341 & IBM 3081. $32,000/yr, 40 hrs/wk. Pinkerton Computer Consultants Inc. 20 Broad St., Suite 1302, New York, NY 10005. Send resumes, Attn: A.J. 380

PROGRAMMER/ANALYST. Analyze, design, develop, code, implement & maintain computer application for company involved in the installation of a TPF-syst. Work w/a team to develop syst. Debug & enhance complicated all-computer-language syst. Develop documentation of the TPF-syst & train users on syst. Provide for back-up & recovery. 2 yrs exp. Must know the following hardware & software: IBM 4381, TPF-Operating Syst, ASSEMBLER, PASCAL, BASIC, COBOL, FORTRAN, MICRO LANGUAGE, REXX. $37,500/yr., 40 hrs/wk. Spondello Consulting Group, 10 East 21 Street, Suite 1304, New York, NY 10010. Send resume: Attn: K.S. (386)

SYSTEMS ANALYST

Develop and implement computer-based system programs and analyses methodologies for scientific and business applications, using IBM mainframe and PC. BS plus two years experience or MS in lieu of experience. Degree in Computer Science, Math, or Engineering, proficient in FORTRAN, COBOL, PASCAL, "C" languages. $3,000 per month. 40 hours per week. Job site/interview in Los Angeles, CA. Send ad and resume to:

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HOUSTON, TX 77002
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INFORMATION TECHNOLOGY DEPUTY DIRECTOR

Position serves as Deputy Director for Data Processing and Telecommunications services for the Department of Information Technology, which is established by the Code of Virginia as the central management agency responsible for providing technology services to all branches of State Government. Major duties include: managing and directing the agency's Data Processing and Telecommunications service operations and hardware, software and telecommunications systems in support of customer agencies and institutions. Must have extensive knowledge and experience in the management of Data Processing and Telecommunications service operations. Exceptional interpersonal and communications skills are essential.

We offer excellent benefits and relocation assistance.

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All applications/resumes should reference position #IT132 and must be received by August 31, 1987. Reply to:

Department of Information Technology
110 South Seventh Street, Third Floor
Richmond, VA 23219
Attention: Personnel
EOE/M-F

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The Applied Computer Analyst will provide analysis of computing problems with regard to feasibility and method, consult with users regarding their computing and statistical needs and aid in the development of plans to meet these needs; direct computer programmers engaged in consulting, programming, and teaching functions.

Bachelors degree plus graduate work, preferably a masters degree and four to eight years experience in programming work or an equivalent combination of education and experience. Send cover letter and resume to:

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Director of MIS
CW Transport Inc.
610 High St.
Wisconsin Rapids, WI 54494
Tel. # (715) 424-[illegible]

EOE

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Programmer analyst II for a Western PA computer software company to analyze, code, and test technical assignments utilizing IBM 370 Assembler and SAS languages. Participate in continued upgrading of existing high technology productivity enhancement software products, assist in resolution of problems with customer specific software applications.

Requirements: Bachelor of Science in Computer Science. Must have experience in systems programming, proficiency in IBM 370 Assembler and SAS languages, and be knowledgeable of MVS internals. Two (2) years experience in the position or Two (2) years as a Systems Programmer. 40 hrs/wk, Mon - Fri 9am-5pm, $26,500-$28,000/yr. Reply to CW-84945, Computerworld, Box 9171, Framingham, MA 01701-9171

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Develop and implement computer-based system techniques and analysis methodologies for business, accounting, and financial management. Two years experience with BSCS or BBA, or MSCS or MBA in lieu of experience. Knowledge of computer/programming (FORTRAN, "C", COBOL, PL-1) and accounting/financial analysis. $2950 per month. 40 hours per week. Job site/interview in Fountain Valley, CA. Send ad and resume to:

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COMMUNICATION SOFTWARE ENGINEER

Must be able to develop sophisticated software for telephony switching applications such as the DMI (Digital Multiplex Interface). Use of programming language C, IBM PC logic analyzer and INTEL ICE (In Circuit Emulator). Bachelor's degree in Electrical Engineering, Computer Science or related degree is required. Must have a minimum of one year experience in job offered. Advanced degree accepted in lieu of experience but must have knowledge of telecommunications software applications. Forty hours per week; $37,000 per annum.

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John P. Bertsch is President of Bertsch & Company Advertising, Inc., a full service recruitment advertising agency headquartered in New York, with offices in Boston, MA and Irvine, CA. John is often asked by his clients to recruit data processing professionals and where to run their ads.

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Sealed proposals will be received by the CDPA, 301 N. Lamar St., 301 Building, Suite 508, Jackson, MS 39201 for the following equipment and services.

Request for Proposal No. 1282, due Thursday, August 27, 1987 at 3:30 p.m. for the sale of two DEC PDP11/70 [illegible], two IBM 3277 CRT's, and one 3271 controller for the MISSISSIPPI DEPARTMENT OF PUBLIC SAFETY. No charge.

Request for Proposal No. 1283, due Thursday, September 10, 1987 at 3:30 p.m. for the acquisition of a distributed processor with full office automation capabilities for the WORKERS COMPENSATION COMMISSION. Charge $10.00.

Request for Proposal No. 1284, due Friday, August 21, 1987 at 3:30 p.m. for the acquisition of data entry services for the MISSISSIPPI DEPARTMENT OF PUBLIC WELFARE. No charge.

Detailed specifications may be obtained free of charge from the CDPA office or at the specified cost by submitting a written request accompanied by the appropriate payment.

NOTE: Valid forms of payment are corporate check on a Mississippi bank, certified check or POSTAL money order. NO CASH OR OUT-OF-STATE CHECKS. The CDPA reserves the right to reject any and all bids and proposals and to waive informalities.

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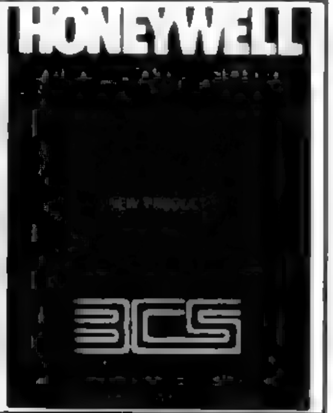

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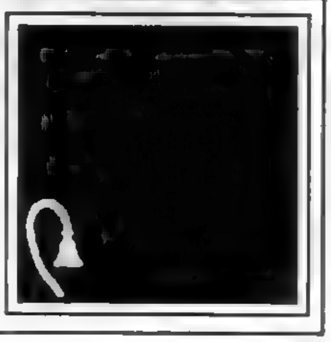

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Sealed bids shall be accepted by Procurement until 11:00 A.M., Monday, August 31, 1987. Bid forms and specifications may be obtained, free of charge, from the Bureau of Procurement, Contract Section, 7th Floor, 66 Leonard St., New York, N.Y. 10013 beginning August 3, 1987. You may contact Nicole Grant at (212-553-5353) if you have any questions concerning the pick up of said bid book or to arrange for the mailing of the bid package. Please refer to the Temp. Id number when making inquiries in this matter.

REQUEST FOR PROPOSAL

87-230

The County of Manatee, will receive sealed Proposals at Purchasing, 2806 12th St. Ct. E., Bradenton, Fl 34208 until 3:00 P.M., THURSDAY SEPTEMBER 24, 1987 to select a firm to aid Manatee County government in the development of a comprehensive land information system. Services requested are: Financing considerations for software, associated hardware, and data base development costs. Technical services to aid in the preparation of a complete data base development plan, an appropriate application software specification in response to that plan, and a method for selecting a hardware vendor based on the result of the software evaluation.

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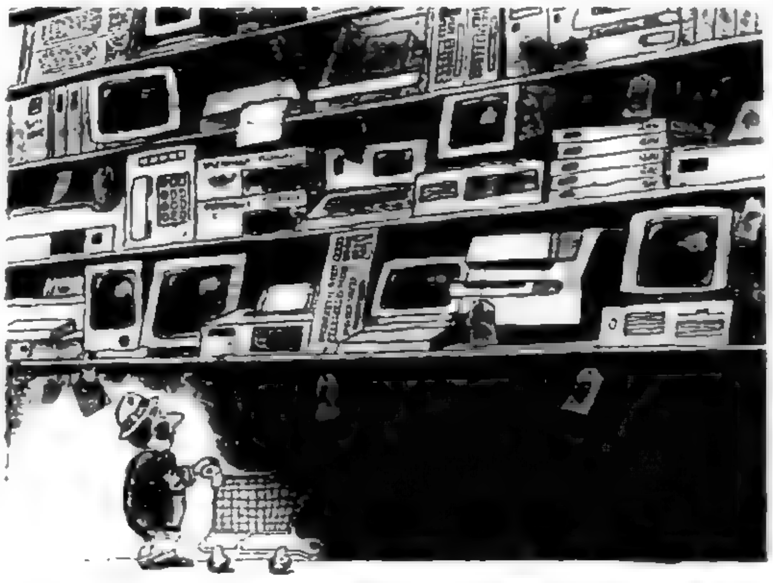

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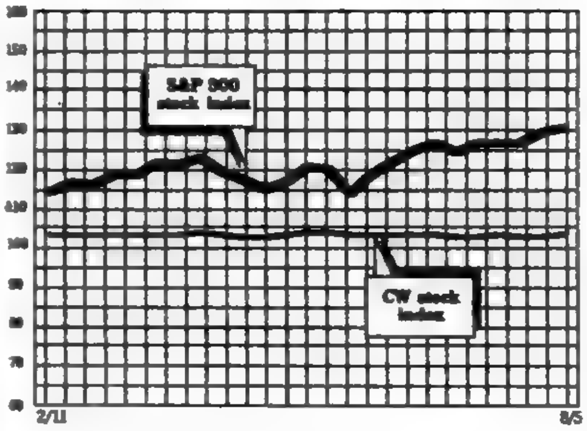
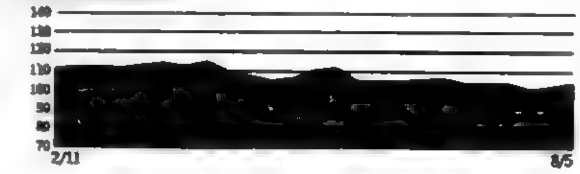
Sept. 14	DB2 Market	Aug. 28
Sept. 21	Hardware Roundup: Large & Medium Scale Systems	Sept. 4
Sept. 28	Hardware Roundup: Small Scale Systems	Sept. 11
Oct. 5	Hardware Roundup: Micros	Sept. 18

STOCK TRADING INDEX

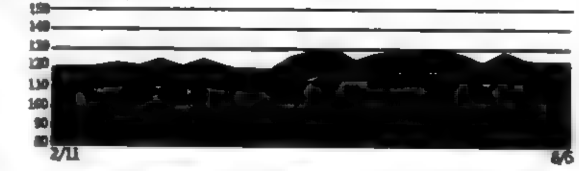


Indexes	*Last Week*	*This Week*
Communications	101.8	**103.4**
Computer Systems	123.6	**123.5**
Software & DP Services	131.6	**134.4**
Semiconductors	117.1	**120.3**
Peripherals & Subsystems	113.0	**114.1**
Leasing Companies	116.7	**120.9**
Composite Index	103.1	**103.5**
S&P 500 Index	129.4	**130.5**

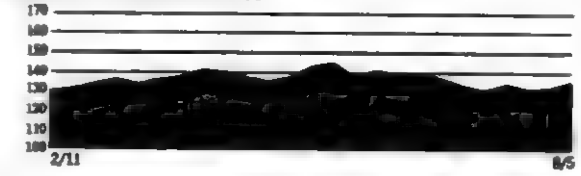
Communications



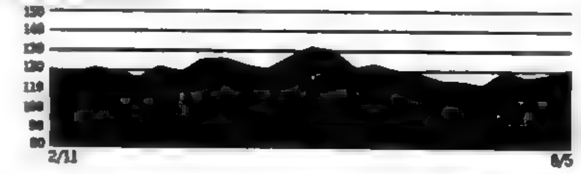
Computer Systems



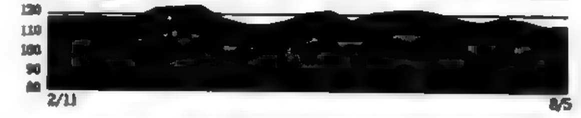
Software and DP Services



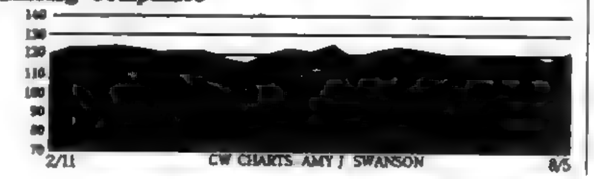
Semiconductors



Peripherals and Subsystems



Leasing Companies



CW CHARTS: AMY J. SWANSON

Computerworld Stock Trading Summary

CLOSING PRICES WEDNESDAY, AUG. 5, 1987

Communications and Network Services

EXCH		52-WEEK RANGE (1)		PRICE CLOSE AUG. 5 1987	WEEK NET CHNGE	WEEK PCT CHNGE
N	AMERICAN INFO TECHS CORP	101	77	[illegible]	+0.9	+1.0
Q	ANDREW CORP	19	14	[illegible]	-0.8	-4.4
Q	ARTEL COMM CORP	5	2	2.88	+0.0	+0.0
N	AT&T	33	22	32.88	+0.5	+1.5
Q	AVANT GARDE COMP INC	7	3	[illegible]	+0.6	+18.3
Q	AVANTEK INC	19	13	14.88	+0.3	+1.7
N	AYDIN CORP	38	18	30.63	-2.0	-6.1
N	BELL ATLANTIC CORP	77	62	69.00	+1.5	+2.2
N	BELLSOUTH CORP	46	35	39.25	+0.3	+0.6
Q	BRIDGE COMMUNICATION	27	11	[illegible]	+1.6	+8.0
Q	COMPRESSION LABS INC	13	4	4.38	-0.3	-6.7
Q	COMPUTER NETWORK TECH	8	4	4.06	+0.0	+0.0
Q	CONTEL CORP	37	27	36.50	+3.3	+9.8
Q	DATA SWITCH CORP	9	5	6.38	+0.0	+0.0
Q	DIGITAL COMM ASSOC	40	17	36.50	+2.0	+5.8
Q	DYNATECH CORP	44	27	28.50	+0.4	+1.3
Q	EQUATORIAL COMM CO	6	2	3.00	-0.3	-7.7
Q	GANDALF TECHNOLOGIES	11	5	7.25	+0.3	+3.6
Q	GENERAL DATACOMM INDS	14	8	[illegible]	-0.3	-2.8
N	GTE CORP	43	34	41.63	+2.3	+5.7
Q	INFOTRON SYS CORP	13	7	9.00	+0.0	+0.0
N	ITT CORP	66	47	63.75	+1.1	+1.8
N	M A COM INC	16	12	15.88	+0.3	+1.6
Q	MCI COMMUNICATIONS CORP	9	5	7.88	+0.0	+0.0
Q	MICOM SYS INC	18	10	11.75	+0.6	+5.6
Q	NETWORK SYS CORP	19	9	10.25	-0.1	-1.2
N	NORTHERN TELECOM LTD	24	14	21.50	-0.5	-2.3
Q	NOVELL INC	27	9	19.00	+0.5	+2.7
N	NYNEX CORP	73	59	[illegible]	+2.3	+3.3
N	PACIFIC TELESIS GROUP	31	23	27.13	+0.8	+2.8
N	PARADYNE CORP	8	4	[illegible]	-0.3	-3.8
A	PENRIL CORP	6	4	4.88	+0.4	+8.3
N	PLESSEY PLC	41	34	32.13	-1.9	-5.5
N	SCIENTIFIC ATLANTA INC	20	9	[illegible]	+1.1	+6.7
N	SOUTHWESTERN BELL CORP	41	33	39.00	+1.9	+5.1
Q	3 COM CORP	24	9	15.75	+1.0	+6.8
N	TIMEPLEX INC	41	15	33.13	+0.1	+0.4
Q	UNGERMANN BASS INC	16	7	10.50	-0.6	-5.6
N	U S WEST INC	62	45	[illegible]	+0.9	+1.7

Computer Systems

EXCH		52-WEEK RANGE (1)		PRICE CLOSE AUG. 5 1987	WEEK NET CHNGE	WEEK PCT CHNGE
Q	ALLIANT COMPUTER SYS	37	18	18.75	-1.5	-7.4
Q	ALPHA MICROSYSTEMS	7	3	5.13	+0.1	+2.5
Q	ALTOS COMPUTER SYS	17	10	12.50	+0.3	+2.0
A	AMDAHL CORP	42	17	[illegible]	+0.3	+0.7
Q	APOLLO COMPUTER INC	26	9	19.25	+1.0	+5.5
Q	APPLE COMPUTER INC	45	16	43.25	+2.3	+5.5
N	BOLT BERANEK & NEWMAN	30	19	[illegible]	+0.0	+0.0
Q	BRITTON LEE INC	5	3	3.25	+0.8	+30.0
N	COMPAQ COMPUTER CORP	51	13	47.00	+0.0	+0.0
Q	COMPUTER AUTOMATION INC	17	2	11.75	+0.0	+0.0
A	COMPUTER CONSOLES INC	12	7	8.13	-0.6	-7.1
Q	CONCURRENT COMP CORP	20	11	19.50	-0.5	-2.5
N	CONTROL DATA CORP DEL	35	20	[illegible]	+5.6	+20.4
Q	CONVERGENT TECH	12	4	7.25	+0.0	+0.0
Q	CONVEX COMPUTER CORP	22	8	15.88	+1.9	+13.4
N	CRAY RESH INC	136	69	104.88	+3.0	+2.9
Q	DAISY SYS CORP	13	7	7.75	+0.8	+10.7
N	DATA GEN CORP	39	25	32.25	+0.3	+0.8
N	DATAPOINT CORP	9	4	[illegible]	+0.8	+12.2
N	DIGITAL EQUIP CORP	175	88	165.25	+4.8	+3.0
N	FLOATING POINT SYS INC	17	8	10.00	-1.5	-13.0
N	GOULD INC	23	16	21.75	-1.4	-5.9
N	HARRIS CORP DEL	43	27	38.13	+1.6	+4.7
N	HEWLETT PACKARD CO	67	37	62.25	+0.3	+0.4
N	HONEYWELL INC	88	59	84.75	+2.0	+2.4
N	IBM	170	116	160.25	-1.3	-0.8
Q	INFORMATION INTL INC	17	13	14.00	-0.3	-1.8
Q	IPL SYS INC	3	2	[illegible]	-0.3	-8.0
Q	MASS COMPUTER CORP	10	5	8.75	+0.3	+2.9
N	MATSUSHITA ELEC INDL LTD	173	81	[illegible]	-1.8	-1.0
Q	MEGADATA CORP	7	2	5.00	+0.0	+0.0
Q	MENTOR GRAPHICS CORP	34	11	[illegible]	-0.4	-1.3
N	NBI INC	14	8	12.13	-1.0	-7.6
N	NCR CORP	80	42	76.50	-1.8	-2.2
N	PRIME COMPUTER INC	30	16	26.13	+0.0	+0.0
Q	PYRAMID TECHNOLOGY	12	4	7.75	-0.3	-3.1
Q	STRATUS COMPUTER	41	18	27.50	+0.5	+1.9
Q	SUN MICROSYSTEM INC	46	11	34.13	-1.1	-3.2
Q	SYMBOLICS INC	8	4	4.50	+0.1	+2.9
N	TANDEM COMPUTERS INC	38	16	27.88	-1.0	-3.5
N	TANDY CORP	56	31	46.25	+0.9	+1.9
N	ULTIMATE CORP	30	13	28.88	+1.0	+3.6
N	UNISYS CORP	45	22	44.38	-85.0	-65.7
A	WANG LABS INC	19	11	16.50	-0.3	-1.5

Software & DP Services

EXCH		52-WEEK RANGE (1)		PRICE CLOSE AUG. 5 1987	WEEK NET CHNGE	WEEK PCT CHNGE
Q	ADVANCED COMP TECH	6	3	3.88	+0.3	+6.9
N	ADVANCED SYS INC	25	12	23.88	+0.9	+3.8
N	AGS COMPUTERS INC	22	8	19.88	+1.0	+5.3
Q	AMERICAN MGMT SYS INC	19	7	16.63	-0.5	-2.9
Q	AMERICAN SOFTWARE INC	22	7	15.50	-0.3	-1.6
N	ANACOMP INC	11	3	10.50	+0.6	+6.3
Q	ANALYSTS INTL CORP	9	3	8.00	+0.8	+10.3
Q	ASHTON TATE	30	11	23.13	+0.1	+0.5
Q	ASK COMPUTER SYS INC	17	10	[illegible]	+0.5	+3.7
Q	AUTODESK INC	285	9	25.00	+3.0	+13.6
N	AUTO DATA PROCESSING	51	29	47.13	-0.4	-0.8
Q	BOOLE & BABBAGE INC	12	4	11.00	+0.0	+0.0
N	COMPUTER ASSOC INTL INC	29	10	26.25	+2.1	+8.8
Q	COMPUTER HORIZONS CORP	15	10	12.63	-0.6	-4.7
N	COMPUTER SCIENCES CORP	61	30	54.00	-1.8	-3.1
N	COMPUTER TASK GROUP INC	18	11	12.25	+0.0	+0.0
Q	COMSHARE INC	28	11	24.25	+0.3	+1.0
N	CULLINET SOFTWARE INC	13	6	11.88	-0.4	-3.1
Q	CYCARE SYS INC	12	7	9.25	+0.6	+7.2
Q	DUQUESNE SYS INC	33	12	20.25	+1.3	+6.6
Q	ENDATA INC	12	5	[illegible]	+0.3	+2.6
N	GENERAL MTRS (CL E)	45	24	43.00	+0.6	+1.5
Q	HOGAN SYS INC	17	9	13.38	-0.3	-1.8
Q	INFORMIX CORP	23	7	18.50	-0.5	-2.6
Q	INTELLICORP INC	11	4	7.00	+0.0	+0.0
Q	KEANE INC	10	5	7.25	-0.8	-8.4
Q	LOTUS DEV CORP	37	9	30.00	-0.5	-1.6
Q	MANAGEMENT SCI AMER	21	11	12.00	+0.0	+0.0
Q	MICRO PRO INTL CORP	8	2	5.44	-0.1	-1.1
Q	MICROSOFT CORP	128	26	97.25	-2.0	-2.0
Q	NATIONAL DATA CORP	32	17	31.75	+4.9	+18.1
Q	ON-LINE SOFTWARE INTL INC	20	6	18.88	+1.5	+8.6
Q	ORACLE SYS CORP	30	7	23.50	+2.8	+13.3
N	PANSOPHIC SYS INC	23	12	18.13	+0.1	+0.7
Q	POLICY MGMT SYS CORP	30	15	23.50	+0.0	+0.0
Q	PROGRAMMING & SYS INC	13	8	11.25	+0.3	+2.3
Q	REYNOLDS & REYNOLDS CO	42	27	34.75	+1.8	+5.3
Q	SEI CORP	18	8	15.75	+0.0	+0.0
Q	SHARED MED SYS CORP	53	23	25.75	+0.4	+1.5
Q	SOFTWARE AG SYSTEMS INC	20	10	13.00	+0.5	+4.0
Q	SOFTWARE PUBG CORP	17	5	8.75	-0.5	-5.4
A	STERLING SOFTWARE INC	19	9	10.25	+0.4	+3.8
Q	SUNGARD DATA SYS INC	21	10	[illegible]	-1.0	-5.6
Q	SYSTEMATICS INC	30	14	26.75	+0.5	+1.9
N	UCCEL CORP	45	19	43.88	+3.1	+7.7
N	URS CORP	21	13	17.88	-0.6	-3.4
Q	VM SOFTWARE INC	45	15	18.25	+0.8	+4.3

Semiconductors

EXCH		52-WEEK RANGE (1)		PRICE CLOSE AUG. 5 1987	WEEK NET CHNGE	WEEK PCT CHNGE
N	ADV MICRO DEVICES INC	25	13	18.13	+0.3	+1.4
N	ANALOG DEVICES INC	24	14	21.88	+0.4	+1.7
Q	ANALOGIC CORP	13	10	12.25	+0.3	+2.1
Q	INTEL CORP	51	16	46.88	-0.4	-0.8
Q	LSI LOGIC CORP	17	8	10.75	+0.1	+1.2
Q	MONOLITHIC MEMORIES INC	19	10	15.63	+0.4	+2.5
N	MOTOROLA INC	64	34	58.63	+1.9	+3.3
N	NATL SEMICONDUCTOR	17	8	13.63	+0.8	+5.8
N	TEXAS INSTRS INC	68	24	62.88	+3.1	+5.2
A	WESTERN DIGITAL CORP	33	12	27.75	+1.3	+4.7

Peripherals

EXCH		52-WEEK RANGE (1)		PRICE CLOSE AUG. 5 1987	WEEK NET CHNGE	WEEK PCT CHNGE
N	AM INTL INC	9	6	7.88	+0.3	+3.3
Q	AST RESH INC	23	11	17.00	+2.0	+13.3
Q	AUTOTROL TECH CORP	9	3	6.50	+0.0	+0.0
Q	BANCTEC INC	16	6	[illegible]	+0.1	+1.0
Q	CIPHER DATA PRODS INC	18	9	9.63	-0.4	-3.8
A	COGNITRONICS CORP	5	2	3.88	+0.0	+0.0
N	COMPUGRAPHIC CORP	24	16	23.25	-0.3	-1.1
N	COMPUTERVISION CORP	23	11	14.50	-0.5	-3.3
N	CONRAC CORP	30	12	0.00	+0.0	+0.0
A	DATAPRODUCTS CORP	16	10	11.38	+0.3	+2.2
A	DATARAM CORP	10	7	7.13	-0.1	-1.7
N	DECISION INDS CORP	13	7	11.25	-0.8	-6.3
N	EASTMAN KODAK CO	96	52	95.25	+1.4	+1.5
Q	E M C CORP MASS	35	11	[illegible]	+6.0	+20.9
Q	EMULEX CORP	10	6	7.50	-0.1	-1.6
Q	EVANS & SUTHERLAND	40	20	30.75	+0.8	+2.5
Q	ICOT CORP	13	5	5.88	-0.5	-7.8
Q	INTERLEAF INC	20	6	[illegible]	-0.3	-1.6
Q	IOMEGA CORP	12	2	3.38	+0.3	+8.0
Q	LEE DATA CORP	10	5	5.25	+0.1	+2.4
Q	MASSTOR SYS CORP	6	2	[illegible]	-0.8	-15.0
Q	MAXTOR CORP	34	12	13.75	-0.4	-2.7
Q	MICROPOLIS CORP	44	14	[illegible]	+8.6	+11.3
Q	MINISCRIBE CORP	18	5	14.00	+1.3	+9.8
N	MINNESOTA MNG & MFG CO	75	50	73.88	+1.6	+2.2
A	MSI DATA CORP	19	10	19.00	+1.0	+5.6
Q	PRIAM CORP	8	2	[illegible]	-0.1	-3.6
Q	PRINTRONIX INC	14	10	[illegible]	-0.8	-6.7
N	QMS INC	22	11	18.25	-0.8	-3.9
Q	QUANTUM CORP	35	15	17.00	+0.0	+0.0
Q	RAMTEK CORP	6	4	5.56	+0.6	+11.3
N	RECOGNITION EQUIP INC	27	11	19.00	+0.4	+2.0
Q	REXON INC	14	5	9.38	+0.1	+1.4
Q	SCAN TRON CORP	17	11	12.75	+0.3	+2.0
Q	SEAGATE TECHNOLOGY	46	11	30.13	+3.1	+11.6
N	STORAGE TECH CORP	5	2	[illegible]	-0.3	-6.9
Q	TANDON CORP	7	2	4.50	-0.4	-7.7
A	TEC INC	7	3	5.00	-0.3	-4.8
N	TEKTRONIX INC	43	26	38.75	+1.3	+3.3
Q	TELEVIDEO SYS INC	3	2	2.56	+0.2	+7.9
N	TELEX CORP	102	53	64.63	-0.4	-0.6
Q	WYSE TECH	35	13	30.88	-0.5	-1.6
N	XEROX CORP	81	51	73.25	-1.3	-1.7
Q	XIDEX CORP	20	11	13.25	+0.4	+2.9

Leasing Companies

EXCH		52-WEEK RANGE (1)		PRICE CLOSE AUG. 5 1987	WEEK NET CHNGE	WEEK PCT CHNGE
N	COMDISCO INC	33	15	[illegible]	-1.3	-4.2
N	CONTINENTAL INFO SYS	14	7	12.13	+1.8	+15.5
Q	PHOENIX AMERN INC	8	3	4.50	+0.3	+5.9
Q	SELECTERM INC	7	5	[illegible]	+0.0	+0.0
N	U S LEASING INTL	53	39	53.00	+0.4	+0.7

EXCH: N—NEW YORK; A—AMERICAN; Q—NATIONAL;
O—OVER-THE-COUNTER; S—SPLIT

O-T-C PRICES ARE BID PRICES AS OF 3 P.M. OR LAST BID
(1) TO NEAREST DOLLAR

Join the party

Tech issues push aside months of disfavor, host market rally

Two weeks ago, computer industry stocks missed the stock market's party of rising prices. Last week, they hosted it.

After a couple of months of disfavor, technology issues roared back into investors' portfolios, leading a market rally that propelled the Dow Jones industrial average up more than 27 points Thursday and sparked other market indicators to record levels as well.

Seven of the New York Stock Exchange's 15 most active stocks on Thursday were computer-related, and all were gainers. Star performers included the following: Tandem Computers, Inc., up 2 points to 29⅞; Hewlett-Packard Co., up 2¾ points to 65; and IBM, up 3⅜ points to 163.

Two less active stocks gained more than 8% in value. Computervision Corp. rose 1¼ points to 15¾, and Advanced Micro Devices, Inc. went up 1½ points to 19⅝.

Six technology issues on the Big Board hit their highs for the year on Thursday: Compaq Computer Corp. at 50⅝; AT&T at 33½; Unisys Corp. at 44⅝, its highest since a recent stock split; Uccel Corp. at 45; Anacomp, Inc. at 10¾; and Contel Corp. at 37⅞.

CLINTON WILDER

ADR greases DBMS's wheels

Claims up to 35% performance gain in new release of Datacom/DB

BY CHARLES BABCOCK
CW STAFF

PRINCETON, N.J. — Applied Data Research, Inc. (ADR) last week announced a performance-oriented release of Datacom/DB, its relational-like data base management system, that it says is 25% to 35% more efficient in transaction processing than its predecessor.

In addition to performance improvements, Release 7.5 of the DBMS incorporates a 31-bit addressing mode so it can take advantage of the facilities of IBM's MVS/XA operating system. Release 7.5 operates above the 16M-byte line that constrains regular IBM MVS/SP users, and it takes advantage of the larger virtual memory above the line. The DBMS also frees up Common Storage Area memory, for which there is frequently contention in busy shops relying heavily on older, 24-bit applications running below the 16M-byte line.

Besides increasing transaction throughput, ADR spokesmen claimed, this release of Datacom/DB is able to trim CICS response time by 25% to 35% and cut CPU utilization by 10% to 15%.

The performance improvements stem from a faster set-selection optimiser that uses a proprietary statistical estimation technique to select access paths and automatically stay abreast of changes in data patterns and keys. The optimiser is rule-based and can make trade-off decisions on access paths when it encounters complex queries, ADR spokesmen said.

Delegates work load

Datacom/DB is capable of distributing the I/O work load across multiple processors, allowing it to exploit dyadic and quadratic processors for greater system throughput, ADR spokesmen said.

Release 7.5 is available immediately. It carries a price tag of $145,900 for IBM OS and MVS environments and $114,500 for DOS environments.

In addition, the Princeton-based mainframe software house last week announced added functionality in Release 2.4 of its Datadictionary. The upgraded package is said to allow dynamic cataloging to support data base prototyping with change control of rapidly executed versions. It also allows multiple test, production and history versions of data base definitions to be established, tested, used, archived and refreshed with integrity.

Datadictionary Release 2.4 is available immediately and priced at $39,600 for OS and MVS versions and $32,600 for DOS versions.

Users edgy over VAX price rise

Digital Equipment Corp. customers were receptive last week to the price reductions on the lower end of the VAX line but stressed that they need more information about the price increases enacted on many of DEC's other products.

"I would have expected [the price cuts], since the Microvax III is coming out," said Larry Johnson, manager of MIS at Interlake in Burr Ridge, Ill. Regarding the price increases of up to 5% on most other DEC equipment, Johnson said, "I'm going to have a long, serious talk with my DEC rep." He said he was leaning toward Fujitsu, Ltd. disk drives on the five or six VAX 8250 and 8350 systems he might buy.

"As long as they keep dropping the prices in that low-end range, it suits us fine," commented Richard Baldwin, director of data processing at the Alabama River Pulp Co. in Perdue Hill, Ala. Last week, Baldwin received an 8250 system and said he is looking forward to the announcement in the near future of the VAX 8400.

Another manager, who is in the process of purchasing several Microvax 2000 models, said the 17% to 20% price reductions on those machines were most welcome. Steven C. Sneider, who heads computer model development at Batelle Memorial Institute in Willowbrook, Ill., also greeted favorably the ability of 8000 series systems to attach directly to a local-area Vaxcluster, which he said will save him the $13,000 cost of a Unibus channel he would otherwise have needed.

However, Sneider was less pleased with DEC's price increases. "I think their software is too expensive as it is," he said.

Donald Kelch, an applications analyst at a Caterpillar, Inc. facility in Pontiac, Ill., said the throughput increase made possible by DEC's new 1M-bit chip memory technology is good news because he will be using his VAX in a memory-intensive graphics application.

DAVID BRIGHT and STANLEY GIBSON

Ashton-Tate tests publishing waters

BY STEPHEN JONES
CW STAFF

Ashton-Tate moved to carve out a niche for itself in the desktop publishing market last week, introducing a $295 package designed for professionals with limited needs in that area.

The Byline package is positioned as a kind of workingman's desktop publishing program that does not require the high-performance hardware associated with such pricey software as Aldus Corp.'s Pagemaker.

Byline is aimed at what Ashton-Tate called an untapped market of word processor users who want fancier output but do not need sophisticated publishing skills. "We're planting a flag in a market that has great opportunities for big volume success," said Ashton-Tate product manager Bill Jordan.

Byline, which is Ashton-Tate's first desktop publishing offering, is scheduled to ship to authorized Ashton-Tate dealers this quarter. Jordan said preview copies of the product will go out to about 160 Ashton-Tate customers this week.

Targets occasional users

The package is the latest in a series of low-end desktop publishing systems that are aimed at the pocketbooks of occasional desktop publishing users. Byline will fit in between Software Publishing Corp.'s Pr S First Publisher, which sells for $99, and Digital Research, Inc.'s GEM Desk Publisher, which costs $395.

Designed to run on IBM Personal Computers and compatibles with 384K bytes of random-access memory (RAM), Byline uses low-level monochrome graphics capabilities and does not need a mouse. Most high-end desktop publishing systems, in contrast, require high-resolution color graphics, a mouse and at least 512K bytes of RAM.

Craig Cline, associate editor of the *Seybold Report on Desktop Publishing* in Malibu, Calif., said Byline is the first product of its kind to provide a data base publishing capability. The feature allows users to import Ashton-Tate's Dbase III Plus data bases into prestyled forms.

Byline also directly imports and exports files created by such word processor programs as Ashton-Tate's Multimate, Wordperfect Corp.'s Wordperfect and Micropro International Corp.'s Wordstar. It also imports files from Lotus Development Corp.'s 1-2-3 and Symphony.

Lacks friendliness factor

Cline said the package's weak point is that occasional users may not find it to be as user-friendly as other low-end programs.

Once a user develops the skills to master the product, Cline said Byline might not offer enough capabilities.

"Although it's not as difficult [to operate] as high-end products, Byline is still difficult enough to use that when people get up to speed on it, they'll reach a wall of limitation and get frustrated," he said.

DEC prices

FROM PAGE 1

crease system capacity and throughput, the ability to directly connect to local-area Vaxclusters and the ability to support up to four Ethernet connections. DEC also halved the footprint of 8530 and 8550 systems configured for Vaxclusters.

IBM's spasms

The restructuring is "not atypical, because IBM is going through the same spasms right now — a constant rebalancing of the price/performance levels at each point of the systems line," said Stephen Dube, an analyst at Shearson Lehman Brothers, Inc.

By being more aggressive at the low end, DEC is "creating in its own mind a position for a follow-on Microvax product," noted Infocorp analyst Sandra Gant.

The Microvax III is expected to offer at least double the performance of the Microvax II, which operates at about 0.9 million instructions per second (see story page 51). The system will differ from the larger, VAXBI-bus-based 8000 series machines in that it will retain the slower Q-bus.

The steepest increase was made on the 8550 system, which moved to $506,000 from $479,000 for a basic 32M-byte configuration. Prior to the March price restructuring, the price of the same configuration had been approximately $398,000.

The price of the VAX 8700, DEC's most powerful single-processor system, rose from $564,000 to $592,000 for a 48M-byte configuration, and the price of a dual-processor 8800 system with 64M bytes rose from $852,000 to $885,000.

Leading the VAX 8000 price reductions was the 8350, which dropped from $132,000 to $124,000 for a 32M-byte building block system. In March, DEC had reduced the 8350's price by as much as $19,000. The price of a 32M-byte 8530 system fell from $342,000 to $331,000, and the 8250 dropped from $96,000 to $92,000 for a 16M-byte configuration.

"None of the changes were very big," said Mark Roberts, corporate product operations manager at DEC. "What we did was just move some of the stuff around to make the line more consistent. We made the low end of the 8000 series a bit more competitive and enabled it to be expanded with more memory, which will make a lot of difference. The 16M-byte memories for the 8250 and the 8350 will give people a lot of performance. The larger systems being able to use a 64M-byte memory board will have a tremendous impact."

A marketing move?

Analysts noted that the changing of retail pricing is often no more than a marketing move and may not mean that much to large corporations that buy in volume. "The public announcement of price changes is really a marketing statement, as opposed to a real-world situation," Dube said.

Because DEC recently made software eligible for the company's standard discounts, most price increases on software would be negated, Roberts claimed. He said the only other products not impacted by the price hikes are the Vaxstation workstations and some recently announced servers.

However, DEC did not provide pricing information by press time on such products as disk drives, terminals and printers. John Rose, head of DEC's personal computing group, said he did not know of any price changes on the Vaxmate personal computer.

DEC claimed that use of the new surface-mount memory modules can increase system throughput by as much as 40%. The 16M-byte module expands the capacity of the 8250 and 8350 from 32M to 128M bytes, and the 64M-byte module doubles the capacity of the 8530, 8550, 8700 and 8800 systems to 256M bytes. Adding 64M bytes of memory now costs a customer $25,000, compared with $36,000 previously, Roberts said.

Software firms claim HP switch poses no risk

BY JEFFRY BEELER
CW STAFF

CUPERTINO, Calif. — Two suppliers of system utilities for the Hewlett-Packard Co. 3000 series said last week they have been able to convert their products to run on HP's commercial Precision Architecture processors with a minimum of code revisions.

Unison Software, Inc. in nearby Mountain View, Calif., and Los Angeles-based Vesoft, Inc. recounted their recent visits to HP's Software Evaluation and Migration Center (SEMC) here, where the companies successfully moved their packages to the machines.

When the HP 3000/930 and 3000/950 were announced in February 1986, much of the industry voiced serious doubts about whether such radical departures from conventional architectures could remain compatible with the rest of the company's minicomputers.

During a series of eight to 10 SEMC visits from May 1986 to last month, however, Unison successfully migrated four packages, totaling some 160,000 lines of code, according to Michael Casteel, Unison executive vice-president.

One of Unison's software products, a library package called Tapes, was ported to native mode, which allows the code to take full advantage of Precision Architecture's enhanced functions.

Two other utilities — a response-time measurement aid and a transaction processor — were moved to compatibility mode, which enables 3000-series programs to execute on the 930 and 950 without exploiting their expanded performance features. The fourth package, a batch job scheduler named Maestro, was split between compatibility and native modes.

In Tapes' case, the migration entailed little more than restoring the code to tape and recompiling it to run under Precision Architecture. Less than 1% of the package's 10,000 to 15,000 lines of source code had to be changed.

With Maestro, about three-fourths of its code, which was written in HP's proprietary SPL programming language, was simply restored and migrated to compatibility mode.

Like the bulk of Maestro and some of Unison's other products, Vesoft's MPEX/3000 productivity tool and Security/3000 utility were also written in SPL.

But even though the two software offerings were migrated only as far as compatibility mode, the company still felt the need to rewrite 2% to 3% of its 30,000 lines of code because of operating system-specific operations, according to Vesoft Vice-President Eugene Volokh.

Cincom President Yablonsky resigns

CINCINNATI — Cincom Systems, Inc. announced last week that company President Dennis Yablonsky, who has been with Cincom for 12 years, has resigned for personal reasons. Stepping back into the president's role will be Cincom founder and Chairman Thomas Nies, who had previously held the title.

"It is necessary for Dennis to relocate back to Pittsburgh, his hometown, to be close to his parents and family," Nies said in a prepared statement.

However, Yablonsky, 35, said he is leaving for a better position as president of the Carnegie Group, Inc., a $13 million artificial intelligence consulting firm. Carnegie employs 150 people.

"I will be responsible for all the strategic aspects of the company. I'll be the head coach now, and at Cincom, that wasn't possible," he said last week. Yablonsky will also own stock in the privately held Carnegie Group.

During the past two years, Yablonsky had emerged at Cincom as a strong spokesman for the company.

Yablonsky became president after emerging from marketing positions at the company. In addition, he oversaw the company's growth from $89 million in 1985 to a projected $120 million this year.

He was a key player in the firm's replacement of its aging Total data base management system with the relational Supra in the IBM mainframe world.

Mac attack

FROM PAGE 16

As a user of DEC and Apple equipment, Rodger Mansfield said he found Helix VMX an ideal departmental data base environment. Mansfield, a senior management systems analyst for the Valley Systems Division of General Dynamics Corp. said he used Helix on a Macintosh to develop a complex application in one weekend. Now he is implementing Helix VMX on a Microvax.

"We could have just used Helix for that project and gone on to a mainframe application, but when we saw it would solve a lot of our networking problems, we kept the Helix product," he said. Mansfield said he believes the DEC backing will make users more comfortable with the Helix product.

Another user agreed. "We had always been sold on the user interface of the Mac and decided to apply it to data bases. The VAX came into play as we charted out our growth curve because the VAX is easy to upgrade," said John Damico, general manager of Public Enterprises, Inc. in Rochester, N.Y.

INSIDE LINES

Keep on keeping me waitin'. Don't count on IBM to rush its introductory version of MVS — MVS/IS. IBM executives reportedly told analysts at a recent gathering in Dallas that MVS/IS will be available in 1990. The prepackaging is being coordinated by IBM groups in Poughkeepsie, N.Y., and Boblingen, West Germany.

This ever happen with Mitch in charge? Users of Lotus's 1-2-3 Release 2.0 are still waiting for Learn and Speedup, two add-in enhancements for which a March delivery was promised. Sources at Lotus said the company's software developers are having trouble writing the Speedup recalculation feature because it taps directly into the actual code of 1-2-3. Meanwhile, Learn is ready and waiting for Speedup to live up to its name. Anybody out there still waiting for Networker?

The short and the long of it. Novell Netware users can expect shipment of Version 2.1 next month, and our friendly users group tells us OS/2 support will follow by year's end. But (there's always a but), Novell has confirmed reports that shipment of two gateway products, X.25 and the Netware Asynchronous Communications Service, announced at Comdex/Spring '87, will be delayed. No explanation was available.

As the world turns. Joint marketing agreements between minisupercomputer and technical workstation vendors have become quite commonplace of late. The most recent, expected to be disclosed at a New York press briefing today, pairs fledgling minisupercomputer maker Multiflow Computer, Inc. with Apollo. Apollo is an investor in Multiflow but also has a joint marketing relationship with another minisuper vendor, Alliant. Alliant, meanwhile, has a relationship with Sun.

Trading places. IBM has shifted responsibility for the development of its RT PC 32-bit Unix processor from the Industry Systems Products Group to the Entry Systems Division in Boca Raton, Fla. "This will provide a single development focus on technical and intelligent workstations," an IBM spokeswoman said last week. It also means that the RT PC will be refocused to reach a broader market. "We are targeting the Unix marketplace," said Merry Quackenbush, director of media industry and publishing systems.

It's a small world after all. Hewlett-Packard is reportedly preparing to release two microcomputers this fall based on the Intel 80286 and 80386 chips. The desktop machines supposedly offer the option to have both a 5¼- and a 3½-in. floppy disk drive built in. A lot of users have been grumbling about the conversion process since IBM released its PS/2 series with microfloppy drives.

Reaching for the top. Panosphic wants executives to be able to query its Easytrieve Plus data bases as easily as programmers do. To that end, the Oak Brook, Ill., firm is planning to announce this fall a natural language interface to the company's Easytrieve Plus data retrieval system. Easytrieve Plus NL "will be an English-language product that creates mainframe queries from a personal computer," said Jom Fee, manager of Panosphic's Personal Computer Products group.

Best of the batch. Software Publishing will usher in a new wave of desktop publishing with the release of a package that includes a built-in full-featured word processor. Other desktop publishing packages require word processor files to be imported, often through MS-DOS batch files that befuddle novice users.

OK, just one more late notice. Apple has been forced to revise delivery dates of A/UX, a version of Unix compatible with AT&T Unix System V and the University of California at Berkeley Unix 4.2. Co-developed by Unisoft and Apple, A/UX has been tripped up by performance problems and won't meet its July schedule, sources say. Unisoft delivered the basic product to Apple, which has been trying to graft its icon-based user interface to A/UX.

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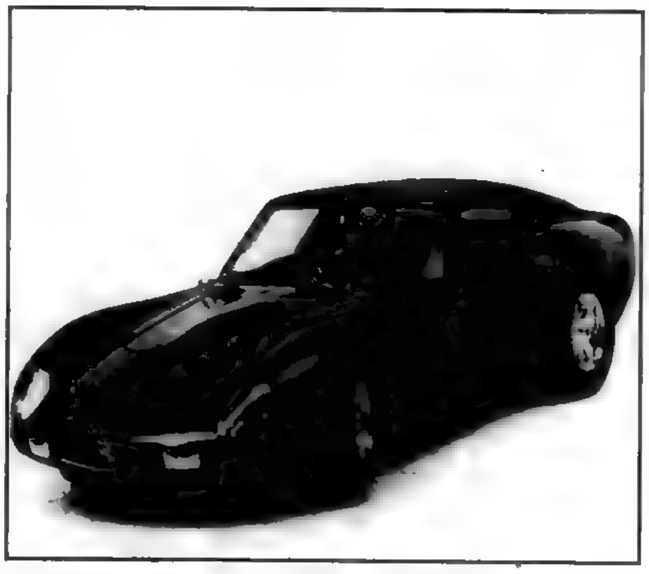

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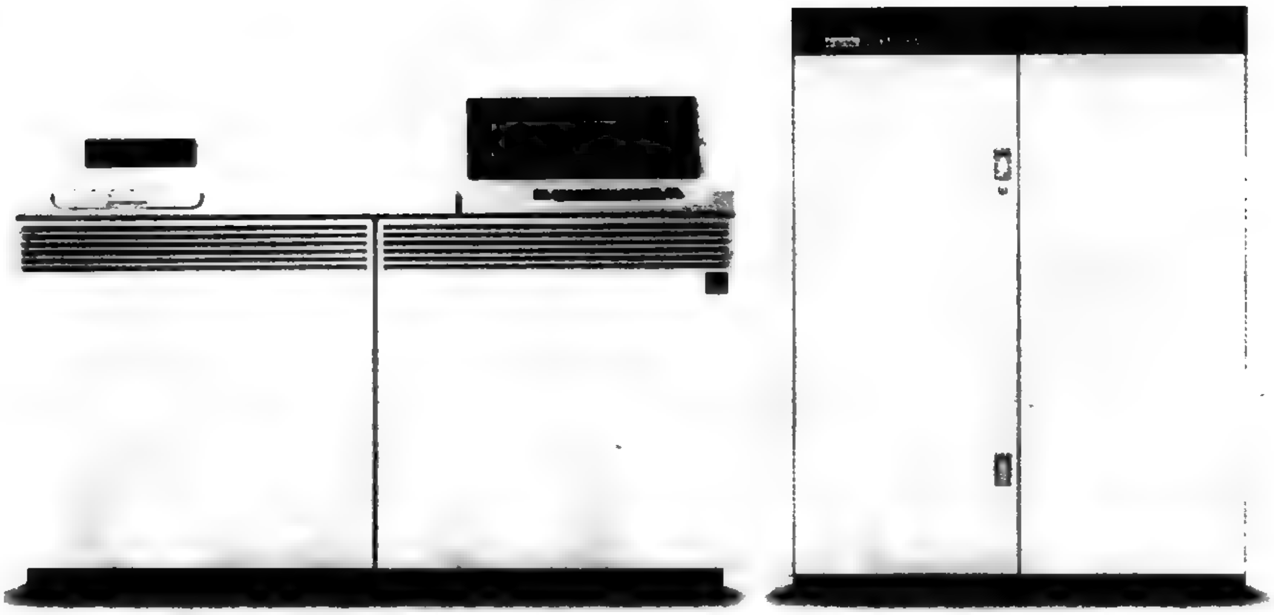

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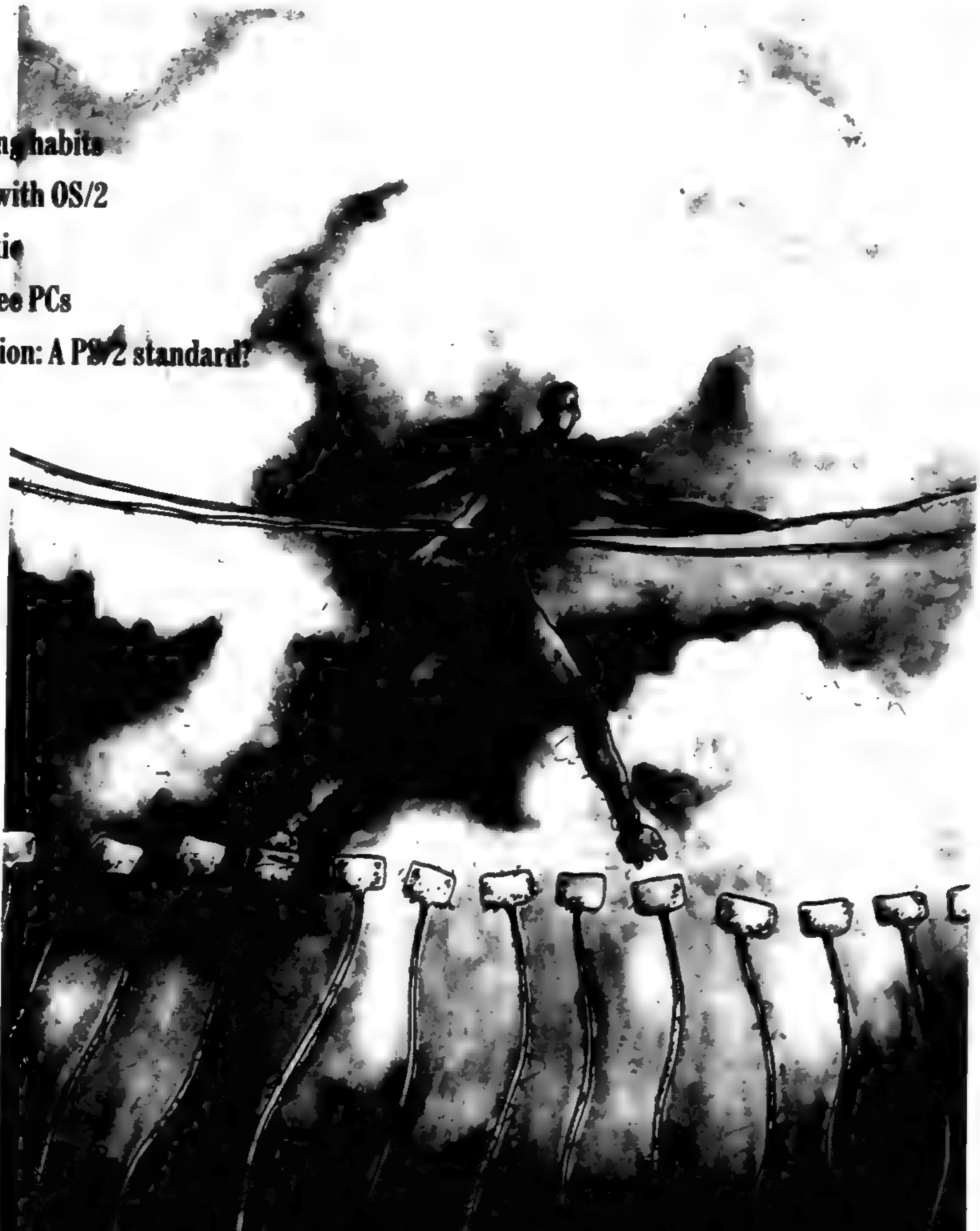

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in focus

IN THE MARKET FOR MICROS The introduction of IBM's PS/2 microcomputers, the dropping price of IBM PCs and compatibles and the changing economic climate are forcing MIS managers to alter their buying habits. The greatest shift may well be toward the introduction of more compatibles into Fortune-class companies. By Avery Jenkins. Page 22.

BEDEVILED BY SYSTEM CHOICES Deciding what PC system to buy has never been easy. And now IBM, Apple and DEC are making the selection more difficult. Their 32-bit offerings with optimized user interfaces all have their own unique blend of power and user-friendliness. See which system is right for you. By Michael Tucker. Page 25.

Help for the PC junkie
By Rebecca Hurst. Handling a PC power user is a tricky management task. Managers must refocus the user's energies away from being a technology guru for others and back to the business at hand. But dealing with the root of the problem — ensuring that MIS provides proper end-user support — may be a more monumental undertaking. Page 33.

Rivals fill OS/2 void
By Rebecca Hurst. As the industry ticks off the time until the arrival of IBM OS/2, users are looking for an operating system solution now. The answer may be in current MS-DOS enhancement products that effectively provide the same capabilities offered by OS/2. Page 19.

From the Editor
Including your letters to us. Page 5.

Q and A
Software productivity manager discusses the PC power game. Page 8.

PS/2 analysis

Will IBM's Personal System/2 Model 80 become a standard in microcomputing? While its hardware credentials are impressive, the machine may be dragged down by a lack of software — namely, OS/2. And clone vendors will surely try to usurp the newcomer's position. Against these odds it may take all of Big Blue's marketing strength to propel its newest machine to stardom. By Stan Kolodziej. Begins on page 29.

Manager's Corner
Jim Young on mergers and acquisitions. Page 8.

News & Analysis
Superconductivity; PS/2 data storage conversion; IBM's graphics moves; optical drive update. Page 9.

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Thomas Roberts on the wait for the 32-bit "OS/3." Page 44.

Log Off
A forecast of the worldwide PC growth to 1991. Page 44.

COVER ILLUSTRATION BY KEVIN POPE

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FROM THE EDITOR

A dog of a deal

Maybe its true that you can't teach an old dog new tricks. Once again, IBM is demanding unswerving loyalty from its customers by phasing out the Personal Computer AT and XT lines in favor of its new Personal System/2 family, products that leave many questions unanswered. Not all of corporate America, which has invested heavily in ATs and XTs, is pleased at being pressured to tread the Big Blue line toward a speculative future. Prior to the PS/2 debut, users were left to watch and wait, unsure of what to do. Unfortunately, months later, many are still wondering.

Part of the uncertainty stems from the confusion about whether IBM will support old products and for how long. Even if demand continues strong for the older PC line, the company has stated that it will "not build any more PCs." Although IBM maintains it is not abandoning the Personal Computer line and its customers because it will continue to support the installed base, many users remain skeptical as to what that support entails.

The initial PS/2 announcement and the phaseout clarification at a recent analysts' meeting in New York has left customers scurrying around looking for black-market ATs and XTs. Other buyers say they plan to continue purchasing from compatible and clone makers such as Compaq Computer Corp.

IBM is expected to undertake a considerable effort to wean its existing customer base from XTs and ATs to the PS/2s. Even though IBM claims that orders are exceeding expectations, a number of surveys have shown that users are not dropping everything to make the PS/2 move. According to a recent study by Framingham, Mass.-based market research firm International Data Corp., 40% of users questioned said they were less likely to change or were not changing existing buying plans at all after reviewing the details of the PS/2. These figures indicate that IBM users won't roll over and blindly follow the company's commands. By forcing the installed base to migrate to a largely unknown standard from an accepted one signifies that Big Blue does not yet realize that what's good for IBM is not necessarily good for its customers.

Ann Dooley

Reader makes move to find AT&T video

The article "Insider Crimes Threaten Corporate Well-Being" in the June 3 issue of *Computerworld Focus*, mentions an AT&T videotape called "It's Your Move."

I am very interested in viewing and/or purchasing the videotape. However, every attempt I have made has failed to locate the right resource in AT&T from which I can get the pertinent information. Can you please provide the name and phone number of the AT&T representative who is responsible for marketing the tape?

Norman Ching
Manager, Data
Administration
Calfarm Insurance Co.
Sacramento, Calif.

[For information concerning the AT&T videotape, contact Mary Tiffany, 9333 John Young Pkwy. S., Orlando, Fla. 32819, or call 305-345-7565.]

A plan for all seasons: Course highlights need for backup

The June 3 issue of *Computerworld Focus* on security was very well done and greatly needed. In particular, the article on uptime management publicizes a critical area that few people understand. This topic generally only comes up when the foundation of disaster recovery planning needs to be constructed. What was missing from your issue, however, was a discussion of how risk analysis and quantification fit into the security picture.

A course that I designed and hope to teach in a local university deals with just that. The course can be useful in getting management to focus on the value and need for contingency planning.

Edwin B. Heinlein
Heinlein Associates, Inc.
San Rafael, Calif.

Quality is the selling point for implementing CASE tools

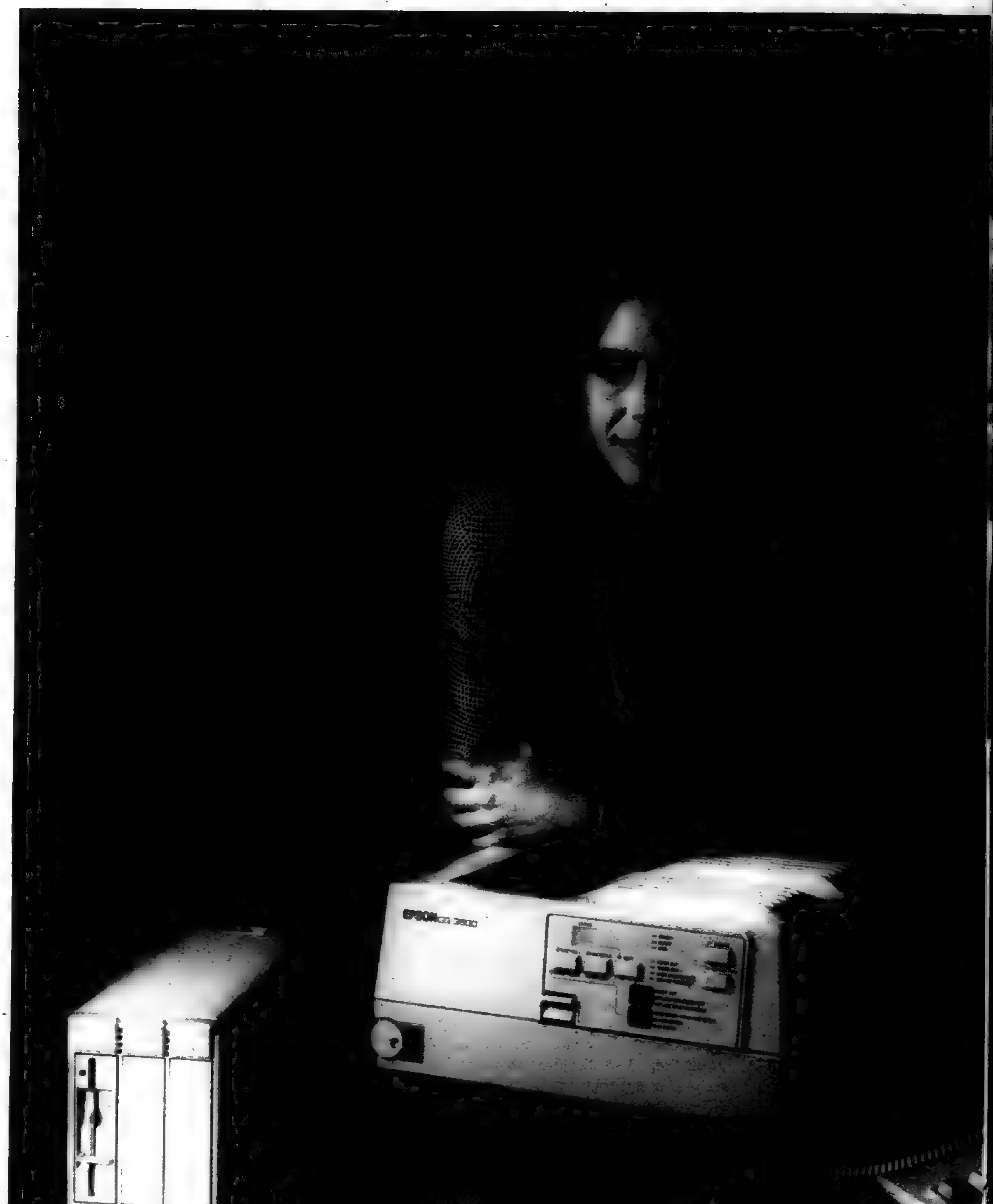
Having just completed your July 8 issue of *Computerworld Focus*, I'm enriched by the information and new perspectives the articles provide.

I am currently serving as a software engineering consultant to AT&T Bell Laboratories, where I am involved in both research and application of software life cycle methodologies and tools. From that vantage point, I was struck by the absence of the most compelling argument of all for the implementation of formal methodologies and computer-aided software engineering tools (CASE) — software quality.

As the author noted in the story entitled "It's a dirty job," software budgets for maintenance are approaching and even exceeding 50% of total MIS/DP expenditures. Analysis of cost and effort expended over the life of a software product clearly indicates a geometric relationship between the cost of maintenance (change) early in the life of the product vs. the cost of implementing those changes after deployment.

I realize that the topic of software productivity and quality is a complex one that encompasses a wide range of management and technological issues. However, I'm sure your readers would appreciate an update on state-of-the-art techniques available to alleviate the increasingly critical quality problems that threaten their credibility as managers and escalate their cost of service.

Victor Brown
Software Engineering Consultant
Dublin, Ohio



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Q AND A

Jerrold Grochow

Power play: Software manager sees targeted use for new breed of PCs

Jerrold Grochow manages activities in the area of software productivity as part of the Corporate Technology Group at American Management Systems, Inc. (AMS), an Arlington, Va., software services and consulting firm. Grochow's team is responsible for the development and support of AMS's Life-Cycle Productivity System, an integrated set of productivity tools used through software life cycles.

Grochow recently spoke with *Computerworld Focus*'s Senior Editor Stan Kolodziej about IBM's PS/2 Model 80 microcomputer and the power game taking place in the microcomputing business.

Do you think users are really interested in the power of the new breed of personal computers such as IBM's PS/2 line?

What we're starting to see is the so-called power user in departments other than corporate engineering. People in accounting and marketing are using PCs to handle heavier statistical loads. Many accounting departments, for example, are starting to consolidate monthly sales results from subsidiaries on PCs. They use PCs because of the hands-on nature of the machine. They can also make last-minute adjustments and quickly rerun results. Those users are looking for faster PCs, and when they get data from the mainframe, they don't want to go back to the mainframe to run a statistical package. They want to keep it on the PC.

OS/2, IBM's operating system, will reportedly finally break the 640K-byte barrier. What will that mean to users?

I've found that in a lot of things the 640K-byte barrier is not as imposing as it is in other areas. Besides programmers, the people you hear complaining about the limits of the 640K barrier are those who are doing superlarge spreadsheets. The number of people doing spreadsheets that large isn't a great percentage of the population. Lotus Development Corp. has a million copies of 1-2-3 out there, and the company did a survey that indicated that only about 20% of those users actually do macros. I would expect that only a portion of those users, maybe 5% of the total user population, is even worrying about superlarge spreadsheets.

So for most single applications, the 640K barrier is still not a problem. But for multiuser, multitasking applications a little further down the road, breaking the 640K barrier is essential.

Some users I've spoken with are trying to find a good use for the Intel Corp. 80386-based PS/2 Model 80 when it becomes available later this year. The Model 80 will pack 16-MHz speed, a 32-bit processor and up to 230M bytes of storage. Is that too much power for the user community to absorb right away?

[That is too much power if used] as a single-user system. I think a lot of people are going to get a Model 80 to use it as a network server because there seems to be a fair amount of improvement in general network performance by just having a faster CPU on the network server. The Model 80 also gives an extremely high transfer rate to the disk. Both the Model 80's 70M-byte and 115M-byte disks have the new enhanced small device interface, which gives a much higher transfer rate.

Also, at about $11,000 for a fully configured Model 80, we're not about to buy many and put them on programmers' desks. We're buying IBM Personal Computer AT clones these days because the price is right. So I see the Model 80 as a network server with potential as a good multiuser system when OS/2 arrives. Of course, the way the industry works, the software is going to be late and the hardware price is going to come down faster than we think, so a year from now I may be saying something very different.

As a network server, will the Model 80 provide closer local-area network and mainframe ties?

Yes. You can buy software that allows your network server to provide a single gateway to the mainframe. So rather than having to buy a Digital Communications Associates, Inc. Irma card for every PC on your floor, you only need one Irma card on your gateway to the mainframe, and everyone on the network can go through that.

It also raises some interesting questions about what's going to happen to Digital Communications, because when people start channeling data through only one card, the company may find itself selling fewer Irma cards.

There is now, more than ever, the need for more horsepower on the network server. Intel has already announced experimental quantities of its "80486" processor, which will be a factor of two to four times faster than the 80386. I don't think the 386 is a true 32-bit machine, and I don't think Intel is going to change that in the 486. What they'll do is add speed.

I would also be very surprised if IBM hasn't already anticipated this [course of events]. The PS/2 Micro Channel bus was designed to allow coprocessor cards in a very easy way, so you're going to start seeing an 80486-based coprocessor in a few years.

What impact will the new PCs have on programming?

Until recently, we would do some design and analysis on PCs because of their good graphics capabilities and then shoot some information up to the mainframe to write code. But we're already seeing some fairly decent Cobol compilers running on PCs, so people are now saying they'll do their programming on the PC and then just do some testing on the mainframe.

The biggest problem in PC programming right now is the loss of centralized control. A typical project at AMS will involve from 10 to 50 people. If everyone is sitting at their PCs, not connected to each other, how are those people communicating? One group will say we should hook everyone together on local-area networks, but you still run into problems of how to share data, and the data base management systems on the PCs don't really deal with distributed data bases. There are also the problems of locking and access control.

Others are in the same dilemma, but I don't think these are insurmountable problems. If we can figure out exactly what we want to do conceptually, we'll find the technical solution.

MANAGER'S CORNER

Industry merger fever

Jim Young

Nowadays, MIS must not only be alert to product announcements, price changes, service programs and other vendor news, but it must also track the changes wrought by mergers and acquisitions. These conditions cause a great deal of confusion for high-tech consumers.

Mergers and acquisitions are not new phenomena in the computer industry. In the late 1970s and early 1980s, there was a lot of high-tech trading. Much of the activity then was by nontechnical corporations wishing to add computer-related companies to their empires.

Today, computer merger activity seems to be predominantly high-tech companies acquiring each other. While this trend may result in more technologically knowledgeable management teams than could be found in the mergers of the '70s and early '80s, it likely will not foster a hands-off approach toward existing operations.

Though there is not much the typical MIS manager can do to influence the destiny of vendor marriages, he can react more intelligently to potential or implemented unions if he analyzes the situation carefully.

By examining market impact, an MIS manager can more accurately judge whether he can place his group in a position to benefit from a burgeoning success story or distance itself from an impending failure. To assess a merger's prospects of success, MIS should consider the following issues:

- What is the reason for the merger?

Is one party in difficulty? Will a company improve its financial weakness, such as a debt, or will it disguise a poor financial performance? Is the merger a situation of reinforcing overlapping products and services, or will the companies join complementary areas? Does the merger provide geographical expansion, additional or alternate channels of distribution, vertical integration or technical skills?

Managers should analyse these areas as an existing or potential buyer of goods and services. In a worst-case scenario, a newly merged or acquired company may create a virtual stranglehold on the market. As a customer, MIS may fear the resultant reductions in service levels, product introductions and attention as well as unwelcome price increases that typically accompany a business monopoly. A far more desirable situation would be the creation of a firm that can provide its customers important services and products.

- How are the companies implementing the merger?

If the merger is not a pairing of equals or even complementary partners, beware of the impact on the acquiree. A weaker unit could be swallowed up.

Financial considerations can also have a serious impact. For example, does an acquisition cause a cash drain that the company will pay for with major expense reductions? Observe how customers are treated during the proceedings. Does the company keep them honestly informed or does it ignore them? Does the merger plan call for a major restructuring, or will it maintain existing organizational compartmentation?

- What is the new company's direction?

Will the company continue to concentrate on and support the products and services in which you are interested? Will it overcommit in other areas, possibly abandoning important offerings along the way? Despite the firm's stated strategy, does it have the resources to carry out its plans? Is the organization strongly positioned against competition?

Fresh initiatives may bring new products or services to customers. Sheer size may bring more support. However, just as often, existing customers are abandoned in the frenzy of new opportunities. Experienced MIS managers know that size and capabilities are not nearly as important as consistent mutual interests.

In their evaluations, managers should be critical and skeptical of mergers that affect their vendors. Count on change. Whether it is tighter management, redirected marketing strategies, new or consolidated product lines or the removal of nonchargeable services, a merger can be bad news for MIS. With time and money at stake, it is not enough just to listen to industry pundits and the vendors that are involved in a merger. MIS managers must form their own, unbiased and informed opinions based on professional insights and professed intentions.

Young is managing director of MIS for the Wheeler Group, a division of Pitney Bowes in Hartford, Conn.

news & analysis

UPDATE

Execs work, play on PCs

All work and no play? Evidently, that is not the scenario for a majority of executives who use personal computers at the office for more than just business.

A recent survey of 750 executives with titles of vice-president or higher revealed that 66% use their computers for non-work-related purposes. The poll was conducted by New York-based G. S. Schwartz and Co. for Epyx, Inc., a Redwood City, Calif., PC entertainment software developer to determine how executives integrate computers into their workday.

Among executives who use office computers for other activities, 74% write personal letters, 57% play computer games and 33% balance their checkbooks. The survey also indicated that 20% of the respondents write resumes, 35% help family and friends with work, and 18% do schoolwork using office microcomputers, minicomputers or mainframes.

The majority of executives (71%) spend 15 minutes or less per day using office computers for personal business. Another 23% devote between 30 minutes and 2 hours to using the computer, and 6% of the users spend more than 2 hours per day. While 34% of the respondents said they use the office computer during office hours, 82% reported that they stay after hours to do non-work-related personal computing.

Corporate management can take a few cues from these survey reports, says Naomi Karten, president of Karten Associates, a Randolph, Mass.-based management consulting firm. First, she notes, although the study includes only executives, their responses probably reflect usage trends among other employees.

Second, the personal use of computers is a good sign at this stage, Karten asserts. "The first step in getting people to use computers for good business purposes is just getting them to use them," she says. Also, allowing users to take advantage of office computers during off-hours does not really cost the company, she comments.

However, Karten advises that personal use of office computers should not jeopardize data integrity or computer security or interfere with business.

C language gains in popularity for development

Developers and users may still debate the merits of the Microsoft Corp. MS-DOS and Unix operating systems, but for many others, C is the language of choice. "C is the biggest thing to come out of Unix," says Paul Cubbage, a senior industry analyst for San Jose, Calif., consulting firm Dataquest, Inc. Almost all MS-DOS application vendors have shifted to C as their development language, he claims. Many systems integrators and value-added resellers are beginning to shift from Basic and Cobol to C, he adds.

With C's popularity in the professional developer market, two vendors have begun a battle for the end-user market. Borland International, Inc. began by introducing Turbo C in January. At $99.95, Turbo C offers a lot of functionality at a low cost, Cubbage notes. In June, Microsoft responded with its Quick C language package, which offers similar performance for the same price.

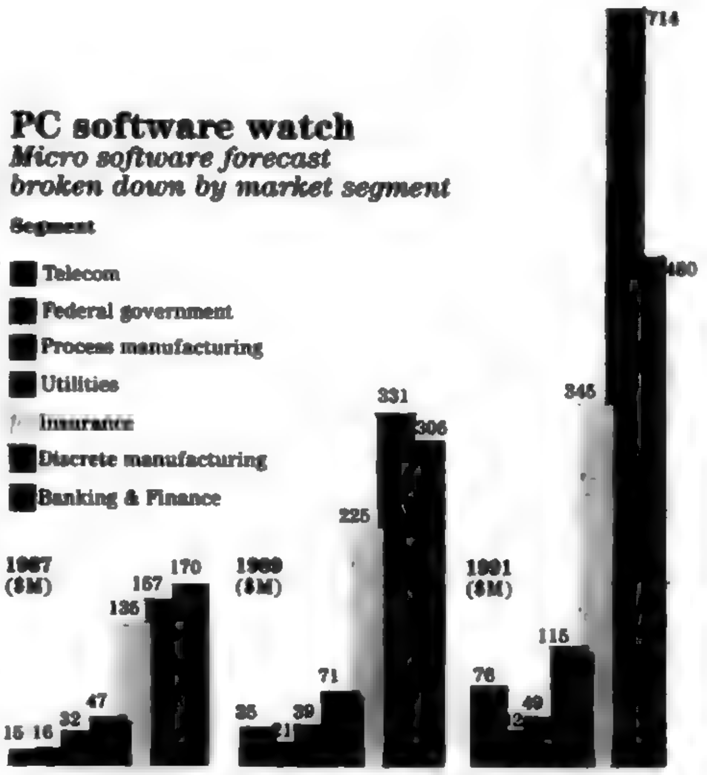
C's popularity stems from a combination of factors, according to Cubbage. A large number of leading universities are turning out students trained in Unix and C, he says. Also, C has constructs that make it convenient for programming. "Theoretically, C is not as good as Pascal," Cubbage comments. "However, in practice, it allows programmers to do what they want."

Apple marketing gaffe will not hurt Macintosh II

Apple Computer, Inc.'s Macintosh II, dubbed the Open Mac, has faced some compatibility problems with current Macintosh applications. However, these problems will not hurt the microcomputer's credibility as an office machine, predicts Robert Clarke, vice-president of marketing for The Seybold Group, Inc., a consulting firm located in San Jose, Calif.

Although a majority of applications for the Mac can run on the Mac II, a number of Apple

Continued on page 16



PC software watch

Micro software forecast broken down by market segment

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IBM pitches a 3½-in. data storage curveball

PS/2 floppy-disk conversion troubles users

When IBM introduced the Personal System/2, it threw users a data storage curveball. The PS/2 machines sport a 3½-in. floppy disk rather than the previously standard 5¼-in. format.

Few observers were surprised by the format change. Technical advantages, including the toughness of the 3½-in. disk's semirigid medium, made the move inevitable.

Although it was expected, this change in size is a problem for MIS officers, who must now somehow convert their existing personal computer applications to a 3½-in.-drive format. A recent survey by International Data Corp., a market research firm in Framingham, Mass., revealed that 3½-in. disk drives rated near the top of the PS/2's features that MIS most disliked.

"When I realized the PS/2 didn't have a 5¼-in. drive, naturally, my first concern was the conversion process," notes Terri Wolford, data processing manager at Checker Motors Corp., an automobile manufacturer located in Kalamazoo, Mich. "I was afraid that conversion would be difficult or costly — or both."

Conversion facilities available from third parties have mostly dispelled Wolford's fears. But the experience has given her misgivings about IBM. "I don't think IBM did its homework up front. It should have done something to support its existing users, rather than just improving the technology," she says.

Perhaps because it is an improved technology, the 3½-in. disks seem to be catching on. Phil Devin, senior analyst on data storage at San Jose, Calif.-based market research firm Dataquest, Inc., notes that "in spite of everything, this is the age of the 3½-in. disk." For instance, he points out that a smaller size, coupled with greater storage capacity, makes the 3½-in. disks a natural winner. "[The 3½-in. format] is a fact of life," he claims.

What does the hot superconductivity field mean for computers? Page 14

However, Devin does not think the 3½-in. media is any more eternal than was the 5¼-in. disk. He argues that storage media display a predictable life cycle averaging about seven years. Devin used that cycle to predict that 3½-in. drives would start being shipped in large

Continued on page 14

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NEWS & ANALYSIS

Superconductors: Hot times for a cool technology

Superconductors may soon be as common as semiconductors. Once merely a laboratory curiosity, a host of new, relatively inexpensive superconducting materials has come into being during the last year. The materials are certain to be used in future computers.

Superconductivity is the ability of some materials to carry electric current with little or no resistance. The applications of such materials in electrical design and electronics are virtually limitless. An electromagnet made of superconductive cable, for instance, would be vastly more powerful than a conventional electromagnet and would require far less energy to work. Theorists have suggested that electric motors using such magnets might prove a serious rival to the internal combustion engine in the automobile.

Superconductive circuits, meanwhile, could work much faster than those built of normal materials; computers built using superconductive devices would be faster.

Until recently, the only known superconductors were certain metals cooled to temperatures approaching absolute zero. The only known way of making a device superconductive was to submerge it in a liquid helium bath.

However, that restriction began to change late last year when J. Georg Bednorz and K. Alex Mueller at IBM's research center in Zurich announced the discovery of a class of oxides that were superconductive at a "warm" -98 degrees Kelvin (-283° F).

This discovery touched off an international research race. As of this summer, scientists were reporting superconductivity near -90° K, or roughly the temperature of liquid nitrogen.

Meanwhile, some theorists are beginning to talk about room-temperature superconductors.

But, even if room-temperature superconductors prove impossible, those that function in the -90° K range could easily be adapted to computer technology. Some supercomputers already cool their silicon components with liquid nitrogen.

The question then is not *if* but *how* superconductors will be used in computers. One possibility is that superconductors could be used as an alternative to conventional silicon transistors. For some years, researchers have talked about building computers out of Josephson junctions, superconductive switches that can turn on and off faster than conventional transistors.

IBM has experimented with Josephson technology, but abandoned it early this decade. Despite the success of its own staff in Zurich with superconductive materials, IBM says it does not intend to resume work on superconductive switches.

Gerald Present, senior communications specialist at IBM's T. J. Watson Research Center in Yorktown Heights, N.Y., argues that conventional silicon chips work so well that Josephson junctions would provide only a small advantage. However, "One of the first things that superconductive materials might be used for in computing is in interconnect wiring. It is more likely to show up there than as a switching device, if for no other reason than we know how to build wiring out of the material," Present notes.

And Josephson junctions continue to have their fans. When IBM abandoned Josephson technology, it also lost one of its chief researchers, Sadeg Faris, who left the company in 1983 to found Hypres, Inc., in Elmsford, N.Y. Shortly thereafter, Hypres introduced a line of laboratory test equipment based on Josephson technology — one of the first commercial uses of superconductivity.

Hypres rapidly became the leader of the fledgling U.S. superconductive industry and has, in fact, drawn contracts from both government and private organizations. — MT

Curveball

Continued from page 9

quantities by 1986 to 1987. "But they will peak," he says, "sometime about 1992."

What will replace the 3½-in. disk? "Some sort of integrated circuit memory card," Devin predicts.

He envisions a solid-state memory device about the size of a credit card that would plug into a computer in much the same way that floppy disks do.

He notes that some organizations are already offering integrated circuit cards with 256K bytes of memory and that cards with 2M bytes of memory are clearly on the horizon. — MT

Correction

In "Minis get Unix mainframe link" [*CW Focus*, July 8], the price of Unisoft Corp.'s 9750 CU/X communications controller should have read $70,000.

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Update

Continued from page 9

packages, including Macwrite, Macpaint and Macterminal as well as some third-party applications, cannot. Such compatibility problems are not unusual for a firm as large as Apple, but "it was a mistake to release the Mac II without addressing the compatibility issues," Clarke says.

Apple should have released more Mac IIs to software developers and held seminars so developers could modify their applications for the Mac II, Clarke says. Instead, Apple released its first models to the press. "The journalists found they couldn't run their favorite applications, and the software developers complained that they couldn't get Mac IIs to work with," he says. The bad press has caused marketing heads to roll, Clarke adds.

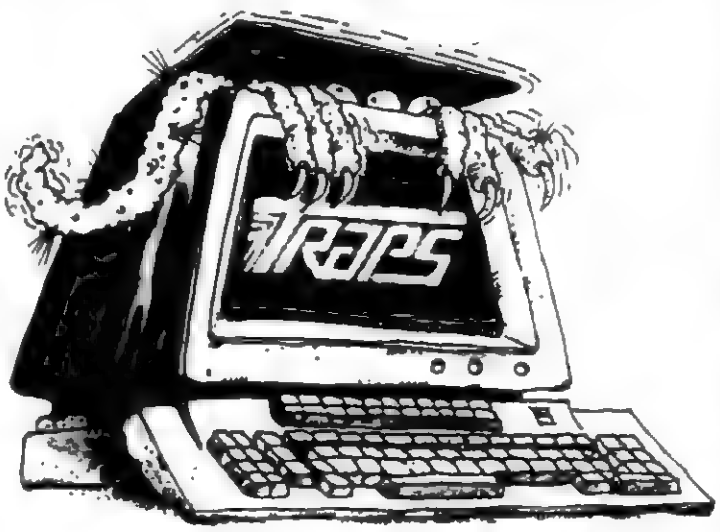
Apple has now solved the problem by getting the Mac II to developers.

Apple's marketing gaffe "ultimately will have little affect on the Mac II's success," Clarke predicts. Although the Mac II's compatibility problems are giving IBM's Personal System/2 an opportunity to catch up, the Mac II's problems are likely to be solved in the next several months. At that time, the PS/2 will begin facing similar compatibility problems with the availability of OS/2, Clarke says.

Survey: Corporate managers attend shows with intent to buy

With the computer slump waning, corporate managers are attending computer shows with the intent to buy. For example, 83% of the corporate volume buyers who attended the 1986 PC Expo in New York reported that they purchased information processing products. This finding was reported in a survey of 104 attendees by Exhibit Surveys, Inc. Among these buyers, 75% reported that the show influenced their purchases.

Purchases by 59 of the 104 corporate buyers totaled $16.3 million and averaged $276,970, the survey reports. Using this average, the research firm projects that the product expenditures by the 8,338 corporate buyers at the show came to $208.8 million. Of the responding buyers, 64% represented nonmanufacturing industries. Approximately two-thirds came from management and administration (33%) or DP (34%). — RH



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dB

By Rich Tennant

IN MY OPINION, THIS IS THE FIRST AND ONLY TRUE MICRO-TO-MAINFRAME PRODUCT THAT'S ALSO A SNAP FOR USERS TO OPERATE.
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PS/2 legal issues may hurt clone makers

IBM has done some aggressive posturing lately toward those who would recreate the new line of IBM Personal Computers in their own image — namely, PC compatible and clone makers. One of the most outspoken IBM executives is William Lowe, president of IBM's Entry Systems Division, who has publicly stated that IBM will take "appropriate measures to prevent people from copying patented technology."

Euphemisms aside, you can interpret that statement to mean that IBM intends to take to court anyone who tries to duplicate and sell the patented and patent-pending architecture of IBM's Personal System/2 microcomputers.

A legal battle would not surprise John C. Yates, attorney and partner in the Atlanta law offices of Vaughan, Roach, Davis, Birch and Murphy.

"I remember the old days when IBM went after Eagle Computer, Inc. and Columbia Data Products, Inc., two compatible makers," Yates says. "IBM also became aggressive in defending its computer BIOS after the Apple Computer, Inc. and Franklin Computer Corp. decision, which declared that computer object code could be copyrighted. That was a precedent-setting decision and opened a lot of ground for IBM and other companies to go after people whom they felt were violating computer copyrights."

IBM, however, isn't showing all its cards just yet. Yates says IBM has been sketchy about exactly what components in the PS/2 line are going to be patent protected. That is especially true with the PS/2 Model 80, IBM's Intel Corp. 80386-based micro. IBM claims the machine contains up to 80% proprietary hardware and software components.

"IBM's aim is directed at the PC cloners, not the add-in board people," explains Steve Urbanski, design engineer at PC Technologies, Inc., an Ann Arbor, Mich., maker of PC accelerator boards. "I'd be worried if I were a cloner."

Clone makers remain defiant

Nevertheless, most of the clone and compatible makers remain defiant.

Michael Dell, president of Austin, Texas-based PC's Limited, one of the first companies to introduce an 80386-based machine, says he is doubtful of the success of the PS/2 line anyway.

That sentiment is echoed by Compaq Computer Corp. President Rod Canion, who says the PS/2 line and architecture are an unnecessary burden on IBM users who might not want to convert to the machines. Canion is hedging his bets, however, by adding that he will produce PS/2 compatibles if Compaq's users want them.

In fact, sources say that Compaq already has its engineering and manufacturing departments churning out PS/2 clones, waiting until the muddy legal waters clear before jumping in. "It's no accident, after all, that one of the top-ranking officials at Compaq used to be one of IBM's patent attorneys," Yates concludes. — SK

Users applaud IBM's graphics moves

IBM's Video Graphics Array (VGA) is a step in the right direction, according to users. The VGA, a built-in graphics capability in IBM's Personal System/2 Models 50, 60 and 80, contains 256K bytes of random-access memory, enabling the user to work with 16 colors in 640 by 480 dot/in. resolution or 256 colors in 320 by 200 dot/in. resolution format.

VGA replaces IBM's Color Graphics Adapter and Enhanced Graphics Adapter cards, which offer limited resolution and color selection.

Adding more punch to VGA is IBM's top-of-the-line 16-in. color display monitor that can paint up to 1,024 dot/in. by 768 dot/in. resolution on its screen.

Windows 2.0 — or Presentation Manager, as IBM refers to it — reportedly will be bundled into the OS/2 operating system and is a long overdue nod by IBM in accepting graphics and graphical program interfaces as key facets of business computing.

Still not as good as Apple

"I agree that VGA is an important step for IBM and a big improvement over its previous graphics," explains Donald K. Hsu, a marketing consultant with SJ Development Co. in Fort Lee, N.J. "Though it's still not as good as Apple Computer, Inc. Macintosh graphics, it's better than before. The only problem is that there is no software to take advantage of the VGA, and there probably won't be for another two years. Now it's just something sitting there outside a user's reach."

Dave Dickens, senior information processing consultant at the University of Wisconsin-Madison, says he is a little frustrated by the software delay but indicates the wait will be worth it.

"I think a lot of people are going to take advantage of the new graphics," Dickens says. "Our marketing and accounting people will use it for statistical charts, and it's going to open up new applications. We're getting a PS/2 Model 80 in for evaluation, and I can see both our business school faculty and grant students using the graphics to create new programs, such as real estate demographics, that they could maybe spin off into the local marketplace."

Gene Masshardt, director of computing services at the university, adds that the graphics will complement the extra power of the 32-bit Model 80 for statistical use. "We can always use the extra speed and graphics," Masshardt explains, "and I'm sure a lot of other users will feel the same." — SK

Optical drive market picks up momentum

IBM PC optical drive debut pressuring other vendors to drop prices

The market for 5¼-in. optical disk drives, though still small, is starting to develop into a price war.

"IBM's announcement of its personal computer optical disk drive is putting pressure on other disk vendors to drop their prices," explains Jay Bretzmann, a marketing analyst at International Data Corp. (IDC), a research firm in Framingham, Mass. The IDC researcher also says media prices are dropping. Double-sided optical disks can be had for $125, and single-sided disks cost half that amount.

IBM claims to have an order backlog of 40,000 for its recently announced 3363 Optical Disk Drive, which uses a small, removable disk that can store up to 200M bytes. The drive is an internal option for the IBM Personal System/2 Models 60 and 80 and an external option for Models 30 and 50.

Although 8-in. optical disks on larger, dedicated optical disk systems can carry 750M bytes of data storage, Bretzmann says that there is generally nothing with more than 500M bytes on the disks' smaller, 5¼-in. cousins. Most disks' capacity falls between 200M bytes and 500M bytes, he says.

"IBM is selling its optical drives for $2,950, and I think at least one optical disk drive vendor will try and push its drives to less than $1,000 next year," Bretzmann maintains.

Hopefully, the price cuts will help boost what Bretzmann classifies as a technology-driven, not demand-driven, market and will force vendors to look for users outside existing markets, such as the federal government.

Bretzmann says there was only a total of 3,200 5¼-in. optical drives sold in the U.S. in 1986, primarily from such U.S. companies as Information Storage, Inc. and Optotech, Inc., both located in Colorado Springs. Yet that amount was up from a paltry 550 drives in 1985, the first year the 5¼-in. drives were introduced. IDC predicts 5,000 to 6,000 drives will be sold this year, but the big year should be 1988 when the Japanese, represented by companies such as Ricoh Corp. and Toshiba Ltd., up the marketing ante with several systems.

Erasable optical disks

Help for the market may also be coming from technology that will enable users to erase and use optical disks again, an existing trait of hard and floppy computer disks. Currently, optical disks can only be written to or be recorded on once with write-once read-many technology. This limitation may be what has put an early drag on the optical disk market, some analysts say.

The race to perfect erasable optical disks involves many corporations and several different kinds of technologies, but the front-runners seem to be Japan's Matsushita Electric Industrial Co. and IBM, which have explored a technology called "phase change" to come close to producing erasable optical disks.

Matsushita has already made the 3363 optical drive for the IBM PS/2s, and, observers say, it is no coincidence that the drives can be converted to operate with erasable optical disks.

Many analysts predict that IBM will soon roll out its own personal computer erasable optical disk system. — SK

Impact printers losing to laser

The daisywheel printer that faithfully produced typewriter-quality text is losing ground to its flashy cousin, the laser printer. Behind this push is another upstart, the personal computer.

"As users gain the ability to manipulate both text and graphics on their PCs, they are demanding a wide font variety that you just can't get with an impact printer," explains Catherine Dingman, an associate director for Marshfield, Mass.-based publishing research firm CAP International, Inc. As a result, CAP projects that sales of daisywheel-type printers will fall from 660,000 in 1985 to 380,000 in 1990.

By contrast, sales of laser printers in what CAP calls the "workstation and office cluster categories" are expected to grow rapidly. The number of workstation-level printers sold will grow from 19.5 million in 1985 to 119.5 million in 1991, according to CAP. Laser printers falling under the workstation heading print up to 5,000 pages per month at a rate of up to 10 pages per minute.

The number of office cluster-level laser printers sold should nearly double from 1.3 million in 1985 to 21.5 million in 1991 Machines that qualify as office cluster laser printers print between 5,000 to 100,000 pages per month at a rate of 10 to 35 pages per minute. In addition, these printers also provide paper-handling capabilities such as large input and output bins and double-sided printing. — RH

Chip showdown

In the territory where the lines between 32-bit workstations and personal computers begin to overlap, the Intel Corp. 80386 is heating up competition. Still, no one has had to leave the showdown. "There is absolutely room enough for both technologies," says John Logan, a senior analyst for The Yankee Group, a Boston-based consulting firm.

Today, 32-bit workstations, generally based on the Motorola, Inc. 68020, can count among their chief rivals PCs using the 16-bit Intel 80286 chip. "The 286-based computers are having a major impact on the lower end of such marketplaces as electrical engineering, computer-aided design and computer-aided engineering," Logan reports.

However, these 286 machines are not vanilla personal computers. "These computers are highly modified. They may have 1M byte of random-access memory, a floating-point accelerator and high-resolution graphics," Logan notes. As a result, the heavily equipped 286-based workstations are much more expensive than standard PCs. "These workstations are equal in cost to low-end 32-bit workstations," he says.

Despite the similar cost, many users opt for the 286 workstation because they feel it is a safer investment, Logan says. "If the 286 PC does not work out as a technical workstation, managers know they can use the PC somewhere else in the firm to run other Microsoft Corp. MS-DOS-based applications," he says. The 68020-based workstations generally cannot run the MS-DOS packages that the 286 PCs can.

Reacting to these 286-based machines, 32-bit workstation vendors have dropped the prices on their lower end systems. Sun Microsystems, Inc. began in April by lowering the cost of its 68020-based, entry-level Sun-3/50 from $7,995 to $4,955. The 3/50 includes a 19-in. monochrome monitor, 4M bytes of memory and built-in Ethernet.

Apollo Computer, Inc.'s pricing strategy centers on its 68020-based Domain Series 3000 personal workstations, which feature 4M bytes of memory, IBM Personal Computer-compatible bus and floating-point coprocessor. A recently introduced entry-level model with a 15-in. monochrome monitor costs $4,990. The older entry-level system with a 19-in. monochrome monitor has been reduced from $9,990 to $5,990.

DEC follows suit

Similarly, Digital Equipment Corp. has announced that it will cut the price of its Vaxstation 2000 with a 19-in. monitor from $10,500 to $5,400. The company also stated that in December it will introduce two competitively priced systems. A monochrome workstation reportedly will cost $4,600, and a color Vaxstation will sell for $7,900.

These pricing strategies will help differentiate the 68020 workstations, which offer low-cost 32-bit technology, large amounts of usable memory, multitasking and multiple user support through the Unix operating system. However, these distinctions will blur with the availability of IBM's 386-based Personal System/2 computers running the OS/2 operating system. "Together, PS/2 and OS/2 will give users large amounts of real memory and high-resolution graphics support," Logan says.

The Intel 80386, a 32-bit processor, provides capabilities similar to those of the 68020, making the two chips equally viable, Logan notes. Already, Sequent Computer Systems, Inc. has replaced the 68020 processors in its Balance series computers with 80386 processors. Sequent was able to make this switch because it uses a vanilla version of Unix and an industry-standard bus architecture, he says.

Other companies lack Sequent's flexibility, however. "A majority of vendors have developed a full line of software and tools around a hardware platform. They would have problems switching to a new processor," Logan claims.

Ultimately, these chip debates, critical to vendors, will have little effect on users, Logan notes. "Users are buying workstations for the applications that run on them, not for the hardware platform below." — RH

News section compiled by *Computerworld Focus* staff members Stan Kolodziej, Michael Tucker and Rebecca Hurst.

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Rivals fill OS/2 void

BY REBECCA HURST

OS/2 is the future salvation for frustrated MS-DOS users. At least, that is what Microsoft Corp., developer of the OS/2 and MS-DOS operating systems, and IBM, an advisor on OS/2 development, are telling the personal computer user population.

Yet the fact that the companies are proposing OS/2 as a future solution poses a problem for many PC users who need more than MS-DOS can offer today. OS/2 will not be available until 1988, and the first OS/2-based applications are at least 18 months away. Even then, some users may find that MS-DOS enhancement products more effectively provide the same capabilities offered by OS/2.

The biggest problem with OS/2 is that it is not here, says William Zachmann, vice-president of research for International Data Corp. (IDC), a Framingham, Mass.-based research firm. "If you commit to OS/2 today, you don't know what you're committing to." OS/2 is being developed in an atmosphere of creative tension between Microsoft and IBM, he explains. This tension could foster terrific results, or it could lead Microsoft to introduce a system that demands a lot of resources, Zachmann says.

Availability concerns aside, the known OS/2 specifications raise questions about compatibility and performance. Applications written for OS/2 can go beyond MS-DOS's 640K-byte memory barrier and perform multitasking, but MS-DOS-based applications running under the MS-DOS 3.3 portion of OS/2 cannot.

Some current applications may not run under OS/2 at all, suggests Eugene Schklar, director of PC product marketing for Belmont, Calif.-based Oracle Corp. Software packages such as Lotus Development Corp. 1-2-3 sometimes bypass MS-DOS, he explains. When the products running under the MS-DOS portion of OS/2 try to escape MS-DOS, they can destroy the operating system, Schklar says. Therefore, users who want to run 1-2-3 on OS/2 will have to buy a new version designed for OS/2.

To fill the gaps left by OS/2, third-party vendors are offering their own improvements for MS-DOS. These products are designed to run multiple concurrent tasks, break the 640K-byte memory barrier or support multiple users. Many of the products are also designed to take advantage of the Intel Corp. 80386 processor. The number of these MS-DOS enhancements entering the market this year makes it difficult to list every product. However, by looking at the options available, users can choose the solutions that best meet their needs.

STEVE DENINNO

The best known MS-DOS multitasking product is the Desqview windowing program from Santa Monica, Calif.-based Quarterdeck Office Systems Co., says Dave Eden, president of the San Francisco PC Users Group. Desqview, available since 1985, allows users to load programs into different windows, which can then be run concurrently.

For example, another member of the San Francisco users group continually runs an electronic blackboard in a background window while working on an application in the active window, Eden notes. This active window can overlap other windows, or users can blow it up to full-screen size.

Eden has recently purchased the $99.95 Desqview package to get more mileage out of his IBM Personal Computer XT running MS-DOS 2.1. The version he uses, Desqview 1.3, supports up to nine windows. A newer version introduced in November 1986, Desqview 2.0, supports up to 256 windows, but Eden says that this number constitutes more windows than most people need. "Program developers may need to use all of them," he comments, "but I can't see using more than five or six."

To support multiple running applications, users generally add boards that support either the Lotus/Intel/Microsoft Expanded Memory Specification (EMS) or the Enhanced Expanded Memory Specification, a superset of EMS, Eden says. These boards are available from such vendors as Irvine, Calif.-based AST Research, Inc. and Norcross, Ga.-based Quadram Corp.

Hurst is *Computerworld Focus*'s senior writer.

However, users with Intel 80386-based machines do not need to add the boards because the 386's Intel 8086 virtual architecture provides capabilities similar to those of the EMS boards.

Desqview may provide more functionality than users who want only to switch easily between applications can use. Rather than a true multitasking product, these users may be better satisfied by a task-switching product such as Software Carousel from Manchester, N.H.-based Softlogic Solutions, Inc.

William Sprague, president of Computer Results, a consulting firm in Darien, Conn., made the switch from Desqview to Software Carousel. "I got Desqview with my AST Six Pak Plus [board package]," he recalls. However, he says, "The switching capability of Carousel is all I want. I have no need to run applications in the background."

Software Carousel costs $59.95. It uses approximately 70K bytes of random-access memory (RAM) and does not require EMS or an Enhanced EMS board, but many users choose to add the boards to handle several applications. Carousel allows users to store up to 10 programs. Only the program in the foreground can run while the others reside in the background.

Hot key to save steps

The advantage of the Softlogic product is that it saves users steps in moving between applications. Usually, a user has to exit the old document and then call up a new one. Software Carousel allows users to simply hit a hot key to move into another application, says Calvin Holt, Softlogic's vice-president of sales. When users return to a program, Software Carousel brings them back to the character or command at which they were when they exited the application, Holt adds.

For users who want true multitasking, Softlogic offers a product named Double DOS, which splits memory into two partitions that can run concurrently. The utility, available since 1984, is priced at $49.95. For even more functionality, users can add Software Carousel to either one or both partitions. This addition provides a platform for up to 20 applications that users can access with one or two keystrokes. Of course, from these 20, users can choose one from each partition to run simultaneously.

Another area in which MS-DOS products provide alternatives to OS/2 is adding RAM capacity for applications. Many of the products being introduced this year utilize the 80386 architecture and are designed as a platform for software applications. One product, Oracle's Professional Oracle, stands apart.

Professional Oracle is an MS-DOS 3.3-based data base management system that allows users writing or using DBMS applications to go beyond the 640K-byte memory barrier. Unlike other products in this category, though, it works on both the Intel 80286 and 80386 processors. To offer additional memory, Oracle has implemented a function it calls Protected Mode Executive, which allows applications to use the 16-bit protected-mode capability of the 80286. "We have a large installed base of users with 80286 machines," Oracle's Schkdar explains. "We want to protect their hardware investment.

Professional Oracle protects users' software investments as well. First, it allows users to write applications in Oracle's DBMS language or third-generation languages such as Cobol. Most Fortune 500 companies have written their data base programs in Cobol, so they have a huge investment in Cobol applications and programmers, Schkdar says. By using Professional Oracle on the PC, users can write applications that will work on both the PC and the mainframe because they are not limited by memory size or development language.

Second, applications written for the MS-DOS-based version of Professional Oracle will be able to run on OS/2. Because any applications written to the DBMS product are unaffected by the operating system below, the applications will be upwardly compatible with OS/2. After OS/2 becomes available, Oracle will release an OS/2 version of Professional at no cost to users who have a Professional Oracle maintenance contract.

> **"If you commit to OS/2 today, you don't know what you're committing to."**
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Geared to corporate users, Professional Oracle has been available since May and costs $1,295 for one copy. Oracle shipped almost 5,000 copies to Fortune 500 customers and value-added resellers in the DBMS product's first five weeks of availability.

The main line of enhanced memory capacity development centers on the 80386 processor's 32-bit protected mode. This mode allows the computer to run 32-bit data instructions, whereas the 8086 and 80286 only run 16-bit instructions. As a result, applications that can utilise the 80386 protected mode will execute faster. Also, the 80386 protected mode provides a 4G-byte linear address space. This allows applications to access all the memory they require without relying on memory-switching schemes.

There are two types of software products that form a platform for applications to take advantage of the 80386 32-bit

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protected mode: MS-DOS extension software and language compilers. In addition to these products, the systems also need a linker, which combines relocatable object program modules, and an assembler for the 80386. Phar Lap Software, Inc. in Cambridge, Mass., has currently cornered the market for these two items, according to David Fulton, president of Fox Software, Inc., in Perrysburg, Ohio.

MS-DOS extension software sits between MS-DOS and the application. Because MS-DOS only works in real mode, the extender gives the application the illusion that it is talking to a protected-mode operating system. Then, whenever the user or application issues a call to MS-DOS, the extender makes the application believe that it is switching to real mode. Two products based on this technology are 386/DOS-Extender from Phar Lap and VM/386 from Softguard Systems, Inc. of San Jose, Calif.

Requires recompiling for 386

The MS-DOS extension products will only work with applications that have been written in a third-generation language and have been recompiled to run on the 80386. To that end, three companies have begun offering 80386 compilers for languages running on MS-DOS. Language Processors, Inc. in Waltham, Mass., has compilers for Cobol, Fortran and Basic and will offer one for Pascal in late August. Santa Cruz, Calif.-based Metaware, Inc. is shipping C and Pascal compilers. Green Hills Software, Inc. of Glendale, Calif., is making C, Pascal and Fortran compilers available.

Reportedly, more than 300 software developers have been looking into these compilers and MS-DOS extenders, but only a few have introduced products. The most interested software vendors appear to be those offering computer-aided engineering or DBMS packages because of the amount of memory these applications require, says Richard Smith, president of Phar Lap. For example, Viewlogic Systems, Inc. in Marlboro, Mass., has rolled out an 80386 version of its Viewsim computer-aided engineering package that uses Phar Lap's 386/DOS-Extender.

Two DBMS vendors that have announced they are working on 80386 versions of their products are Fox Software and Belmont, Calif.-based Ansa Software. Fox began shipping a version of its Foxbase DBMS that works with Softguard's VM/386 in July, Ansa is investigating the use of Phar Lap's 386/DOS-Extender, says Richard Swartz, Ansa's vice-president of software development.

Given the ability to break the 640K-byte barrier and perform multitasking, the natural next step is to combine the two. Quarterdeck and Phar Lap are attempting to do just that. The two firms have signed a codevelopment pact to support Phar Lap's 386/DOS-Extender under Quarterdeck's Desqview multitasking windowing software. The vendors expect to release compatible versions of their products by the end of this year.

Another area of MS-DOS functionality that OS/2 does not attempt to address is multiuser support. For firms that want multiuser MS-DOS systems, the best solution is MS-DOS running as a task under the Unix operating system, IDC's Zachmann says. "MS-DOS under Unix is appealing because it is a flexible solution, and it's here today." As a result, the Unix-to-DOS options may take a big chunk of the potential OS/2 user market, he adds.

The two leading developers of Unix-to-DOS products that give MS-DOS multiuser functionality are two Santa Monica, Calif.-based firms: Locus Computing Corp., which created Merge 386, and Interactive Systems Corp., which codeveloped VP/IX with Phoenix Technologies Ltd. of Norwood, Mass. Both products are based on the same concept. MS-DOS and Unix co-reside on the same hardware, and MS-DOS is able to share Unix's multitasking, multiuser and unlimited memory capabilities by running under it as a task.

Before the 80386 was available, the MS-DOS portion of Unix-to-DOS products could not handle multiple users because the Intel architecture did not provide a workable hardware platform. With the 80386, Merge 386 and VP/IX take advantage of the processors' ability to run multiple virtual 8086 machines. Because each virtual machine only supports one user at a time, this system does not defy the rules defining MS-DOS as a single-user system.

Users unaware of Unix portion

Most importantly, the Unix aspect of the Unix-to-DOS products are invisible to users unless they decide to work with Unix-based applications.

Despite the functionality of the Unix-to-DOS products, users perceptions may limit their acceptance. "Most of the people who request Unix-to-DOS are Unix users who want to run MS-DOS," explains Martin Schwarz, president of LAN/Comm, Inc., a Cypress, Calif.-based consulting firm. "People who already have MS-DOS prefer a network that allows them to share 1-2-3."

These MS-DOS users will probably choose an OS/2-based network as the best solution, Schwarz predicts. The network operating system will provide the multiuser capabilities OS/2 lacks, and unlike a single multiuser machine, the network will support cooperative processing, he says. With the communications functions IBM plans to add to OS/2, Schwarz concludes, "OS/2's most important task will be getting business systems to communicate with one another." ◆

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In the market for micros

BY AVERY JENKINS

Pressures from both inside and outside the corporation are forcing changes in the personal computer buying habits of MIS. The introduction of IBM's PS/2 line of microcomputers, the ever-dropping price of IBM Personal Computer XT and AT compatibles and changing economics are conspiring to force MIS managers to modify their PC purchasing plans.

Market researchers and MIS managers both say that microcomputer purchases will remain at about the same level this year as they were last year. But the nature of those purchases will likely change. More compatibles, traditionally spurned by Fortune 1,000 corporations, will find their way into these firms. However, those machines will likely not have the same uses as the PCs already existing in companies and will also be accounted for differently.

Until recently, corporate planners have applied the same justifications to microcomputer purchases as they have to mainframe ones. Cost-justification procedures were integral to the usual purchase approval process, including analyses of the computer's intended use and planned applications software. And, just as IBM has been the mainframe of choice for corporate data processing, MIS departments ensured that the micro world was true Blue as well.

"A few years ago, the corporate guys were still tied to IBM's apron strings," says Tim Bajarin, executive vice-president of Creative Strategies Research International in Santa Clara, Calif., a market research firm.

But two occurrences forced a change in MIS's outlook — the introduction of Compaq Computer Corp.'s IBM compatibles and the commoditization of the personal computer.

The success of Compaq's IBM compatibles in the corporate arena is well-known. Even in cases in which PC strategies called for IBM machines only, corporations turned to Compaq, first for its portable machines and later for its desktop workstations. Though Compaq never claimed 100% compatibility with IBM products, the 99% compatibility that Compaq's units provided proved to be close enough for most consumers.

This situation, in turn, opened the doors to a horde of IBM clones for the personal-use market. Few of the feared compatibility problems have cropped up — in fact, more compatibility complaints have been directed at IBM's line of computers than at the compatibles.

The competitive clone market then forced the price of microcomputers to drop. Two years ago, companies estimated their average PC workstation costs at approximately $10,000, including software, maintenance and support. However, that price has currently fallen to less than half that amount.

Part of the decrease has been the result of falling hardware and software prices, but it is also a result of increasing computer literacy on the part of users. More knowledgeable users means less support, a situation that reduces the cost of an overall PC installation.

Now, the PC is more of an appliance, Bajarin explains. Cheaper workstations are causing the loosening of strict purchasing procedures requiring maintenance contracts and other types of expensive support.

Jenkins is a Boston-based free-lance writer.

In some cases, firms are even discarding such support, according to Chris Whichard, managing director of Business Technology Research in Wellesley Hills, Mass.

Frills will disappear

Noting that a PC AT clone costs only a few thousand dollars, Whichard says a company is much less likely to be concerned with long-term viability. Because companies do not expect the machine to last and last, he explains, "frills," such as maintenance contracts, for inexpensive PCs will likely disappear altogether.

Another prospect for the cheap PC is in vertical, single-purpose applications, Whichard adds. Cost-justifying micro purchases has long involved proving the machines' value through manpower reductions or savings. This justification required the PC to be a general-purpose machine that firms could use for many different applications. However, as PC prices drop, it makes sense to buy the machines for a single purpose such as a data base project or desktop publishing.

Another of the traditional blocks preventing companies from purchasing IBM compatibles has been the hovering specter of communications. But now PC-compatible vendors are actually using communications to bolster their penetration of the market.

Connectivity, whether to a local-area network or a mainframe, is much more hardware dependent than other PC applications, and corporate PC managers have been reluctant to buy machines other than IBM for fear that a clone will be incompatible when it comes time to link it to other machines.

This fear has, until recently, slowed the introductions of non-IBM microcomputers. But in a quick reverse, connectivity is now forcing MIS to look harder at the clone market. Whichard says that the increased use of networks is devaluing the corporate microcomputer. "Putting [a micro] on a network, where it becomes a terminal-type device . . . [causes it] to become even more of a commodity," he explains. The use of a network also makes possible the diskless PC, which uses the network's file servers for its long-term storage and only provides local processing power.

At Land O' Lakes, Inc., an Arden Hills, Minn.-based agricultural cooperative, the ability to communicate with IBM mainframes was the overriding factor in a decision to switch from IBM to Wyse Technology, Inc. PC compatibles, says Michael McKeown, manager of user services.

McKeown recommended in April that Land O' Lakes make the switch to Wyse machines instead of IBM PCs partly because of price benefits and partly because of the good relationship between his company and a local retailer that would provide the Wyse PCs.

> **"Even if the PS/2 is a complete flop, it will still sell millions because it says IBM on it."**
>
> HARRY MCENERNY
> THIRD NATIONAL BANK

Beyond communications, price and goodwill, a major reason McKeown left the IBM fold was because of the PS/2.

"I don't think the PS/2 gives us anything," McKeown says. "It's a [Microsoft Corp.] MS-DOS-based machine, so it doesn't buy us anything beyond what we have got right now."

At the same time, if he bought the PS/2, he would lose the ability to communicate with his mainframe. While the Digital Communications Associates, Inc. and Tecmar, Inc. boards that Land O' Lakes uses to link its PCs and mainframes will work in the Wyse micros and other PCs, they do not work in the PS/2. In fact, no vendor currently makes a micro-to-mainframe board to fit the PS/2.

However, even though certain vendors are working to provide such boards, McKeown says he does not want to wait. The first versions of the micro-mainframe boards will likely have bugs in them, he claims, adding that it does not make sense for his firm to be a guinea pig for new hardware while it can use existing equipment that is largely hassle-free.

IBM is hampering the development of third-party boards for micro-to-mainframe links, according to Harry McEnerny, senior vice-president of office and personal computing for the Third National Bank in Nashville.

Third National is a holding company that owns several banks throughout Tennessee. Like Land O' Lakes, Third National uses its IBM Personal Computers to communicate with its corporate mainframes. McEnerny says IBM is being fairly frugal with the technical information necessary to develop these third-party link products.

Unlike McKeown, McEnerny is willing to wait a while. He has bought the PS/2 and plans to continue with the IBM line of microcomputers, but he says he is not entirely happy with that decision.

"We would prefer to not be tied to IBM as the sole supplier of these things," McEnerny explains. But because of the name, his firm will continue to buy Big Blue products. "Even if the PS/2 is a complete flop, it will still sell millions because it says IBM on it," he says.

While Third National has similar communications needs to Land O' Lakes', these needs are not as time critical.

McEnerny's organization can afford to bide its time, particularly because it currently has a surplus of PCs. This situation is not uncommon for companies that have pursued an aggressive PC purchasing strategy. These firms have met most of their critical PC-based needs, and new purchases represent either upgrades of older equipment or needs created by growth of the company.

McEnerny says Third National created its surplus through a consistent recycling policy. Micros that the company bought for specific needs have, in some cases, outlived the applications for which they were purchased. In other cases, the original equipment, such as a PC or PC XT, was replaced by an AT as the application grew in size and the user's dependency on it increased.

Rather than trading in these machines, which have already been written off by the company, McEnerny has kept them. When a need for PCs arises, McEnerny pulls a machine out of mothballs, upgrades it as needed and gives it to the user.

For example, Third National originally supplied XTs to its clerical staff for word processing. But the company found out that, in many cases, the typists were faster than the machines. Therefore, 18 months ago, the company equipped the clerical staff with ATs. Instead of dumping the XTs on the used computer market or trading them in for a discount on ATs, McEnerny installed the XTs in the financial department, where the analysts were less dependent on the microcomputers' speed.

Although some organizations, such as Third National, are forging ahead with their PS/2 purchases, other corporations claim it is too early to tell what effect the release of this machine will have on their acquisition plans.

The retail market indicates that PS/2 inventory has not been burning through stockrooms. Computerland retail stores are reporting that sales of the new machine are "sort of slow," in the words of one sales representative. Perhaps part of the PS/2's underwhelming sales can be attributed to the machine's applications dearth.

More than the mainframe or even the minicomputer market, micro purchasing is directly driven by applications. There are many non-application-related reasons for upgrading a mainframe or even a minicomputer. But, especially because the PS/2 lacks host communications capabilities, the major reason for buying it is the applications that it can provide.

Those applications are still few and far between. Although IBM has released an interim PC-DOS 3.3, the OS/2 operating system for PS/2 Models 50, 60 and 80 will not be available until the first quarter of 1988.

Beyond its immediate PS/2 functions, OS/2 is also the first product that will be available to support IBM's Systems Application Architecture, a common framework for applications development across the range of IBM products.

"The applications available are a very real part of PC sales," Whichard says, and with operating systems and software for the PS/2 yet to be seen, the reaction of buyers is likely to be guarded.

Land O' Lakes McKeown claims that it was not only the lack of software and an operating system that pushed his decision to go with the clones but also the PS/2's data storage format.

Equipped with 3½-in. disks, the PS/2 would require that the rest of the organization's PCs be similarly equipped for data compatibility, he explains. This format brings with it added expense as well as "a hassle," McKeown claims.

While MIS in many organizations waits to see what level of functionality the price of the PS/2 will buy, many others are not delaying the purchase of PC equipment. Many, like Land O' Lakes McKeown, continue to buy IBM compatibles to meet their firms' existing, urgent needs.

Will not reach dizzying heights

Although almost nobody expects the PC market to once again ascend to the dizzying heights it reached during 1983 and 1984, analysts expect it to grow at a moderate pace.

And if the PS/2 proves to be successful, it still is not expected to result in a sharp increase in overall market sales. Companies that have invested many thousands of dollars in their existing PC inventory will most likely engage in piecemeal upgrades to replace existing equipment that has become obsolete.

On the other hand, applications may be just the thing to spur a market resurgence. As applications filter into the corporation through new machines, other software will have to be replaced because "you want to get everybody in your company using the same level of application," Whichard says.

Those companies that can afford to wait as IBM prepares its products may find themselves rewarded in the long run. "It may be several years before IBM can supply us [with applications systems for the PS/2], but I think they are on the right track for the first time in the 25 years that I have worked with IBM equipment," McEnerny says.

"You don't learn to love it, but you learn to live with it," he concludes. ◆

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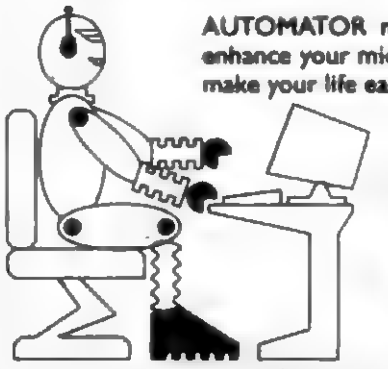

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Bedeviled by system choices

Selecting among IBM, Apple and DEC

BY MICHAEL TUCKER

At the end of last year and the beginning of this one, an entirely new breed of personal computer came into being. Machines that exploited 32-bit microprocessors and optimized user interfaces appeared almost overnight. Suddenly, the average executive had the power of a technical workstation at his fingertips.

The question facing MIS officers is how can they use these devices to improve both computing practice and their positions in organizations.

To get some idea where and how these PCs fit into commercial computing, *Focus* recently examined three vendors' offerings: the IBM PS/2, the Apple Computer, Inc. Macintosh SE and Macintosh II and the Digital Equipment Corp. Microvax 2000.

None of the three lines is currently available in great enough numbers to determine how end users will respond to the machines. However, the industry can learn much about the machines by looking directly at the technology behind these second-generation personal computers.

In terms of market expectations, the most important of the offerings is the IBM PS/2. When it was introduced in April, the machine ended nearly a year of fevered speculation on what IBM would do to top its Personal Computer products.

However, if the PS/2 ended speculation on IBM's future, then it also generated a host of questions regarding the future of the PC market as a whole. The industry expected the PS/2 line to be firmly based on 32-bit processors. That speculation may have been unfair because the performance of a computer is not entirely dependent on its processor.

But because the industry does have a horsepower mentality, people believed that IBM had to

JEFF FARIA

Tucker is *Computerworld Focus*'s features editor.

either produce an Intel Corp. 80386-based machine or abandon microcomputing to other firms, notably Compaq Computer Corp., that had already staked a claim on the 386 standard-making role.

In fact, the standard that IBM is now proposing is based on four machines — the PS/2 Models 30, 50, 60 and 80. To everyone's surprise, only the Model 80 is a 386 system. The Model 30 is a throwback to the venerable Intel 8086 processor. The Models 50 and 60, meanwhile, use the Intel 80286, similar to the Personal Computer AT.

This modest use of 32-bit processing, however, masks significant technical innovations elsewhere — innovations that could be far more important to MIS than processing power.

For instance, all but the Model 30 of the PS/2 line use 3½-in. disks and abandon the IBM PC bus for a sophisticated, high-speed bus, the Micro Channel.

OS/2 capabilities

In addition, most of the PS/2s can replace traditional Microsoft Corp. MS-DOS with OS/2, which was developed in association with Microsoft. In theory, OS/2 will eventually give the PS/2 multitasking and multiuser capabilities.

However, because software developers are only now starting to work with the system, no one knows yet what the operating system will mean.

What is clear about OS/2, however, is that it lends itself to friendly, graphically oriented user interfaces. This ability ties in neatly with PS/2 hardware, which is biased toward powerful graphics. All the PS/2s have incorporated graphics very large-scale integration chips on their motherboards. Also on those motherboards is a remarkable capability for connecting to IBM mainframes.

These developments prod some analysts to suggest that a new model of corporate computing is starting to take shape. In this model, users are shielded from the operation of even their local, desktop system by a graphically oriented, Macintosh-like interface. However, the system can easily access data in mainframes at the discretion of a central MIS department.

In effect, this model simultaneously extends computing power to and withdraws it from the end user. Because their desktop systems will be far easier to use, nontechnical end users will be able to get much more out of their systems. But because they will not have to struggle through the intricacies of MS-DOS or, worse, micro-to-mainframe packages, these users may be less of a threat to central data base operations.

In fact, software vendors are already designing products for that model. Ronald P. Kral, vice-president of strategic marketing for VM Software, Inc., in Reston, Va., says, "IBM has become increasingly aware that the end user has to be isolated from the operating environment."

The Mac challenge

But if the PS/2 generated the most market interest, Apple's machines — the Macintosh SE and Macintosh II — proved that neither IBM nor Intel can claim to be the only standard maker in PCs. Apple, and products based on the 32-bit Motorola, Inc. 68020 processor, still have a shot at the market.

Apple's Mac line is one of the great comeback stories of the 1980s. After virtually creating the PC market in the late 1970s, Apple flatly lost it. Widely publicized failures, such as Apple's Lisa small business computer, and the IBM PC's overwhelming presence made the company look like a has-been.

The first-generation Macintosh was part of the firm's troubles. When it first debuted, the machine was greeted with some amazement. Its mouse and icon-oriented interface were regarded as remarkable innovations.

However, relations between the industry and the Mac soon soured. The new Apple was friendly but slow. It had a superb interface but had few applications software packages compared with the mountain of applications building up around the

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IBM PC. It also lacked expansion slots and, therefore, could not partake of the boom in boards and peripherals that would make the PC the center of a multibillion-dollar aftermarket.

Meanwhile, PC power users grew contemptuous of the Mac. They did not need the user-friendliness of the Mac's interface and found it restrictive. Because many such people were micro managers of large corporations, the commercial world rejected the Mac as well.

Apple's biggest problems, though, were largely invisible to the outside world. It is now clear that during the mid-1980s, a titantic contest was waged at Apple. On one side was Steve Jobs; on the other was Apple's current management team.

The Mac, like the Lisa, had been Jobs's protege. His opposition, meanwhile, was more closely associated with the Apple IIe, the machine that had made the company's fortune in the first place. Thus, when Jobs left Apple, some analysts suspected that the Mac would either be phased out, joining the Lisa in obscurity, or else be upgraded to an MS-DOS-compatible IIe with [illegible]

However, the Mac didn't disappear. For one thing, the Mac gained its own circle of die-hard fans who supported even the computer's first, unexpandable incarnation. For another, it wasn't entirely clear what Apple could have offered in place of the Mac. Even a 32-bit Apple IIe would be hard-pressed to oppose the IBM PC's market presence.

In any case, in March, just one month ahead of the IBM PS/2, Apple brought forth the Macintosh SE — which stands for System Expandable — and the Macintosh II.

The Mac SE is the smaller and less expensive of the two systems, priced at $2,898 for a basic configuration. It is also the most Mac-like, sporting the familar boxy footprint of the original Mac. However, the Mac SE differs from the elder system in that it has two floppy drives and a single expansion slot.

The Macintosh II is more like the IBM PC in appearance. It has a broad desktop chassis and a detachable monitor. Inside the chassis, the Mac II has a 32-bit Motorola 68020 processor, a floating-point arithmetic chip and six expansion slots. The machine costs between $3,000 and $5,000.

> **"It depends on what you're doing. If you need strong connectivity, then go with the PS/2. But, if you're oriented toward ease of use, then you're better off going with the Mac."**
>
> BILL KIRWIN
> THE GARTNER GROUP, INC.

Both machines have the famed, icon-based Mac interface, their single strongest point. According to Eric Arnum, editor of *Electronic Mail and Microsystems*, a publication produced by the market research firm International Resource Development, Inc., located in Norwalk, Conn., "The story with the Mac is the user interface. Obviously, Apple has gone far beyond IBM in making its interface easy to use."

But the two machines also have high degrees of mainframe connectivity. The Mac SE, like all Macintoshes, contains the Appletalk local-area network (LAN) as a standard feature. In addition, the Macintosh II has a small computer systems interface connector, two RS-422 serial ports and the Apple Desktop Bus, an interface for input peripherals.

But it is on the Macintosh II's bus that mainframe links get interesting. The Mac II contains the Nu-bus, a data channel device that was originally developed by university research. Like the old PC bus and unlike the Micro Channel architecture, the specs for the Nu-bus are public domain. Board makers, many of which are becoming nervous about IBM's delay in making Micro Channel data widely available, are turning to the Nu-bus as a new market for their wares.

One of the very first boards on display for the Nu-bus came from Apple at the Mac II introduction. The board included the Ethertalk card, an Ethernet interface for use with the Macintosh II under Apple's version of Unix, A/UX. Ethertalk is scheduled to ship in the third quarter of this year.

The presence of Ethertalk, in turn, means that the Macintosh II can exploit links to the VAX line of long-time Ethernet vendor, Digital Equipment Corp. Apple's move could be significant in that DEC has recently begun a major push into the MIS market.

Meanwhile, for the MIS shop in which "mainframe" means "IBM," the Apple machines still have potential. Opinion generally is divided on how connectable the new Macintoshes are, but the majority view is still that they can fit rather easily into IBM's Systems Network Architecture (SNA) universe.

"We are finding that the corporate data base standard is IBM," notes International Research Development's Arnum, "but now there is no penalty in presenting a Mac to the user and then, somewhere out of sight, linking that Mac into SNA."

Arnum argues that there is nothing to be gained by using a PC instead of a Mac. He says that the PS/2 is not yet a full participant in SNA and so for it, too, micro-to-mainframe links mean terminal emulation.

"Maybe the PS/2 is better at pretending to be a terminal than most workstations, but [it is] still only pretending to be a terminal," Arnum adds. "If it's doing that, it might as well present the friendliest interface it can." And that means the Mac.

Bill Kirwin, project director for personal computing at The Gartner Group, Inc. in Stamford, Conn., says he feels the Apple machines will play a major role as low-end scientific and engineering workstations. "As a general-purpose office automation workstation, we don't see the Mac II impacting the PS/2. And we see the Mac SE having only a niche market in office automation. We feel the installed base of application software will keep OA along the Intel path," Kirwin states.

He also says he believes that the PS/2 is more connectable to IBM mainframes than the Macintoshes will ever be. However, the interfaces of the machines are still key considerations. "It depends on what you're doing. If you need strong connectivity, then go with the PS/2. But, if you're oriented toward ease of use, then you're better off going with the Mac," he says.

In fact, Kirwin has begun to recommend to his corporate customers that they consider the Apple Mac II and Mac SE as secondary standards to IBM.

Beyond the Macintoshes and the PS/2s, there are other desktop machines, such as technical and engineering workstations, that people rarely associate with corporate computing. Will these machines still be key assets in the MIS world?

Enter the Microvax 2000

Consider DEC's Microvax 2000. Introduced in February, the 2000 is a Microvax II scaled down to a single-board machine and then installed in a system that is slightly smaller than a PC.

For $10,000, the 2000 delivers the Microvax II 32-bit, VAX-on-a-chip microprocessor, 4M bytes of memory, 42M bytes of disk storage and a software license for either the micro version of DEC's VMS operating system or Ultrix-32, DEC's version of Unix.

The Microvax 2000 is not being sold primarily as a single-user system. Rather, DEC notes that the 2000 will support up to four users by itself and up to 16 users on a LAN. In fact, if pressed, DEC will actually discourage buyers from selecting the 2000 over a Vaxstation if the applications they intend to perform with the machine are graphically oriented or highly interactive — both characteristics of PC applications.

So, machines like the 2000 are clearly not appropriate for nontechnical end users. But they could still have a role in MIS as the PC of MIS managers.

MIS officers have recently found a need for mainframe-like power on their desktop systems, which must also be highly connectable to their central systems. Increasingly, computer managers are undertaking tasks that are computer-intensive, such as extremely large-scale project management and remote software development.

In this case, machines like the Microvax 2000 have the potential to fit MIS's bill. Other players in the microcomputer game may be aiming at a similar market. For example, some observers have pointed out that the Model 80, the 386 version of the PS/2, is actually a VAX-like system. Perhaps it, too, is meant for the MIS department.

The workstation weapon

So, how should MIS react to the new generation of PCs?

The machines offer two things. First, they offer a chance finally and fully to extend computing to the end-user domain and, second, they do so in such a way as not to disrupt MIS's effectiveness.

According to Arnum, "From all the studies I've done, it is the user interface that has become the dominant issue in computing. That's where you expend your energy." And, he says, the function of that interface is not only to make the system easy to use but also to perform what are practically connectivity tasks. It allows the user to dip into corporate data bases without endangering the integrity of those bases.

The Apple and IBM machines can give MIS that sort of power. In fact, Arnum says of the PS/2, "It's designed for mainframe networks. I don't think it's really meant to a be a stand-alone personal computer."

This perspective would suggest that the entire generation of new PCs lends itself to the IBM model of corporate computing in which the use of the machines is kept as easy as possible, while users are removed from the operating environment.

In the process, MIS officers could actually improve their political positions if they become the most active promoters of the new systems within their firms.

"In a way, the new generation of PCs actually performs the tasks that people bought the first generation of PCs to do," notes Michael Packer, senior associate and codirector of the strategic information technology practice at the Mac Group, a consulting firm in Cambridge, Mass. "People bought PCs to ease their work load and gain control of their data only to find themselves trapped by training, application development and data entry problems. Now, by allowing access to mainframe data, the second-generation PCs could fulfill the promise of the first."

MIS managers can exploit this knowledge to their advantage. "If MIS can position itself so that it is viewed as the agency that makes that fulfillment possible," Packer claims, "then there could be a true detente between MIS and user communities." ◆

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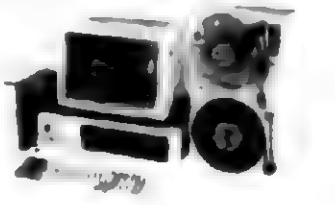

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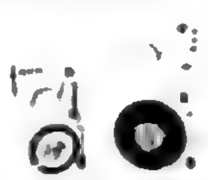


PS/2 ANALYSIS

RICHARD OHANA

IBM breaks from the pack

BY STAN KOLODZIEJ
SENIOR EDITOR

Has IBM created a new standard in corporate microcomputing with its Personal System/2 Model 80? IBM thinks so. Others are not so sure.

For the PS/2 Model 80 to become the [illegible] microcomputer with which all other micros are compared, it will take everything the machine has to offer — hardware, software and, perhaps most important of all, IBM's marketing strategy and clout.

On the surface, the Intel Corp. 80386-based Model 80 has some impressive hardware credentials. Its 32-bit processor cruises at 16 MHz. It comes standard with 1M byte or 2M bytes of main memory, expandable to 16M bytes, and is equipped with a 44M-byte fixed hard drive. Another 44M-byte drive can also be added.

The PS/2 Model 80 contains fewer components and boards and is built on a more modular basis. Is this construction an important factor to users?

"It will cut down on maintenance and repair costs," explains David Nickolich, a systems analyst with the information systems application development center of Indianapolis-based Indiana Bell.

"For those large firms with hundreds of micros, labor costs are going to be a lot lower for in-house micro repairs. Anything that will make it easier and less costly to repair [these machines] will get MIS support," he says.

IBM says that the Model 80 represents the company's best shot at vertical integration, claiming that roughly 80% of the component parts, including the 1M-byte random-access memory (RAM) chips, IBM hard disk drives and custom chips controlling disk storage, come from Big Blue's design laboratories and manufacturing facilities. Built into the system are 3½-in. floppy disk drives, serial

For *CW Focus*'s interview with Rod Canion of Compaq, turn to page 32

and parallel ports and IBM's higher resolution Video Graphics Array (VGA) chip.

Despite IBM's confusion in introducing two kinds of 3½-in. disk drives, one at 720K bytes and one at 1.44M bytes of memory, users generally agree that the 3½-in. format is the way of the future.

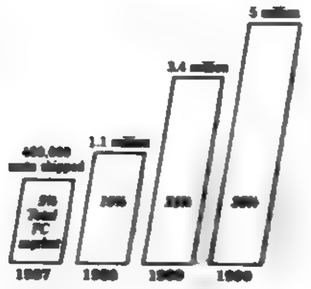
Not for everyone, though.

Many users are confused about the format conversion. "I couldn't go for the 3½-in. drive right now," explains Sandra Patterson, marketing coordinator at The Benham Group, Inc., an architectural engineering firm in Oklahoma City. "I don't know how you'd get existing applications over to that new format."

A key element in IBM's claim that the Model 80 heralds a new personal computer architecture is the Micro Channel bus. The IBM Micro Channel carries up to 32 bits of data to and from the processor, about twice the capacity of most earlier IBM PCs. It will also give users multitasking capability. The Micro Channel can support up to 15 direct memory access devices, more than double the number available on the existing IBM PC bus. With more memory access devices and faster data rates, analysts say there will be a definite improvement in application throughput. The Micro Channel also contains seven expansion slots.

386 PC staying power

Worldwide shipments of Intel Corp. 80386-based micros



INFORMATION PROVIDED BY GARTNER GROUP, INC.

"I don't think many people are going to find fault with the Model 80 hardware," explains Leland Freeman, consulting editor for the "James Martin Report" in Marblehead, Mass. "I think IBM is establishing a hardware standard."

Illinois Bell's Nickolich agrees. "There are so many new things in the PS/2 line," he says. "Add-in boards are easy to plug in and take out, there is less wiring in the box, everything seems to be composed of snap-in components, and it seems like it's adaptable to robot engineering, which will give IBM more room to fight the clones in price wars. I think others are going to follow in line."

Which brings us to PS/2 software, a real bone of contention. At this time, IBM is only offering PC-DOS 3.3 for its 386-based machine. PC-DOS 3.3 is an extension of Microsoft Corp.'s MS-DOS 3.0 series of operating systems for IBM PCs and compatibles. The "real" 386 operating system, the OS/2, is still shrouded in some mystery and not slated for commercial release until 1988.

"OS/2 is what PC-DOS 3.3 should be now," Freeman claims. "PC-DOS 3.3 doesn't do anything for the Model 80 except fill a gap until OS/2 arrives. OS/2, however, is going to be a major reawakening for the desktop environment. It finally breaks the 640K-byte barrier. One expert said the fault line between MS-DOS and OS/2 is as big as the one between the [Apple Computer, Inc.] PC and the IBM PC or between [Lotus Development Corp.] Visicalc and 1-2-3. The point is, OS/2 will make a big splash."

It just might. OS/2 will enable programs to access up to 16M bytes of main memory on the Model 80, finally eliminating the need to fit individual programs within 640K bytes of memory. The extra addressing space given by OS/2 obviates the need for users to exit from one large program in order to use another. The 16M bytes of addressable memory is nothing to sneeze at because it is 25 times the memory allowed by existing MS-DOS versions. This extra space opens up new avenues of corporate microcomputing. Not only will users have access to large programs and data, they will also be able to do multitasking and work on several programs concurrently.

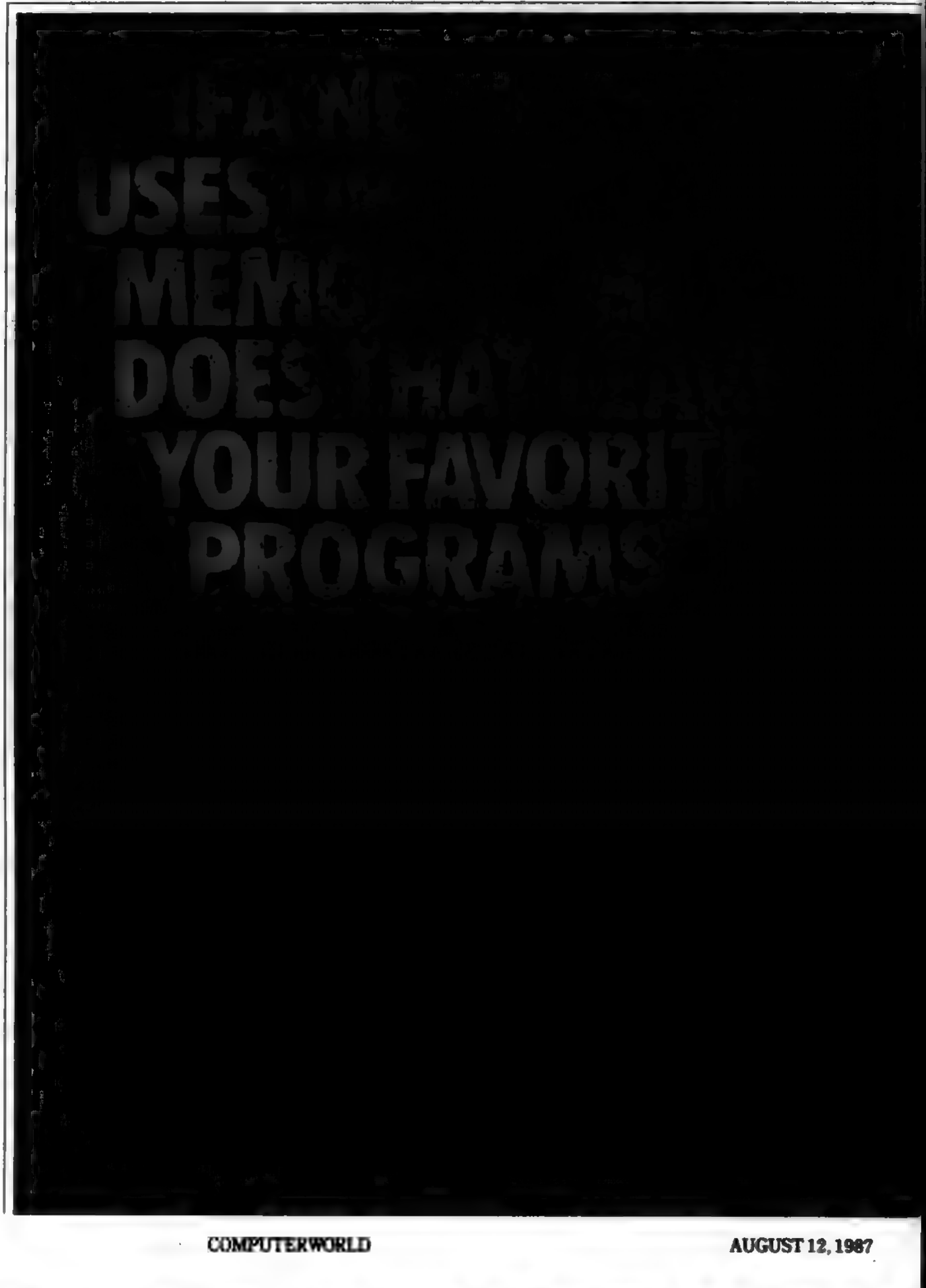
Three stages

OS/2 will be divvied up into three stages, a policy destined to be confusing to many customers. OS/2 Standard Edition 1.0 will support enhanced memory space, multitasking and the existing MS-DOS operating environment. Standard Edition 1.0 is due in April 1988.

Standard Edition 1.1, which will replace 1.0, adds IBM's Presentation Manager, a graphics-based program interface with windowing capabilities based on Microsoft's Windows. IBM seems to have finally opted for Windows over its moribund Topview windowing program.

Beyond the standard editions comes the OS/2 Extended Edition, which really begins to make things exciting. The Extended Edition is scheduled to toss in a relational data base management system, terminal emulation and connectivity consisting of application development facilities for IBM's Dialog Manager, remote local-area network (LAN) data services, Systems Network Architecture (SNA)/LAN gateway support and IBM's Enhanced Connectivity Facility.

However, don't expect OS/2 Standard Edition 1.1 and the Extended Edition to



be available soon.

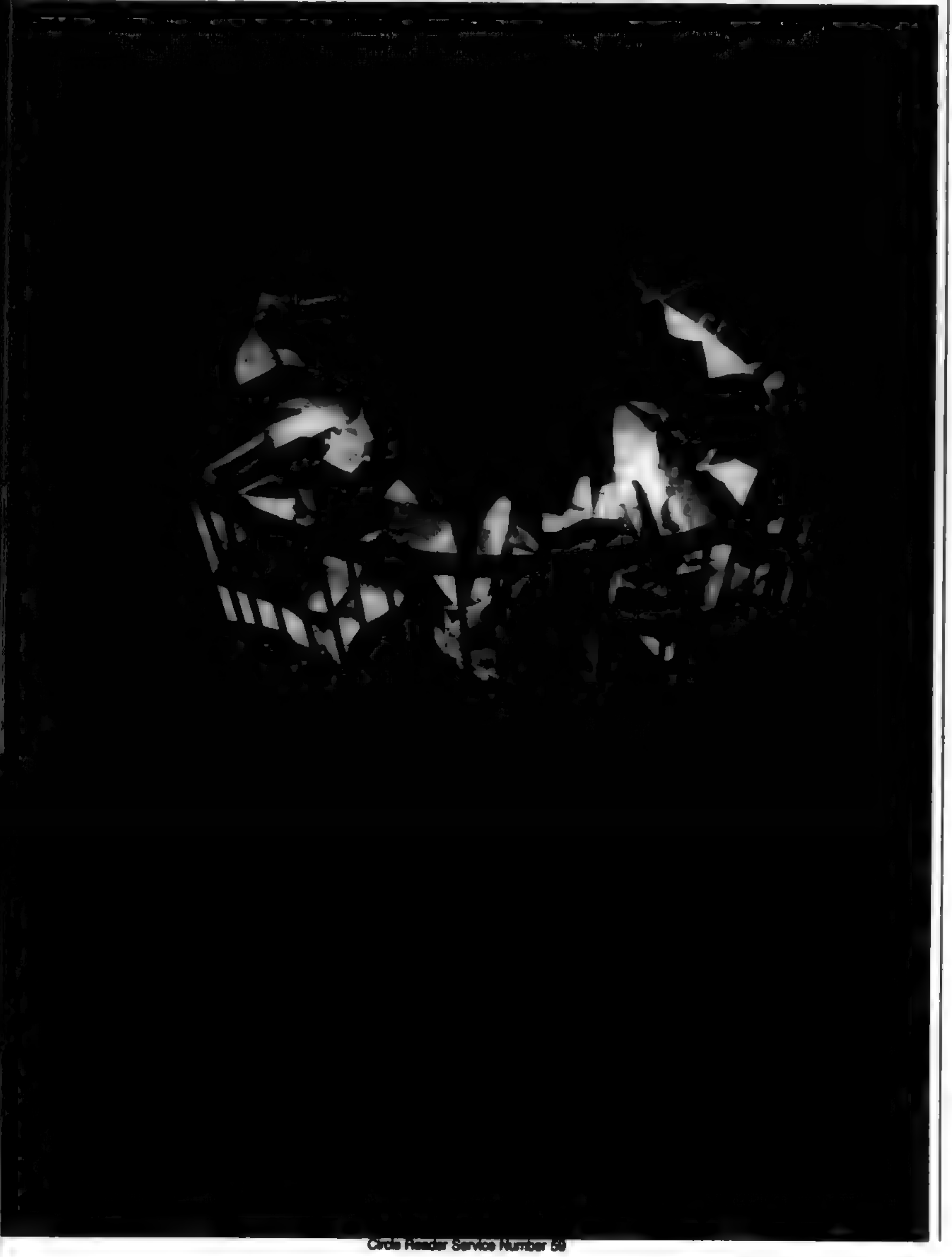
Although these software programs will not arrive commercially for some time, they slowly put IBM's micro plans into perspective. The company, for example, has stated that the data base manager running on the Extended Edition of OS/2 will be compatible with the current DB/2 version running on IBM 3090 series mainframes. IBM also announced that OS/2 will support the firm's Systems Application Architecture (SAA), a planned common programming interface across the diverse range of IBM systems.

> **"IBM has upped the stakes. These clones are going to have to be functionally equivalent machines and not just duplicates of the PS/2."**
>
> BILL KIRWIN
> THE GARTNER GROUP, INC.

Van Weathers, a director at San Jose, Calif.-based Dataquest, Inc., maintains that if IBM is aiming to make its 386-based systems the standard in corporate microcomputing, then SAA will play a major role in getting the company there.

"I think IBM is going to move rapidly to implement SAA," Weathers says. "IBM refers to the PS/2 as an intelligent workstation, and it is going to use it as an offensive weapon to create a uniform interface to all its system architectures.

"SAA is both a defensive and offensive maneuver by IBM. Defensively, it represents IBM's turn in midstream to answer the critics who pointed to Digital Equipment Corp.'s success with uniform interfaces and architectures. IBM's System/36 and 38 and 4300 series computers, for example, have incompatible architectures and several inconsistent user interfaces that will be corrected by SAA. Offensively, IBM is going to use SAA to grab new markets and keep its customers loyal. The Model 80 is a good way of getting SAA into the micro level," Weathers says.



Circle Reader Service Number 59

Bill Kirwin, program director of personal computing at The Gartner Group, Inc. in Stamford, Conn., agrees and adds that SAA represents a good way for IBM to have its micros penetrate the user environments of other vendors.

"The world is becoming more amenable to mixed-vendor environments," Kirwin explains, "and SAA is made up of a number of interface options. DEC, for example, already is planning an SAA interface. Others will be doing the same."

Weathers says he feels the Model 80's multiuser capability is another key facet.

"I think this feature will actively appeal to the expansion of the market because the market comprising small minicomputer systems and PC groups with up to about five users is a very mixed-vendor market," he claims. "The PS/2 Model 80 and other 386-based machines will take this market by storm. I wouldn't be surprised if the Model 80 is expanded upward to overlap with IBM's multiuser systems such as the System/36s."

A recent Dataquest report stated that OS/2 is the long-awaited MS-DOS 5.0. The report goes on to suggest that, although the OS/2 software announcements are important, they are primarily short term. IBM, the research firm suggests, is planning nothing less than an all-encompassing system architecture that will link all IBM computers, including the PS/2s, under one umbrella. Tying everything together will be IBM's VM.

The tie that binds

"This [VM] strategy is apparent in the MS-DOS 5.0 debacle," the Dataquest report reads. Although observer opinions are divided on how far IBM will port VM into its low-end micros, IBM has stated it intends to make VM the operating and program development environment that will bind desktop and workstations with mainframes through IBM 9370 departmental computers.

"The concept of bringing VM to the desktop is intriguing, although I don't think it's going to happen," Kirwin claims. "OS/2 has certain VM characteristics anyway."

Weathers adds that there are some busy developers out in the field putting VM on 386-based machines "simply because IBM isn't. If the VM/386 market develops, it will remain a separate and distinct market for several years."

Although it is an impressive plan, the integration of SAA, LU6.2 and, possibly, VM is still a long way off. If IBM is out to create a new standard in microcomputing, it will not happen this year nor will it be likely to occur next year. Dataquest points out that even though IBM announced 80 PC products last April, most of these offerings will not be delivered until after the third quarter of this year. Short-term objectives are now important to IBM as a bridge to carry customers and sales successfully into 1988 and into IBM's long-term 386 objectives.

But do the PS/2 Model 80 and PC-DOS 3.3 offer enough now to persuade customers to buy? There are few mainstream software applications that can take advantage of the speed and power of the 386 processor. Software programs for IBM's 3½-in. disk drives are slow coming off the mark. Though IBM has announced seven Solutionpac programs for the PS/2, most

INTERVIEW

Will IBM PS/2 hurt Compaq? No, according to Rod Canion

Rod Canion is president of Houston-based Compaq Computer Corp., IBM's biggest competitor in the corporate personal computer market. Canion recently spoke with Stan Kolodziej, *Computerworld Focus*'s senior editor, about IBM's Personal System/2 machines and OS/2 operating system as well as Compaq's view of the future of microcomputing and the company's role in it.

Is IBM going to be successful in creating a new de facto personal computing standard with its PS/2 line of micros?

There are two separate issues involved. The personal computer standard that's been in existence the past five years has constantly been moving forward. The question is, Do people want a new standard? That's easy to answer. People do not want the pain and the cost of moving away from the existing standard. If you asked people if they wanted to change from the current standard, I think they would almost uniformly answer no. They want to move forward, they want new technology, they want improved performance, but they don't want to have to pay the penalties of breaking from the current standard.

Are you including OS/2 in that assessment?

No. OS/2 is, in fact, very important, will be real, and we'll be offering it. My problem with IBM is in the way it related PS/2 and OS/2 to each other, as though the implication of their announcement was that OS/2 and PS/2 were basically one and the same. OS/2 is totally independent of PS/2. The PS/2 has to be evaluated on its own merits as a hardware system, and I've recently been pointing out the incompatibilities of PS/2 that don't seem justified.

The impression I have is that OS/2 will run on existing Intel Corp. 80286 IBM Personal Computer ATs but at an excruciatingly slow pace.

Not true. Take a look at one of IBM's PS/2 machines, the Model 60, which has a 10-MHz processor. Compare that to Compaq's Deskpro 286, which has a 12-MHz processor. If there are any differences in speed related to IBM's new Micro Channel bus — and nobody's been able to show any differences — the differences are still going to be much less than the existing 20% difference in processor speed. So we're contending that our Deskpro 286 will run OS/2 better than the PS/2 Model 60.

Is there anything in the IBM PS/2 announcements that could cause trouble for Compaq?

Not that we've seen. The whole issue is whether most companies will suffer to convert to IBM's new architecture. Because they don't have to [convert], it's going to be an interesting test of how much IBM can influence its customer base.

Canion

You were quoted recently as saying that if your customers wanted a PS/2-compatible computer, Compaq would deliver one.

We've always emphasized meeting user needs above everything else, and when I take a position on the PS/2s, I'm not trying to tell users what they should do. What we're trying to do is help them understand what their trade-offs are, what their choices are, but we'll look to users in the long term to decide what they want.

I hope they know what they want better than anyone else.

IBM has made it clear that it will support third-party hardware and software developers enhancing the PS/2 line. The company has also been sounding a little belligerent about protecting technology patents, which leads many to believe it will take PS/2 compatible and clone makers to court. Will any of that stop you from producing a PS/2 compatible if your customers want it?

We don't know what IBM will do for sure. Our belief is that if we need to, we'll be able to offer a compatible machine.

If you were IBM, what would you have introduced on April 2?

Well, there's a very clear path of success in PCs that I think IBM could follow just like the rest of us. That path is to bring new technology and new enhancements to the PC market in a compatible way, so that the transition to these new capabilities is painless.

That's been done many times now in the last five years, and each time it has been done right, it has been done successfully.

For IBM to add the pain and costs unnecessarily, as it has done with its new products, raises a big question as to how successful the company will be.

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notably the Personal Publishing System and the Publishing System VM Edition, much of the meaty stuff lies in the future.

Illinois Bell's Nickolich says he is still evaluating the Model 80. "The first users will be the heavy number crunchers who need the Model 80 for generating mainframe program code, statistical analysis and so on. The Model 80 has great graphics, though, and much better resolution than the old IBM [PC] graphics. To have the VGA graphics already built in and ready to use is a big selling point," he says.

"This is where IBM's marketing influence becomes so important," Weathers claims. "If anyone can create a standard through sheer immense marketing force, it's IBM."

Kirwin adds that IBM will create some industry ripples on the way to establishing the PS/2 Model 80 as the de facto corporate micro of choice. For one thing, he says, the PS/2 line is going to help perpetuate a three-level PC market.

"At the top end are loyal IBM customers who have always gone with IBM, who might have purchased System/38s and who are conditioning themselves for the IBM 9370s," Kirwin says.

"The next tier will consist of those companies adopting such multiuser systems as DEC minis and IBM mainframes. These people will be looking more toward the [International Standards Organization's Open Systems Interconnect] standard rather than IBM's SNA. They have their options of going with PS/2s or other micros. When IBM stops shipping its Personal Computer XTs and ATs, some of these users will go to the clones.

"This is a market that IBM has been a partial player in until now, but with its 386-based engine, SAA and multiuser software, IBM will become a bigger player," he says.

"IBM has no control over the third level," Kirwin says. "This is the low-end PC market consisting of stand-alone machines, mainly clones. These people don't care about the PS/2s."

The new standard

Kirwin adds that IBM's attempt to market the Model 80 as a new standard in microcomputing has been clear from the start. The entire PS/2 announcement, Kirwin maintains, was aimed at differentiating the PS/2 line from the more commoditized existing 386 and 286 markets.

"IBM is targeting the Model 80 at its 500 key customer accounts," Kirwin says.

"By mentioning OS/2, DB2, SAA and so many ambitious communications links and development software in the same breath as its PS/2 line, IBM has sent a message to its big customers — 'The Model 80 is an integral part of our new overall computing strategy, and there is now a big disparity between the two worlds of us and them.' "

Weathers agrees that IBM can use SAA in combination with the PS/2 Model 80 to prove the product and move the arena away from the plug-compatible or clone vendors. And where exactly will this strategy leave the IBM PC-compatible vendors, such as Compaq Computer Corp. and the legions of clone makers?

"People have said Compaq has a pretty loyal core of customers, but I don't think that washes," claims Jim Weber, president of Insight Technology, Inc., in Piscataway, N.J. "What Compaq does have is a loyal core of dealers built on the great profit margins Compaq gives them on their micros. If they keep those margins in place, I think Compaq will continue to do well."

Kirwin says that Compaq will have to work hard to maintain its current leading market position.

"IBM is going to use the PS/2s as a way to regain lost ground in the PC marketplace," Kirwin says. "Compaq is one of the big targets. A large part of Compaq's success has been to offer 20% greater performance over equivalent IBM PCs at 20% less in price. IBM is pricing the PS/2s competitively from the start, however, so the challenge will be to match or beat IBM's machines in functionality.

IBM wants to be a moving target and have others come at them. The PS/2 will become the standard at which others will aim," he adds.

Aiming at that standard might prove more difficult than expected. IBM has placed a roadblock in front of clone makers. The same IBM proprietary components in the PS/2 Model 80 that Nickolich applauds will also prove a formidable task for most clone companies to duplicate.

"These will not be cookie-cutter clones like previous PC machines when the only unique IBM component was the BIOS," Kirwin says. "IBM has upped the stakes. These clones are going to have to be functionally equivalent machines and not just duplicates of the PS/2."

And Kirwin says that requisite makes for a much different clone market — one that will have to work with a new IBM architecture with application-specific circuits, advanced BIOS and a Micro Channel bus. That will require a new order of reverse engineering and money, manpower and marketing, the likes of which are only within reach of Compaq and a few others.

Moot point

That is, of course, if IBM will even allow it. Right now, that point is moot. With one hand, IBM has been beating its litigation drums, as Bill Lowe, IBM's Entry Level Systems president, warns that the company will take action against anyone who copies patented PS/2 technology. IBM is using the other hand, however, to stroke concerned hardware and software developers, assuring them that the company will go out of its way to accommodate third-party enhancements to the PS/2 Micro Channel and VGA.

Even Rod Canion, Compaq's president, will not venture to say how IBM will react to alleged violations of its technology patents. "That's just too unpredictable," he says. (See Canion interview above).

According to Freeman, there could be another key element in IBM's marketing strategy.

"In these days of sagging mainframe sales," Freeman says, "IBM could begin pushing the sheer power of its 386-based machine to help take up some of the sales slack. With 386-based machines now offering one [million instructions per second (MIPS)] for about $3,000, you can buy dozens of micros for the cost of one mainframe MIPS. IBM could really start selling the Model 80 on power as well as its closer mainframe ties. In such a scenario; mainframes could eventually become data base machines, giving way to the distributed power of the PS/2s and other 386-based machines. The OS/2, with multitasking, is a big step in that direction."

So, will the Model 80 become a standard?

"I don't know if it will be a seperate standard," Nickolich concludes. "I don't even know that it's that important. I do know it's an impressive machine."

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Help for the PC junkie

Channeling a power user's energies

BY REBECCA HURST

He was the local hero in his company. He was a business user with a lot of personal computer expertise. He was a power user.

At first, the employee provided co-workers with help for their PCs, earning their friendship and admiration. "He was in a very nice situation," recalls Charlotte Hofmann, president of Information Ideas, Inc., an Oakland, Calif.-based management consulting firm.

ROBERT PIZZO

However, that situation gradually soured. "MIS regrouped and began providing the support it should have begun earlier," Hofmann says. The power user did not like this intrusion on his expertise. He told users not to rely on MIS, she says. "He sabotaged MIS support." In the process, Hofmann notes, the power user's job began to look redundant.

The power user hurt his image, not only with MIS but with his work group as well. The man began exuding a great deal of confidence about his technical expertise and stopped making friends, Hofmann explains. As a result, he probably will be on the company's next layoff list, she predicts. "There's no one to root for him."

The relationship among top management, MIS and PC users often has been filled with confusion and ambivalence. But the average PC user is now earning increasing respect and support. Managers see PCs as a means of improving employee productivity. MIS, flooded with requests for PC support, likes to see self-sufficient users.

However, the techies, or power users, once revered by companies for leading the use of PC technology in business, are often viewed as a threat to MIS and a drain on resources. Additionally, managers often question the balance of time these users devote to technology and to their official duties.

The problem does not rest exclusively on the power users' shoulders, though. MIS and business managers are equally responsible for the corporate culture that has contributed to unwanted power user practices. These managers are also responsible for implementing changes that can turn the power user from a problem to an asset.

Before trying to solve the problem of power users, managers need to take a close look at these users and their relationships to other employees. From a study of PC users, Information Ideas' Hofmann has developed a four-tier model to describe the levels of PC expertise within corporations. The model categorizes users as potential, typical, technical and advanced. The number of employees who fall into these groups shrinks with

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Hurst is a *Computerworld Focus* senior writer.

each successive level of expertise.

Potential users are the largest group, accounting for 50% of the people who fit into the model. These employees work with information and could use PC technology to improve their productivity, Hofmann says. This group consists of clerical workers, professionals and upper management.

Typical users may account for 40% of the employees who can benefit from PCs, according to Hofmann. "Typical users should be very close to the business process," she says. They use PC applications, such as word processing and spreadsheets, to provide informational support. These users have a generic understanding of the computer and depend on others for technical support, she adds.

The line between typical user and technical user is a big one, Hofmann says. "The territory above that line is dangerous." Technical users are mesmerized with the technology, she comments. "I would wonder about a president who regularly uses Lotus Development Corp. 1-2-3," she says, because he should be delegating such functions to his staff. "If he or she is using the PC for electronic mail, though, that's great."

> **Frustrated by a lack of promotions, some employees attempt to take advantage of weak managers to build their own power.**

There is also some debate whether power users know more about products than how to use them to support the information they need, she says. These users may focus on learning one application to the exclusion of other ones. For example, some users know 1-2-3 so well that they use it for word processing instead of doing their work more efficiently with a word processing package.

Technical or power users can also be an asset, however. "I've seen power users use PCs in some absolutely creative and productive ways," comments Irene Nesbit, president of Nesbit Systems, Inc., a Princeton, N.J.-based consulting firm. "They see that they have a tool at their desks, and they're using its potential to improve their work." In addition, technical users help co-workers improve their productivity using PCs.

Advanced users are tired of concentrating on the technology, Hofmann says. These users generally are managers who realize the need to concentrate on business so they take on a mentor role and train others to become technical users. Advanced users are good for a corporation because they have a strategic knowledge of the business and technology. "They can grow into good chief information officers."

There are several ways in which power users can contribute to a company's growth. However, managers that bring out the assets of these users have to consider a complex matrix of factors. First, corporate managers must face two huge areas of concern: users' emphasis on technology and the need for greater PC-level support. Second, the types of action managers take will depend largely on whether power users have decided to remain in their current profession or shift to a technical career.

Most power users have to choose between their profession and a technical career if they want an extended career path. Some users find unofficial positions in their departments in which they combine company business with end-user support, says Naomi Karten, president of Karten Associates, a consulting firm located in Randolf, Mass. Because the position is not officially recognized, upper management may question the time devoted to helping co-workers, she says. Also, MIS often fails to recognize this user's assistance in offsetting support requirements. No matter how well-intentioned, the power user could become a casualty of company layoffs.

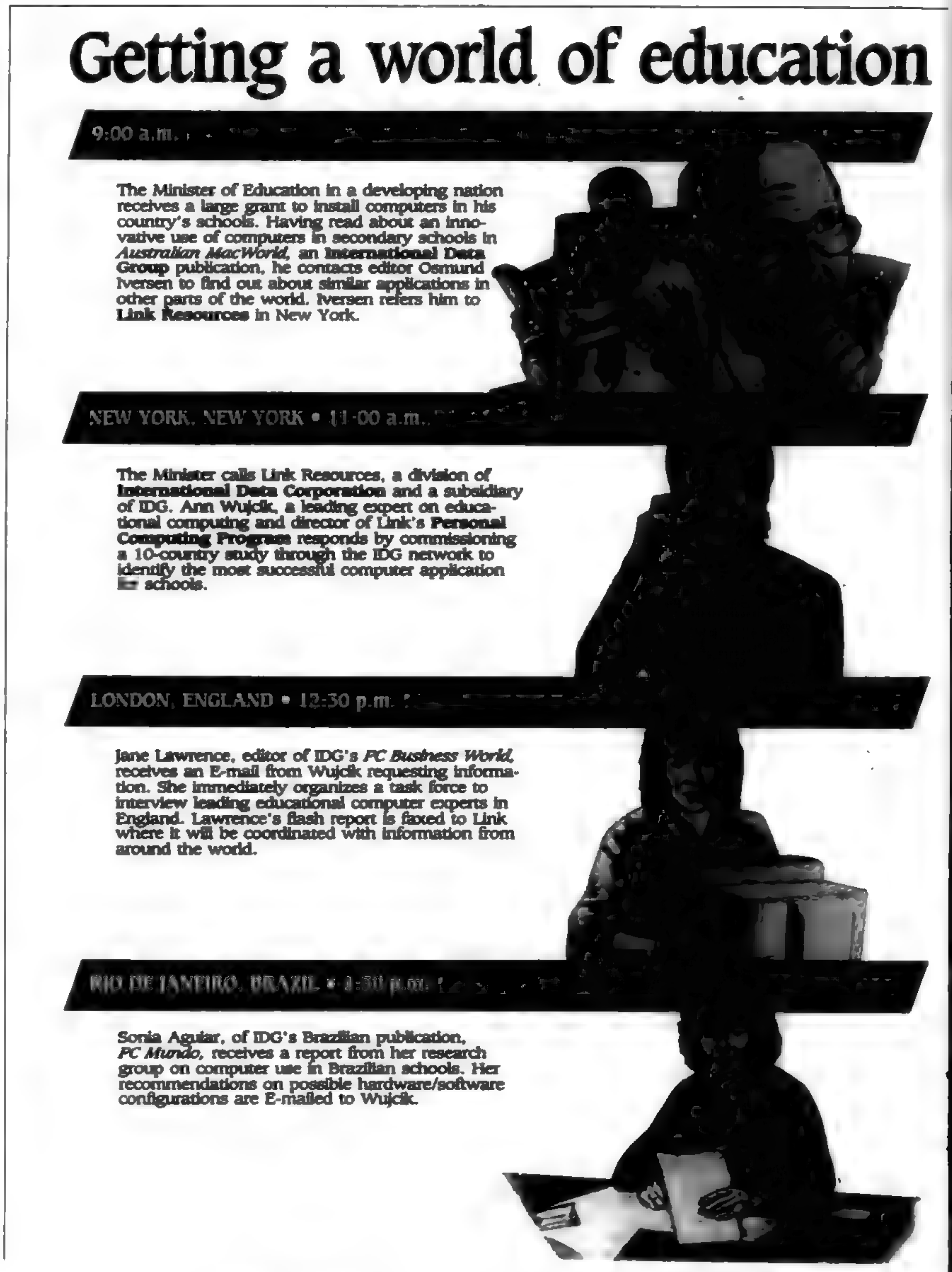
Some power users are less benign. Frustrated by a lack of promotions, some employees attempt to take advantage of weak managers to build their own power. The most vulnerable managers tend to be intimidated by computing, Hofmann says. Technically competent employees may convince managers that they have a better grip on business information.

"In some cases, a manager ceases to attend steering committee meetings," she says. Instead, the power user assumes the manager's role. However, any influence these users may gain is usually short term, Hofmann notes. "They are either fired or laid off."

Managers of MIS departments and their end-user extensions, information centers, largely determine whether employees who want to shift to a technical career will find a position at their current company. For organizations with overworked, understaffed information centers, hiring power users for end-user support positions can provide a win-win solution. "User support has become more complicated," Nesbit says. "Companies need a manager who understands PCs and the business and who can coordinate with MIS."

'Users know a lot more'

Karten agrees. "Information center people used to stay a half hour ahead of the end users. It's difficult today because users know a lot more. Sometimes they



Getting a world of education

9:00 a.m.

The Minister of Education in a developing nation receives a large grant to install computers in his country's schools. Having read about an innovative use of computers in secondary schools in *Australian MacWorld*, an **International Data Group** publication, he contacts editor Osmund Iversen to find out about similar applications in other parts of the world. Iversen refers him to **Link Resources** in New York.

NEW YORK, NEW YORK • 11:00 a.m.

The Minister calls Link Resources, a division of **International Data Corporation** and a subsidiary of IDG. Ann Wujcik, a leading expert on educational computing and director of Link's **Personal Computing Program** responds by commissioning a 10-country study through the IDG network to identify the most successful computer application for schools.

LONDON, ENGLAND • 12:30 p.m.

Jane Lawrence, editor of IDG's *PC Business World*, receives an E-mail from Wujcik requesting information. She immediately organizes a task force to interview leading educational computer experts in England. Lawrence's flash report is faxed to Link where it will be coordinated with information from around the world.

RIO DE JANEIRO, BRAZIL • 1:30 p.m.

Sonia Aguiar, of IDG's Brazilian publication, *PC Mundo*, receives a report from her research group on computer use in Brazilian schools. Her recommendations on possible hardware/software configurations are E-mailed to Wujcik.

know more than the information center people."

Another problem is that PC users far outnumber the people assigned to support them, she says. MIS and information center managers need to realize the need for more end-user support and take advantage of existing expertise within the company, Karten asserts.

Such power users could be clerical workers as well as professionals, Hofmann notes. Secretaries with five years of word processing experience are often advanced technical users, she says, but other employees may not listen to them. These secretaries usually have to make the transition from clerical worker to technical professional by moving to another company, she notes. MIS and information center managers who overlook these power users may be letting corporate resources slip through their fingers.

Reporting structure

Power-users-turned-support-providers can report centrally to MIS or the information center, or they can report to the department managers, Karten suggests.

"I've seen job postings in departments hiring technical specialists because they've seen the need. To users familiar with information centers, these positions looked everything like postings for an information center manager," Karten says. Whether these support roles appear in MIS, the information center or the department, they should be formally recognized to promote effective corporate backing and a career path for employees.

However, while power users may be good in end-user support roles, they may not have the background to support data processing functions, Hofmann cautions. Distributed processing is an important part of corporate computing, she explains. "Micro users have learned distributed processing from the ground up," she explains. "They began with 'sneakernet,' in which they passed floppy disks to a PC local-area network." By contrast, MIS professionals have focused on mainframes and minicomputers, which have evolved toward distributed processing, Hofmann notes.

One power user convinced a small company that he could handle the duties of an MIS director, Hofmann recalls. Six months later, the company demoted him and hired an MIS director with a DP background.

'Didn't have the experience'

"He didn't have the experience to run an MIS department, even though it only served five people," she says.

Offering user support positions is a good solution for power users who have discovered a technical vocation. However, MIS and upper management also have to realize that some power users want to focus on their professions at hand. With little encouragement, these users find themselves flooded with requests for help from other workers. In these instances, MIS must find a way to support the average end user better, relieving power users of their roles as technical assistants and allowing them to get back to their careers, Nesbit advises. Some power users in management positions may also be in a position to delegate technical support responsibilities.

For example, David Jacobson, a planning officer for the Internal Revenue Service, works in a division that relies heavily on microcomputers. "We have about 1.2 to 1.3 micros per person," Jacobson says. He explains that in the past he and two other power users had problems balancing work and interruptions from less experienced users. "My major concerns were keeping people away from me and doing my job," he recalls.

> **MIS must support end users better, relieving power users from their roles as technical assistants and allowing them to get back to their careers.**

To handle these users, Jacobson established formal channels for assistance by establishing secretaries and paraprofessionals as PC applications experts. In addition to their regular duties, these employees are responsible for supporting an area of technology. Some of these staff members have been trained as experts in Micropro International Corp.'s Wordstar word processing software. Others are designated experts in 1-2-3, Ashton-Tate Dbase III or graphics software. With the support system in place, Jabobson says, few questions come to him or other power users. "People realize that they'll get a quicker, better solution if they go to the designated experts."

From negative to positive

By engaging clerical workers in technical support, Jacobson has also turned the negative effects of office automation into an opportunity. As professionals began using PCs, secretaries and paraprofessionals had less work, he explains. "Our secretarial staff shrunk by 40%, and the remaining clerical workers did not have enough to keep them busy." These employees, trained in PC applications, report they find end-user support more fun than mundane clerical chores, Jacobson says. Also, their technical expertise gives them a pathway to professional positions, he adds. "Some secretaries have already left for programming jobs."

about computers in schools.

LONDON, ENGLAND • [illegible] p.m.

Martin White, managing director of Link Europe, who heads the 10-country study for Link, receives reports from Yves Delacour, managing director of IDC/France and Roberto Masiero, managing director of IDC/Italy, giving valuable information on the recently installed educational computer systems in Paris and Milan. This is instantly faxed to New York along with the results of the European study.

NEW YORK, NEW YORK • 5:30 p.m.

Wujcik's assistant Natasha Thomsen compiles research from around the world and combines it with her findings on interactive video technology in the U.S. K-12 educational system. Based on these findings, Link makes a recommendation to the Minister on how the system can be set up and implemented most efficiently.

NEW YORK, NEW YORK • [illegible] p.m.

The Minister arrives at Link to review the IDG report by Wujcik. A four-man team of educational computer experts handpicked by IDG is also at the meeting to answer further questions. The Minister decides to act promptly on the recommendation and requests that IDG continue to act as advisors as the system is installed and put to use.

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Beyond support issues, managers also face the problem of users who let their fascination with PC technology subvert their professional obligations.

To a large extent, power users must put their careers in perspective. Hofmann suggests that one way users can accomplish this task is to write down five functions they have been hired to perform.

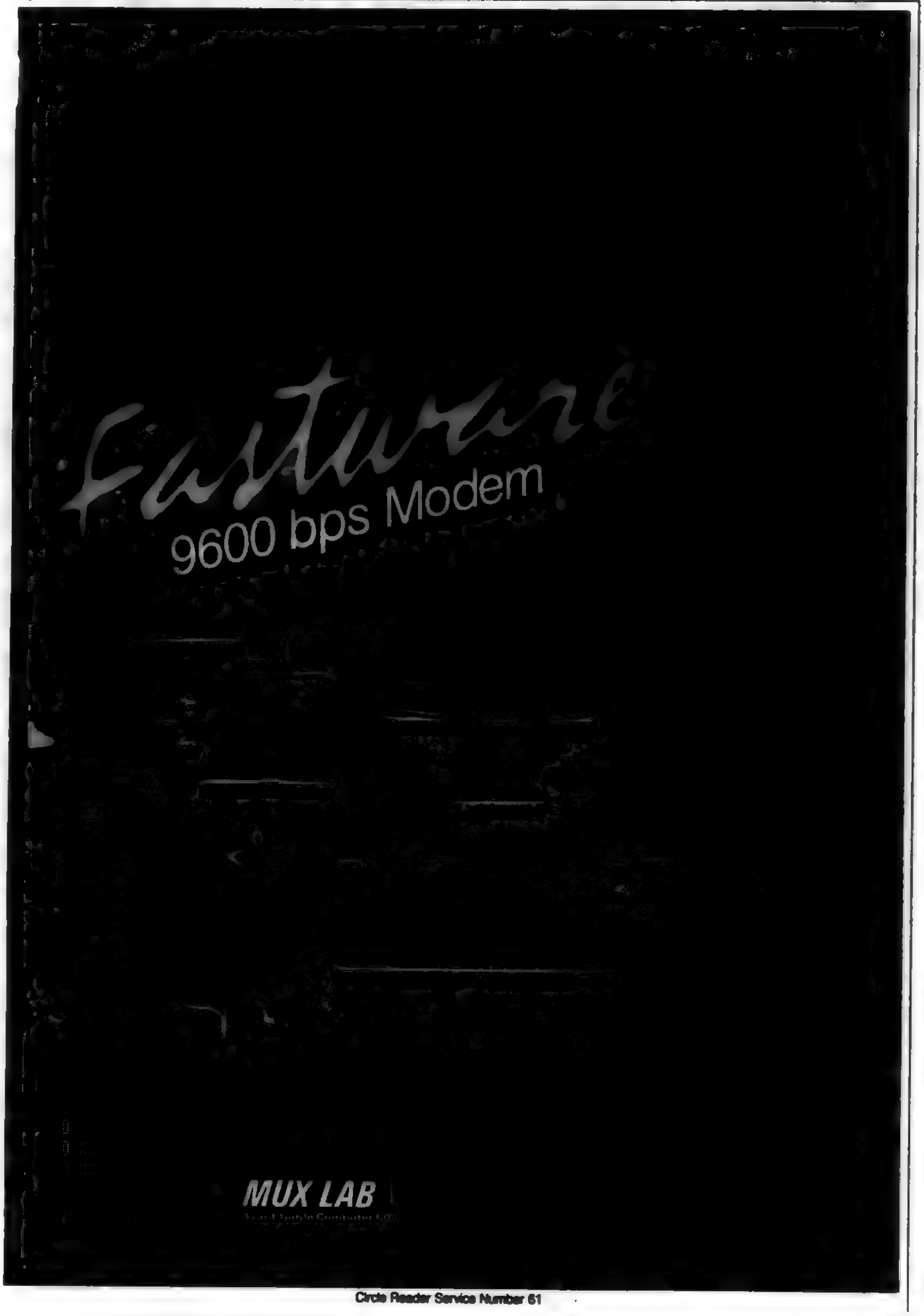
When a power user is failing his business obligations, his manager should call the problem to the user's attention before it becomes serious.

Managers can also help by talking with employees who appear to be losing their career focus, she adds.

Power users can make the transition to advanced user once they realize their professional objectives, Hofmann says.

For instance, one power user in the finance industry realized that his best career path lay in climbing the financial management ladder, she says. After training someone to be the next-generation personal computer expert and refocusing his efforts on finance, Hofmann notes, "he received a promotion within four months."

The problem of users seduced by technology is also a problem of management and training, the consultants agree. "Power users know all the features and functions of the PC products, but they don't know how to relate them to the data they use," Karten says.



Circle Reader Service Number 61

Forgetfulness

A related problem among average users is that they forget what they learned in their personal computer training classes before they can put this knowledge to use, she notes.

Karten maintains that both these problems stem from one root cause. "PC training is usually done out of context," she says. "Trainers teach users about the products and the mechanics of using them, but they don't show people how to use these tools to solve specific business functions."

MIS and information center managers need to establish training programs that emphasize problem solving from the start, Karten asserts. Otherwise, the training leaves users with a gap between knowing the technology and knowing how to use it.

A happier ending

Given the management options for handling PC power users, perhaps the story of the fallen hero who tried to sabotage MIS could have ended differently. Perhaps early training and a company emphasis on the PC as a tool would have helped the power user retain a better perspective on his business obligations.

Noticing the user was failing those obligations, his manager could have called the problem to the power user's attention before it became serious.

Even after the power user had alienated MIS, he might still have found a place in that department, Hofmann suggests.

"If his manager proposed him by name, MIS's answer would have been, 'No,'" she says. However, the manager might have been able to sell this user to MIS in terms of the functions he could provide. "The manager could talk to MIS in terms of the company's need for support and the existing resources to provide it," she suggests.

In any case, the power user should not have been dealing with MIS by himself, Hofmann argues. "That's the manager's responsibility."

Before either business or MIS managers can do anything about power users, however, they need to acknowledge that a problem exists, Hofmann says. "It's not a matter of assigning blame," she states. "Managers just need to look at the problem and talk about it." ◆

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TECH TALK

Covering all the bases at Comdex conference

By Michael Tucker

As far as personal computers go, Comdex/Spring 1987 was energetic.

The add-in board makers were particularly active. That action may prove to be significant, because with the introduction of the IBM Personal System/2, people were concerned about the add-in board industry. The feeling is that IBM plans to monopolize or dominate the add-in business by controlling developers' access to the PS/2 bus, the Micro Channel.

It may be that the aftermarket for the PS/2 is just going to be too expensive a game for the garage entrepreneur. But the big-league players seem to be adapting to the rule changes without much difficulty. Quadram Corp. in Norcross, Ga., for instance, was showing not one but three memory/multifunction boards for the PS/2 Models 50 and 60. These were the Quadmeg PS/Q, a 2M-byte memory board; the Quadport PS/Q, an I/O board; and the Quardboard PS/Q, a 2M-byte multifunction board. All three reportedly are due for shipment between this month and September.

Desktop publishing puts spotlight on large display monitor market, page 41.

Meanwhile, as if to prove that the original PC bus isn't dead, the motherboard makers were in good form as well. Atlanta-based American Megatrends, Inc. introduced an Intel Corp. 80386-based motherboard for IBM Personal Computer AT-compatibles. The firm claimed that the board is up to 25% faster than Compaq Computer Corp.'s comparable model.

American Megatrends was also talking about but did not introduce a PS/2-compatible Intel 80286-based motherboard for "some time in the near future." (Just when you thought it was safe for IBM to go back in the water — Clones 2!)

There was also a considerable number of complete AT-compatible systems demonstrated at Comdex, including some offerings from Xtra Business Systems, headquartered in San Jose, Calif. (Xtra, until recently, was known as the Information Systems division of ITT. Then, along came the restructuring craze, and now it is a separate firm).

Xtra rolled out an entire line of machines — the Xtra/Professional series — just like IBM did with the PS/2. These systems range from an Intel 8088-based Model 300 (not to be confused with the 8088-based IBM PS/2 Model 30) to a top of the line, 80386-based, floor-standing 386/XL (not to be confused with the 386-based, floor-standing PS/2 Model 80).

Hedging their drive bets

The Xtra line is clearly the choice for micro managers who want to hedge their bets. One of the options on the systems is that you can get both a standard 5¼-in. floppy drive and a PS/2-style 3½-in. drive. Prices on the line range from $1,299 for the Model 300 to $21,295 for the 386/XL.

Software looked good, too. A number of companies were starting to show PS/2 applications, which is rather remarkable when you think about it because there aren't that many PS/2 users out there. CXI, Inc., located in Mountain View, Calif., was showing a number of communications products in both hardware and software. On the communications software side there was the Pcox/Two, a 3270 micro-to-mainframe link for the PS/2.

Actually, the most interesting software news on the PS/2 came a few days after Comdex, when Lattice, Inc. in Lombard, Ill., announced that it was prereleasing a version of its C compiler for IBM OS/2 (see story page 40).

I'm not really sure what "prereleasing" means. It seems to translate into the fact that Lattice has had the product in beta test since October of last year. Apparently, it works well enough that the firm can actually talk about it as a product rather than a project.

There is something surreal about all this activity because the OS/2 won't be available for about two years. Wouldn't it be amusing if OS/2 becomes the first product to develop a mature aftermarket *before* it ships?

Continued on page 41

PRODUCT CLOSE-UP

Disk conversion tool out

A possible sore point with users of IBM's Personal System/2 microcomputers is that they are unable to use the PS/2 to access data from existing 3½-in., 5¼-in. or 8-in. disk drives.

To remedy this situation, IBM has recently released its 4869001, 5¼-in. external disk drive interface for the PS/2 family. IBM's package, however, does not get any points for simplicity.

To assemble the 4869001 fully, users will need a drive carriage that has to be inserted into the PS/2's second drive cavity, a flat bus cable that wraps through the PS/2's housing unit and connects to a vacant controller card that takes up one of the open slots in the back of the PS/2 and a cable from the PS/2's D connector to IBM's 5¼-in. external disk drive and power assembly.

According to David Chevalier, director of communications at Flagstaff Engineering, Inc. in Flagstaff, Ariz., the IBM procedure takes up to 25 minutes to complete. More importantly, it costs $395 — $335 for IBM's new 5¼-in. drive and $60 for its extra bus connector. Rubbing salt in the wound is the fact that users still cannot access their existing 3½-in. or 8-in. disks with the new drive.

Edapt reportedly takes five minutes to install and can access a variety of drives.

Flagstaff has come to the rescue. The company's $99 Edapt system can do the same thing as the IBM product, Chevalier claimed. Edapt reportedly only takes five minutes to install and can access a library of 3½-in., 5¼-in. and 8-in. disks on existing drives.

But Chevalier put certain qualifications on his statements.

Continued on page 41

BLUE
BEAT

Havoc, IBM style

Deidre Depke

By introducing the Personal System/2 in April, IBM not only threw the microcomputer industry into chaos, it radically changed the way vendors and users look at personal computers.

The havoc IBM wreaked on the industry was immediately apparent. On one hand, compatible makers quickly criticized the machine and its Micro Channel architecture for incompatibilities and poor techology. But on the other hand, these vendors voiced support for the PS/2's accompanying operating system, OS/2, leaving users wondering what standard these firms were really endorsing.

Software developers pledged to produce their products on the 3½-in. disk format that the PS/2 uses but could not provide a timetable for when the versions would be available or how the applications would change.

Product supplies in the retail channel almost immediately dried up. Suddenly, it became as difficult to get an IBM Personal Computer XT, AT or Compaq Computer Corp. machine as it became to find a $2 movie ticket. Retailers and vendors were shocked: Micro sales generally slow to a standstill following an IBM announcement as users evaluate the products.

Wall Street reaction

Wall Street fell into a panic of indecision. Immediately after the PS/2 introductions, high-technology stocks rose in anticipation of a recharged industry. Later, as analysts began to evaluate the sales prognosis of these

Continued on page 40

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Circle Reader Service Number 62

C compiler for OS/2 to debut

One of the first C compilers for IBM's OS/2, the multitasking operating system for the firm's Personal System/2, has been preannounced by Lattice, Inc. in Lombard, Ill.

The Lattice C compiler for OS/2 has been in beta test since October, and a complete, production-quality version is expected to be shipped sometime this fall. However, an initial prerelease copy of the compiler is currently available to users of Lattice's C compiler for Microsoft Corp. MS-DOS at a fee of $150.

When the production version is ready, users of the prerelease compiler will receive it free of charge. The compiler's price to new users is not yet known.

Short-order conversion

Lattice is a long-time maker of compiler products. Its C for MS-DOS is an acknowledged market leader. Apparently, the MS-DOS-based C compiler was developed with enough OS/2-like features that it could be converted to the new operating system in short order.

This ability for quick adaptation could say a great deal about the nature of OS/2 and its kinship to MS-DOS. It may be that developing applications for OS/2 will be less difficult than was first feared.

Lattice said its compiler will not be bound by MS-DOS's 64K-byte limit. It will give programmers the power to set the default integer size to 32 bits. Lattice also said it plans to offer programmers' tools for developers working with OS/2. In addition, the firm will reportedly offer expanded manuals for the C compiler.

Meanwhile, the industry continues to await the actual shipment of OS/2, which is not expected to be in users' hands until 1988 or later. — MICHAEL TUCKER

Circle Reader Service Number 130

Blue Beat

Continued from page 37

machines, they launched a selling spree of the same stock, fueled by speculation that the PS/2 would sell poorly and that OS/2 would be delivered late.

Suddenly, everyone was calling press conferences to explain their positions. Compaq hosted the most star-studded event; it dragged Lotus Development Corp.'s Jim Manzi, Microsoft Corp.'s Bill Gates and Ashton-Tate's Ed Esber to New York July 6 to clarify what was happening in the industry. Even IBM got into the act, reassuring security analysts and the press at a June meeting that PS/2 sales were better than expected.

Clearly, the PS/2 will not be a bomb for IBM. And compatible makers, board makers and software firms will not be driven out of business by the new technology. But when the dust settles, users and vendors alike will find that the microcomputer industry has changed for good.

A systems smorgasbord

Users will be left with far more choices than ever before. For the first time since the death of Digital Research, Inc. CP/M (remember that?), users will be able to standardize on two separate operating systems: Microsoft's MS-DOS or IBM's OS/2. They will even be able to run both systems within the same organization. At Comdex/Fall '87 in Las Vegas, computers will likely come with a choice of boards: one built to be compatible with the Micro Channel and one built for compatibility with the MS-DOS standard.

Eventually, users will find that many firms will not sell PCs any longer; instead, they'll be selling workstations. IBM has already gone beyond using the phrase "personal computer." Now, only the most unsavvy IBM staff members call the PS/2 anything but a "workstation."

The point is clear: First-tier companies that sell to big business will sell workstations for connectivity to larger systems. Second-tier firms will market plain-vanilla PCs via dealers to small business.

The shift is subtle but important. IBM and its major competitors have finally followed up on the promise they made long ago — that when the personal computer industry becomes truly commoditized, they will abandon that end of the market. Instead, they'll participate in the smaller, more lucrative corporate market.

The winners here are those corporate users who will find themselves presented with increasingly sophisticated hardware and software technology that really fits into their computing environments.

Depke is editor of "IBM Watch," a biweekly newsletter published by IDC Communications, Inc.

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Circle Reader Service Number 63

PC monitor sports larger display

Workstation-like graphics enhance desktop publishing

The Turbovision full-page display monitor from Irvine, Calif.-based AST Research, Inc. introduced at Comdex/Spring 1987 garnered a great deal of interest from attendees.

But the Turbovision offering has not been the only product to grab the monitor spotlight.

Two years ago, such a machine raised the eyebrows and hopes of desktop publishing users. Today, that monitor is just one of the pack.

There are at least 17 full-page display monitors, according to Ed Wong, a senior analyst for San Jose, Calif.-based research firm Dataquest, Inc.

Some monitors work with IBM Personal Computers and compatibles; others work with Apple Computer, Inc. Macintosh systems.

Ranging from $1,000 to $5,000, these monitors come in monochrome and color. The resolution of this new breed of monitor can range from a minimum of 600 to 1,600 pixels at the high end. Some monitors reportedly even have the ability to display two pages at a time.

AST's Turbovision, which works with the IBM PC, Personal Computer XT and AT and compatibles, falls in the mid-range in terms of price and functionality.

Retailing for $1,995, the Turbovision 15-in. monochrome monitor features a full 8½- by 11-in. page display with a 1,024-pixel by 1,280-line resolution.

A graphics boost

Also part of the Turbovision package is a graphics board that incorporates the Texas Instruments, Inc. 34010 graphics engine. This board reportedly boosts performance by off-loading graphics from the host CPU.

While there a number of monitors that compete with AST's Turbovision, there is a great demand for these products, Dataquest's Wong says. "Large display monitors really help productivity in publishing systems," he says.

Two years ago, users who published on PCs only had standard PC monitors, he recalls.

If these users wanted a larger display, they had to move to 32-bit technical workstations with large graphics displays. "Today, the lines between PCs and workstations are diminishing as larger, high-resolution displays are made available," Wong concludes. — REBECCA HURST

Circle Reader Service Number 137

Tech Talk

Continued from page 37

The PS/2 wasn't the only machine to receive a little attention from the software folks. The Apple Computer, Inc. Macintosh II and Macintosh SE are also gaining their share of fans. It's my personal conviction that the PS/2 may actually create the Macintosh aftermarket, as board makers turn to Apple's public domain Nu-bus as an alternative to the Micro Channel architecture and software developers discover the open version of the Mac interface.

For instance, Digital Communications Associates, Inc. in Alpharetta, Ga., was at the show with several products, including Macirma software for the Macintosh. There are two Macirma versions — one for the Mac SE and one for the Mac II — that allow an Apple machine to perform IBM 3270 emulation to gain access to IBM mainframes. Macirma will reportedly ship sometime this fall and will cost $1,195.

If there was a message to Comdex, it was that nothing is settled yet. The PS/2 did not blow the rest of the industry out of the water and neither has the industry snubbed the PS/2 and crowned Compaq or another vendor the new king of standards. Instead, people are covering their bases. Vendors are bringing out products for the PS/2, but they are also happy to support Microsoft Corp. MS-DOS or IBM PC-DOS and Apple machines.

Disk conversion

Continued from page 37

"We haven't been able to run IBM single-sided disks yet, and we don't know why," Chevalier admitted. "But our engineers are working on it."

Flagstaff will try and get a jump on the data conversion competition, which, Chevalier reported, only consists of IBM at this point. Lacking the huge direct sales force and distribution channels of IBM and others, Chevalier said he is sure the double whammy of Edapt price and availability will bring in the customers.

And if those incentives are not enough, the burden caused by the general awkwardness of the IBM disk conversion system will lore its share of business to Edapt's corner, he claimed. "We're looking for those people who don't follow IBM blindly and pay the extra money," Chevalier said. — STAN KOLODZIEJ

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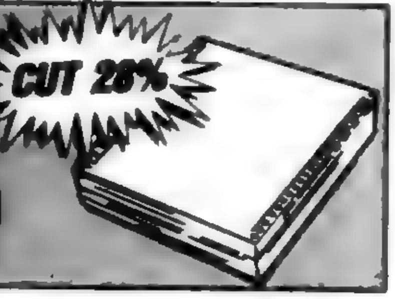

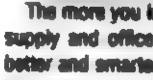

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PRODUCT CHECKLIST

Prime Computer, Inc. has introduced the Prime EXL 316 supermicrocomputer.

The Prime EXL 316 is a Intel Corp. 80386-based microcomputer that uses Locus Computing Corp.'s Merge 386 to simultaneously run AT&T Unix System V.3 and Microsoft Corp. MS-DOS.

A standard configuration of EXL 316 includes Prime's implementation of Unix V.3, 2M bytes of memory, a 90M-byte formatted disk, a 60M-byte streaming tape backup subsystem and 10 asynchronous lines. It costs $23,900.

Prime Computer, Prime Park, Natick, Mass. 01760.

Circle Reader Service Number 139

Digital Equipment Corp. has introduced the IBM PC Network Integration package.

The product enables users of IBM Personal Computers, Personal Computer XTs and ATs to participate in local-area networks using DEC's previously announced VAX/VMS Services for Microsoft Corp. MS-DOS software.

VAX/VMS Services for MS-DOS is software that enables DEC VAX, Microvax or Vaxmate computers to act as application, data and resource servers to groups of Vaxmates, XTs or ATs.

The IBM PC Network Integration Package is priced at $895.

DEC, Maynard, Mass. 01754.

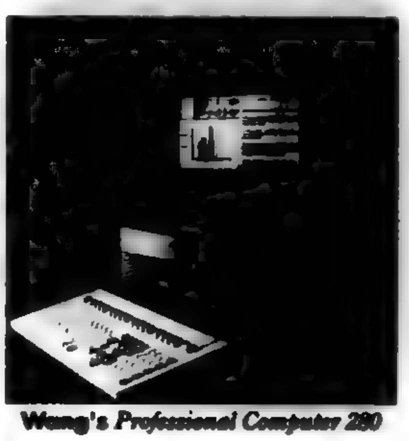
Circle Reader Service Number 140

Wang Laboratories, Inc. has introduced the Professional Computer 280 and Professional Computer 380.

The two IBM Personal Computer AT compatibles are based on Intel Corp. 80286 and 80386 processors, respectively. Both the 280 and 380 are bundled with the Microsoft Corp. MS-DOS 3.2 operating system.

The Professional Computer 280 comes with 640K bytes of random-access memory (RAM). The Professional Computer 380 has 2.5M bytes of RAM. Both systems can expand up to 10.5M bytes through memory option cards that are compatible with the Lotus/Intel/Microsoft Enhanced Memory Specification.

A base configuration for the Professional Computer 280 is priced at $3,550; a base configuration for the Professional Computer 380 starts at $6,495.



Wang's ***Professional Computer 280***

Wang Laboratories, One Industrial Ave., Lowell, Mass. 01851.

Circle Reader Service Number 141

NCR Corp. has announced the PC916, a 32-bit personal computer based on the Intel Corp. 80386 processor.

The PC916 supports 268M bytes of physical memory and 4G bytes of virtual memory. NCR said it currently offers 2M-byte expansion boards. The PC916 also accepts a combination of integrated 5¼-in. and 3½-in. floppy disk drives.

The basic PC916 configuration is priced at $6,353.

NCR, 1700 S. Patterson Blvd., Dayton, Ohio 45479.

Circle Reader Service Number 142

Microsoft Corp. has rolled out the Microsoft Basic Compiler.

The Microsoft Basic Compiler was designed for personal computers running the Microsoft Xenix System V/286 operating system.

It allows programs written in the Microsoft MS-DOS version of Microsoft Basic and the company's GW-Basic Compiler as well as those written in Microsoft Basic Interpreter for the Xenix environment to be compiled with little or no modification, the company said.

The Microsoft Basic Compiler costs $695.

Microsoft, Box 97017, 16011 N.E. 36th Way, Redmond, Wash. 98073.

Circle Reader Service Number 143

PC's Limited has announced its 386^{16} personal computer.

PC's Limited 386^{16}, based on Intel Corp.'s 80386 processor, was designed to serve as a workstation, multiuser host computer or network file server. It has 1M byte of pure static random-access memory for zero-wait-state operation and a 1.2M-byte 5¼-in. floppy disk drive.

Pricing for the PC's Limited 386^{16} ranges from $4,499 for a system with a 40M-byte hard drive and monochrome monitor to $6,499 for a model with a 150M-byte hard drive and enhanced graphics adapter color monitor.

PC's Limited, Building 3, 1161 Headway Circle, Austin, Texas 78754.

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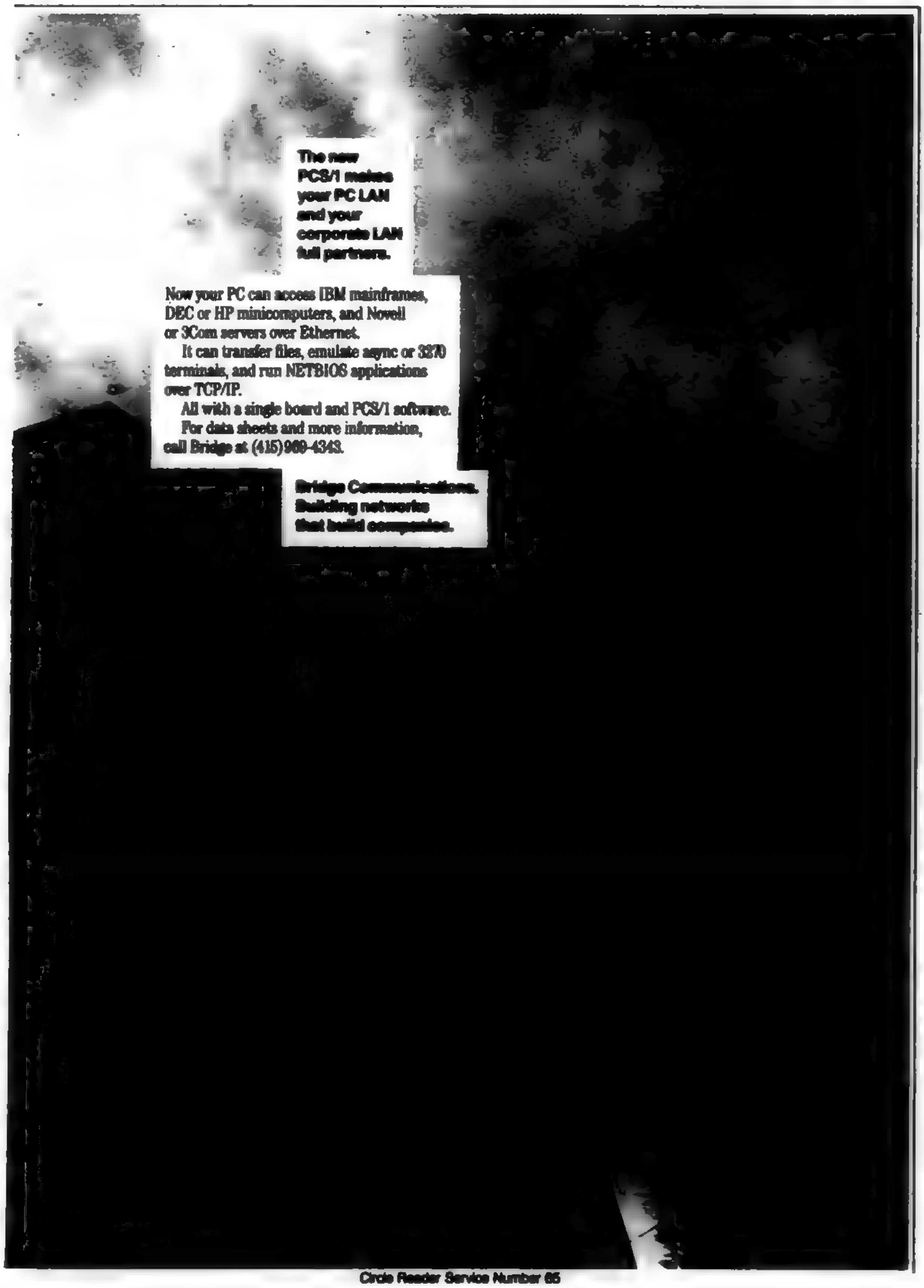

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August 16-22

Introduction to Telecommunications Systems: Technologies and Applications. Seattle, August 17-18 — Contact: Business Communications Review, 950 York Road, Hinsdale, Ill. 60521.

Software Futures: An Executive Forum. Boston, August 17-18 — Contact: Digital Consulting, Inc., 6 Windsor St., Andover, Mass. 01810.

National Computer Graphics Association CAD/CAM '87. Boston, August 17-20 — Contact: National Computer Graphics Association, Suite 200, 2722 Merrilee Drive, Fairfax, Va. 22031.

Network Planning and Design with New Technology. San Francisco, August 19-21 — Contact: Network Career Advancement Institute, 202 Fashion Lane #113, Tustin, Calif. 92680.

T1 Networking. Boston, August 20-21 — Contact: Business Communications Review, 950 York Road, Hinsdale, Ill. 60521.

August 23-29

Software Maintenance: Controlling the Computerized Organization. Washington D.C., August 24-28 — Contact: Technology Transfer Institute, 741 Tenth St., Santa Monica, Calif. 90402.

IBM Products and Architectures. Boulder, Colo., August 24-28 — Contact: Center for Advanced Professional Education, Suite 110, 1820 E. Garry St., Santa Ana, Calif. 92705.

Queueing Systems and Computer Applications. New York, August 24-27 — Contact: Technology Transfer Institute, 741 Tenth St., Santa Monica, Calif. 90402.

Relational Data Bases: Practical Applications with Emphasis on DB2, SQL, Oracle and Ingres. Washington D.C., August 26-28 — Contact: Technology Transfer Institute, 741 Tenth St., Santa Monica, Calif. 90402.

August 30-Sept. 5

PC LANs: What You Really Need To Know. Chicago, August 31-Sept. 2 — Contact: Technology Transfer Institute, 741 Tenth St., Santa Monica, Calif. 90402.

Network Management and Problem Determination. Los Angeles, Sept. 1-3 — Contact: Business Communications Review, 950 York Road, Hinsdale, Ill. 60521.

CAP '87 West. Los Angeles, Sept. 1-3 — Contact: Computer Aided Publishing, Suite 200, 90 W. Montgomery Ave., Rockville, Md. 20850.

5th Annual PC Expo. New York, Sept. 1-3 — Contact: Jim Mion, PC Expo, 333 Sylvan Ave., Englewood Cliffs, N.J. 07632.

Second International Technical Innovation and Entrepreneurship Symposium. Birmingham, UK, Sept. 1-4 — Contact: Utah Innovation Foundation, Suite 195, 417 Wakara Way, Salt Lake City, Utah 84108.

Sept. 6-12

1987 Capital Microcomputer Users Forum. Washington, D.C., Sept. 9-10 — Contact: Jackie Voight, National Trade Productions, Inc., Suite 400, 2111 Eisenhower Ave., Alexandria, Va. 22314.

Advanced Topics in Expert Systems: Knowledge Acquisition & Uncertainty Management. Washington, D.C., Sept. 9-11 — Contact: Technology Transfer Institute, 741 Tenth St., Santa Monica, Calif. 90402.

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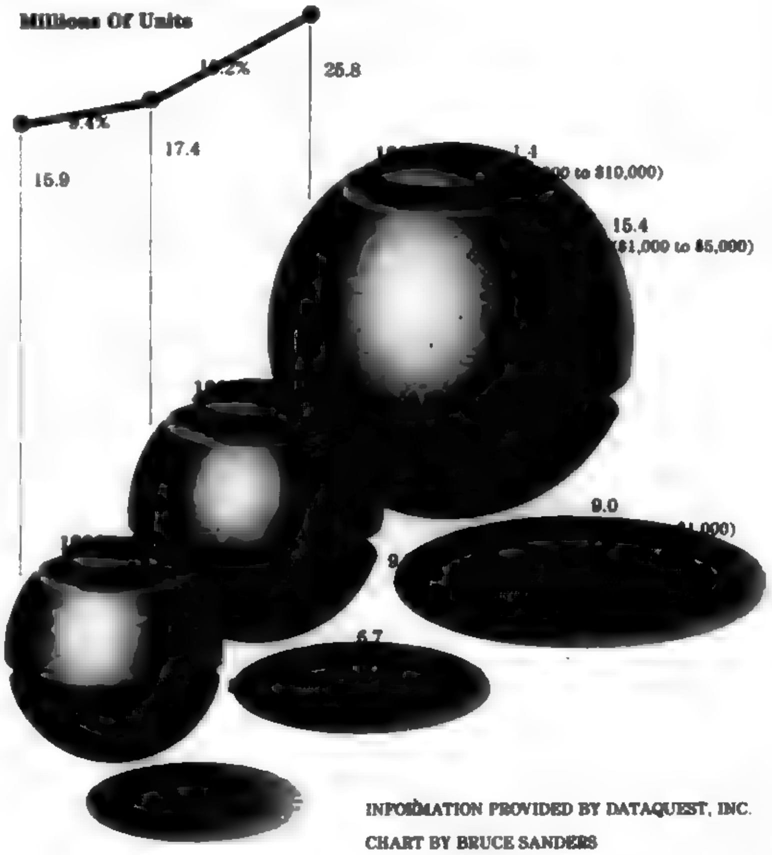
Worldwide PC forecast

Growth to take place in $1,000 to $5,000 segment



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Hurry up and wait

Thomas Roberts

There's been a lot of hullabaloo about IBM and Microsoft Corp.'s forthcoming operating system, OS/2. Users of IBM Personal Computer AT systems have been waiting since August 1984 for a protected-mode successor to IBM PC-DOS. Don't kid yourself, though. OS/2 and its applications won't be available until the middle of 1988 at the earliest. But application development kits for OS/2 have been out for several months, and the prospect of a protected-mode operating system is no longer just vaporware.

Mixed in with the hue and cry about OS/2, however, is the rumble of dissent from a more idealistic band of PC users and software developers. These people are Intel Corp. 80386 technology junkies, believers in the idea that 386-based PCs will soon be the standard personal computing platform for business users.

Some 386 disciples even wish that Microsoft had skipped its Intel 80286-based system altogether and had tailored its next operating system specifically for the 386. Of course, that didn't happen. OS/2 is a 16-bit operating system written for the protected-mode of the 80286. OS/2 will run on 386-based systems in "286 emulation mode," but it will leave untapped some essential benefits of the more powerful 32-bit chip.

At some point in the future, there will be a 32-bit implementation of OS/2 — an OS/3, if you will. Exactly when this software will appear, however, is open to debate. Microsoft Chairman Bill Gates has implied that an OS/3 will be available a year or two after OS/2 makes its way to market.

Anyone who puts much stock in that kind of timetable for a Microsoft 386 operating system has a problem with long-term memory loss. If you remember when the first PC ATs were making their way into end users' hands, the air was filled with promises of a Microsoft operating system for the 80286. Back then, no one considered that the wait for OS/2 would eventually take three and a half years.

By now, we should know better. It will take on the order of three to five years before an OS/3 will make its way to market. There are two reasons for this delay.

First, the installed base of 386 systems will, for several years, be minuscule in comparison with the machines capable of running OS/2. It will take time for a viable OS/3 market to develop.

Second, Microsoft is betting heavily on OS/2's success and will do little to jeopardize its chances. Introducing another operating system on the heels of OS/2 would harm OS/2 by placing another set of choices before end users and application developers.

The moral is this: Those 386 users with an urge to get the most out of their systems should look to Unix or alternative operating systems. Waiting for a 32-bit operating system from Microsoft will bring little more than frustration.

Roberts is manager of personal computer research at International Data Corp., a Framingham, Mass.-based industry research firm.

next issue

September's *CW Focus* will give you the latest line on communications and connectivity issues. We'll look at net management systems, analyze the current bridges between the Apple Macintosh and IBM worlds, and see how personal computer networks can adapt to IBM's PS/2 and Micro Channel bus. Listen in as multinational companies report how they handle a world of integration and regulatory problems, and call on *Focus*'s special section on telephony to make sense of the everchanging telecom market.

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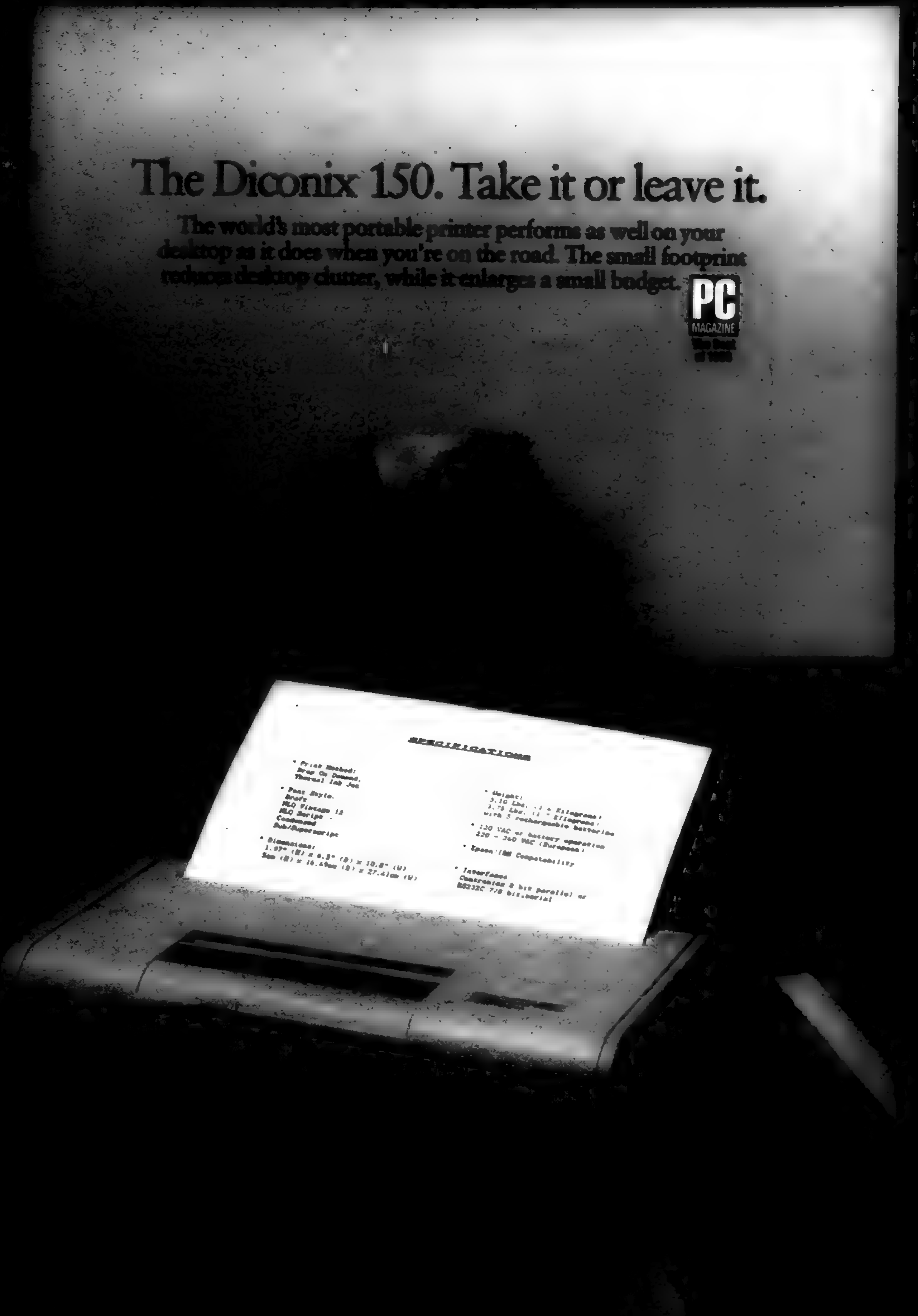

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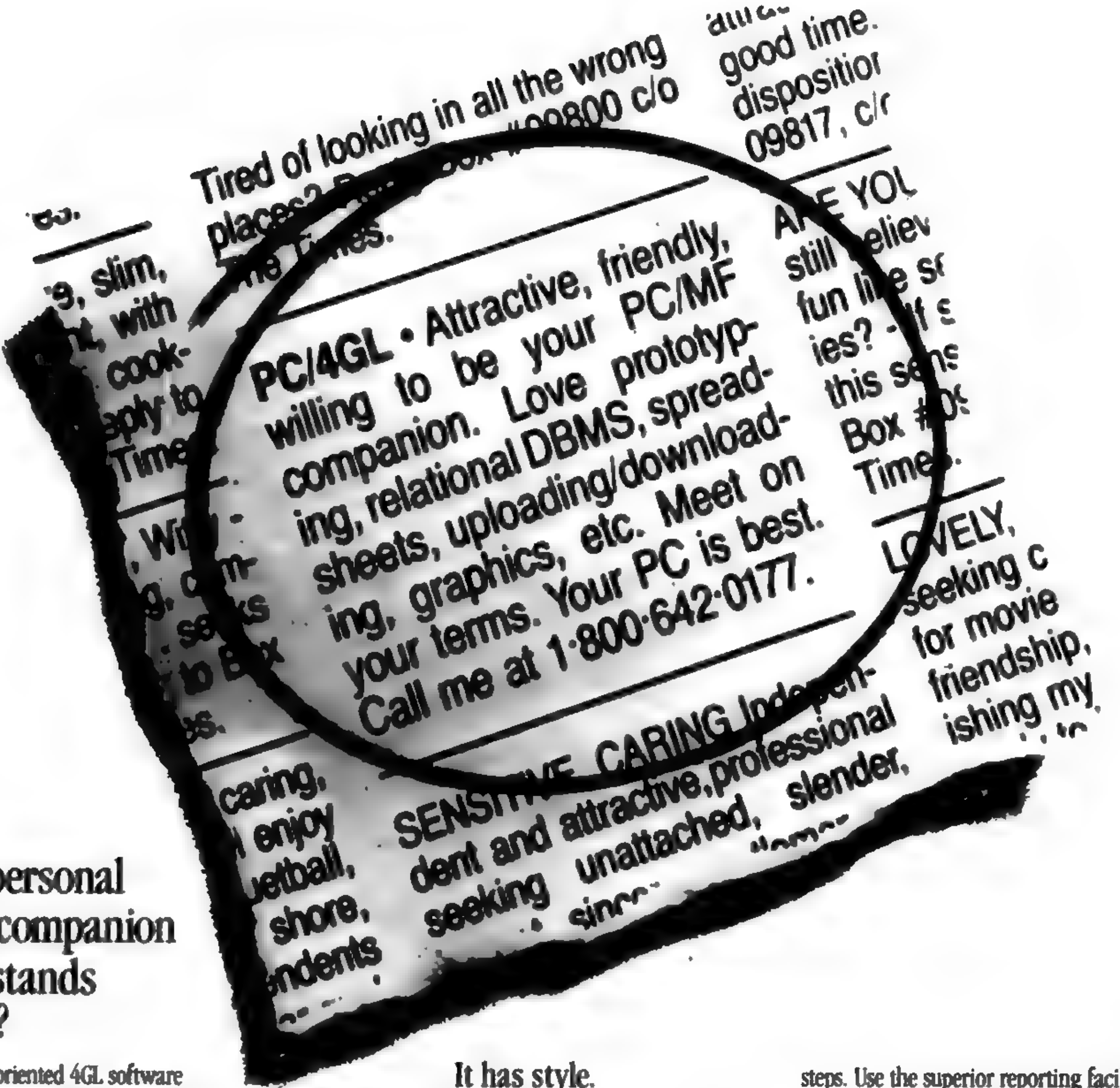

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COMPUTERWORLD

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EMS update to make room for bigger RAM disks, exploit 386's capabilities. Page 90.

Imaging system packs 160 MIPS into deskside unit. Page 47.

IBM squeezing front-end market

SNA drive boon for software vendors, tough on network processor rivals

BY ELISABETH HORWITT
CW STAFF

IBM's accelerated drive toward a fully functional distributed Systems Network Architecture communications system is likely to limit MIS managers' choice of SNA front-end processor vendors but broaden offerings from third-party SNA software retailers.

Companies such as Communications Solutions, Inc. and Cincom Systems, Inc. have already started bringing out new SNA connectivity tools and applications designed to ease users' passage to the new distributed environment.

However, several third-party communications processor vendors contacted recently by *Computerworld* appeared to be having trouble keeping up with IBM's rapid stream of updates to its front-end processor architecture while maintaining their products' added value.

This has discouraged some MIS managers from looking outside of IBM's domain for their communications hardware.

Support woes

Support for IBM's Network Control Program is one stumbling block. "We've looked at the possibility of buying our front-end processors from NCR Comten, but they don't maintain current NCP support," said Dan Schultz, manager of network support at the Columbus, Ohio, banking consortium Banc One Corp. "The way we are growing, we want to get IBM's new Network Control Program features as soon as they appear," he added.

Two such capabilities recently promised by IBM are dynamic reconfiguration and front-end processor support of IBM's PU2.1 peer-to-peer communications. "This will mean major functionality that people like NCR Comten have got to get for their own products," said David Passmore, a principal at Fairfax, Va., research firm Network Strategies, Inc.

"NCR Comten has to come up with IBM's functions and features plus its own added value," Passmore said. "That's a dangerous game, because if it gets ahead of IBM, it will have to backtrack when IBM introduces similar capabilities."

Unisys Corp. and Control Data Corp., which recently entered the SNA communications processor market, are also playing catch-up with IBM's NCP enhancements, Passmore said.

Amdahl Corp., whose front-end processors were designed to run IBM software unchanged, does not have the problem of

Continued on page 89

Tymnet takes low cost tack

BY KATHY CHIN LEONG
CW STAFF

SAN JOSE, Calif. — Seeking to capture the low end of the packet-switching arena, Tymnet, McDonnell Douglas Network Systems Co. last week said it will deliver its most inexpensive packet switch to date that is designed for large corporate office branches and small and medium-size companies.

Dubbed the MD 7408, the $8,000 switch signals a growing trend in the marketplace toward smaller packet switches, according to analysts. The switch is slated for limited delivery in January and for general availability by next April.

"The products are definitely coming down in price and size," said Victoria Marney-Petix, an analyst at Dataquest, Inc. in San Jose. "There's a rosy future for a product like this."

Continued on page 6

Mac gets graphics integration tool

BY JULIE PITTA
CW STAFF

CUPERTINO, Calif. — Capping a three-year development effort, Apple Computer, Inc. last week unveiled Hypercard, a $49 package the company dubbed a "personal tool kit" that allows Macintosh users to integrate text, graphics and video.

Apple heralded the product as a key element in its push to penetrate the corporate marketplace more effectively, a thrust the firm said will be aided by third-party software developers.

Reactions of corporate users contacted were generally positive. "It's a real breakthrough in software — it's only limited by the imagination," said Jeff Ehrlich, manager of product technology at General Electric Co. "In the beginning, people will use it for routine types of things, like appointment books and reminder systems, but as they see its power, it can be used for creating visual data bases and even creating training systems — all kinds of applications."

"I'm anxious to get my hands on it to play with it," said Orv Jordahl, senior manager of technical management information systems at McDonnell Douglas Corp.'s space station program. "It's going to allow users to take information and assemble it in ways meaningful to them."

However, James Hayes, vice-president of electronic services at Seafirst Corp., a Seattle-based Bankamerica Corp. subsidiary, cautioned that Hypercard's requirement of 1M byte of random-access memory may prove to be an obstacle to its use in his department. "I can see a lot of potential for it," he said. "But we'd have to upgrade all

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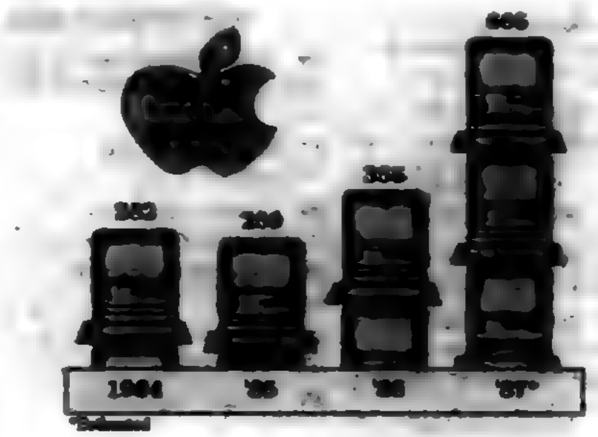
Bumper crop

U.S. Macintosh sales, boosted by third-party market, will nearly double this year



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CW CHART: MITCHELL J. HAYES

Tiny tape works big

2.2G-byte-size cassette called backup milestone

BY ED SCANNELL
CW STAFF

SAN DIEGO — Emerald Systems Corp. announced last week a tape backup system, a pocket calculator-size cassette tape that holds up to 2.2G bytes of data. The firm said the product will facilitate moving applications from minicomputers to high-powered microcomputers and will make it easier for micro users to do their own tape backup.

Dubbed the Vast Device, the product is aimed at corporations that need to manipulate large data bases and have local-area networks using file servers with disk volumes greater than 183M bytes. The company plans to ship the product Oct. 26.

"This [Vast Device] should help MIS managers in those ar-

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Expansion. Among the products showcased by the estimated 270 vendors at Macworld Expo last week were a disk drive for Mac Plus from Jasmine Technology, a Mac II-compatible industrial computer from Automatix, a port server for the Appletalk network from Abaton Technology and a CAD system from Versacad. Page 9.

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"Large companies are staying away from us. People are very scared — they're in a standby mode, and it's hurting our sales."

RICHARD BEZJIAN
MOSAIC SOFTWARE, INC

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Hackers under the gun

Secret Service sweep yields arrests nationwide

BY MITCH BETTS
CW STAFF

The U.S. Secret Service and local police departments have put a scare into the hacker community with a nationwide crackdown on computer crime that has resulted in arrests of teen-age hackers in at least three cities.

"People who monitor the bulletin boards say there are a lot of nervous hackers out there, wondering who will be arrested next," said Ronald E. Freedman, vice-president of Advanced Information Management, Inc., a Woodbridge, Va.-based computer security firm.

Nine teen-agers from Mount Lebanon Junior-Senior High School near Pittsburgh were arrested recently and charged with computer fraud. The juveniles allegedly used home computers to gain illegal access to a credit card authorization center. They obtained valid credit card numbers and used them to purchase thousands of dollars worth of mail order merchandise, police said.

High-class operation

Freedman said it appears the hackers used some relatively sophisticated techniques in the scheme, including specially written software that enabled them to bypass security controls and navigate through credit records to obtain key information.

Police officials said the hackers also obtained access codes from pirate bulletin boards to make free long-distance calls and gain access to various business and government computers.

The arrests were the result of a six-week investigation by the Secret Service and the Mount Lebanon, Pa., police. The police were tipped off by parents who were suspicious about how their son obtained a $140 skateboard, Officer Tim Howell said.

In addition, the Secret Service was involved in investigations that led to the arrests of several hackers in New York and the San Francisco area last month.

Local hackers

Secret Service spokesman William Corbett said that although some reports have portrayed the hackers as part of a national crime ring, the cases are unrelated. "It's just that a few of these computer hacking cases came to a head at about the same time," he said.

Federal legislation enacted in 1984 gave the Secret Service, part of the Department of the Treasury, a major role in investigating computer crimes.

Under the federal Computer Fraud and Abuse Act of 1986, computer fraud is a felony that carries a maximum penalty of five years in prison for the first offense and 10 years for a second offense. Displaying unauthorized passwords on hacker bulletin boards carries a maximum penalty of one year in prison for the first offense and 10 years for the second offense.

Uccel buy-out receives shareholder approval

BY CLINTON WILDER
CW STAFF

The shareholders of Computer Associates International, Inc. and Uccel Corp. both overwhelmingly approved Computer Associates' proposed $780 million acquisition of Uccel in separate meetings last week.

The shareholder votes paved the way for the expected approval by the U.S. Department of Justice's antitrust division this week. The department last week requested a five-day extension of its deadline to act on the merger, extending it to Friday.

"I would be highly surprised if anything would happen to block the acquisition," said Prudential-Bache Securities, Inc. software industry analyst Charles Taylor Jr. "This is the Reagan administration looking at two companies that say they're combining partially as a defense against IBM."

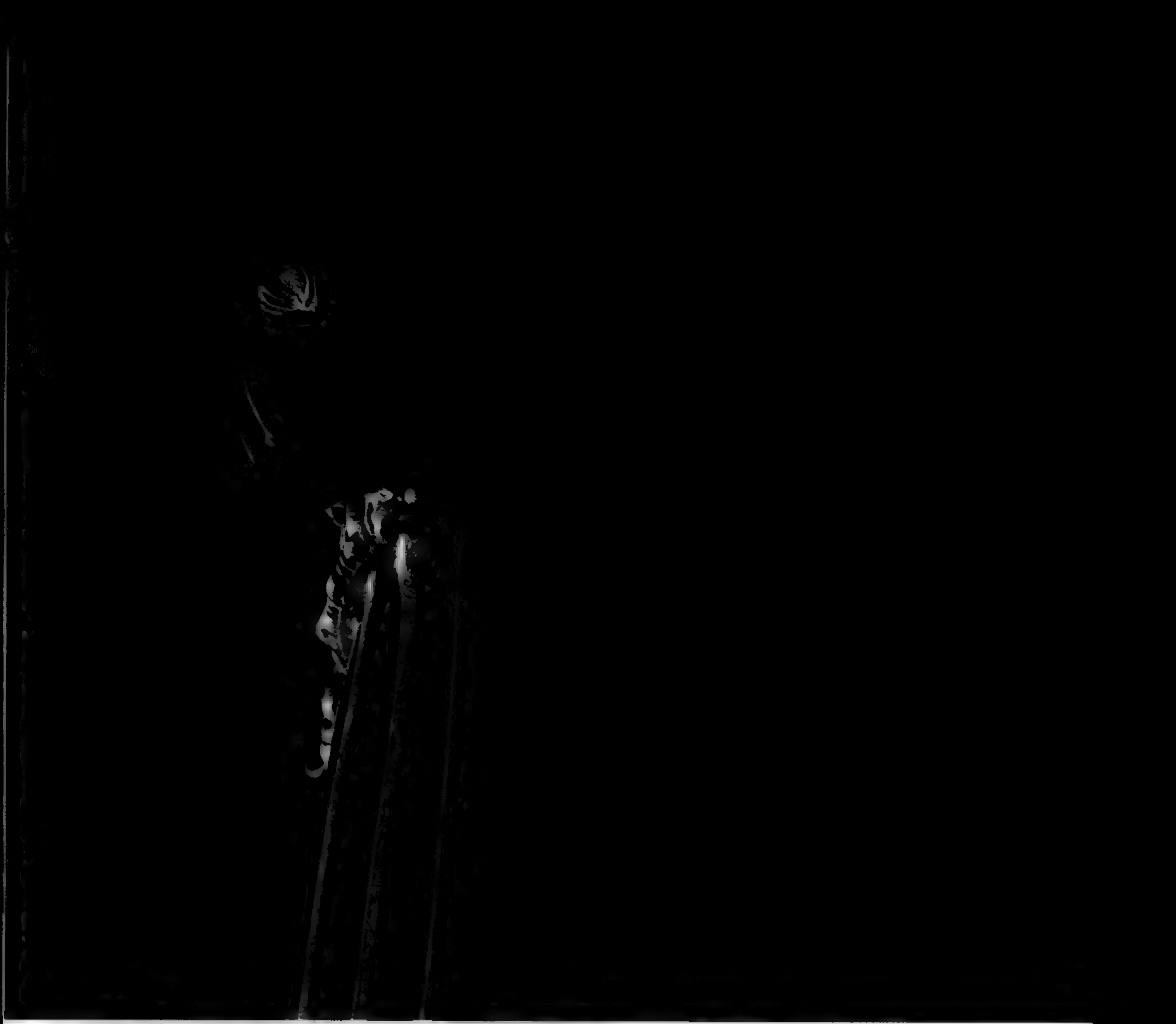
Uccel said 13.8 million of the 13.9 million shares voting at the Dallas shareholders meeting approved the buy-out. Computer Associates shareholders meeting in Garden City, N.Y., cast 32.2 million of 32.6 million voting shares in favor of the acquisition.

Widen the gap

If approved by regulators, the deal will significantly extend Computer Associates' lead as the largest independent software vendor.

Reclusive Swiss businessman Walter Haefner, who owns 58% of Uccel stock, will become Computer Associates' largest shareholder, with about 21% of its shares.

Computer Associates Chairman Charles Wang and President Anthony Wang will together control about 10% of the company.



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VAX hikes meet with ire, shrugs

Some decked by second round of price increases; others grin and bear it

BY DAVID BRIGHT
CW STAFF

Digital Equipment Corp.'s second round of VAX price hikes in five months has disturbed some DEC customers, while others have accepted the action as "the nature of the business."

"Digital has yet to discover the magic of having client presence," said Richard White, director of MIS at Union Texas Petroleum Corp. in Houston. "They're trying to be more like IBM in their marketing and product-support efforts, but they've got thousands of miles to go. So as they increase their prices and nothing else gets better, it really makes you look for other ways of doing business."

Union Texas Petroleum runs both IBM and DEC systems. White said his strategy will be to extend the life of his company's VAX 8800 and 8500 systems as long as possible while software vendors port their petroleum engineering applications from DEC to IBM machines. "When they become available on IBM, we'll have an alternative to look at," he said.

Ten days after the most recent round of changes took effect, the DEC sales representative for Ball Corp.'s Aerospace Systems Division still could not quote the new prices, said Angelo Privetera, director of information at the Boulder, Colo., facility. Ball Aerospace also has a mix of DEC and IBM systems.

Privetera said having a flexible, mixed shop gives his company the option of increasing its percentage of IBM purchases if necessary.

"We're going back to Decworld next month," he said, "and we'll make it a point to speak to the powers that be about what we'll do next."

Two weeks ago, DEC raised prices on the high end of its VAX 8000 series by as much as 5.5%. The company dropped prices on the more competitive low end by a similar amount and slashed Microvax 2000 prices by up to 20% [CW, Aug. 10]. At the same time, DEC reduced PDP-11 prices, introduced denser VAX 8000 memory modules priced up to 30% less than the previous memory and raised prices by less than 5% on the balance of hardware and software products.

Echoes earlier shifts

The move was similar to the March restructuring, in which DEC increased high-end VAX 8000 series and low-end VMS software prices, brought out lower end systems with better price/performance and drastically reduced memory and mass storage prices [CW, March 9].

With such a changeable pricing structure, some customers and analysts worried last week that DEC's marketing organization had fallen into a state of confusion.

With DEC's high-end VAX 8000 shipment rates up, DEC is looking to increase its profit margins without losing any business, said Bob Randolph, director of the DEC Advisory Service at International Data Corp., a Framingham, Mass.-based market research firm. But with IBM's 9370 "breathing down its neck" at the low end, DEC was forced to cut prices, he said.

Randolph warned that DEC's recent volatile pricing could have a negative long-range impact with large, more conservative potential customers. "The kinds of customers they're going after are used to a reasonable degree of stability. DEC, in the last year, has shown everything but stability in some key areas, like pricing, policies and product offerings," Randolph said.

Some users not budging

But at New York-based Bantam Books, Inc., which bought several VAX 8550 systems just before the price hikes took effect, Data Processing and Systems Vice-President Frank Zaso said his company will stand by DEC. "No one likes to see prices go up, but it's the nature of the business to have periodic price increases that, percentage-wise, are not too much out of line," he said. "We're not going to move to another vendor."

Also standing pat is a large Eastern university with several VAX systems as well as a National Advanced Systems Corp. IBM plug-compatible mainframe. "Even though we're a mixed shop, changing from the DEC systems could mean a big software investment," the school's DP manager explained.

Now that it is realizing bigger profit margins on the high-end VAX systems, many observers said they expect DEC to begin offering more attractive discounts. "They'd been very tight on discounting the 8700," noted William Arms, vice-president of academic services at Carnegie-Mellon University in Pittsburgh. "Maybe they raised the price so they can give deeper discounts. It's like buying used cars."

DEC officials were unavailable to respond to users' and analysts' comments by press time.

Ups and downs

During the last five months, DEC's system prices have fallen on the low end, risen on the high end

*VAX prices are for building block systems with one-year VMS and Decnet licenses.

INFORMATION PROVIDED BY DIGITAL EQUIPMENT CORP

Will Quattro land Borland in court?

BY STEPHEN JONES
CW STAFF

SCOTTS VALLEY, Calif. — Software industry watchers are eager to see if Borland International's forthcoming Quattro spreadsheet can offer all the features of Lotus Development Corp.'s 1-2-3 without copying the look and feel of the popular program.

Two other software companies that tried to walk the fine line between compatibility and blatant cloning of 1-2-3 have been slapped with lawsuits by Lotus for alleged copyright infringement. Separate suits charge Paperback Software International and Mosaic Software, Inc. with selling copycat versions of 1-2-3 that duplicate the program's- commands and screen formats.

The litigation has hurt both Paperback Software and Mosaic since the suits were filed in January and has resulted in stalled-out sales and stinging hits to their bottom lines, the companies have claimed.

Soft interface a savior

But Borland said it is confident it can stay out of the courtroom, thanks to a soft interface that allows users to modify Quattro to look like several spreadsheet programs, including 1-2-3, Microsoft Corp.'s Multiplan and Computer Associates International, Inc.'s Supercalc. The idea is that Borland is leaving it up to the user to decide what kind of spreadsheet he wants to run, sources at Borland said.

Borland announced last week that Quattro would be released by the end of this year.

"The ability of the user to reconfigure the interface. . . avoids any potential that the product could impinge the rights of another publisher," said Robert Kohn, Borland's general counsel. "We're just providing the user with a file that implements a set of commands that many users are already familiar with." Kohn added that federal copyright laws that give users the freedom to modify a program legitimize the soft interface.

Quattro has received high marks from beta-test users who have customized the program to run like 1-2-3 while taking advantage of the new package's quick recalculation features and sharp graphics. John Boyd, a longtime Lotus customer who has a beta-test version of Quattro, said Borland has combined the best of 1-2-3 with high-functionality enhancements. "I'll switch to Borland as soon as the software is available," he said.

Lotus would not comment on Quattro because officials at the Cambridge, Mass., vendor have not seen a copy of the product, said James O'Donnell, a Lotus representative.

But Jim Manzi, president and chief executive officer of Lotus, expressed strong feelings in a recent prepared statement on the issue of software clones. "Recently, more and more software development talent, money and time has been spent on imitation rather than true innovation," Manzi said in the statement.

If Borland becomes entangled in a legal battle with Lotus, analysts said, the financially strong company has the big guns needed to beat a lawsuit. Paperback Software and Mosaic, on the other hand, have limited resources that are being swallowed up by the costly Lotus litigation.

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	Austin	Oct 9
	Dallas	Sep 9, Oct 6, Nov 4
	Houston	Sep 18, Oct 16, Nov 18
	San Antonio	Oct 8
UT	Salt Lake City	Sep 29, Oct 29
VA	Norfolk	Oct 20
	Richmond	Sep 8, Nov 17
	Virginia Beach	Oct 15
VT	Burlington	Sep 2
WA	Seattle	Sep 3, Oct 15, Nov 10
WI	Madison	Nov 12
	Milwaukee	Sep 3, Oct 14

CANADIAN SEMINARS

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London	Sep 15, Nov 17
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CW

TCP/IP development push on

Air Force interest sparks vendors to work double time creating products

BY ELISABETH HORWITT
CW STAFF

A contract to supply the U.S. Air Force with a $200 million multivendor networking system has galvanized major network and computer vendors to develop Transmission Control Protocol/Internet Protocol (TCP/IP) network management protocols and products that could be commercially available within a year, according to sources close to the project.

The initial Air Force contract, for which proposals are due this week, calls for a prototype Unified LAN Architecture (ULANA) that would link a wide variety of computers and workstations at the Gunther Air Force Base using TCP/IP. If that $20 million project is successful, the system will be expanded to link a large portion of the Air Force sites at a cost of approximately $200 million, according to one prime contractor.

Companies involved as subcontractors in the ULANA bid reportedly include Bridge Communications, Inc., IBM, Sun Microsystems, Inc., Hewlett-Packard Co., Excelan, Inc., Sytek, Inc., Communication Machinery Corp. and Ungermann-Bass, Inc.

Digital Equipment Corp. equipment is incorporated into the proposal of prime contractor Computer Sciences Corp. However, "Digital's heart and soul is not in it," said Daniel Lynch, president of Cupertino, Calif.-based consulting firm Advanced Computing Environment. "They do not directly support TCP/IP."

Gaining favor

Originally developed for the U.S. Department of Defense, TCP/IP has gained increasing support from vendors and users who are tired of waiting for the Open Systems Interconnect (OSI) networking standard to arrive.

The Air Force was a prime mover in the formation of a TCP/IP network management task group at the TCP/IP Workshop held in Monterey, Calif., in March, Lynch said. "The ULANA project clearly states TCP/IP and asks for network management functionality that doesn't presently exist," he added.

The contract has acted as a stimulus for vendors to come up with a TCP/IP network management standard. Vendors who are participating in the ULANA bid "understood that network management is a prerequisite for meeting Mitre's request for proposals and have all promised to conform to the protocols once they are developed," Lynch said. Mitre Corp. is the Bedford, Mass.-based company managing the ULANA project for the Air Force.

The Air Force and the DOD both "want a standard network management system that will work across all programs, as soon as it can get done across vendor lines," said Stan Ames, a department head at Mitre. Trial implementations for the project should be done by the fall, and vendors could start offering commercially what they develop for the project approximately nine months later, Ames said.

The ULANA installation, which will go into trial implementation this fall, should be up and running before TCP/IP network management specifications are finalized, according to Bridge President William Carrico. "Assuming we win the contract, we will implement our existing NCS/2 Sun-based network management system, then migrate our software to match [the network management task group's]," he said.

TCP/IP network management development should go much more quickly than the parallel OSI effort, "which is far more broad-based," Carrico said.

The task group hopes to firm up the specifications for the protocols by year's end. It could take vendors as little as six months to implement the specifications in commercial products, according to Bridge Vice-President of Engineering Eric Benhamou, who is a member of the group.

Customs trips on $40M coat check gaffe

BY DAVID A. LUDLUM
CW STAFF

WASHINGTON, D.C. — A programming error at the U.S. Customs Service temporarily stranded an estimated $40 million worth of cotton coats from China that were awaiting importation to the U.S.

Because of the error, a Customs Service computer failed to record the importation of about 3.3 million coats between June 1986 and May.

Quotas had limited importation of the coats to roughly 3.5 million last year and 3.7 million this year.

The low figure that the Customs Service reported for the imports at the end of 1986 led importers to step up shipments early this year.

Coats left hanging

But after discovering the error, the Customs Service moved to redress it by declaring that the quota for this year's imports had been met, which stranded about 2.4 million coats worth an estimated $40 million that were in bonded warehouses awaiting importation.

The glitch arose in June 1986 during conversion to a new trade quota record-keeping system that was intended to integrate the quota system with other Customs Service applications.

The new system runs on an IBM 3090 under OS/MVS with a CICS teleprocessing monitor.

Havoc from blank fields

A programmer mistakenly left blank two of the 4,454 fields in the program that apply to imports from China, according to Karen Cooper, director of the Customs Service quota branch, noting that many of the fields are supposed to be left blank.

The programming error prevented two subcategories of the coats from being included when the total for the category was calculated.

Customs officials at ports around the country enter import data into the on-line real-time system.

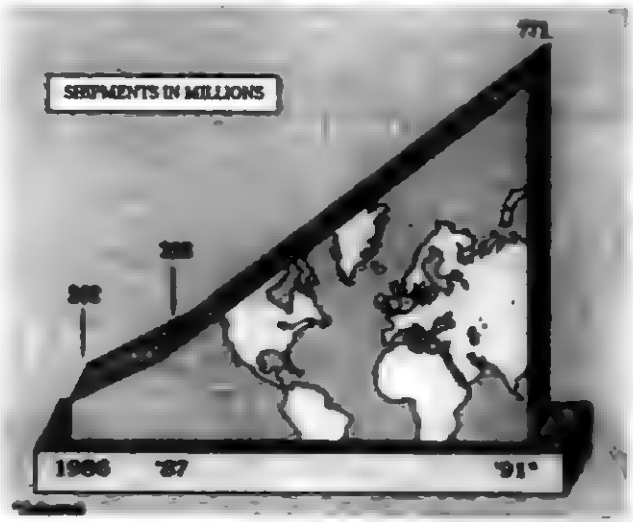
The system does not contain edit or validation procedures that would alert officials in Washington, D.C., to omissions, such as the ones arising from the blank fields, which would require them to check reports manually.

"We spent as much time as we could checking but didn't get to this one until May," Cooper said.

Validation procedures now are being built into the system, she said.

Demand swells

Worldwide shipments of packet-switching devices



INFORMATION PROVIDED BY DATAQUEST, INC.
CW CHART: AMY J. SWANSON

Tymnet

FROM PAGE 1

Ken Bosomworth, president of International Resource Development, Inc., added, "The high end of the spectrum has already been saturated. Now there's plenty of room in the low end of the market."

'Reasonable' price tag

While not the least expensive product on the market, the switch is positioned with a "very reasonable" price tag, Marney-Petix noted, since the MD 7408 is packaged in the same unit with a packet assembler/disassembler (PAD).

Many vendors, such as Micom Systems, Inc. in Simi Valley, Calif., and Telenet Communications Corp. in Reston, Va., typically sell their switches separately from their PADs.

The MD 7408 is considered the most significant offering in a battery of hardware enhancements and software announcements that Tymnet is set to release in mid- and late September at the Tele-Communications Association show held in San Diego, according to company officials.

Need apparent

Even Tymnet's fiercest high-end competitors see the need to add smaller switches to round out their product lines.

Telenet Communications reportedly expects to announce a low-end packet node with fewer than 50 ports in November.

Its smallest switch now is the TP 5254, with 112 ports.

Meanwhile, BBN Communications Corp. in Cambridge, Mass., is already taking orders for the 12-port C/3, its first small engine, which was unveiled in March.

According to Jeff Stern, Tymnet manager of hardware systems, the desktop MD 7408 is equipped with eight ports and will cost between $8,000 and $15,000, depending on the user's configuration.

Up until now, the smallest switch in the Tymnet Micro Engine product line has been the Model 4, a switch that supports 14 ports and is priced at more than $15,000.

The MD 7408 will support popular protocols such as CCITT's X.25, Synchronous Data Link Control and bisynchronous and asynchronous communications simultaneously.

Users reportedly can configure four of the eight ports to handle up to four links at speeds of 64K bit/sec. and 9.6K bit/sec.

Size of a PC

The switch employs very large-scale integration technology that enables engineers to downsize the components, according to Tom Chard, Tymnet product manager.

The unit, which houses a PAD concentrator, is approximately the size of a personal computer, according to the company.

Tymnet officials stressed that the switch will compete head-on with the synchronous PAD market since it can handle synchronous protocol conversion functions.

Stern said Tymnet expects financial institutions to use the switch to support critical jobs such as cash deposits and money transfer. He also said retail and insurance users can deploy the miniature switches in smaller sites.

Ideal for small offices

One user of Tymnet products, Jim Chatleain, technical consultant at Alascom, Inc. in Anchorage, Ala., said a low-end switch would be ideal for his company's small offices.

"Being in Alaska, we have offices spread out over many small communities. We wouldn't be able to justify a high-end piece of equipment, but a small switch is something we would be interested in," he said.

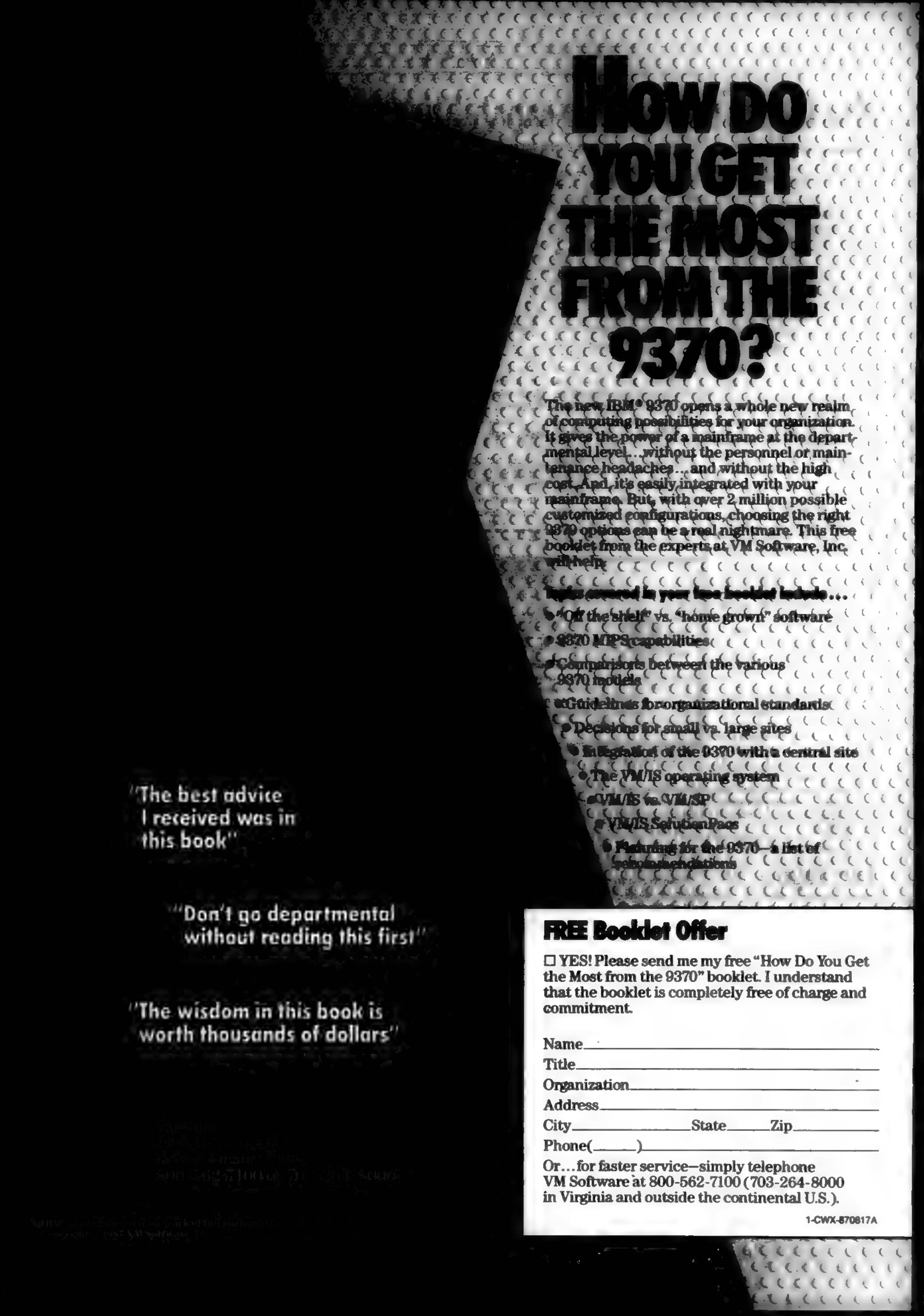
The MD 7408 is compatible with all of Tymnet's existing hardware, communications software and network management tools, Stern said.

It will also feature a battery backup that holds memory for up to 72 hours.

While the product will be sold to users of private-packet networks, Tymnet will also deploy the switches in its public network to regions the company is currently not serving.

Tymnet's public network has switches in 600 locations in the U.S.

According to Stern, Tymnet will seed the country with the low-end switches where necessary.



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Mac boosts networking capabilities

Pursues corporate accounts with line of four connectivity products

BY STEPHEN JONES
CW STAFF

Apple Computer, Inc. last week announced a line of desktop connectivity products designed to boost the Macintosh's limited networking capabilities and win over a large portion of the corporate marketplace.

The four products, including an Ethernet add-in card for the Macintosh II, are aimed at establishing the Mac as a serious business machine among corporate users, analysts said. The new offerings were announced at the Macworld Expo in Boston.

"Apple is very much going after the corporate environment with these business-oriented products," said Brad Baldwin, an industry analyst with market research firm Dataquest, Inc.

"Apple knows that the more business products you supply on a computer, the more that computer will come before an MIS manager as a possible solution," Baldwin said.

Fast interface card

The Ethertalk Interface Card, which is said to run up to 40 times faster than the vendor's current Appletalk, could warm up corporate users who in the past have shied away from the Mac because of Appletalk's sluggish networking performance. However, third-party Ethernet products are available for Appletalk. The $699 package, which is due by the end of the year, uses a board from 3Com Corp. to connect Mac users to Ethernet.

Described by Baldwin as a "quantum leap" over Appletalk, Ethertalk will give users access to the 10M byte/sec. Ethernet network. In contrast, Appletalk currently runs at approximately 230K byte/sec.

Appleshare PC Software, meanwhile, allows Mac users to transparently share information with IBM computers when used with the Appletalk PC Card, which was announced in January. A price has not been announced for the software, but Apple said it will be available in the first quarter of 1988.

Transfer and translate

Apple File Exchange, which will be included in the system software for new Macs, has the ability to transfer and translate documents created in Microsoft Corp. MS-DOS and Prodos environments.

The software is expected to be bundled with the Mac in the third quarter.

A $699 desktop facsimile modem called Applefax can exchange information between two Macintoshes at speeds up to 9.6K bit/sec. Although it has no scanner, the modem is compatible with industry-standard Group 2 and Group 3 facsimile machines and the international standard.

Synoptics Ethernet hits 10M bits

BY PATRICIA KEEFE
CW STAFF

MOUNTAIN VIEW, Calif. — Synoptics Communications, Inc. will become the first vendor to offer 10M-bit Ethernet over unshielded twisted-pair cabling with today's scheduled announcement of immediate availability of its Lattisnet version of that technology.

In addition, AT&T said it has certified Lattisnet for operation over its Premises Distribution System (PDS) cabling system.

Unshielded Twisted Pair Lattisnet is the result of a joint effort initiated between AT&T and Synoptics in January. The project combined technology tested by Synoptics with a testing and certification process technically managed by AT&T.

The resulting technology reportedly allows companies to install a single local-area network cabling system using standard telephone wire to support high-speed Ethernet over three major premises cabling systems: fiber optics; the IBM Cabling System, which is a shielded twisted-pair option; and AT&T's PDS, the unshielded twisted-pair.

Beta-test results

The latest Lattisnet offering has been in operation for two months at eight beta-test sites, operating reliably within the ANSI and IEEE 802.3 Ethernet specification, Synoptics claimed.

It uses a star topology and allows up to 330 feet of horizontal telephone cable between the wiring center and the work area. Both the transceiver and the host module in the concentrator use standard AT&T four-position modular jacks. The concentrators are located in wiring closets and connected by a fiber-optic backbone.

Consisting of Model 405 host modules and Model 505 transceivers, Unshielded Twisted Pair Lattisnet costs approximately $500 per node.

Both companies said they will pursue marketing opportunities for PDS. The two firms also said they will continue to jointly explore new implementations of the Lattisnet technology within the PDS architecture.

Although conceding the importance of running 10M-bit Ethernet over unshielded twisted-pair, analysts cautioned that users may still have to pull new cable.

Much of the installed wiring today is unusable, analysts claimed, warning that users may find themselves tied up in a "rat's nest" of cabling.

Mac

FROM PAGE 1

the machines; 99% have only 512K bytes of RAM, and that's expensive."

Available this month, Hypercard is a relational data base organized around an index card concept. Users can store information on "cards" as they would jot notes on an index card. The software allows users to organize information by linking cards, which are then organized into "stacks."

Hypercard is composed of three disks and a backup. Each disk, in turn, is made up of a number of stacks.

Apple officials said they envision the product being used by businesses to serve as front ends to large data bases. Additionally, corporate users could employ Hypercard in creating interactive training systems, the company claimed.

Hypercard will be bundled with every new Macintosh shipped. It requires a Macintosh with at least 1M byte of RAM and two 800K-byte floppy disk drives. However, the company recommends a hard disk for maximum performance.

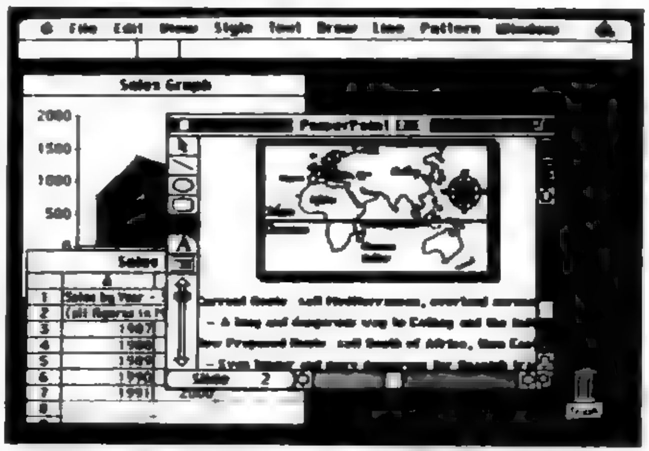
Apple last week also unveiled Multifinder, a multitasking operating system for the Macintosh that the firm said enables users to switch between applications across different operating environments, including Microsoft Corp.'s MS-DOS.

Scheduled to be available in late September, Multifinder will be shipped in all new Macintoshes. Current users can receive Multifinder for $49 in Apple's new Macintosh System Software Update, which will be sold through dealers and through the company.

While Multifinder was received favorably, industry observers last week focused their attention on Hypercard.

"Multifinder is a checkoff. It's something that's been needed," said Esther Dyson, editor of the "Release 1.0" newsletter. "Hypercard is wonderful stuff."

Dyson said Hypercard is another step for Apple toward increasing the Macintosh's appeal to individual users. Microsoft's MS OS/2 "is very much a corporate tool," she said. "With Hypercard, Apple is empowering the user. What has made the Macintosh successful in the face of terrible odds has been the strides Apple has made in powering systems software. This is one more step in that direction."



Multifinder lets users *move among applications.*

Tiny tape

FROM PAGE 1

eas where users have a disk capacity much greater than their tape backup," said Tom Toperczer, Emerald's director of product management.

"It provides an easy way for users to do their own backup without disrupting the MIS manager's schedule," he said.

Analysts see the product as a significant breakthrough in terms of price and capacity but believe it will probably not gain immediate widespread acceptance among users because the cassettes cannot be used with drives made by other manufacturers.

"This is a significant advance in capability," said Ray Freeman of Freeman Associates, a research and consulting firm. "But it is hard to say how widely accepted it will be because it is such a unique product."

Toperczer agrees that the product's inability to be used with a wide range of drives will slow any early momentum, but he said he thinks that Vast Device will be readily accepted by those who have a critical need for it.

Setting the pace

"People that have to have high-capacity backup won't find that a drawback. And as the product becomes more accepted, other companies will produce compatible products," Toperczer said.

Another factor that might hasten acceptance of the system is the influx of Intel Corp. 80386-based systems such as IBM's recently announced high-end Personal System/2 Model 80, which handles up to 300M bytes.

Because the Vast Device is an off-line medium, Toperczer said, it is possible for MIS managers to exchange massive data sets to outlying divisions of their companies.

"The product will prove interesting for people using distributed data bases and distributed transaction processing," he added.

CD-ROM alternative

The Vast Device is an attractive price/performance alternative to compact disk/read-only memory products because it is erasable and is a proven technology that can be delivered today, Toperczer said.

"The optical disk community has been working on [erasable disks] for years but hasn't delivered any. We have tape technology that is read-write and can be delivered today," he said.

The product uses Emerald Systems' helical scan recording technology, which yields a disk-to-tape backup speed of up to 15M byte/min., a company spokesman said.

Vast Device cassettes are available in four sizes: 250M and 500M bytes and 1G and 2.2G bytes.

Nonobsolescence

A "nonobsolescence" feature allows users to start off with just one Vast Device and to link additional Vast Devices for unattended data archive capacities of more than 15G bytes.

The unit measures 16 by 14 by 8 in. and interfaces to IBM desktop computers using a 60-in. cable and an Emerald controller board that plugs directly into a desktop system.

The Vast Device cassette can hold the equivalent of almost 6,200 floppies and one million sheets of paper.

The device can be installed in a few minutes, according to the company. The product's software can be installed on any IBM system's hard disk.

Apple enhancements sprout at Macworld

Open architecture spurs bounty of third-party vendor product introductions at show

BY ALAN J. RYAN
CW STAFF

BOSTON — By opening up the architecture of its Macintosh computer, Apple Computer, Inc. has created a seemingly boundless market for third-party vendors, as was evidenced at last week's Macworld Expo here.

"The market for expansion boards and other devices that enhance the capability of the Mac is an explosively growing market," said Benny Lorenzo, an analyst with L. F. Rothschild & Co.

Because of the open architecture and its expandability, the Macintosh is "finding wide acceptance in the large-account area," Lorenzo added.

The following hardware and software products for the Mac were introduced last week by third-party developers:

- Jasmine Technologies, Inc. in San Francisco demonstrated its Backpac 40 disk drive for the Macintosh Plus and its family of internal disk drives for the Macintosh.

The Backpac 40 external 40M-byte small computer systems interface drive mounts on the back of the Macintosh Plus and sells for $1,299. The internal 90M-byte Innerdrive 90/II sells for $1,499 and reportedly has a 16-msec access time.

- Automatix, Inc. released a Macintosh II-compatible industrial computer, the AI 90, which was designed for use on factory floors. The Billerica, Mass.-based company said the 100%-compatible system features an open Nubus architecture along with a Motorola, Inc. 68020 32-bit processor.

The system runs Macintosh II software and has optional support for Microsoft Corp.'s MS-DOS and Unix programs. The price of the unit is $8,500 in its standard version.

- A 15-in. full-page display for the Mac was introduced by San Jose, Calif.-based Radius, Inc. The Full Page Display has a resolution of 864 by 640 pixels and a refresh rate of 67Hz, the company claimed. It is priced at $1,995 and is slated to be available in the fourth quarter.
- Sigma Designs, Inc. in Fremont, Calif., also announced a page-display unit. The Laserview Display System, a high-resolution, large-screen monitor system, includes the monitor and a display adapter board. Two resolutions are available: 1,664 by 1,200 or 832 by 600 pixels, both in noninterlaced mode. The 15-in. version is priced at $1,895, and the 19-in. version costs $2,395.
- Abaton Technology Corp. in Pleasanton, Calif., displayed Multitalk, a port server that reportedly expands the capability of the Appletalk network to accommodate peripherals in addition to other computers.

The server requires that peripherals such as modems, plotters and mainframe and minicomputer links have an RS-232 interface and communicate at speeds between 75 and 9.6K bit/sec.

- Nantucket Corp. in Los Angeles, maker of the Clipper compiler for Ashton-Tate's Dbase III, demonstrated McMax, a relational data base management system for the Mac. The system, which will reportedly sell for $295 when it begins shipping early next month, is fully Dbase III compatible, the company said.
- Versacad Corp. annoònced its Versacad/Macintosh Edition, a two-dimensional computer-aided design system. The package, priced at $1,995, is slated for release on Dec. 1.
- Human Intellect Systems, a San Mateo, Calif.-based developer of expert systems software, introduced Instant-Expert Plus, an environment for nonprogrammers that the vendor said lets them develop expert system applications. The program uses natural language rule entry, interactive graphics, variables and more than 18 different inference engine search strategies, the company said.

The Mac version is set to ship in October at a retail price of $498.

- Cambridge, Mass.-based Cognition Technology Corp. released Version 2 of its Macsmarts expert system tool. Version 2 adds hypertext techniques for creating knowledge bases that combine rules, graphics, data bases, text, spreadsheets and other forms of knowledge, the vendor said. It sells for $149.95 and is available immediately.
- Officetalk, Inc. in Bala Cynwyd, Pa., described an electronic mail and bulletin-board service that allows Macintosh and personal computer users to send graphics and text to as many as 400 recipients worldwide. Officetalk also allows users to set up private bulletin boards and on-line technical libraries for fast communication with branch offices, customers and others.

The service is available with a registration fee of $50 per address. On-line rates are 80 cents per minute during prime time and 40 cents during nonprime hours.

- Cambridge, Mass.-based GW Instruments released hardware and software to handle data acquisition, data analysis and external control applications on the 32-bit Macintosh II. The Macadios II is a 10-board set supporting both analog and digital channels. Complete systems sell for between $1,500 and $10,000.

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Zenith snares $104M Pentagon deal

BY MITCH BETTS
CW STAFF

Zenith Data Systems, which has been extremely successful in selling microcomputers to the federal government, last week won the biggest prize of all: a $104.5 million contract to provide the military with an estimated 90,000 of its Z-180 series laptop microcomputers. It was the largest government contract for laptops ever awarded.

The Glenview, Ill.-based subsidiary of Zenith Electronics Corp. reportedly won with a bid that beat out 17 other competitors, including Toshiba America, Inc.

Zenith is the largest supplier of microcomputers to the federal government. In 1984, it won a contract to supply the military with 10,000 desktop computers; in 1986, the firm won a widely publicized contract to supply the Internal Revenue Service with 15,000 laptops for auditors.

The battery-operated Z-180 laptops feature a backlit supertwist LCD screen. Zenith will supply dual-floppy and Winchester hard disk drive versions of the computer, as well as peripherals, technical support, maintenance and software support.

In addition, Zenith said it will provide Microsoft Corp.'s MS-DOS Manager, a new interface developed by Microsoft for Zenith that helps the user move through the operating system more easily.

Under the three-year contract, Zenith will supply the laptops for use worldwide by the U.S. Navy, Air Force, Army, Defense Logistics Agency and other military agencies. The Z-180 was designated as the Pentagon's preferred general-purpose portable micro by the Air Force Computer Acquisition Center at the Hanscom Air Force Base in Bedford, Mass., which handled the contract.

The procurement had been delayed earlier this summer while the Pentagon investigated Toshiba Machine Co. of Japan, a company affiliated with Toshiba America, concerning the former's illegal sale of submarine technology to the Soviet Union [CW, June 29]. However, Toshiba America ultimately was not barred from competing for the laptop contract.

Find Out What's Going On Between Apple And IBM.

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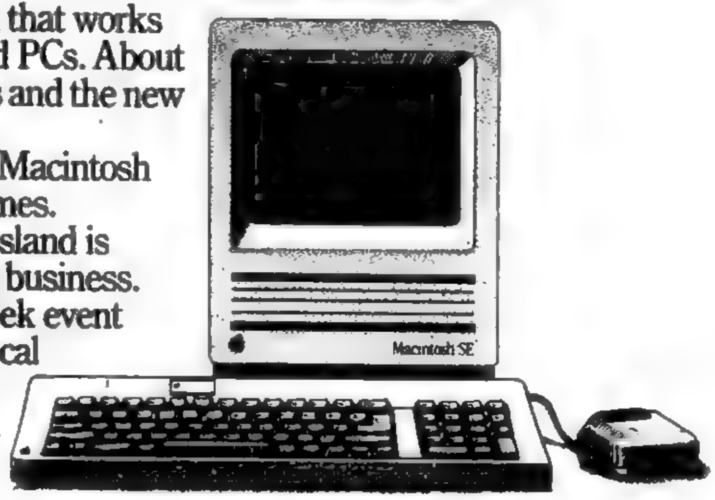

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Orchid PS/2 card blooms

Orchid Technology, Inc. said it will announce later this month a new version of its PC Net local-area network (LAN) interface card for the IBM Personal System/2 Micro Channel architecture series.

PC Net/2 is expected to provide 8% to 10% faster throughput between IBM Personal Computers and PS/2 models connected on Orchid's PC Net LAN, according to Bill Berkman, product manager at Orchid.

Since at least half of Orchid's existing 80,000 to 120,000 PC Net customers also run Novell, Inc.'s Netware, the two companies are working on modifications to ensure PC Net/2 compatibility with the Netware software driver, Berkman said.

The PC Net LAN reportedly supports up to 60 users and is software compatible with the majority of microcomputer LAN software communications and applications packages as well as IBM's Token-Ring and PC Network.

No major changes

PC Net/2 will take advantage of such Micro Channel features as burst mode direct-memory access for faster throughput; otherwise, no major changes were required for the board, according to Berkman.

Orchid first released PC Net in 1983. The company is seeking to gain a foothold in the emerging PS/2 aftermarket and the expanding communications market.

Pricing and availability have not been determined, Berkman said.

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3Com, Atlantic Microsystems tie marketing knot

BY PATRICIA KEEFE
CW STAFF

BOSTON — 3Com Corp. last week confirmed plans to co-market — and perhaps privately label — fault-tolerant technology from Atlantic Microsystems, Inc. in Salem, N.H.

The two companies are in the process of certifying Atlantic Microsystems' products on Santa Clara, Calif.-based 3Com's Ethernet network and said they will complete testing within three weeks.

"If it really works the way they say it does, then we'll OEM the product," 3Com President William Krause said. Development efforts are already under way to port Atlantic Microsystems' fault-tolerant software to 3Com's 3Server3 file server, added Joe Flack, Atlantic Microsystems' marketing manager.

Atlantic Microsystems has developed two IBM Personal Computer AT-based fault-tolerant servers for Ethernet and IBM Token-Ring microcomputer networks, Flack said. Both products run Microsoft Corp.'s MS-DOS and support off-the-shelf applications with no modifications, he said.

Atlantic Microsystems' Me2 is said to enable disk mirroring between two hard disks within a single stand-alone workstation. However, if the AT goes down, both disks will crash. The network operator can also assign partitions on the disks. It costs $385 and began shipping in May.

There is a second networked version of Me2 that supports 3Com's 3+ software and adapter cards, Flack said. It costs $1,285. 3Com is interested in plans for a third version, ported to the 3Server3 and enhanced with features such as disk error correction, Flack said.

The Equalizer2 provides yet a higher level of fault tolerance via mirrored file servers. It requires two ATs, which mirror activity on the primary server to the secondary machine. In the event of a crash, the user reboots the backup server and is up and running, Flack said.

The Equalizer2, which is set to be demonstrated at PC Expo next month in New York, is not shipping yet.

A 3Com-specific application is expected to cost at least $7,000, including two boards, cabling and software, Flack said. The Equalizer2 would give 3Com a leg up on rival Novell, Inc., which has shipped two levels of its System Fault Tolerant line.

Space center averts havoc

HOUSTON — Preparation for storm damage helped protect Johnson Space Center's mission control system when a water pipe damaged by workers spilled thousands of gallons of water on it recently.

After the pipe was broken, space center employees quickly shut off power to the system and covered it with plastic sheets stored nearby for protection from storms, according to Kelly Humphries, a space center spokesman.

The water soaked three cabinets containing peripheral equipment, such as a multiplexer/demultiplexer, but not the cabinets housing the system's four IBM 3083 main processors, space center spokesmen said.

The system, which is used both to monitor space shuttle flights and to run flight simulations, was back in operation 2½ days after workers installing a power cable broke a fitting from the air conditioner's water pipe.

A simulation of a space shuttle reentry being conducted at the time was suspended. During a shuttle mission, the control system is backed up by another at Goddard Space Flight Center in Maryland. "There wouldn't be anyone working in there during a mission," said Kyle Herring, a space center spokesman.

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Wang tightens grip on PBX market

Will enhance Telenova system, meld it to high end of Intecom line

BY ELISABETH HORWITT
CW STAFF

Working to leverage its two private branch exchange (PBX) investments more effectively, Wang Laboratories, Inc. last week announced that it has purchased nonexclusive rights to enhance and resell Telenova, Inc.'s Telenova1, and has given its wholly owned subsidiary, Intecom, Inc., the job of integrating the low-end PBX with Intecom's high-end PBX line.

In exchange for its reselling right to Telenova's product, Wang relinquished 30% of the 40% investment it made in the PBX company two years ago. International Data Corp. (IDC) Senior Analyst Jeff Kaplan suggested that Wang was "trying to reduce the cost burden of its percentage share in Telenova, having recognized that the PBX field has a limited opportunity for growth and profits."

According to an IDC report, Intecom sales constituted 1.3% of total market revenue in 1986, while Telenova's sales made up less than 0.1%. However, Telenova reportedly finished the year in the black.

Wang Vice-President Tim Cronin emphasized that the consolidation of Telenova and Intecom products under the Wang subsidiary's administration represented "just the opposite of a cutback," marking Wang's next step toward "integrating different forms of information on the desktop."

With the continued input of Telenova's research and development staff, Intecom will continue to work toward "two types of integration," Cronin noted. One priority is bridging the gap between Telenova's PBXs, which support between 20 and 160 lines, and Intecom's product family, which supports 700 to 20,000 lines.

"We want to overlap the two product families and build in network capabilities and feature transfer so, for example, least-cost routing on the small switch is also available on the larger one," Cronin said. Merging the two PBX lines' protocols will allow networking and feature portability so that voice mail routing, conference calling, call management and other features will be available across multiple PBXs, he added. Wang-Intecom is also working toward a single network management system for PBX lines, Cronin explained.

Wang hopes to provide better integration between the PBXs and its VS computers, for example, to allow users to share client files among workstations through the PBX, Cronin said.

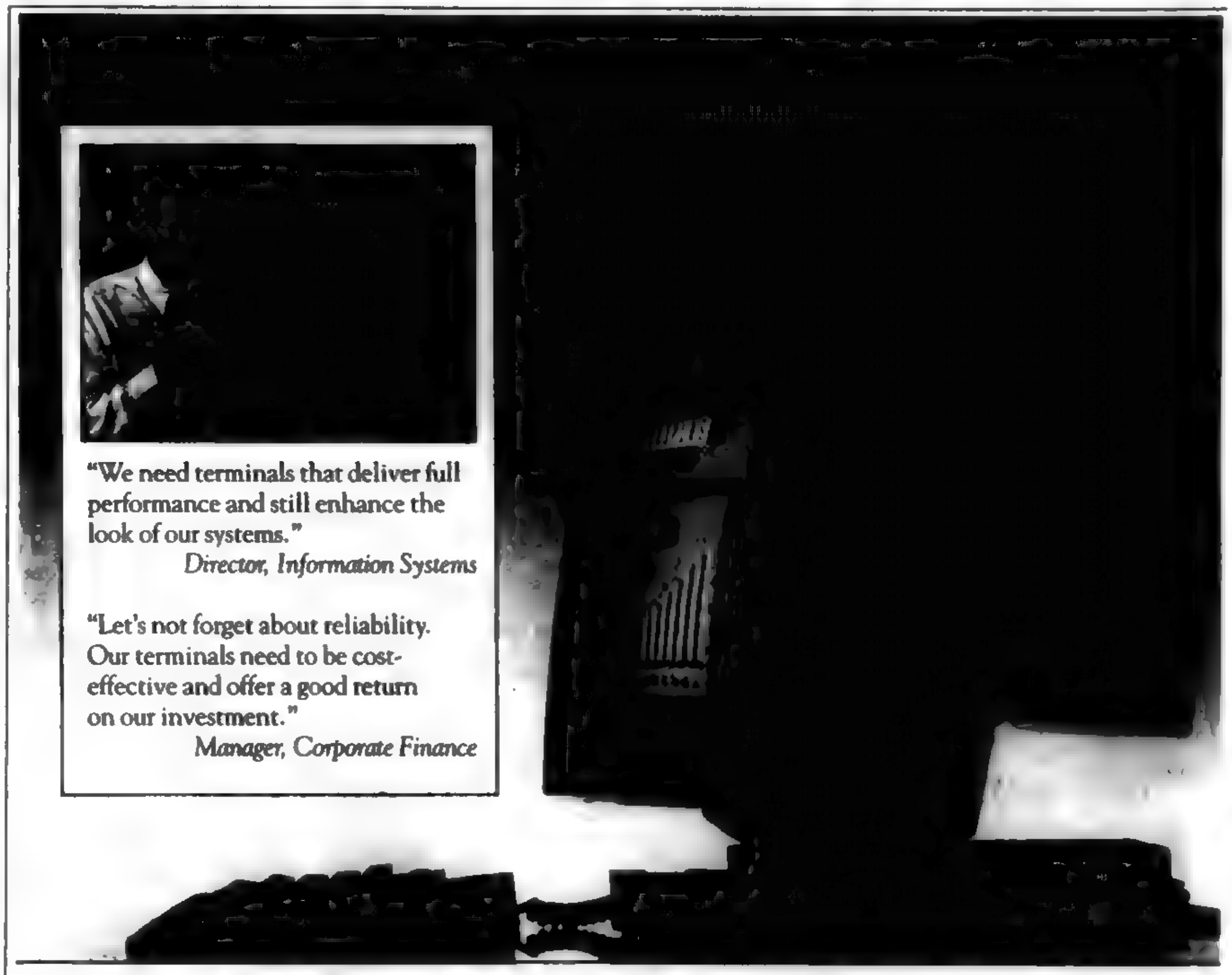
Under the terms of the agreement, Wang has also acquired exclusive rights to sell its Integrated Office Solution, which meshes a Telenova1, a VS host and application software into a system designed to support vertical applications.

While Telenova will continue to manufacture the Telenova1 for Wang, there is a possibility that Intecom will take over that job in the future as well, Cronin said. By relinquishing the bulk of its holdings, Wang frees Telenova to pursue relationships with investors that had been put off by the vendor's dominant presence, Telenova said.

Net gain

Sales of digital voice/data PBXs are expected to increase steadily through 1989

INFORMATION PROVIDED BY SALOMON BROTHERS, INC.
CW CHART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Microrim taps Dbase

Graphics tool made compatible with data base

BY ALAN J. RYAN
CW STAFF

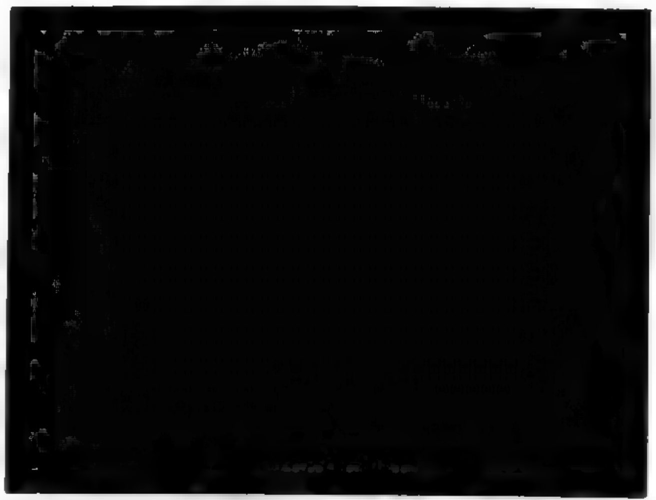
REDMOND, Wash. — Acknowledging the substantial installed base lead that Ashton-Tate's Dbase holds in the data base market, Microrim, Inc. last week announced a Dbase-compatible graphics package.

Microrim, which has long positioned its R:base product as an alternative to Dbase, said the DB Graphics package will work with R:base and other data bases as well. A spokesman hinted that the package would eventually be followed by other Dbase-compatible products.

Marco Hegyi, Microrim vice-president of marketing, said the company is "segmenting the graphics market by going after the data base user."

Because DB Graphics reads live Dbase III, Dbase III Plus and R:base data, import and conversion utilities are avoided, the company said. Users can read the data base directly and use the product's data management functions to select the data that will be graphically displayed. DB Graphics can also be used as a stand-alone presentation graphics package.

DB Graphics, which reportedly will sell for $295 when it becomes available next month, operates on the IBM Personal System/2 and on Personal Computer XT, AT and compatible microcomputers. It requires Microsoft Corp.'s MS-DOS 2.0 or higher in a single-user application and MS-DOS 3.1 in local-area network applications.



Sample screen *from Microrim's DB Graphics package*

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CWRLD817

Novell opens architecture

BY PATRICIA KEEFE
CW STAFF

PROVO, Utah — Novell, Inc. opens up its architecture to third parties today with the introduction of System Fault Tolerant (SFT) Advanced Netware 2.1, a version of its network operating system said to feature minicomputer and time-share capabilities.

Among the many new features are built-in fault tolerance, significantly increased network management and security features and, for the first time, hooks to enable third parties to develop hardware and software extensions to the operating system.

Early reaction from users and resellers who have previewed the product is generally positive. However, most users will have to wait until the first quarter of 1988 to take advantage of the enhanced software. Priced at $4,695, SFT Advanced Netware 2.1 will be available, on a limited basis only, during the fourth quarter, Novell said.

SFT Advanced Netware 2.1 incorporates all of the features of Version 2.0A, including the Transaction Tracking System, which was previously sold as an option.

Application programming interfaces for third-party software and hardware developers provide the hooks, or value-added processes and value-added drivers. Value-added processes enable programmers to develop multitasking applications in protected and real-time mode, said Craig Burton, Novell's vice-president of corporate planning and development.

The processes also aid in the development of server-based applications. Value-added drivers enable users to use non-Novell drives on their networks. Netware users are currently limited to a volume size of 250M bytes, said Edward Wilk, a microcomputer network specialist with television station WNEV in Boston. "That will no longer be a problem," he said.

Among the highlights of SFT Advanced Netware 2.1 are a virtual console, which allows a supervisor to monitor a local-area network and gather information on the status of the server from any workstation on the network, as well as remotely, and accounting and billing services that include audit trails of disk use.

DG settles suit with Digidyne for $26M charge

WESTBORO, Mass. — For the second straight year, financially reeling Data General Corp. will take a substantial charge against fourth-quarter earnings to pay a successful plaintiff from a 9-year-old software bundling suit.

DG announced last week it will take a $26 million charge to cover an out-of-court settlement with Digidyne Corp. With DG posting losses of $104 million in the first nine months of the fiscal year, last week's announcement virtually assured that its losses will exceed $100 million for the year.

In 1978, Digidyne filed a joint suit with Fairchild Semiconductor Corp., charging that DG's refusal to unbundle the operating system for its Nova minicomputers was unfairly restrictive. A federal judge essentially upheld the plaintiff's arguments last year.

DG then reached a $52.5 million settlement with Fairchild and took a $29.4 million charge against fiscal 1986 fourth-quarter earnings.

DG said it will take the charge relating to the Digidyne settlement in its current quarter, ending Sept. 30.

DG had a loss of $65.1 million in its most recent quarter, ended June 30, mainly from one-time charges associated with a recent layoff and plant closings.

The settlement ends all pending litigation relating to the Nova software bundling suit.

Cullinet wins bank contract

BY ROSEMARY HAMILTON
CW STAFF

NEW YORK — American Express Bank Ltd. announced last week that it will use the Cullinet Software, Inc. Banking System as the basis for its new corporatewide international banking software.

The Cullinet selection comes after American Express reviewed a number of banking software vendors; including Uccel Corp. and Hogan Systems, Inc., according to Michael Tuohy, first vice-president of global systems at the bank.

Neither party would reveal the value of the contract, but the IDG News Service reported the value is in the $6 million range. A single copy of the software is priced at $2 million, which includes the cost of Cullinet's IDMS/R data base management system — a requirement for the banking system.

Tuohy said the system is being installed at the bank's corporate headquarters and will "wind up on about 15 CPUs." He declined to say whether the bank will be charged a license fee for each installation. Tuohy said no other banking software vendors offered as comprehensive a system as Cullinet.

"We looked at Uccel, but they couldn't present a concrete system," he said. "We had discussions with Hogan, but we thought Cullinet had a better approach."

Software AG tiered pricing to emulate IBM's

RESTON, Va. — Software AG of North America, Inc. will introduce a tiered pricing structure next month that is similar to IBM's graduated pricing scheme, the company said last week.

The structure will bring price hikes to some customers, such as high-end IBM MVS and PC-DOS users, while greatly benefiting low-end IBM and Digital Equipment Corp. users.

IBM's VM users, regardless of processor size, will also see steep price cuts for products, such as Software AG's Adabas relational data base management system.

In the IBM market, Software AG reportedly will offer prices based on the four groups of processors as defined by IBM. Within these groups, pricing will vary depending on the operating system.

The IBM structure starts with Group 10, which includes IBM's low-end 9370 models, and moves up to Group 40, made up of IBM's high-end 3090 models.

A five-group DEC pricing scheme begins with Group 5, which includes the Microvax II and Microvax 2000, and is topped off with Group 40, which is based on DEC's VAX 8800 series. With the old pricing policy, an Adabas license for MVS users was $178,000. As of Sept. 1, the prices for MVS users will be $150,000 for Group 20, $170,000 for Group 30 and $190,000 for Group 40. VM users have been paying $142,000 for an Adabas license. New pricing starts at $30,000 for Group 10, $53,000 for Group 20 and $113,000 for Groups 30 and 40.

For DEC hardware, an Adabas license was $25,000 for a Microvax-class system and $70,000 for all other processors. New prices are scheduled to be $10,000 for Group 5; $20,000 for Group 10, which includes the VAX-11/700 series; $40,000 for Group 20, which includes the VAX 8200, 8300 and 8350; $60,000 for Group 30, which is made up of the VAX 8500, 8600 and 8700; and $80,000 for the VAX 8800s in Group 40.

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Vendors counterattack higher access charge

BY MITCH BETTS
CW STAFF

WASHINGTON, D.C. — Value-added network vendors are enlisting the help of their customers in a lobbying blitz aimed at killing a federal proposal to make the vendors pay higher access charges to connect with the local telephone network.

Telenet Communications Corp., for example, is meeting with its business customers to explain how the proposed access charges will raise prices and how to file written comments to the Federal Communications Commission, according to spokeswoman Claudia Houston.

The FCC recently issued a proposal that would eliminate the exemption from access charges currently enjoyed by so-called enhanced service providers, including vendors of data networks, electronic mail, remote computing and information retrieval services.

The proposal, which is subject to public comments before a final FCC vote, has raised a storm of protest from the affected vendors, whose costs may increase about $4 per hour.

"While there is dispute about the precise amount of additional access charges, the ruling could add more than $4 per hour to the costs that enhanced service providers incur in providing service, nearly doubling the cost in some circumstances," said a statement issued last week by Tymnet, McDonnell Douglas Network Systems Co. in San Jose, Calif.

"Of course, these charges would, to a large extent, have to be passed on to the business user," Tymnet said, adding that it is collecting information on the specific effects that the proposal would have on businesses, educational institutions and other organizations.

Supporters of the FCC proposal argued that enhanced service providers should not be exempt from paying their fair share of the cost of maintaining the local communications network.

The FCC said it provided a temporary exemption for enhanced service providers in 1983, when it first levied a local-access charge for long-distance carriers. Enhanced service providers "have had ample notice of the commission's ultimate intent to apply interstate access charges and ample opportunity to adjust their planning accordingly," the FCC said.

Warner Sinback, manager of telecommunications affairs for GE Information Services, a division of General Electric Co. in Rockville, Md., said that long-distance carrier MCI Communications Corp. has been goading the FCC to make the change, hoping it will add more revenue to the access-charge pool, thus cutting MCI's bill for access charges.

But Sinback said the total contribution of enhanced service providers would be minuscule — "a drop in the ocean" — amounting to a reduction of only one-tenth of a cent per minute in consumer long-distance bills.

Furthermore, he predicted that enhanced service providers will look for ways to bypass the local network to avoid the access charges.

Discrimination

ADAPSO, the computer software and services industry association, noted that the FCC proposal discriminates between remote computer service vendors, which are classified as enhanced service providers, and in-house data processing systems.

"Contrary to the FCC's apparent belief, a computer service vendor's use of the telephone network is indistinguishable from that of any other large user that operates an extensive voice or data network," said George T. DeBakey, ADAPSO's executive director.

Michael F. Cavanagh, executive director of the Electronic Mail Association, said the group is concerned about the effect of the cost increase on nonprofit and community-interest services operating on meager budgets. For example, a variety of on-line library and low-cost legal services would be jeopardized, he said.

The Videotex Industry Association said it will vigorously oppose the FCC proposal on the grounds that the access charges will make videotex too expensive for most consumers. "It will stunt the growth of videotex services," said Hilary Thomas, chairwoman of the group.

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AST announces 3270, PS/2 links

IRVINE, Calif. — AST Research, Inc. this week will announce two IBM 3270 terminal emulation cards and an Ethernet interface board for the IBM Personal Computer and Personal System/2 series.

The AST-Coax II and Coax IIA are AST's first in-house-designed micro-to-mainframe 3270 communications cards for the PC bus and the PS/2 Micro Channel architecture. Previously, AST sold CXI, Inc.'s Pcox board on an OEM basis for PC-to-host communications.

The boards, scheduled to be available in October for $895, are compatible with Digital Communications Associates, Inc.'s Irma series of micro-to-mainframe products. By using AST's high-speed bit-slice communications and coaxial 3270 protocol handler microprogrammable chip sets, the user will reportedly be able to upgrade the system firmware to support new terminal devices and protocols such as LU6.2.

In addition, AST said it plans to unveil for the PC and PS/2 an Ethernet local-area network interface card that will support the Xerox Network Systems protocol now and the Excelan, Inc. communications standard based on the Transmission Control Protocol/Internet Protocol in the future.

AST declined to elaborate on the Ethernet card, pending a formal announcement this week and an unveiling at the PC Expo Sept. 1 in New York. The board announcements reflect AST's desire to expand beyond its role as a memory and add-in board vendor and to establish a foothold in the PS/2 enhancement market.

Revamped Fusion tool unwrapped

BY KATHY CHIN LEONG
CW STAFF

OXNARD, Calif. — Network Research Corp. quietly began shipping a new version of its Fusion software for intervendor communications recently.

Release 3.2 of Fusion, which is due to be announced this week, adds network support for a much broader line of Digital Equipment Corp. computers, new electronic mail capabilities and remote communications features for Transmission Control Protocol/Internet Protocol (TCP/IP) users.

Fusion 3.2 now supports connections between DEC's Microvax 2000, Vaxstation 2000 and VAXBI bus series products as well as IBM Personal Computers and Motorola, Inc. 68000-based computers.

Previously, the product supported only the DEC Microvax II and the VAX-11/700 series. The Fusion family does not currently support IBM mainframe operating systems.

Officials said the new version of Fusion, which is priced between $3,000 and $9,000, will run 20% faster. The release supports up to four DEC Ethernet controllers simultaneously instead of one. Kathy Graham, Network Research's vice-president of sales, said the product will initially run under DEC's VMS operating system and should later support Microsoft Corp.'s MS-DOS and Unix.

Network Research also announced an R Commands option that it said allows TCP/IP users to issue remote commands with fewer keystrokes. With the option, a remote user on Computer A, for instance, can copy a file from Computer B to Computer C, a company spokeswoman explained.

R Commands is a series of Unix applications utilities compatible with the R Commands code originally developed at the University of California at Berkeley.

Fusion 3.2's electronic mail option features an on-line Help facility and commands that alert users at the exact time a message has been delivered and read. Both the mail and R Commands options will range from $100 to $2,250.

Users worldwide

Users of Network Research's new software release already include Nixdorf Computer AG, NEC Corp., Sandia National Laboratories and Mitre Corp.

Dave Robinson, technical staff member at Jet Propulsion Laboratories in Pasadena, Calif., said the latest version of Fusion supporting TCP/IP has successfully linked his department's Sun Microsystems, Inc. and Masscomp workstations under one network. Robinson said he uses the new version on his department's DEC VAX running VMS.

Analysts stressed that Fusion 3.2 will bring Network Research a step closer to DEC. The two companies are already working on a joint development project to write gateways between TCP/IP protocols and Open Systems Interconnect protocols for the National Bureau of Standards.

DG fights back with mid-range rollouts

BY JAMES CONNOLLY
CW STAFF

WESTBORO, Mass. — Data General Corp., battered recently by weak financial results and layoffs, fought back last week with the announcement of a pair of mid-range systems aimed at the departmental computing market.

The systems are faster versions of DG's year-old MV/7800 processor series and provide what the company claimed are performance gains of 45% or better.

DG announced the MV/7800 XP rack-mount system, which fills the same role as MV/7800 but with increased processing power, and the MV/7800 DCX, an office environment minicomputer designed to out-perform the MV/7800 DC.

Vies with VAX

The MV/7800 series competes with the lower half of Digital Equipment Corp.'s VAX 8000 series, which includes the VAX 8250, and the IBM 9370 family, which began shipments last month.

The performance gains were achieved by speeding up the single-board processor in DG's MicroMV chip set and with the use of faster memory chips, according to Gordon Haff, product manager for the MV/7800 line.

Haff said the new systems feature a cycle time of 220 nsec, compared with a 320-nsec cycle time in the older MV/7800s.

The 256M-bit memory chips used in the new systems have an access time of 65 nsec, compared with 100 nsec for the older chips, Haff said.

Using new technology

"Essentially, we took advantage of what we could do with the technology developed over the last six months or so to improve price/performance," he explained.

Data General mid-range
Office offerings — then and now

	MV/7800 DC	MV/7800 DCX
Announced	*November 1986*	*August*
MIPS[1]	*1*	*1.6*
Cycle time	320 nsec	220 nsec
Memory range (in bytes)	2M to 14M	2M to 14M
Memory access time	100 nsec	65 nsec
Maximum users	40	80
Typical number of users	20 to 35	20 to 64
Disk capacity (in bytes)	2.7G	2.7G
Base price	$28,400	$33,300

[1] Million instructions per second

CW CHART

The older systems perform about 1 million instructions per second (MIPS) and will remain available.

The MV/7800 DCX and MV/7800 XP are rated at about 1.6 MIPS. The office version costs $33,300 with 2M bytes of memory and a 70M-byte disk drive. It supports up to 14M bytes of memory and 2.7G bytes of disk storage, according to DG.

Prices for the MV/7800 XP begin at $23,000. That system supports 14M bytes of memory and 9.4G bytes of disk storage.

Haff said upgrades from the older models are available for $9,000.

MV/7800 still available

DG said it will continue to offer the original MV/7800, which, like the MV/7800 XP, was originally designed to operate outside of an office environment such as a copier room or a controlled-environment computer room.

Haff said the MV/7800 DC was designed to support a maximum of 40 users and 20 to 35 active users in a typical environment.

The MV/7800 DCX supports a maximum of 80 users and 20 to 64 users in a typical environment.

Xerox readies System/38 CIM package

BY JEAN S. BOZMAN
CW STAFF

CHICAGO — Xerox Computer Services, which has been an IBM value-added remarketer since 1983, will announce a computer-integrated manufacturing (CIM) package for the IBM System/38 on Sept. 1, a company official said recently.

While differing in some specifics, the package will perform the same functions on the System/38 as current Xerox Computer Services applications for the IBM 9370, creating a single, centralized data base of CIM information. The applications will be written to Xerox Computer Services' Exec/VS operating system, which has an interface to the System/38's CPF operating system, said Frank Lagattuta, president of Xerox Computer Services.

The System/38 announcement will be followed by another, more sweeping mainframe announcement in the first quarter of 1988, Lagattuta said, when Xerox Computer Services will unveil a CIM package written for IBM's CICS, IMS and DB2 environments. "That product will provide automatic documentation of all the steps in the manufacturing process, from design to engineering to final production," he said.

"It will provide a common data dictionary and virtual device interfaces for factory-floor data from non-IBM devices, such as Hewlett-Packard Co. and Digital Equipment Corp. computers," he added. HP and DEC computers are prevalent throughout corporate America's manufacturing plants, but, in many cases, have had trouble updating the IBM mainframe's data base, he added.

The Xerox Computer Services software addresses job scheduling, manufacturing resource planning, finance, marketing and engineering. "All these applications are tied together through a central, active data dictionary and a single, shared enterprisewide data base," a Xerox Computer Services spokesman said.

IBM representatives will comarket the products, and "IBM will ship the hardware product and will assist in on-site preparation," Lagattuta said during a visit to Midwestern clients last week.

Although it is an off-the-shelf product, the new package will leave room for customization. "Large companies don't want an off-the-shelf packaged system," Lagattuta said. "They want a shell that gives them the methodology and the rules of the road. Then, they want to tailor it to their own manufacturing environment."

Supports most IBM systems

Once the System/38 and the IBM 3090 announcements have been made, Xerox Computer Services will support most IBM operating systems, including SSX, VM, DOS/VSE and MVS. The combination of software products will tie plant-floor, administrative and design/engineering applications into a single corporate CIM data base.

Lagattuta said Xerox Computer Services sees its role as one of a systems integrator, using its IBM-compatible systems interface as a leverage point in the CIM market.

Xerox Computer Services, which is based in Los Angeles with a staff of 600, has been selling IBM 4300-based CIM packages for four years. It has its own direct sales force and a marketing staff of 120. Lagattuta, who has been Xerox Computer Services' president since March, would not reveal the amount of revenue his division generates for its $10 billion parent company, Xerox Corp.

In the future, Xerox Computer Services will look for possible synergy with Xerox's mainline printing business by addressing the manufacturing customer's need to document engineering changes, Lagattuta said. Such costs have been estimated by industry consultants as a full 10% of the cost of manufacturing a product. "Our business fits very nicely with Xerox's, because we understand the MIS environment," Lagattuta said.

Multiflow, Apollo in sales pact

BY ALAN ALPER
CW STAFF

NEW YORK — Multiflow Computer, Inc. and Apollo Computer, Inc. last week disclosed that they have entered a joint marketing agreement aimed initially at providing integrated networked computing products for the mechanical computer-aided design marketplace.

Under the agreement, Multiflow will offer its Trace family of minisupercomputers as compute servers for Apollo workstations. Both companies said they will provide personnel for the joint marketing initiative, which includes cooperative selling and mutual sales training.

Joseph Fisher, Multiflow's executive vice-president, said the agreement with Apollo was in response to the need to off-load compute-intensive applications — or portions of applications — from technical workstations to higher performance processors.

The missing piece, he said, had been a way to provide transparent integration between workstations and higher performance minisupercomputers. Apollo's distributed computing environment, called the Network Computing System, "provides a clear methodology to do this," Fisher said.

William Kelly, Apollo's director of market development, said the agreement with Multiflow is part of a continuing effort to compete with IBM and Digital Equipment Corp., which both offer more extensive networking selections.

Interestingly, Apollo has an OEM agreement with Multiflow competitor Alliant Computer Systems Corp. Kelly said the two agreements are not conflicting and Apollo intends to work with both companies in the foreseeable future.

Both Kelly and Fisher said they expect the two companies to jointly explore other technical market segments, although neither would provide specifics.

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EDITORIAL

Finding its niche

The reverence for the company and its principals reaches almost maniacal proportions.

At the blossoming Macworld Expo last week, Apple Computer, Inc. aficionados tailed company executives in search of autographs. These are executives, not Olympic gold medal winners.

And the announcement of the Hypercard was greeted with a standing ovation — much the same style in which the Macintosh was greeted when it was unveiled in Boston three years ago.

There is clearly no other company in the computer business that has inspired and continues to inspire such a rabid following. Most of these Apple lovers inhabit the world of "hackerdom" and still look on the company as a $2 billion garage operation run exclusively by geniuses. But under John Sculley's direction, Apple is unfolding more elements of its corporate strategy, which heretofore had been a niche-penetration strategy.

One development to watch during the coming year will be the relationship between Apple and Digital Equipment Corp. There is great potential in that budding relationship, for, like Apple, DEC has inspired tremendous loyalty, if not outright snobbery, among its technical users.

In the most recent development between DEC and Apple, DEC announced it would cooperate on the development of a data base that runs on both VAXs and Macintoshes, a move heralded by Apple and others as a ringing endorsement of its graphics wunderkind.

Apple is certainly not waiting for others to forge a destiny beyond the home and hacker shop. The company will increase direct sales efforts in an attempt to gain access to what is far and away an IBM (or compatible) world and has hired a former dyed-in-the-wool IBMer to head its U.S. sales and marketing thrust.

All this is not to suggest that Apple is about to take the corporate world by storm. Quite the contrary; its image as a toolmaker for hobbyists and hackers has not scored many successes with the MIS powers that be. It is going to take a much more clearly defined and fully supported marketing strategy on Apple's part to even begin to convince corporate America that Apple is a safe bet. There are just too many people out there who believe in that often-heard quip, "You'll never get fired buying IBM."

However, the tremendous energy and enthusiasm that Apple is generating in the third-party software development community is certain to produce successive generations of products that more fully exploit the inherent genius of the Macintosh. The corporate market is pregnant with potential niches that such technology can exploit. In the role of the outgunned opponent in the corporate world, Apple will clearly follow several niche strategies simultaneously — of which desktop publishing has been the first. Apple may be a garage operation in some respects. But count on its corporate salesmen to be wearing three-piece suits.

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LETTERS TO THE EDITOR

Not quite yet

While in general agreement with C. J. Date's article, "Twelve rules for a distributed data base" [CW, June 8], I strongly disagree with some statements. I believe that certain aspects of site autonomy contradict the "look like a nondistributed data base" rule and therefore do not represent the requirements for a distributed data base. Also, until a standardized interface that covers all aspects of distributed data base management is defined and supported by the various data base management system vendors, distributed data bases will only provide limited data access across heterogeneous DBMSs.

A distributed system should look exactly like a nondistributed system. To this goal, even administrators should see the distributed system as a seamless entity. Thus, the data base administrator should administer the data base as a whole, and the notions of security, integrity and storage management should be controlled by the data base administrator for the whole distributed data base.

Let us look at the issue of local control over storage management. If we allow a user to fragment a table across sites, who controls the storage for that table? What if a table needs to be replicated? In an ideal distributed data base, the system would decide on which site the data should be located, whether it should be fragmented, how many fragments should exist, whether a fragment should be migrated, etc. In fact, it would do so dynamically, based on data base activity. Even today, data base systems build indexes dynamically, if it is more efficient to do so.

In a distributed system, should there be local control over security? Authorization should be based on the data, rather than on its location. A user who has the authority to access data should be able to do so regardless of the location of the user to the data. In fact, that is what location transparency is all about.

Integrity of the data base also needs to be managed as a whole. In fact, it becomes all the more important in the case of a distributed data base.

I agree that sites should not be dependent on other sites to perform operations that could be performed locally. A data base should be as available as possible. If one disk is not available, a nondistributed data base should still function as well as possible. Similarly, if one site is not available, a distributed data base should still function as well as possible. It is the degree of functionality that is lost when parts of a system that need to be examined are unavailable.

The notion of local ownership and local management of data in a distributed data base is contradictory to the "look like a nondistributed data base" philosophy and is of little use. And until a standardized interface that is semantically rich enough for a distributed data base administration is defined and supported by various DBMS vendors, distributed data bases across heterogeneous DBMSs will not be really distributed.

Yogesh Gupta
San Jose, Calif.

This week in history

Aug. 15, 1977
IBM's Systems Network Architecture (SNA) cannot survive beyond the next few years, says Network Analysis Corp. President Howard Frank. Unless SNA capabilities are upgraded, it will be "the most archaic architecture around," and IBM's plan for it becoming the architecture of the 1980s is "virtually impossible," he adds.

Aug. 16, 1982
Researchers at the University of Illinois are working on an opto-electronic chip that could revolutionize the way processors are built. The chip will be about 10 times faster than those based on conventional silicon technology and offer potentially higher packing densities.

People problem

In "Computer insecurity" [CW, Aug. 3], Jack Bologna stated that the Equity Funding case was not detectable by normal audit methods.

That is incorrect. Account verifications had long been practiced for both accounts receivable and payable. The problem was that this was not normal practice for insurance policies. Now it is. Even at that time, the audits by insurance commissioners should have caught the fraud. The problem was that people were not using the techniques available rather than a lack of adequate techniques.

Theodore Willoughby
Professor of Management Information Systems
Indiana University Northwest
Gary, Ind.

Mind over muscle not always best tack

JOHN BARNES

"Work smarter, not harder" is very nearly the motto of the whole information processing industry. From us, it has spread out through the business world, and, until now, it is practically unchallenged as advice. Young people should do it to get ahead, old people to stay on top. Ambitious people should do it to get more done, workaholics so they can take more time off.

But for every proverb, as Philip Wylie pointed out, there's a converb. Many hands make light work, but too many cooks spoil the broth, for example. So — without throwing the baby out with the bathwater (but remembering that we might as well be hung for a sheep as a lamb) — here are a few cautionary notes, cases in which it makes more sense to "work hard" than to "work smart."

On a one-time job that's within existing capabilities. Be careful here, of course — a lot of great software has come from realizing that "everyone else has to do this by hand every month, too." But if the job is truly a one-time application — and would take only half a day to do by hand — then get away from that keyboard and get it done.

When everyone else is already working smart. If there is a single best way to accomplish a task, and you're using it, you can't beat your competition any way but by working harder. If you are making a state-of-the-art product — and so is everyone else, for about the same price — the only thing that will make the difference is more aggressive marketing and having your sales reps knock on more doors.

Similarly, if you are competing for a promotion, and your job is mostly carrying out other people's plans, whoever is in charge of design mainly needs fast turnaround and few errors. You get that by sitting down and getting it done and by being thorough about checking your work.

When the possible gains to working harder are larger. You can look this point up in your college microeconomics text under "marginal gains to efficiency." The idea is simple: If what you're turning out is falling in value and large blocks of time must be devoted to small gains in efficiency, you may well be better off working more intensively with existing technology.

For example, a technically mature product facing a saturated market will only move through heavy selling. In the same way, if the boss needs an answer and you can get one by brute force (at an acceptable cost) while other people are working for elegance — who gets the credit?

When you're close to a big success from working smart. This case is more important than all the others put together. The most brilliant stroke in the world won't pay off without an immediate follow-up — and the bigger the follow-up, the bigger the payoff.

Pearl Harbor was brilliant tactically — except that in the Japanese armed forces in 1941, there were no landing craft to follow up with. The carriers turned around and headed home.

If you've been in the computer industry five years, you can probably name 10 products that were the first of their kind and cannot be found on the market now. A big coup doesn't translate into success automatically. If you are working on it, chances are 20 other people have similar ideas. Furthermore, the day it is announced, 200 people will see ways your idea could be bettered, and they'll put 2,000 people to work on it. Meanwhile, two million will decide to wait for a later version with more features and fewer bugs. Your product dies, and somebody with a name like Macrohard or Incredibly Big Manufacturer picks up the pieces.

Unless you're ready to work hard. If you're as close to zero bugs as you can get, if you've got enough cash squeezed out of other operations to finance a big marketing drive, if you try to get the biggest share of the potential market you can possibly get before anyone else can get on the field, then the competition will simply be too late, and another giant is born. If you propose a project that management goes for, remember that the charm of new ideas lasts about one-tenth as long as the average popular song, in the absence of payoff. Once you've sold management on your idea, your troubles really start — something big had better happen soon.

Recently I talked to a friend who had returned from a yearlong study of Japanese management techniques. He was not as impressed by what Japanese managers did as by how much they did. "Their big secret is that they have no secret," he said. "Anybody could be smart working that hard, that long."

Barnes is the Pacific Northwest area manager for ADG, a high-tech marketing organization based in San Pedro, Calif. His first novel, *The Man Who Pulled Down the Sky*, was recently published by Congdon & Weed.

Faster than a speeding molecule

Superconductors are the darling of science world despite practical limits

HARVEY NEWQUIST

Which of the following words does not belong in this group: Superman, superhero, supercharged, supercomputer, superfluous, supernatural, superimpose or superconductivity? If you picked Superman because he's not real, you're wrong. He's more real right now than superconductivity.

Perhaps you have read that superconductivity is going to change your life more than any scientific discovery since that the world is round. You've seen superconductivity splashed on the covers of business and technical journals. You've even seen it in *USA Today*. About the only place you haven't seen superconductivity is in a commercial product — and you won't, unless you can hold your breath for a very, very long time. Superconductivity refers to a technology that allows for efficient electrical conduction at temperatures that do not have to be cold enough to freeze the toes off the abominable snowman. Depending on what the electricity is passing through, it moves fairly rapidly or fairly sluggishly.

Dead in their tracks

Conductivity relates to how active the molecules in a specific material are. One of the best ways to stop molecules from stepping in front of a high-speed electrical current is to freeze them dead in their tracks.

Doing so is not as simple as dropping the temperature of the material to freezing as we know it — 32 degrees Fahrenheit or 0 Centigrade — because most molecules are still running rampant at that temperature. So we get into a realm of temperatures known as Kelvin. The Kelvin scale is based on the temperature at which all energy, activity and general random movement in molecules stops. Absolute Kelvin is the point at which all energy has been removed from a material. The exact temperature is equivalent to -273.15 C, which means that you really can't try this at home in your own freezer, which probably gets no colder than 26 F.

Once you slow down all molecular movement, electricity can race through a material about as freely as it pleases. There is one drawback: It is sort of tough to sell these great conducting materials as products when they have to be continually cooled at temperatures that would cause hell to freeze over.

But enter 1987 and the age of superconducting. Since March, hardly a week has gone by that someone has not heralded a new temperature breakthrough for superconductive materials. And though these breakthroughs have potential applications in everything from electromagnetically propelled trains to more efficient energy, the big advantage could be the use of superconductors in computers.

One of the major obstacles to faster computers is simply how fast electrical signals can be pumped through the machine itself. The faster it goes, however, the hotter it gets. It is this fact of science that has caused companies like Cray Research, Inc. to immerse their machines in various liquid baths of such chilled substances as Freon and nitrogen. Cooling the actual material helps the electricity to move without causing the computer to melt into large puddles of liquid silica.

CHRISTOPHER KING

Now think about using superconducting materials in such a situation. Electricity moves more freely in a less chilled environment, making the entire operating process more efficient and less reliant on applied cooling techniques.

Easy enough, right? Wrong. Many of the advancements in superconductive materials have been done with ceramics, which are notably nonmalleable and tend to be very brittle at temperatures currently associated with superconductivity — approximately 77 K to 95 K. And when you're dealing with something that is fairly brittle, you're not able to pump too much electricity through it or shape it the way you want without the danger of it crumbling. It is not as though you can replace semiconductors or the 3-foot-thick power coils at Hoover Dam with this stuff overnight.

Much of the work going on in superconducting is at MIT, Bell Labs and IBM. IBM can be credited with starting "superconductivity fever" with a series of well-timed press releases a few months ago. IBM has even been touting its ability to take superconducting material in the form of a plasma and spray it onto existing material to increase conductivity. But this spray does not occur in the same way as having your car cheaply spray-painted for $99. Until this summer, IBM's "spray" consisted of depositing superconducting plasma onto other materials *one atom at a time*. The company's researchers claim that they can now spray superconductors onto materials in particle sizes (you still can't see them without a microscope), which makes the whole process a lot faster. If I were thinking about improving the efficiency of the local utility company, or even a computer product line, applying molecular-size superconductors to an entire system would not be my idea of an increase in power and productivity.

MIT, on the other hand, is developing superconducting oxides out of rapidly cooled metals such as barium, copper and europium. These materials will conduct at the top of the scale, around 90 K. But think about it for a moment: This is still not a room-temperature operating environment. It's doubtful that you can go into a corporate DP center and expect to get this kind of incredible performance in electrical equipment without wearing a parka and mukluk boots.

So in terms of practical use, superconductivity is at least five years away — if even then.

Newquist writes and consults on artificial intelligence and other advanced high-technology topics from his office in Scottsdale, Ariz.

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SOFT TALK

John R. Vacca

MVS facing turf war?

IBM's MVS and its 6-year-old successor, MVS/XA, dominate the high end of information processing like no other operating systems in the 41-year history of commercial computing. Because of IBM's dominance in mainframes, billions of dollars worth of software has been written that is intimately tied to MVS.

Despite this seeming invincibility, there have been recent developments that might affect MVS's dominance in the next few years. Some IBM customers believe the MVS operating system will face competition from alternative operating systems. The one blip on the MVS horizon — so distant as to be barely discernable — is the rise of the specialty mainframe operating systems.

No one seriously expects any third-party vendor to go head to head with IBM in the operating system market. It has been difficult enough for Amdahl Corp. and National Advanced Systems Corp. (NAS) to survive as purveyors of IBM-compatible hardware. They get by because their machines run IBM object code; today's Amdahl or NAS user knows he can return to IBM tomorrow without being disrupted.

Continued on page 22

Users say Pacbase worth effort

BY ALAN ALPER
CW STAFF

PEARL RIVER, N.Y. — Three users of Pacbase, an application generator developed 15 years ago by CGI-Informatique in Paris, are finding that the system saves development time and maintenance costs, even if it is somewhat difficult to learn.

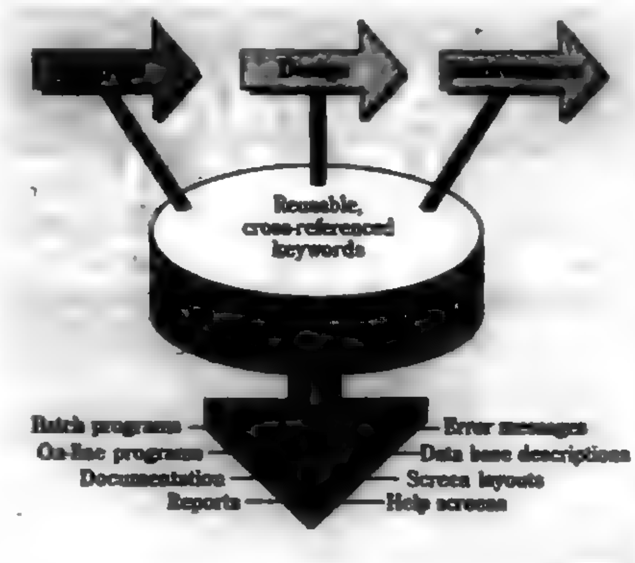
Marketed in the U.S. by CGI Systems, Inc., located here, the system is based on the Merise methodology, a structured programming technique popular in France. The system runs on IBM mainframes under DOS, DOS/VSE and MVS as well as on Honeywell, Inc. and Unisys Corp. large-scale systems. It supports most teleprocessing monitors and data base management systems, including IBM's DB2.

Pacbase is installed at 500 sites worldwide, including 90 in the U.S., the company notes. CGI has stepped up its U.S. presence, and its U.S. revenue is expected to exceed revenue derived from other countries this year for the first time. Worldwide revenue was $77 million last year, CGI says.

Pacbase has evolved from an

Continued on page 23

Pacbase
Development methodology



INFORMATION PROVIDED BY CGI SYSTEMS, INC.
CW CHART

Abend-Aid roots out abnormal ends

Compuware targets analysis, bug diagnostic tool at DB2 users

BIRMINGHAM, Mich. — Compuware Corp. announced last week enhanced functionality in Release 5.2 of Abend-Aid, its 10-year-old analysis and debugging product, and a new product, Abend-Aid for IBM's DB2.

Abend-Aid analyzes the cause of abnormal ends to running applications and tells a programmer what happened and where as well as providing supporting data, Compuware spokesmen said.

Release 5.2 provides diagnostic information that is specific to the language in use, including Cobol, PL/I, Fortran and assembler.

The "Next Sequential Instruction" displayed in earlier releases of Abend-Aid showed the initial statement leading to the error, which was "not necessarily the exact statement in error," Compuware spokesmen said. In Release 5.2, the statement containing the error is displayed, they said.

Continued on page 23

Spreadsheet, VAX data base see 20/20

BY CHARLES BABCOCK
CW STAFF

NATICK, Mass. — A bridge designed to link Access Technology, Inc.'s 20/20 spreadsheet users and Digital Equipment Corp. VAX data bases will be made available at the end of this month, according to Access spokesmen.

Access unveiled its 20/20 Database Connection at its annual users group meeting in Boston last week. The Database Connection works in conjunction with DEC's Datatrieve interface and DBMS data base management system and DEC's RDB relational DBMS and RMS file management system, according to Access Vice-President Carl F. Nelson.

The product was designed to move data into the spreadsheet without laborious data entry and to assist a spreadsheet user in formulating a query against the data base without specific knowledge of the data access lan-

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Inside

- Oracle to launch QMF-compatible query and report writer. Page 24.
- Adesse adopts graduated pricing structure for its VM system software. Page 24.
- Hawkeye program bird-dogs RPG source code on System/38. Page 25.

[illegible]

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MVS fight

FROM PAGE 21

"Virtually no MIS manager would bet his job on the proposition that someone could keep perfect pace with IBM's software," says Mike Kurka, systems analyst for Caterpillar, Inc.

That doesn't preclude niche competition, however, especially if IBM continues to raise its software prices. When IBM's price for MVS/XA or its successors becomes high enough to support someone else's research, development and marketing, someone else will undertake those tasks.

Several software houses are already calculating that price point and plotting preliminary strategies. In addition, Amdahl continues to work on its super-secret MVS-like Aspen operating system, which is widely believed to be a good development, if not a production, system.

Development under way

The only visible effort on this front is Key Logic, Inc., a Cupertino, Calif.-based start-up that has publicly acknowledged it is working on a transaction processing operating system for IBM mainframes.

Early benchmarks show that Key Logic's operating system supports as many as 500 transaction/sec. According to figures supplied by the Gartner Group, Inc. in Stamford, Conn., Tandem Computers, Inc. offers about 250 transaction/sec. and Stratus Computer, Inc. about 50; IBM's CICS peaks at 70 transaction/sec.

West Coast analysts predict that Key Logic will give IBM competition in the transaction processing market, but not everyone agrees. Other analysts say that the big problem is vendor viability. In short, users want to know how long Key Logic will be around. But users should note that the same concern was expressed about Tandem in 1974 and Stratus in 1980.

Will MVS dominate?

It appears, for now, that MVS will continue to remain the dominant operating system well into the 21st century. "However," says Fred Hill, principal systems programmer for Rohm & Haas Co. in Philadelphia, "it's all going to depend on IBM's continuing trend toward higher prices for MVS."

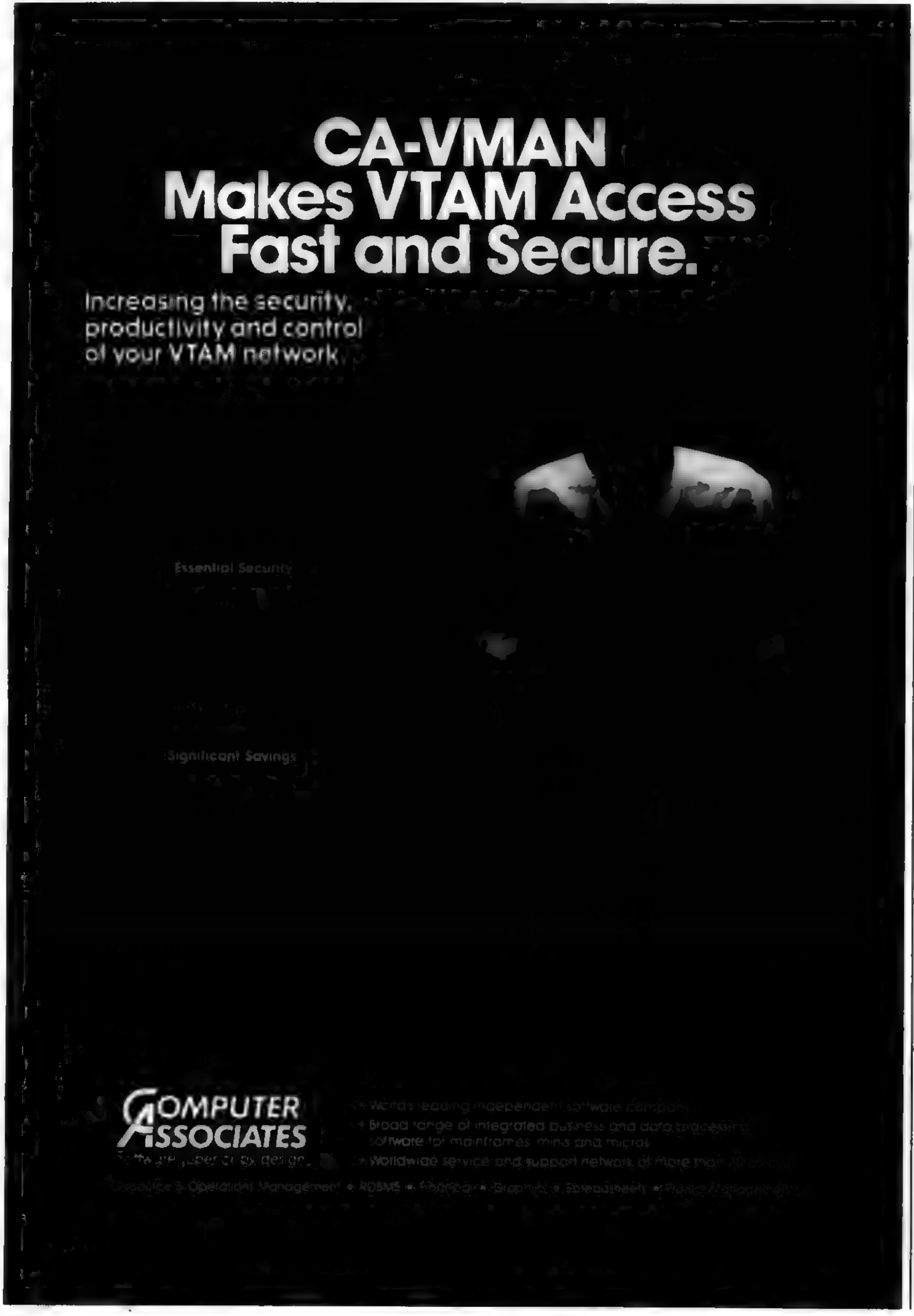
In most cases, IBM offers higher functionality in exchange for higher price. Ed Webb, senior systems programmer at Tangram Systems Corp. in Cary, N.C., says, "the definition of functionality may be about to change. In the past, the term meant software features, such as the extended addressing and support for new peripherals that differentiate MVS/XA from the less expensive MVS."

Based on previous IBM pricing actions at the low end of the 370 line, graduated pricing, along with functional changes, might push the cost of MVS/XA and its successors up from 11% of a customer's three-year operating costs to as much as 39% over a period of years.

Whatever the effective price increase turns out to be — and the question is not whether but how much — it is clear that relatively higher MVS prices are on the way. If this is the case, then IBM will face stiff competition from its competitors and be in danger of watching MVS's position erode.

Analysts are unanimous in their estimate that IBM will strive to make more of its profits from software than hardware in the future. Only time will tell whether operating systems can remain one of the few software arenas in which IBM will face no effective competition.

Vacca is a free-lance technical data processing and air and space contract writer based in Topeka, Kan.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Pacbase

CONTINUED FROM PAGE 21

application generator to encompass a wide variety of life cycle development functions, spokesmen said. Developers using Pacbase create data specifications, which are stored in a central repository — or data dictionary — to generate Cobol programs, screen maps, data descriptions, documentation and reports.

Maintenance efforts are reduced because of Pacbase's active data dictionary, users report. Changes to the specifications within the data dictionary enable Pacbase to regenerate affected programs and update documentation and on-line Help messages.

The company is positioning Pacbase as a life cycle computer-aided software engineering (CASE) tool. "Generating full applications requires defining file data base blocks, accessing tables, creating error message files, Help facilities, user manuals and associated documentation," says Michael Blechar, director of product technology.

Ed Ackley, an analyst with International Data Corp. in Framingham, Mass., does not dispute Pacbase's utility, but says it does not fit under the ever-broadening CASE tool definition. "Pacbase is a fairly powerful product for code generation, but it is no 'soup-to-nuts' product," he says.

"That's something vendors would like users to believe, but I don't see it happening," he adds.

Credited with club's success

The Signature Group, a subsidiary of Montgomery Ward & Co. in Schaumberg, Ill., adopted Pacbase three years ago after deciding to expand its presence in the automotive and credit card club business. A more advanced club processing system was needed and the firm could not afford to wait the 30 man-years it would have taken using conventional Cobol programming methods.

"Management told us that we needed a strategic tool to build this system faster," recalls Bill Herwig, director of club marketing systems. "They told us to locate a tool that was cost-justified so we could chop off development time."

The company chose Pacbase, after making an initial decision to use Pansophic Systems, Inc.'s application generator Telon, primarily because of its built-in active data dictionary, Herwig says. "That was Reasons One through 10," he says.

Signature used Pacbase for detail design of its systems and code generation. Herwig says Pacbase was difficult for both neophytes and veteran Cobol programmers to learn initially, but eventually, most of his staff became comfortable with Pacbase procedures and command structure, he says.

"The first on-line, or batch, program was difficult, but after four or five programs all of my people loved it," Herwig remarks. After ascending the learning curve, Herwig estimates it takes programmers approximately one-fourth as long to write an on-line program with Pacbase as it does with Cobol.

General design of the credit club's system was completed in about one year. The system contains 161 on-line programs and 186 batch programs. The data dictionary contains 2,175 data elements, Herwig notes.

The system is stable, Herwig says, and has never transmitted any data exceptions. "Level of service is 97%," he says. "All on-line and batch reports are delivered on time."

> "PACBASE IS A FAIRLY powerful product for code generation, but it is no 'soup-to-nuts' product."
>
> ED ACKLEY
> INTERNATIONAL DATA CORP.

The new methodology is working so well that Herwig has been able to reduce his in-house staff from 24 to 14. Only three staffers are devoted to maintenance; the others are working on new development, he points out.

Because of its increased capacity, Signature now does the processing for a variety of clubs managed by the Bankamerica Corp., Citicorp and The Chase Manhattan Bank NA. "We are accomplishing our goals," Herwig says.

Decreased maintenance time and costs were the primary reasons another user, Paul Revere Life Insurance Co., a Textron, Inc. subsidiary in Worcester, Mass., bought Pacbase in June 1986. At the time, the company was looking for an integrated development tool to remedy a major business problem — providing more efficient delivery of information to its employees and customers.

"Corporate gave us carte blanche to do what we wanted," notes Mark Saviate, director for systems development.

Paul Revere studied a variety of CASE tools but chose Pacbase because of its superior maintenance capabilities. "If the objective was to get a system developed faster, we probably wouldn't have picked it," Saviate says. "A lot of what we wanted to do was to take the existing system and change its specifications."

Paul Revere has a 10-year plan to migrate all existing applications to Pacbase, Saviate says. In adopting Pacbase, Saviate estimates that the firm would receive substantial cost savings. The product, he estimates, will pay for itself in slightly less than six years and will provide Paul Revere with a 41% return on its investment in later years.

Subsequent to the decision to use Pacbase, Paul Revere also opted for DB2 as its DBMS.

Adopting the technologies concurrently, while risky, is the only way to ensure consistency between the DB2 catalog and Pacbase dictionary.

"Our position was that either you wait for the train to stop or get on here," he says. "Our situation was not good, so we decided to take a chance and get on now."

The company has also recently begun to develop a new field agent compensation system using Pacbase to do all design and analytical work as well as code generation, Saviate says.

Irving Trust Co. in New York recently completed three major applications using Pacbase for the development of a customer information system. At first, Irving thought it would use Pacbase on a limited basis in combination with traditional Cobol programming but soon found that programmers forgot the methodology.

"We found that we had better success when using Pacbase for the entire program," notes Edward Lipson, an assistant vice-president and Pacbase team leader at the bank.

When Irving first started using Pacbase in 1984, it took programmers almost six months to get familiar with it, Lipson says, noting that the translation of French documentation into English was less than satisfactory. With better documentation and CGI's U.S. consultants, "it now takes anywhere from four to eight weeks for people to get comfortable with it," he says. "When you're talking about up to 83 screens in an environment, some with very subtle differences, you can understand why," he adds.

The payoff

Although the firm lost six months in its schedule to teach programmers how to use Pacbase, it regained enough time using Pacbase to deliver an IMS application only one month behind schedule, Lipson says.

Another application that runs under CICS has processed 170,000 transactions a day since February. "We've experienced only one CICS storage violation in that time," Lipson notes.

Like Paul Revere, Irving cost-justified Pacbase on how much time and money would be saved on maintenance. The Pacbase team has reduced its support staff from the mid-teens to four, Lipson says.

Meanwhile, Lipson admits he did have some problems getting his programmers to adopt Pacbase's methodology. "It's a rigid structure; you just can't put things where you want. You have to put them where they fit in the structure," he says.

Abend-Aid

CONTINUED FROM PAGE 21

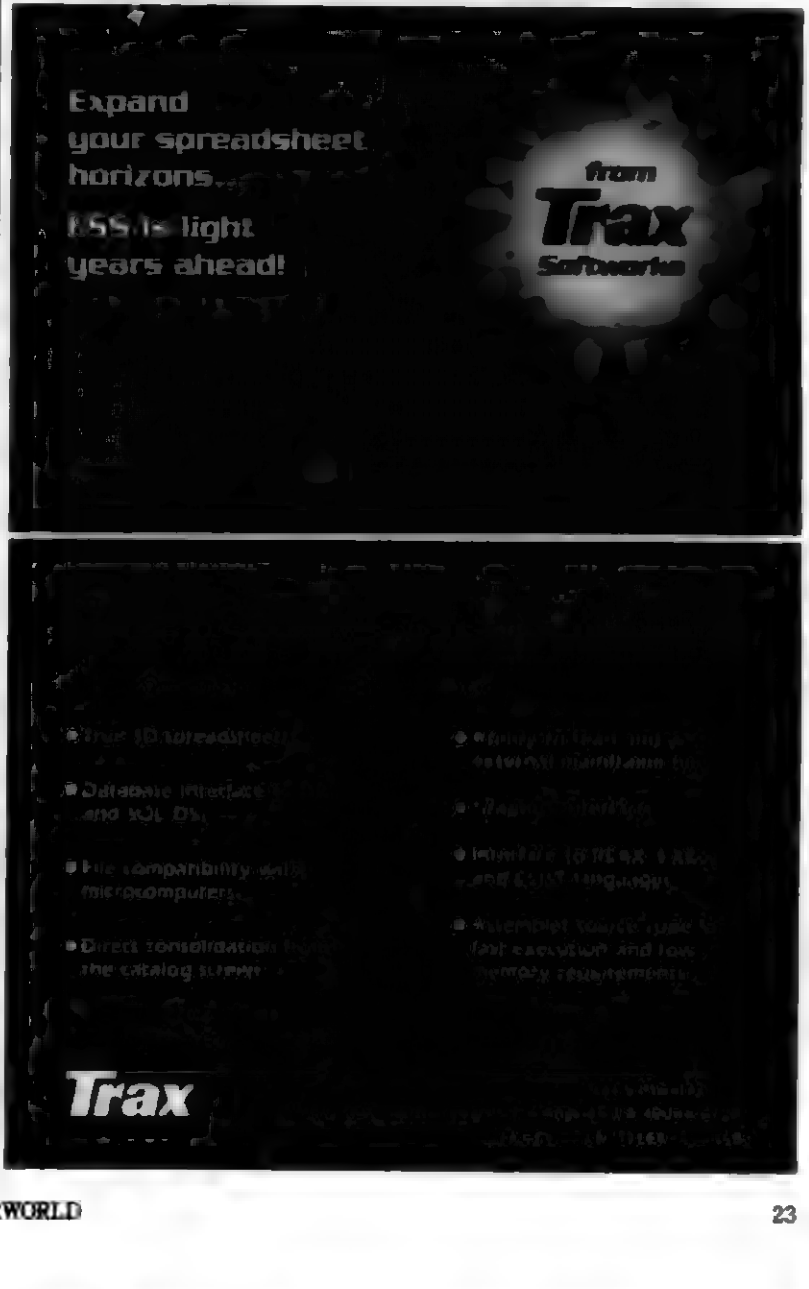
Release 5.2 is available immediately for $12,100 on the IBM 4361 and $30,100 on the IBM 3090 Model 400.

Abend-Aid for DB2 provides a diagnostic section for failed SQL statements, identifying the cause of error and suggesting courses of action. It also presents the SQL statement in error, the spokesmen said.

The product summarizes information on DB2 needed to resolve abnormal end problems in reports that are usually limited to two or three pages, minimizing the need for tedious dump searches, the spokesmen said.

Abend-Aid for DB2 is available immediately for $5,000 on the IBM 4361 and $10,500 on the 3090. After Sept. 30, the prices will increase to $6,500 and $14,000, respectively.

About 3,500 copies of Abend-Aid for IBM's OS/MVS operating systems have been licensed since the product was introduced in 1977, company officials said.



Oracle prepares contender to IBM's QMF

BELMONT, Calif. — Oracle Corp. recently said it would make available in the fourth quarter a query and report writer tool that is compatible with IBM's Query Management Facility (QMF).

IBM's QMF includes Query-by-Example and IBM's SQL data access language for use with DB2, its MVS mainframe relational data base management system.

Oracle's SQL-QMX was designed to work with the Oracle relational DBMS. Currently at beta-test sites, the product will be offered for the IBM MVS and VM operating systems, the Digital Equipment Corp. VAX and Microvax systems and IBM PC-DOS systems. It will also be offered for Intel Corp. 80286- and 80386-based microcomputers compatible with IBM systems.

'Path of least resistance'

"We are trying to find the path of least resistance for those users familiar with QMF," a company spokesman said.

SQL-QMX is said to provide additional features beyond the IBM offering, such as improved error checking and the ability to abbreviate commands; typing Sel instead of Select, for example.

It includes a Query-by-Example function that allows a user unfamiliar with SQL to invoke commands by responding to graphical depictions of commands, which are then automatically translated into SQL, the company said.

Oracle currently offers other tools to query its data base and generate reports, such as SQL-Forms and SQL-Plus, but they are not compatible with IBM's QMF, the company added.

Prices for IBM mainframes range from $7,200 for low-end processors to $32,400 for high-end systems.

A license for DEC hardware ranges from $1,800 for a Microvax to $28,800 for a high-end VAX 8978, a Vaxcluster arrangement with eight 8700s. An IBM Personal Computer license is $395.

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Adesse cuts VM software prices

DANBURY, Conn. — Adesse Corp. last week announced restructured pricing of its System Resource Management (SRM) software for the IBM VM operating system. The pricing corresponds with IBM's graduated pricing scheme.

Adesse's price change is similar to moves made in the last year by other VM system software vendors, such as VM Software, Inc. and VM Systems Group, Inc.

SRM, which had been priced at $60,000, now starts at $15,000 for a low-end processor, such as the IBM 9370 Model 20.

The software is used to allocate system resources. Those resources may be a particular program for a user or a guest operating system, such as MVS.

Adesse said it changed the SRM pricing because it wants to target the product at 9370 users and the $60,000 price tag was too high for a departmental system.

When IBM lowered its software pricing for smaller processors late last year, it left many software vendors with overpriced software for the low-end hardware.

Without the price change in Adesse's case, for instance, it would have been selling a $60,000 product to low-end users who had paid as little as $28,200 for the one-time charge on the VM/IS Release 5 operating system.

Spreadsheet

CONTINUED FROM PAGE 21

guage. Working from a 20/20 spreadsheet, a user accesses the Database Connection from the Tools option on the spreadsheet command heading. Through the use of menu selections and prompts, the user builds a data base query with spreadsheet-style commands.

"We tried to maintain the spreadsheet metaphor as much as posible . . . It provides a much higher level of hand-holding than Datatrieve," Nelson said.

The product provides three choices in building a query, depending on the form of output desired and the user's knowledge of the data base query language. It enables either detailed or summarized data to be retrieved for selected records and fields.

"It sets up a spreadsheet based on the type of data coming in. All the formatting is done for you," Nelson said.

The user can view available data base files and fields through a window while still in the 20/20 spreadsheet.

The Database Connection is being offered as an add-on to 20/20 and is priced at 40% of the spreadsheet price, which depends on processor sise, said Jay B. Yesselman, 20/20 product manager.

20/20 sells for $12,500 on the VAX 8800, with the Database Connection priced at $5,000. 20/20 sells for $2,800 on the Microvax. The Database Connection is priced at $1,200.

Yesselman said the bridge was the most frequently requested enhancement at the firm's annual users group meeting last year, and was not on Access Technology's development priority list at that time.

NEW PRODUCTS

Systems software

A process-management software system that runs on Digital Equipment Corp. VAX computers has been announced by **Weyerhaeuser Information Systems.**

Prosmart is said to incorporate a data base with modeling, graphics and trend software tools. It provides validated real-time data for process monitoring, planning, scheduling and analysis; cost data; and lab data for quality tracking. According to the vendor, Prosmart can also provide financial data.

Other features include the ability to display four windows simultaneously and to simulate processes and show the results of modifying individual variables in the process.

Prosmart is priced from $100,000 to $200,000.

Weyerhaeuser Information Systems, Tacoma, Wash. 98477.

A decision-support software system designed for users of IBM System/36 and 38 computers has been announced by **System Software Associates, Inc.**

The BPCS Decision Support System was designed as an integrated part of the vendor's Business Planning and Control System (BPCS) but can also be operated independently, the vendor said.

The system features a business modeling module that integrates with the System/36 and 38's data base files. Users can access System/38 data base information from up to 15 files at once and output the information in reports, on-line graphs or file interfaces.

The system is priced from $15,000 to $20,000.

System Software Associates, 200 W. Madison St., Chicago, Ill. 60606.

Applications packages

Tesseract Corp. has added the **Investment Plan Management** software to its Benefit Plan Administration System.

The software is an on-line, real-time system that integrates with the vendor's Personnel Management System to avoid the redundant storage of such employee data as name, birth date, address, Social Security number and status.

Investment Plan Management contains two data base segments: Enrollment/Allocation and Transaction for processing fund elections and transaction activities, tracking contributions and withdrawals and fund transfers.

The Investment Plan Management software system costs from $100,000.

Tesseract, P.O. Box 7658, 150 Spear St., San Francisco, Calif., 94120.

Software for editing large-format, high-resolution raster images on Sun Microsystems, Inc.'s Sun 3, Apollo Computer, Inc.'s Domain or IBM Personal Computer workstations has been announced by **Ana Tech Corp.**

The **Raster Edit** package edits any size document up to 60 in. wide by roll length at resolutions from 1 to 1,600 line/in. Edited raster data can be stored in the existing edited format, converted to compaction formats or converted to vector format for further editing.

Raster Edit features such capabilities as scaling and rotating of objects, cut and paste, ASCII text placement, pan and zoom, flyspeck removal and hole fill, polygon fill or erase, addition of polylines, arcs, circles and ellipses and extracting or merging of several files.

Raster Edit is priced from $750 per workstation.

Ana Tech, 10499 Bradford Road, Littleton, Colo. 80127.

Utilities

Softran Corp. has announced **C-Tran** and **C-Run**, tools for porting application software written in Cadol II, the operating system and programming language of Contel Computer Systems Corp.'s Cado computers, to systems running variations of AT&T's Unix System V operating system.

C-Tran is a software translation program written in C that accepts Cadol II source code input and generates C source code output. C-Run is a runtime library of C programs that performs the data base management and terminal handling functions of Cadol.

According to the vendor, the translated programs are executed, not interpreted.

Per CPU, C-Tran costs $4,000; C-Run costs from $750 to $1,500.

Softran, One Naperville Plaza, Naperville, Ill. 60540.

Services

A program to retrieve RPG source code from compiled objects on the IBM System/38 has been announced by **Hawkeye Information Systems.**

The program, **Golden Retriever,** produces RPG II and RPG III source code, including statement numbers, field and file names, variables and constants. The retrieving process utilizes a System/38 assembler program to analyse the object's symbol tables.

The service costs 50 cents per line of code restored, with a minimum of $500.

Hawkeye Information Systems, Bloomfield Industrial Park, 13139 Bloomfield St., Sherman Oaks, Calif. 91423.

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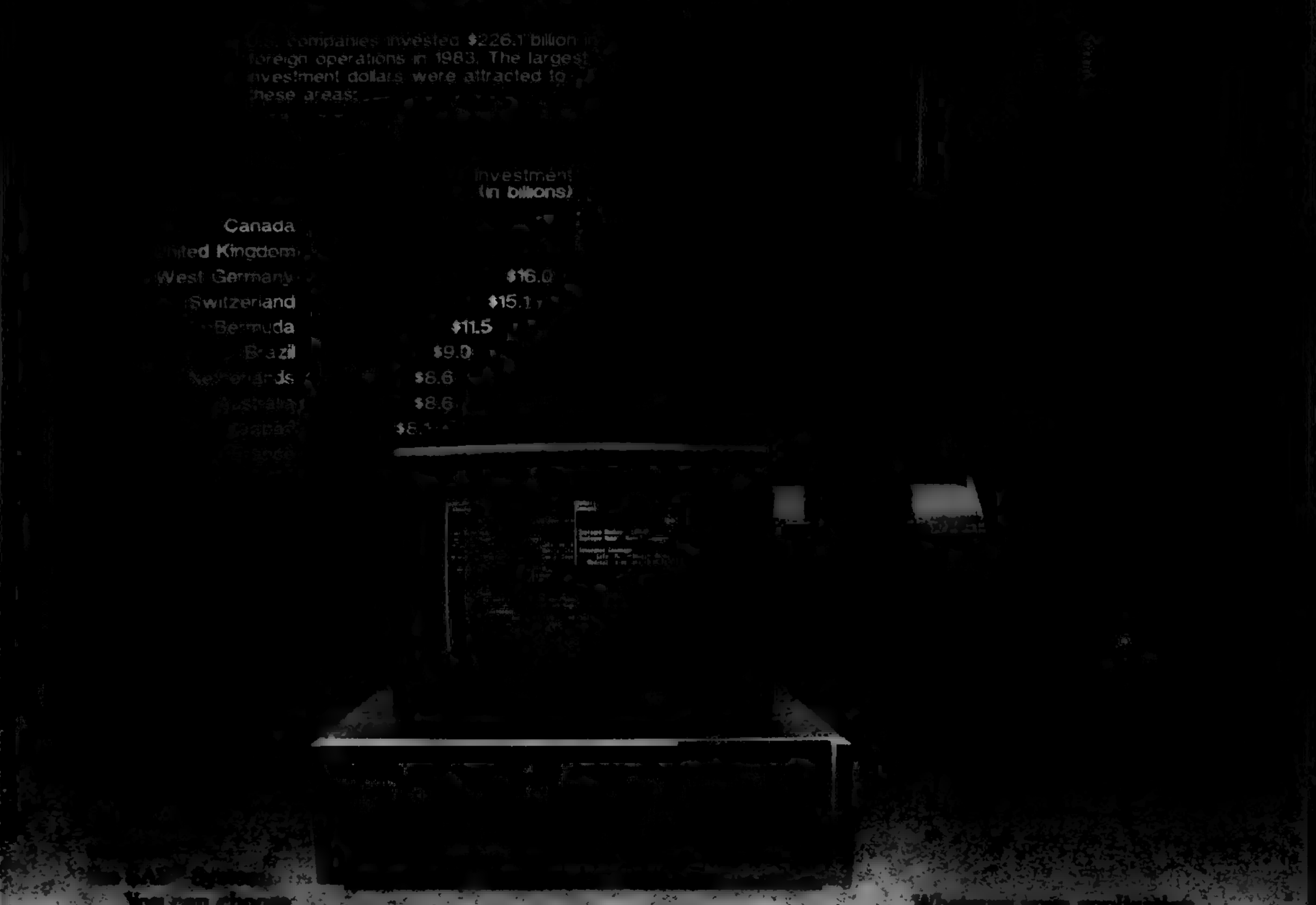

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MICROCOMPUTING

SMALL TALK

William Zachmann

Underware's handy Brief

A friend from Microsoft Corp. was recently showing me a prerelease version of a product his company will introduce this fall. We put it up on a micro in my office. Since it was my system, I was at the keyboard installing the program.

At one point, we needed to modify my CONFIG.SYS file. I started to use the EDLIN editor that comes with Microsoft's MS-DOS. My friend was astonished. "You mean you use EDLIN on text files?" he asked.

"Yes," I replied sheepishly. "Why, what should I use?"

I was, of course, intimidated by the question. I could tell from the way he said it that there must be a better way. But what? After all, didn't Microsoft write EDLIN and package it with MS-DOS in the first place? Maybe he thought I ought to be using Microsoft Word. Or was there a nifty new Microsoft text editor I'd somehow not heard about?

"Well," he replied, "nearly everybody I know uses Brief. You must have heard of it."

Brief? "Er . . . ah . . . no," I

Continued on page 35

DOS comes to the Mac

Boards, software bridge gap — at a price

BY JULIE PITTA
CW STAFF

Breaking IBM's tight grip on the corporate market has proven to be an uphill battle for Apple Computer, Inc. However, soon-to-be-available devices allowing Apple's Macintosh to run IBM's PC-DOS and Microsoft Corp.'s MS-DOS should aid in removing one barrier between Apple and the corporate user.

AST Research, Inc., a third-party developer, is scheduled to ship this fall two products allowing the Macintosh to run PC- and MS-DOS. Slated for shipment next month, the Mac 286 is an MS-DOS coprocessor priced at $1,595 and was designed for use with the Macintosh II.

Following that product will be the Mac 86, priced at $599, an Intel Corp. 8086-based coprocessor scheduled for shipment in November. The Mac 86 was designed for use with the Macintosh SE.

Both boards require Apple's external 5¼-in. floppy disk drive, priced at an additional $399.

Another third-party developer, Insignia Solutions, Inc., will reportedly offer software bridging the gap between the Macintosh and PC- and MS-DOS worlds. The San Francisco-based start-up is set to introduce its first product, Soft PC, a software package allowing the Macintosh II to run MS-DOS,

Continued on page 34

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CW CHART

Users' rep ranks PC vendors, decries Lotus copy protection

At 5,200 members strong, the Capital PC User Group, Inc., located near Washington, D.C., is a powerful entity that, at times, helps shape the industry it watches so closely. The all-volunteer, nonprofit educational and support organization for users of IBM Personal Computers and compatibles holds monthly meetings and publishes a monthly newsletter.

On Sept. 9-10, the group will sponsor its first educational forum for users in the Washington area — The Capital Microcomputer Users' Forum.

Jerry Schneider, president of the Bethesda, Md.-based group, recently discussed his favorite companies in the industry, his fight against copy protection and more with *Computerworld* staff writer Alan J. Ryan.

Jerry Schneider

What software vendor companies are the easiest to get along with?
Microsoft Corp. has to be fairly high on my list. I've found they are very accessible and very understanding. They're one of the better companies out there in terms of product upgrades in both the cost and the timeliness.

Any others?
The worst is IBM. IBM, when it comes to software, you can kiss good-bye. I wouldn't buy any IBM software. They have no software support whatsoever. Computer Associates International, Inc., which has Supercalc, is also a very good company to deal with. In many cases, Borland International, Inc. is, too.

What about hardware companies?
As far as video boards, the Video-7, Inc. people have always been superb to deal with. I've known of a number of cases where someone has purchased a product, and they came out with an upgrade. The person called them and they went ahead and sent the upgrade even though they had no obligation to.

Compaq Computer Corp. is another company that is good to do business with. A good exam-

Continued on page 35

- [illegible] Page 32.
- The System Encyclopedia [illegible] Page 34.
- [illegible] Page 33.

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Autodesk targets mechanical design

Package helps engineers lay out buildings' internal systems

SAUSALITO, Calif. — Autodesk, Inc., a leading supplier of computer-aided design (CAD) software, recently released a $500 package intended to help mechanical engineers lay out the inner workings of a building — from the design of heating systems to the placement of fire alarms.

Autocad AEC Mechanical features a template that speeds up mechanical design by automatically laying out a variety of building equipment, including ventilation and air-conditioning units; pipes and air ducts; and control and metering devices.

The template speaks the same language as mechanical engineers by using a series of icons that are standards in the engineering industry, according to Autodesk.

Runs on IBM PCs

The program is an add-on to Autodesk's Autocad, a general-purpose CAD package. Designed for the architecture, engineering and construction (AEC) markets, the product runs on IBM's Personal Computer, PC XT and AT as well as compatible machines.

"It's an efficiency tool that will increase the productivity of a mechanical engineer who works in an architectural firm," said Keven Seaver, an Autodesk representative.

The vendor has already tried to lessen the burden of general architects with its $1,000 Autocad AEC Architectural, which is a building design tool that started shipping in June 1986.

Takes the floor

The new package can use floor plans generated by its predecessor as the basis for mechanical systems diagrams.

Autocad AEC Mechanical includes an interface to third-party duct-analysis software.

It also requires Autodesk's Advanced Drafting Extensions-3.

Laptop holds two full-size PC XT cards

FREMONT, Calif. — Grid Systems Corp. last week introduced a 15-pound laptop computer that allows the use of two full-size IBM Personal Computer XT-compatible expansion cards.

Called Gridcase EXP, the system caters to users who require a portable machine with expansion cards, such as engineers. It also targets those whose applications demand an expansion card for communications, according to marketing manager Ed Murphy.

"Many of the people who are most directly in line to really make a contribution to a company's revenue stream are people who work in the field," Murphy said.

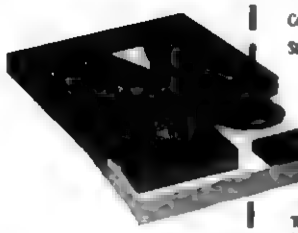
"Workers in the field have often been excluded from the technology in the office," he added.

Card makers eyed

Other potential users are manufacturers of XT expansion cards that can use the unit to demonstrate their cards to prospective clients, Murphy added.

The XT-compatible laptop, priced at $4,640, features a magnesium case and includes 640K bytes of random-access memory (RAM), a single 3½-in. floppy disk drive, RS-232 and Centronics Data Computer Corp. ports and a supertwist LCD.

Options include a 20M-byte internal hard disk for $1,175, a 300/1,200/2,400 bit/sec. modem that starts in price at $595, a gas plasma display that costs $530 and 1M byte of Lotus/Intel/Microsoft Expanded Memory Specification RAM priced at $395.



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For those analyzing developments in the PC industry, Compaq offers an executive summary.

Compaq still

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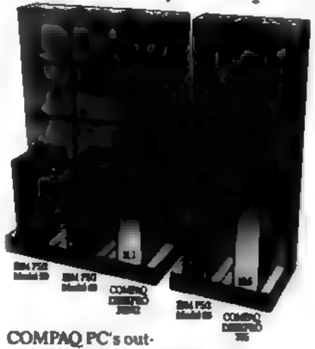

COMPAQ PC's outperform PS/2 PC's in tests for processor speed & disk performance, using the Norton Performance Index Version 4.0.*

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*Index based on a scale that rates the original IBM PC as 1.00.
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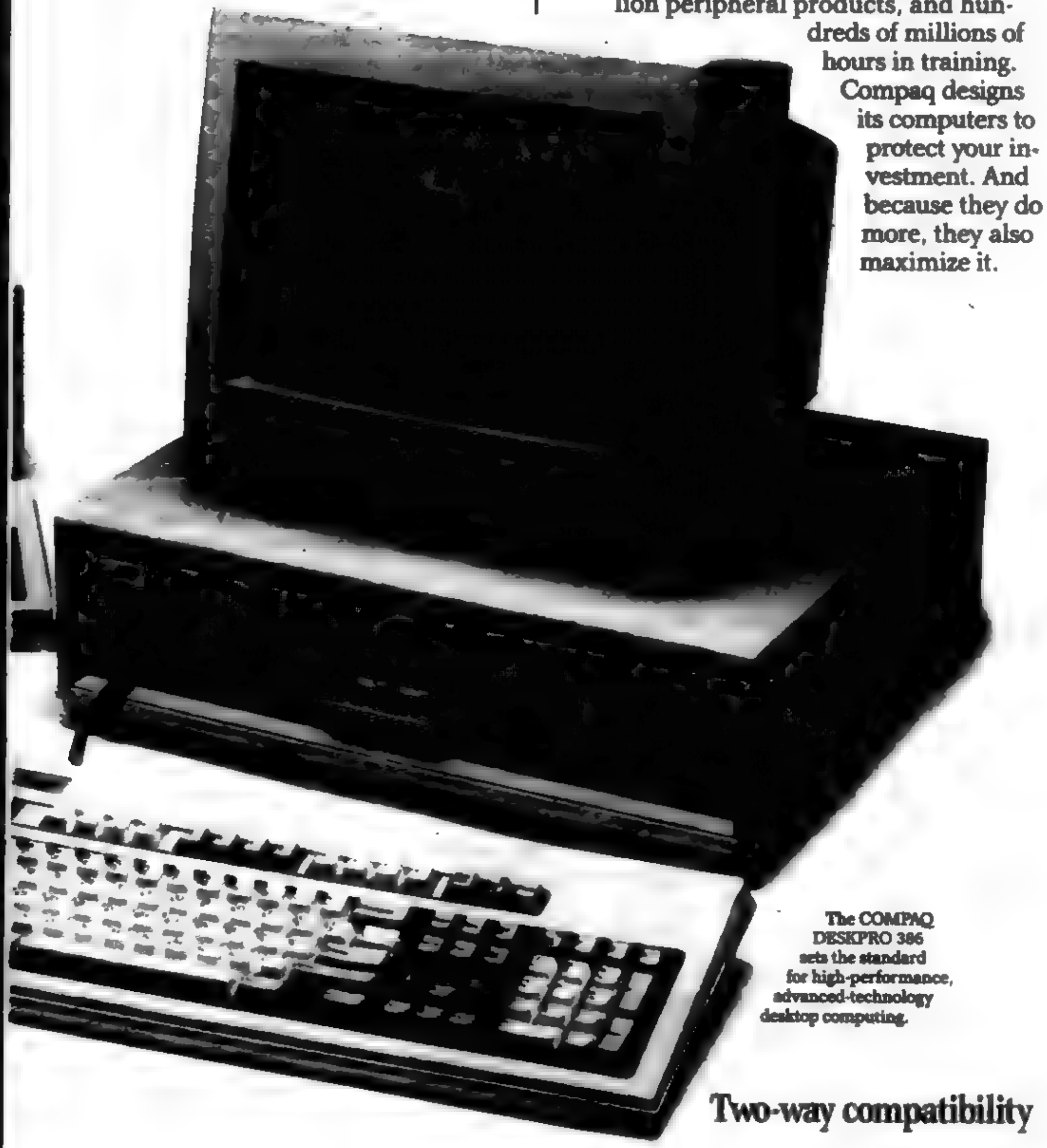
works better.



The COMPAQ DESKPRO 386 sets the standard for high-performance, advanced-technology desktop computing.

drives that store more. These are all innovations built into both desktop and full-function portable PC's.

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Compaq has become famous for its legendary compatibility and connectivity. Our PC's will run thousands of programs far faster than other computers. All the popular programs, including Lotus® 1-2-3®, dBASE III PLUS®, Microsoft® Word, Symphony®, and Paradox®, to name just a few. Without modification.

The new MS OS/2 operating system will run on all [redacted] COMPAQ personal computers.

Furthermore, you can insert the 5¼" diskettes your COMPAQ computers use into all the other compatible computers in your office, without time-consuming diskette conversions.

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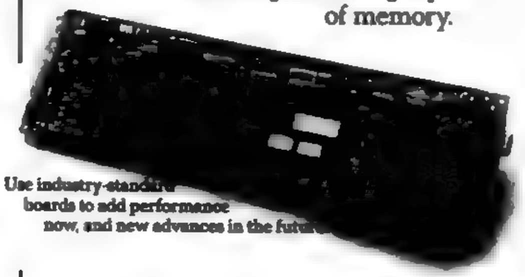

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Software tracks Windows programming efforts

BY JEAN S. BOZMAN
CW STAFF

SCHAUMBURG, Ill. — A new way to design and document programs under Microsoft Corp.'s Windows environment has been developed by two Chicago-area consultants who wrote the code by night in their garage and consulted with local Fortune 500 firms by day.

Called The System Encyclopedia, the program was developed by Frank McGuff and Philip Piotrowski, who together started a software concern called MP&G Research, Inc. The two former A. B. Dick Co. software engineers said they are planning to distribute the program in September, after a series of beta-site tests at Nutrasweet, Inc. in Skokie, Ill., and Beatrice Companies, Inc. in Chicago.

The program allows programmers to call up sections of code in a series of icons and pull-down menus provided by the Windows environment.

The current version of The System Encyclopedia runs under Windows 1.3. Even on a Compaq Computer Corp. portable computer, the program has an Apple Computer, Inc. Macintosh-like look and feel because of its graphics interface and mouse, the developers said.

After leading the user through a series of fill-in-the-blank prompts, the program churns out documentation for the program being developed. It is said to enable users to trace any element of their program and to show where each data attribute is used within a data base.

Multilevel management

"It's the central repository for everything you're developing," McGuff said. "It enhances programmer productivity by managing system specifications and documentation at the management, user and the technical levels."

The categories that can be defined include attributes, reports, processes, batch jobs, menus, views and entity relations.

The purpose of The System Encyclopedia is to maintain a record of how a given program was developed, so that as programming staffers leave their companies, those who take their places can provide consistent software support.

While productivity should increase, Piotrowski said he does not believe in the hard sell.

"We won't try to convince you that using The System Encyclopedia will triple your system builder productivity or reduce your development backlog to zero," he said. "Developing computer applications is very hard work. There is no magic involved."

Piotrowski and McGuff said they plan to modify the product once IBM ships its OS/2 operating system.

For now, users are prompted to fill in boxes with information about fields, data types and the like. Once OS/2 is shipped, however, The System Encyclopedia program will adapt to it, they said.

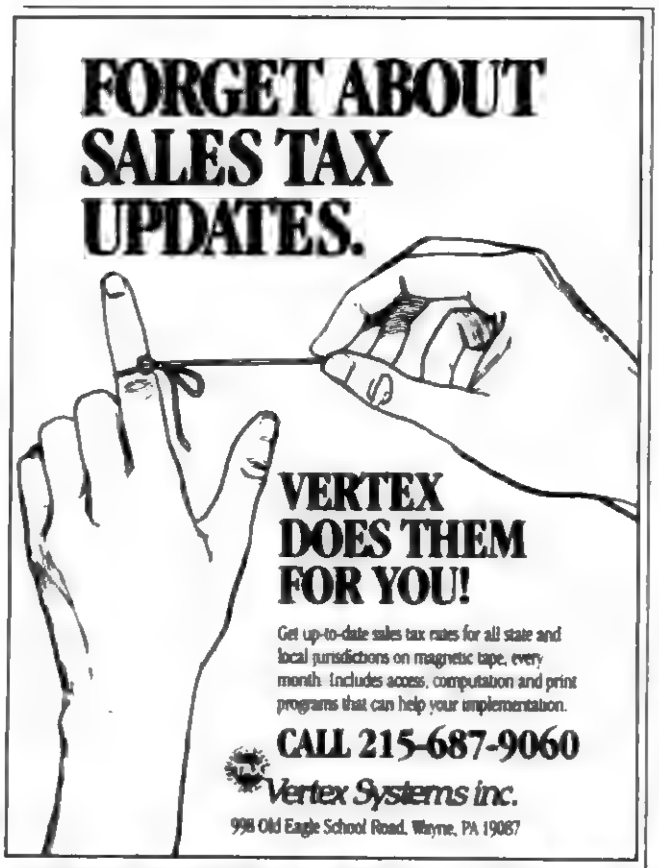
Graphic future

"We feel our users will be very comfortable with a data entry technique," McGuff said. "But, when IBM's Presentation Manager comes along, we'll move to a more graphic approach than we have now."

Since The System Encyclopedia resembles a computer-aided software engineering tool, it will document any program, regardless of the operating system under which the program will eventually run, the developers said.

The System Encyclopedia was programmed using the C language, but it runs under Microsoft's MS-DOS.

The System Encyclopedia is priced at $1,295, which includes a mouse, software and Microsoft's Windows. Volume discounts and site licensing are available, the developers said.



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DOS

FROM PAGE 29

sources said.

The program allows the Macintosh to emulate an IBM Personal Computer XT, those familiar with the package said. The price of the package is expected to be $595. It will be sold by software distributor Softsel Computer Products, Inc. as well as by Apple, sources said. The Insignia package also requires Apple's 5¼-in. external floppy disk drive.

These solutions may appeal most to corporate users seeking to overcome an IBM-only mindset at their companies.

"The corporate world is predominantly a DOS environment," said Peter Teige, a Dataquest, Inc. analyst. "For the coexistence of the Mac in the DOS world, these devices would be an advantage. The promise of the open Mac is that it can run DOS.

"The ability to run DOS would be important to the corporate users reluctant to buy a Macintosh because IBM is predominant in the company," Teige said. "This gives you the loophole to go with the Mac."

Current Macintosh users probably won't flock to either the AST boards or the Insignia package, Teige conceded. "If they've already purchased the Mac, DOS obviously didn't matter to them anyway," he explained.

A political issue

Jeff Ehrlich, manager of product technology at General Electric Co., said corporate users may use the devices to get around company buying restrictions specifying the purchase of IBM-compatible equipment only.

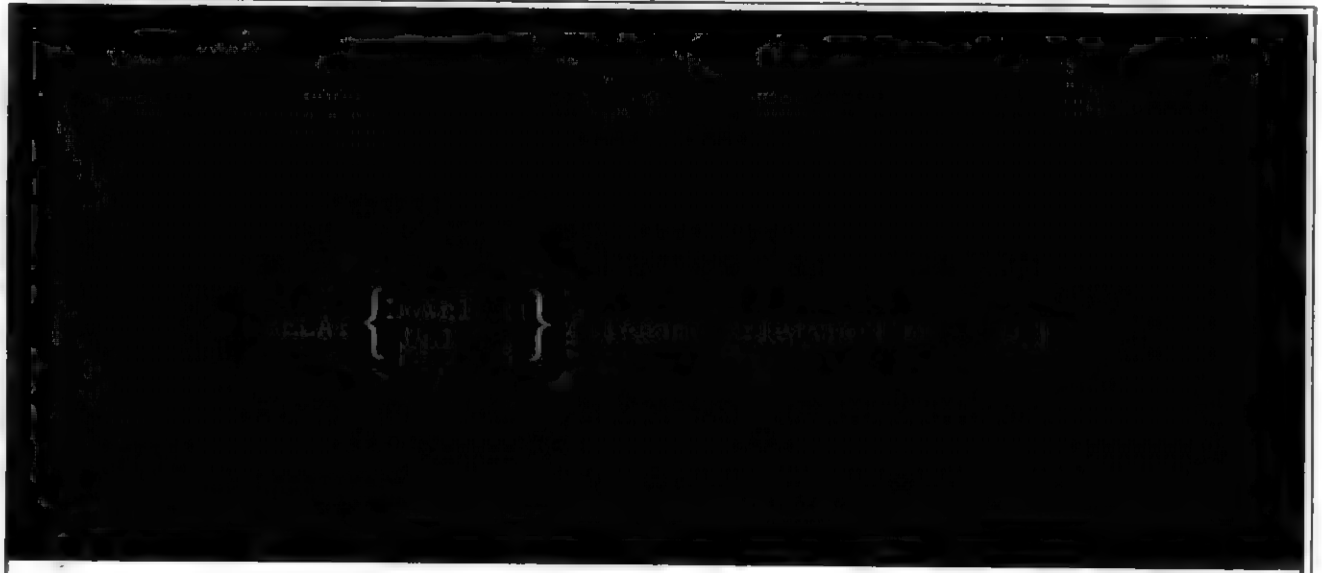
"The issue with these devices is as much political as it is technological," Erlich said. "There will be some people who will buy them because they have that technology need, but there are others who will buy them only to get around certain corporate buying guidelines. If it runs DOS, you can claim it's a clone, and that's that.

"It negates any argument that anyone might have against Apple," he continued. "That's a very real consideration in the corporate environment."

Cost for both the AST boards and the Insignia Soft PC may prove to be a deterrent to some corporate users. Users who have tested the AST boards also complained of mediocre performance.

"They aren't cheap," said Aaron Goldberg, vice-president of microcomputer services at International Data Corp. "For not a lot more money, you can buy a mail-order XT."

Goldberg said there may be some need for Mac PC- and MS-DOS devices from users with space constraints. However, that demand is not expected to be great, he added.



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Users' rep

FROM PAGE 29

ple is how they handled the fact that purchasers of their early Deskpro 386s didn't have a slot for an [Intel Corp.] 80387. Basically, the way they decided to handle the situation is if you order a 387, for the price of the 387 they'll give you a whole new motherboard.

That brings me to Intel, which recently discovered the problem they had during production of the 80386. Rather than wait for someone else to bring it up, they went public with it.

People can understand bugs in software and production problems or problems with hardware. What they can't understand is people trying to stonewall it and pretend it doesn't exist.

What kinds of useful programs do these vendors have for users?

To me, support programs one way or another have to meet user needs. They can't be restricted.

To me, the best support program is a Chinese [restaurant] menu — that's when you go out to your user, you can more or less pick and choose and then pay according to what you need, because every user needs something different.

One company that is really great as far as support is the Wordperfect Corp. group. They have toll-free lines; they are very accessible.

Do you see any up-and-coming stars? Someone who's going to make an impact on the personal computer industry?

I don't think [they're] ever going to become a Microsoft, but there's a company in this area called Qualitas, Inc. They came out with a product called "386 to the Max," which is just shipping. Basically, it's a memory manager for the 386. The way [Qualitas] is putting it together, it can almost be a foundation for anything running under 386.

You've done a lot of work in the area of copy protection. What is still missing in that area that you'd like to see?

Lotus remove copy protection. Period.

Lotus Development Corp. is basically the only one in the way of total industry acceptance. We're primarily talking about what I call business-, professional- and home use-type software. I'm not addressing entertainment software. Copy protection is a nuisance, it is a disruption and it causes far more problems for the user than it ever solves for the vendor. It's going to be increasingly more of a problem under PS/2 with the new disk media.

What do you think about Microsoft's MS OS/2?

I like it. I'm very impressed. I've been using it for about three months, and I think Microsoft has done a really good job. MS OS/2 is a very complex system, but the complexity is at the developer's level.

What are users saying about IBM's Personal System/2?

The PS/2s, particularly the Micro Channel, [Model] 50s on up, are excellent machines, and I strongly believe that they are the next generation — or at least something similar to them is the next generation — of computing. I believe in the 3½-in. media; the Video Graphics Array as a new graphics standard is good, and a number of the features that exist in the Micro Channel architecture, I think, are the right features. Things like the fact that the computer will handle multiple microprocessors will be very critical in the future.

But the problem with the PS/2s, or at least user acceptance of them, is the PS/2 is a machine that's being offered now for the future — and many people don't have an immediate need for the future.

How do you feel users groups can influence vendors?

From a vendor's perspective, they provide a forum for presentation of a product or technology.

In addition, I think more people are getting questions answered and getting some detailed information on products through user group help lines than you're ever going to get at a dealer or anywhere else — except maybe with a one-on-one session with a technical support person at a software publishing house.

Underware

FROM PAGE 29

admitted. "I must have missed that one."

"Oh," he replied, "you've got to get a copy. It's fantastic. It's published by Solution Systems, but the guys who developed it have a company called Underware, Inc. right here in Boston. I can't believe you haven't heard of it."

Needless to say, no sooner had my friend left my office than I was on the phone checking with directory assistance to get the number for Underware. When someone from Microsoft tells me somebody else has a great product, I know I'm on to something.

A tour de force

As it turns out, Brief 2.0 is not only the best programmer's text editor I've ever seen, but it is also a tour de force in the way it was conceived and implemented.

For starters, Brief offers a very handy full-screen text editor. With an IBM Enhanced Graphics Adapter display, a user can have 40 lines of text.

The program provides a very clean display with the file name you are working on at the top of the page, a message area, line and column indicators, mode indicators and the time on the line below the bottom border. The directional keys — Tab, Backspace and so forth — all work as you would expect.

All these are just the basics, however.

There are many features lurking behind Brief's deceptively simple exterior. For instance, you can easily work on multiple files simultaneously. The program sets up buffers in memory for as many files as you could possibly keep track of.

Pressing Alt-B pops up a buffer list with the names of the files currently handled in memory. You can choose the file you want to edit from the buffer list. You can also cycle through the files in the buffer list by simply pressing Alt-N. You can also add or delete files from the buffer list.

> WHEN SOMEONE from Microsoft tells me somebody else has a great product, I know I'm on to something.

In addition, you can create and size multiple editing windows with Brief. You can then edit different files from the buffer list, different parts of the same file or any combination thereof in as many windows as you want.

Brief has an extremely powerful search-and-translate facility. It's pattern-matching facilities go far beyond the basic "?" any-character marker and the "*" any-character marker of DOS. For example, you can search for any string of zeros ending in a one (e.g. 01, 00000001) or for any uppercase vowel.

The program also has a multistep Undo feature that lets you step back through an arbitrary number of editing steps. That is, you can undo not only the last thing you did but also the last 50 — or more if you prefer — things you did.

Being a text editor, Brief does not normally do word processing functions like centering text or word wrap.

Perhaps most impressive of all, and most useful for programmers, Brief can be set up to provide "smart indentation."

It comes with a template file for the C language that automatically provides correct indentation for If, Else, While, For, Switch, Case and Do . . . While clauses.

Speaks the language

Brief has an extremely powerful macro language that can be used to create new commands, modify existing commands, tailor the program to any programming language and create an initial setup to suit the user in almost any situation.

Brief comes with excellent documentation, an on-line Help facility and one of the most intelligently designed setup routines I've ever seen.

All said, Brief is worth every penny of its $195 list price. It is available through dealers, companies selling direct to businesses or from Solution Systems in Weymouth, Mass.

Zachmann is vice-president of research at International Data Corp.

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NEW PRODUCTS

Systems

An IBM Personal Computer AT-compatible workstation measuring 14 by 16 by 4.88 in. has been announced by **IDR, Inc.**, a Reuter Company.

The **IDR 386 Workstation**, based on Intel Corp.'s 80386, offers 16-MHz operation and 32-bit data and address bus architecture. Featuring a single-board construction, the workstation comes standard with integral BIOS, 2M bytes of expandable on-board dynamic random-access memory and two RS-232C serial ports.

The IDR 386 workstation is being marketed to OEMs and value-added resellers. It costs $4,495.

IDR, 370 Vanderbilt Motor Pkwy., Hauppauge, N.Y. 11788.

Software utilities

A software development tool set for use in conjunction with Innovative Software, Inc.'s Smart Integrated System has been introduced by **Amalon Industries, Inc.**

Smart System Services includes a library of pretested, generic project files necessary to build an application, along with a methodology for putting them together. Features include multiple menu pages, data entry validation mode, automatic message justification support, variable display window positions and a project-writer facility that builds the project source code to execute each of the Smart System Services' calls.

Smart System Services is priced at $119.

Amalon Industries, Suite 3C, 725 W. Commerce St., Gilbert, Ariz. 85234.

Development tools

Bbug, a Bitbus 8044 debugger designed for verification of 8044 assembly language programs, has been announced by **Robanks, Inc.**

Bbug is said to use Bitbus as the communication channel for the debugger. It automatically determines the number of programs to create, where the programs start, the priorities of the programs and which register bank each program uses. A built-in 8044 disassembler puts 8044 instructions on the screen and automatically translates relative offset branching addresses and displays them as actual address locations.

Bbug is priced at $595.

Robanks, P.O. Box 493, Banks, Ore. 97106.

Software enhancements

Microsoft Corp. has announced **Microsoft Cobol Compiler Version 2.2** in both Microsoft MS-DOS and Xenix versions.

The compiler now comes with Microsoft Cobol Tools, a set of development tools and utilities including a symbolic debugger, cross-reference generator, menu handler and mouse utility.

Microsoft Cobol Compiler users may choose from four different file structures including indexed sequential-access method, sequential, line sequential and relative.

The Cobol Compiler for MS-DOS costs $700. The Xenix version costs $995.

Microsoft, Box 97017, 16011 N.E. 36th Way, Redmond, Wash. 98073.

NEW AT MACWORLD

Centram Systems West, Inc. has added a laserwriter spooler and a data translation application to the Apple Computer, Inc. Macintosh version of its **TOPS Network**. The enhanced version of TOPS for Macintosh costs $189. Centram, Suite 220, 2560 Ninth St., Berkeley, Calif. 94710.

Flowmaster, an advertising media full-color flowchart package written specifically for the Macintosh has been announced by **Select Micro Systems, Inc.** Flowmaster costs $495. Select Micro Systems, Suite 211, 40 Triangle Center, Yorktown Heights, N.Y. 10598.

Superglue, software that allows users to reduce or enlarge and then print to disk the graphics output from most Macintosh applications, has been announced by **Solutions International**. Superglue costs $89.95. Solutions, P.O. Box 989, 29 Main St., Montpelier, Vt. 05602.

The **Personal Laserprinter**, designed for use with the Macintosh Plus, Macintosh SE and Macintosh II and offering 300 dot/in. text and graphics output, was announced by **General Computer Corp.** It costs $2,599. General Computer, 215 First St., Cambridge, Mass. 02142.

Human Intellect Systems announced its **Instant-Expert Plus** expert system shell application development tool for the Macintosh. It costs $498. Human Intellect, Suite 326, 1670 S. Amphlett Blvd., San Mateo, Calif. 94402.

A multiuser optical disk server for Macintoshes designed for use with the vendor's **Multi-User Archival and Retrieval System** (MARS), was announced by **Micro Dynamics, Ltd.** The server site license fee for MARS software is $15,000. Micro Dynamics, Suite 802, 855 Sixteenth St., Silver Spring, Md. 20910.

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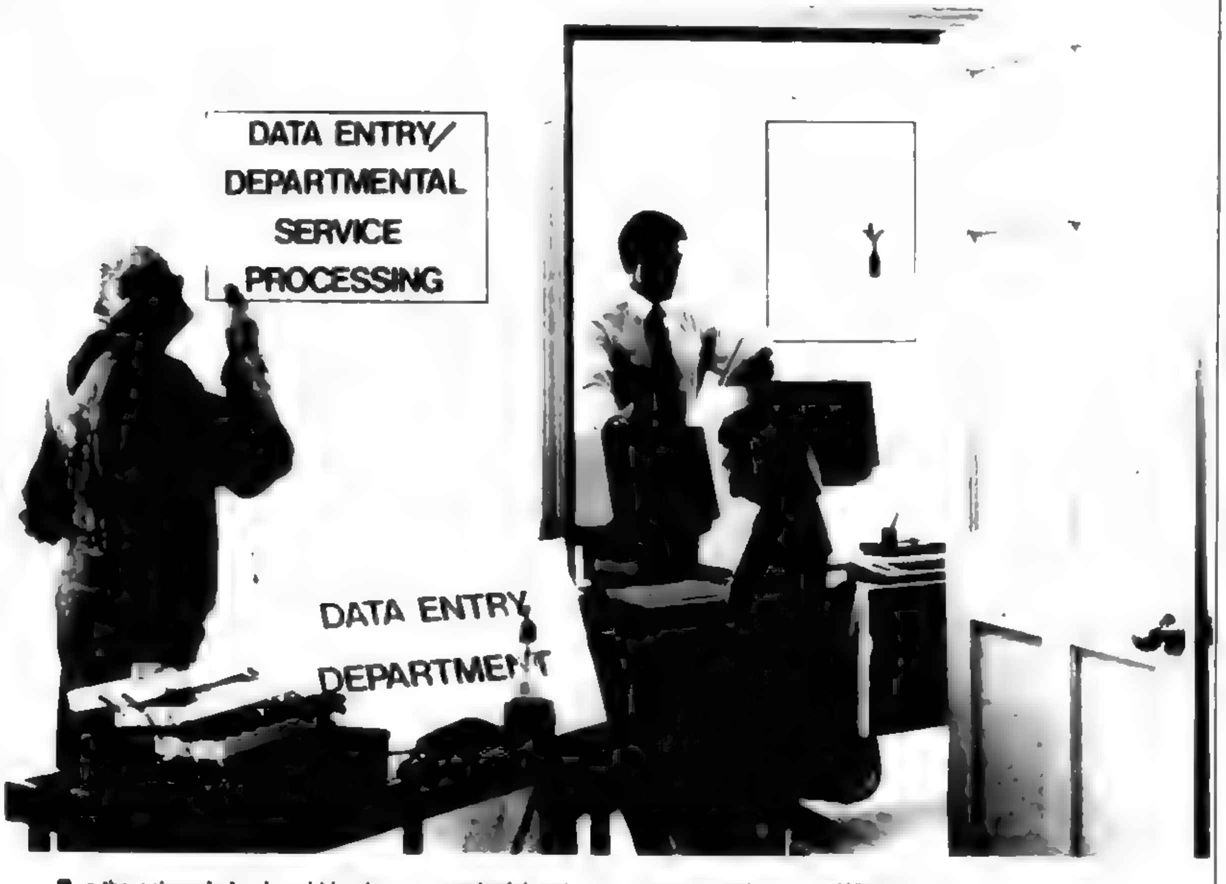

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For instance, we can help complement your host systems by one or more subsidiary distributed systems. By breaking down a problem into meaningful parts, our system permits departmental data capture, which makes you faster and more productive, and your data more valuable to management. Our 8850 distributed system drastically reduces the cost of providing high–level information, saving more than enough to justify the expense of installing the system.

Nixdorf's commitment to the data entry marketplace is well–known. More than 70% of Nixdorf Computer Corporation's business is in data entry. We are working to ensure that our data entry technology keeps pace with the growing demands that are being made on it, and on you.

Which is why we're working on changing your sign.

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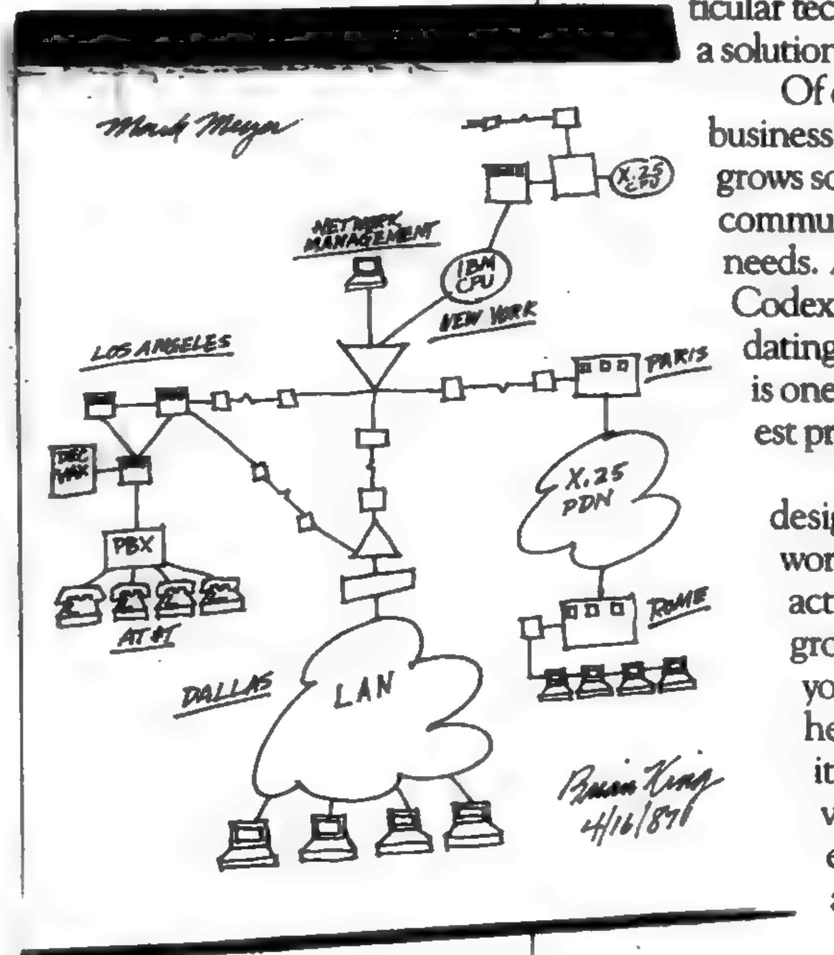
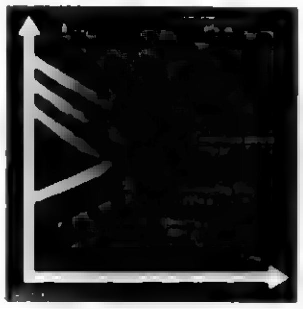


At Codex, we don't have set solutions – we work with your current environment. Which is why we spend a lot of time drawing diagrams like this.

As a result, our communications solutions are perfect for multi-vendor environments.



We can show you how a Codex network can be more profitable and more productive for your company.

And since our capabilities include everything from all types of transmission devices to gateways to network management systems, we're never trying to force fit a particular technology into a solution.

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All of this is the reason Codex is the preferred brand of data communications professionals. And why 97% of the Fortune 100 use Codex equipment.

Of course, besides working for successful companies we're also backed by a successful company – Motorola.

So if you've got a network requirement and you're looking for someone to help you equip it, expand it, and give you the tools to manage it worldwide, Codex is the company to deal with.

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And next time you talk to those other guys, ask them some hard questions.

They'll be so quiet...well, you know the rest.

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370

NETWORKING

DATA STREAM

Elisabeth Horwitt

More change to come

"May you live in interesting times" is a curse reserved for your favorite enemy, according to some Oriental philosophers. Right now, we are in the midst of major developments that could drastically change not only how computers interact but also how companies do business. MIS departments tend to suffer at times like these, since technologies and major vendors keep changing direction in midstream, leaving many companies stuck with obsolete equipment — and MIS managers out of a job.

While we don't claim to have all the answers, the following are a few tips on what areas and companies to keep an eye on during the coming months:

- Digital Equipment Corp. will move to counter IBM's thrust into the telecommunications arena, announcing network management products designed to interface with network transmission equipment. DEC is expected to make a major network management announcement at Decworld '87 next month.

Still in question is whether DEC will bite the bullet and link up to IBM's Netview/PC, an interface to IBM's Netview, a host-based network management system that IBM is proposing as an industry standard.

Continued on page 42

Office nets remain islands

BY PATRICIA KEEFE
CW STAFF

PALO ALTO, Calif. — A recent vendor-conducted survey of Fortune 1,000 companies indicates that less than 50% of these firms have instituted data networking on a corporatewide basis.

These results contradict reports of widespread connectivity among major businesses and institutions, even with galloping sales of networking products, according to the Wollongong Group, Inc., a vendor of Transmission Control Protocol/Internet Protocol communications software, which conducted the survey.

Wollongong's research consisted of three parts: consultation with market research firms; a formal survey conducted by the company's marketing group with outside assistance, targeting senior-level executives in a 10% sampling of the Fortune 1,000; and an informal survey of networking industry executives about real or perceived impediments to corporatewide networking.

Wollongong said it was "disheartened" to find that nearly 75% of the Fortune 1,000 have thus far implemented networking on an intradepartmental, or work group, level only. For example, 57% of those interviewed said they do not link computers and other data devices to similar equipment in other departments.

"Despite the obvious advantages of significant cost savings and increased productivity through shared data and improved communications, more than half of America's largest corporations have . . . failed to recognise and enjoy these interdepartmental networking benefits," Wollongong said.

But among those users embracing corporatewide networking, nearly 40% cited data and peripheral sharing as the primary impetus. Improved productiv-

Continued on page 40

Bell entrance key to voice mail market

Equipment sales, service should pick up after FCC grants approval

BY ELISABETH HORWITT
CW STAFF

While voice messaging equipment sales will continue to make steady gains in the private sector, they should receive a further boost in 1988 when the divested Bell operating companies start setting up voice mail services, according to a recent report by Probe Research, Inc.

Private businesses will continue to account for a large portion of voice mail equipment sales, the New York-based research firm concluded.

But by 1991, purchases by Bell operating companies should make up approximately 20% of total sales of almost $1.1 billion, Probe Research said.

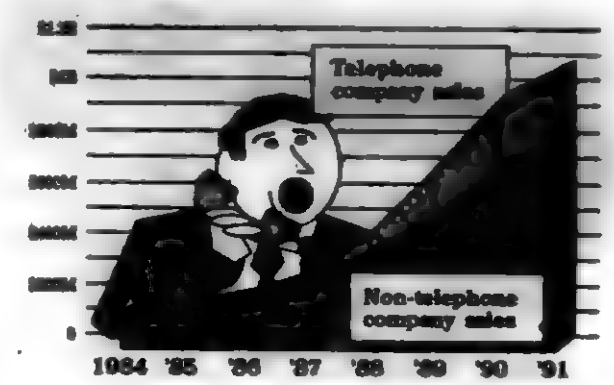
While a few independent telephone companies already offer voice messaging services — such as The Southern New England Telephone Co., which has offered them for approximately two years — "none of them has spent more than $100,000," said Probe Research analyst Karl Kozarsky.

"So the market will really begin next year," when the regional Bell holding companies receive approval from the Federal Communications Commission to

Continued on page 42

Bell operating companies' voice mail services

Telephone company purchases of voice mail equipment should exceed $1 billion by the end of 1991



INFORMATION PROVIDED BY PROBE RESEARCH, INC.
CW CHART: MITCHELL J. HAYES

Data mover links IBM, DEC hosts

BY ELISABETH HORWITT
CW STAFF

IBM VM and MVS host systems and Digital Equipment Corp. VAX/VMS hosts should be able to exchange bulk files using new versions of Systems Center, Inc.'s Network Data Mover (NDM), which the company is expected to introduce this fall.

NDM currently runs in IBM MVS and DOS/VSE VTAM environments and on the IBM Personal Computer. Systems Center said it expects to introduce a VM version of the product in October and a VAX/VMS version in the fourth quarter of this year.

All of the versions will talk to one another, according to Steven Whiteman, Systems Center's vice-president of marketing. The VAX and IBM host versions will communicate via DEC's Decnet/SNA Gateway product, he said.

The IBM versions of NDM are VTAM-based, so they can support a wide variety of job schedulers as well as security systems from different vendors, Whiteman said. NDM also handles a wide variety of IBM file structures, he added.

The product's data transmis-

Continued on page 42

Inside

- GE interfaces connect E-mail, Discos, Profs. Page 40.
- Network vendors link up to bring connections to LANs. Page 40.
- Unisoft rolls out 9.6K bit/sec communications controller. Page 43.

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GE links E-mail, Profs, Disoss

ROCKVILLE, Md. — GE Information Services recently unveiled two software interfaces that provide dial-up connections between its Quik-Comm electronic mail service and private systems using IBM's Professional Office System (Profs) and Distributed Office Support System (Disoss).

The Profs Connector and the Disoss Connector interfaces can be used to interconnect in-house office systems or reach third parties, according to David M. Page, manager of business communications for GE Information Services, a division of General Electric Co.

The Profs Connector for VM hosts costs $10,000, while the Disoss Connector for MVS hosts costs $15,000.

More connection options

According to company officials, links will be provided between GE Information Services' standard Quik-Comm Connector architecture and other computer systems in the future.

GE Information Services said it will announce software for Digital Equipment Corp.'s All-In-1 system sometime this year.

GE Information Services was formerly known as General Electric Information Services Co.

BIT BLAST

LANs gain SNA, LU6.2 connectivity

Yet another pair of network vendors have allied to bring host-based and wide-area communications to the local-area network (LAN) environment. Under the terms of a recently signed OEM agreement, **Eicon Technology Corp.** will provide **Waterloo Microsystems, Inc.**'s Port PC LAN with CCITT X.25 packet switching, connectivity to IBM Systems Network Architecture/Synchronous Data Link Control and 3270 and 5520 gateways and electronic messaging via the CCITT X.400 standard. Norcross, Ga.-based Waterloo will begin shipping the initial products resulting from the agreement in the third quarter, the company said.

Communications Solutions, Inc. in San Jose, Calif., now offers LAN-based versions of its Systems Network Architecture (SNA) software to systems integrators, LAN vendors and large corporate users. Computer Solutions' software includes Access/SNA 3270, Access/SNA Advanced Program-to-Program Communications (APPC) and Access/Document Interchange Architecture. The new LAN offerings allow users to concurrently access multiple SNA sessions, regardless of whether they are 3270, APPC or Document Interchange Architecture applications, Computer Solutions said.

The Corporation for Open Systems (COS), an organization of vendors and users dedicated to promoting standards in the computer industry, gained new input from the user community recently when the International Communications Association (ICA) joined up. ICA, the users group of 630 communications managers, has become a nonvoting affiliate associate member of COS, which enables it to discuss standards issues with other COS members but not vote at meetings.

An Ethernet board recently introduced by **Univation, Inc.** in Milpitas, Calif., reportedly combines faster access to a LAN with software that connects DOS and Unix systems via Transmission Control Protocol/Internet Protocol software. The Lifelink NC516UT's hardware is said to speed up access to the network by incorporating a LAN coprocessor chip and 16K bytes of main memory for multipacket buffering. The board runs TCP/Link, Univation's DOS-to-Unix connectivity software, and is available now for $595.

Office nets

CONTINUED FROM PAGE 39

ity and communications needs prodded 29% into action, while 11% reported that networking was a "necessity" in their operations.

Of the users surveyed by Wollongong, 49% said they saw no need to institute networking on a corporatewide basis. Another 14.5% said they had only recently begun to appreciate the need for, and benefits of, interdepartmental connectivity.

Conversations with other networking vendors revealed a different view of impediments to interdepartmental networking.

Ranked in order of frequency of response, these impediments include:

- Concern over security levels and controls.
- A perception that corporatewide networking is cost-prohibitive.
- Underinformed or misinformed senior management with regard to benefits and reasonable return on investment.
- Compatibility concerns, such as a lack of common networking standards, heterogeny of networks and operating systems and incompatibility between data bases and systems.
- Absence of corporate networking/communications strategies.

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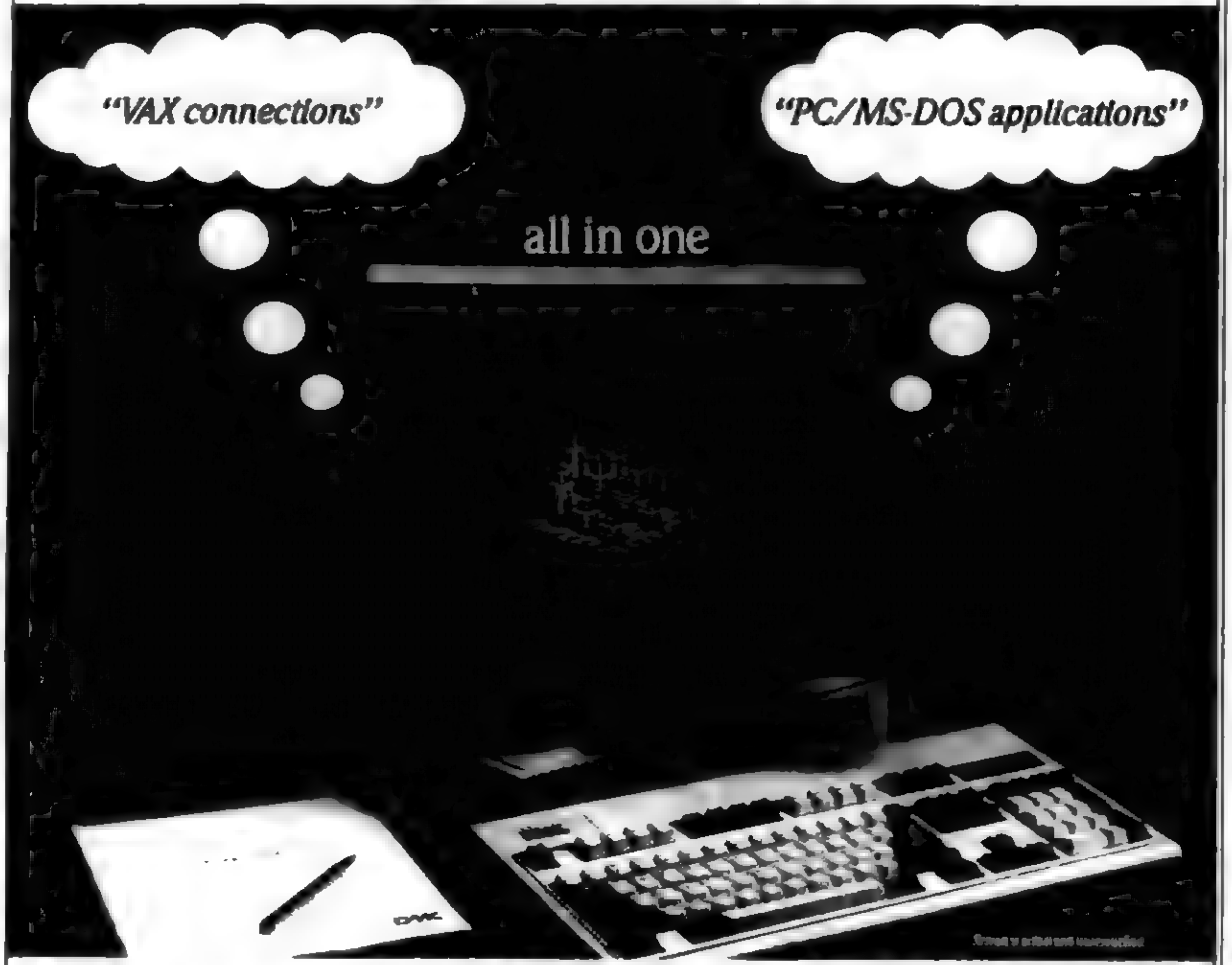

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With its dual capability and high connectivity, you can access on-line information from a VAX™ system or other time sharing systems while simultaneously running PC/MS-DOS applications such as Lotus® 1-2-3.® By simply pressing a "hot key," you can switch back and forth from MS-DOS to the VT240 terminal sessions. And a "cut and paste" feature lets you extract and manipulate information between the two.

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94% wanted the RAMIS human-factored, menu-based architecture, with its easier access to all system functions, plus expert paths for more experienced users, in contrast to competing 4GL syntax-oriented interfaces.

84% wanted a more efficient, flexible PC/4GL workstation. One that would provide completely stand-alone PC applications, as well as development of programs that would run on the mainframe. Only RAMIS®/PC Workstation does both.

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Change

CONTINUED FROM PAGE 39

Gaining even nominal support from DEC would be a coup for IBM. A key issue of the network management wars is whose system acts as collection agent and report generator for the data coming in from various telecommunications devices.

- The regional Bell holding companies will be the next staging area for the battle over telecommunications dominance. As soon as they gain the Federal Communications Commission's permission to offer information services, their divested operating companies will need intelligent processors that can act as adjuncts to their switches, collecting and processing network control and diagnostic data as well as supporting voice and electronic mail services and other enhanced offerings. According to Jack Walsh, managing director for Integrated Strategies Group, Inc., DEC, IBM and AT&T will compete to sell hosts to the operating companies.

The outcome of this battle will determine how and to what extent users can integrate their in-house electronic mail, network management and other applications with carrier-based services. So watch for upcoming joint development agreements between the computer makers and the holding companies. A Nynex Corp.-DEC project to develop Integrated Services Digital Network offerings is reportedly in the works.

- A sure sign that electronic data interchange (EDI) is becoming viable will be AT&T's reentrance into the market. The carrier has already been burned once in the EDI arena, through its aborted Net 1000 venture. At a recent EDI conference, AT&T staff manager Margaret Goscinski said that while AT&T has "all of the facilities to offer EDI now," the company remains unsure as to how soon it will take the plunge.

A spokesman for EDI services vendor GE Information Services said that EDI's slow growth is a not a technical but a management-related "it-takes-two-to-tango" issue. EDI has worked best in cases in which all parties see a benefit in linking up electronically — such as the apparel industry's recent joint EDI effort, which was driven by overseas competition. The interchange has not worked when one group forces another to implement EDI — as the auto makers have done with their suppliers.

- Potential fruits of the IBM-Network Equipment Technologies Corp. (NET) joint development agreement could include interaction between IBM's Systems Network Architecture applications and T1 networking, according to NET President Bruce Smith. This interaction would allow NET's Integrated Digital Network Exchange switches to do bandwidth allocation prioritization based on information about what applications end users are sending, he added.

Horwitt is a *Computerworld* senior editor, networking.

Data mover

CONTINUED FROM PAGE 39

sion facility reportedly can initiate multiple transfers to the same host or to multiple hosts.

It also can preset a time for a file dump. IBM's Bulk Data Transfer software, which is NDM's main competitor, does not handle VSAM; it supports MVS only and has no timed file transfer, according to Systems Center.

By keeping records of file transfers, NDM provides MIS personnel with an audit trail for security and accounting purposes.

The IBM host versions of NDM will be ported to LU6.2 when IBM's VTAM implementation of the peer-to-peer protocol is generally available, Whiteman said.

The product supports Netex, a file transfer product from Network Systems Corp., and can run over Network Systems' channel-based network, Hyperchannel, at speeds of up to 1.35M bit/sec., according to Whiteman.

NDM is currently installed at approximately 230 sites, including several Fortune 500 banks and brokerage houses, he added.

Key applications for the bulk data transfer product include software downloads and overnight data base updates.

Bell

CONTINUED FROM PAGE 39

introduce voice mail tariffs, he added.

Currently, Pacific Telesis Group is the only regional Bell holding company to have filed a voice mail tariff on behalf of its divested operating companies, Pacific Bell and Nevada Bell.

According to Probe Research's Kozarsky, three other holding companies have issued requests for proposals for voice mail equipment — Ameritech, Bellsouth Corp. and Nynex Corp.

The three regional Bell holding companies that have yet to file tariffs are expected to do so within the next several months.

According to current regulations, each of the holding companies must file a Comparably Efficient Interconnect plan to satisfy the FCC that competitors will have the same level of access to basic telephone services that support the voice mail offerings.

The Department of Justice must also give approval, since voice mail is considered an information service offering.

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NEW PRODUCTS

Local-area network hardware

The **H174-04 controller**, designed for the Challenger 3270 Communications System, has been announced by **Harris Corp.**

The H174-04 remote-control unit is said to support four devices and features an ASCII printer port and IBM 3179-G graphics display support. It also supports Systems Network Architecture/Synchronous Data Link Control operation at speeds up to 19.2K bit/sec. and Binary Synchronous Communication operation at speeds up to 9.6K bit/sec.

Other features include 1M byte of system memory, an RS-232C remote diagnostic port and a 3½-in. diskette drive. Software functions include status-line support, dual-session support and on-line diagnostics.

The H174-04 Challenger Contoller costs $3,350.

Harris, 16001 Dallas Pkwy., Dallas, Texas 75248.

Network management

Software designed to centralize support of Novell, Inc. Netware, IBM Token-Ring and Ungermann-Bass, Inc. Net/One local-area network (LAN) users has been announced by **Brightwork Software.**

Netmanager is said to allow network managers to answer questions from LAN users about problems with application software. It includes data base management functions that let LAN managers keep track of time spent on LAN problems and generate reports on LAN support activities.

Features include a full-screen interface and several levels of security.

Netmanager costs $950. Each workstation requires the vendor's Netuser disks, which cost $245 for a package of 10.

Brightwork Software, P.O. Box 8728, Red Bank, N.J. 07701.

Customer-premise equipment

A communications controller said to allow up to 256 asynchronous devices to communicate over a channel-based connection to a mainframe host running Unix has been introduced by **Unisoft Corp.**

The **9750 CU/X**, which is a customized version of Intel Corp.'s Fastpath control unit, supports data rates of up to 9.6K bit/sec. per terminal-to-host connection.

The first version of 9750 CU/X will support UTS, Amdahl Corp.'s implementation of AT&T's Unix System V. A later release will support IX/370, IBM's mainframe Unix operating system. Subsequent versions will support other mainframe versions of Unix according to customer demand, Unisoft said.

A 9750 CU/X supporting 64 lines sells for $70,000, with each 64-line upgrade costing $22,000.

Unisoft, 6121 Hollis St., Emeryville, Calif. 94608.

Links

Gateway Microsystems, Inc. has enhanced its **Microgate 3270/Systems Network Architecture** (SNA) emulation software for IBM's PS/2 series.

Microgate 3270/SNA Version 2.0 features 3270-Personal Computer Applications Program Interfaces (API) and background file transfer capability. API permits an applications program written in a high-level language to control a communications session. The background file transfer capability permits a user to start a file transfer and then exit DOS to perform other tasks while the file transfer continues to completion in the background.

Version 2.0 costs $495 as a software add-on for existing users of Gateway products or between $795 and $1,595 bundled with the firm's Synclink internal modems and communications adapters.

Gateway, Suite 105, 9501 Capital of Texas Highway, Austin, Texas 78759.

File servers

An IBM 5250 emulator, said to allow personal computers to run IBM's Displaywrite/36 in a remote environment without an IBM controller, has been announced by **Micro-Integration Corp.**

The **Micro-SNA/5250** supports the Text Entry Assist feature when configured as an IBM 5294 controller, thus eliminating the need for a 5294 controller.

With the communications adapter, the Micro-SNA/5250 costs $895; without the adapter, it costs $695.

Micro-Integration, P.O. Box 335, 63 Maple St., Friendsville, Md. 21531.

Modems/Multiplexers

The AST Research, Inc. Camintonn/Digital Equipment Corp. Products Group has unveiled a family of four Hayes Microcomputer Products, Inc.-compatible **modems**.

Compatible with personal computers, the modems are said to transfer data over dial-up phone lines at speeds ranging from 300 to 19.2K bit/sec.

Prices range from $399 to $1,899 for the modems.

AST Research, 2121 Alton Ave., Irvine, Calif. 92714.

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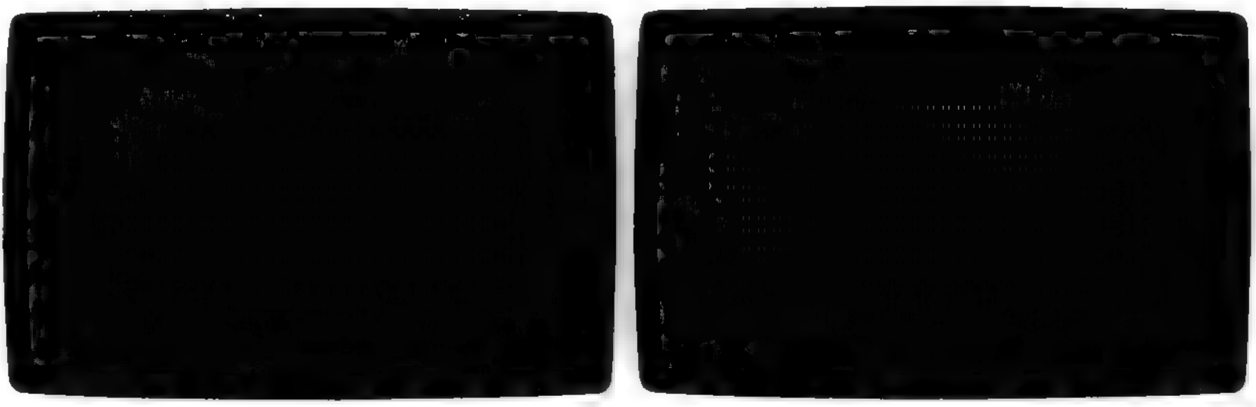

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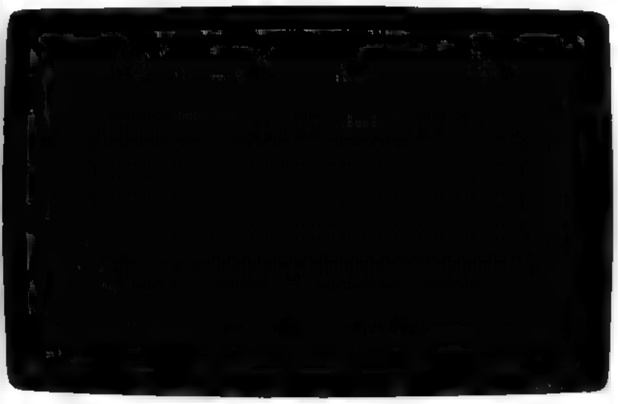

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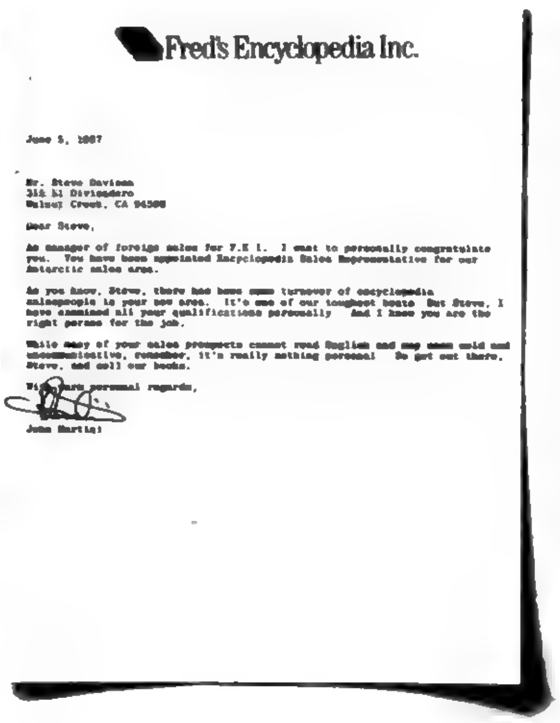

Fred's Encyclopedia Inc.

June 5, 1987

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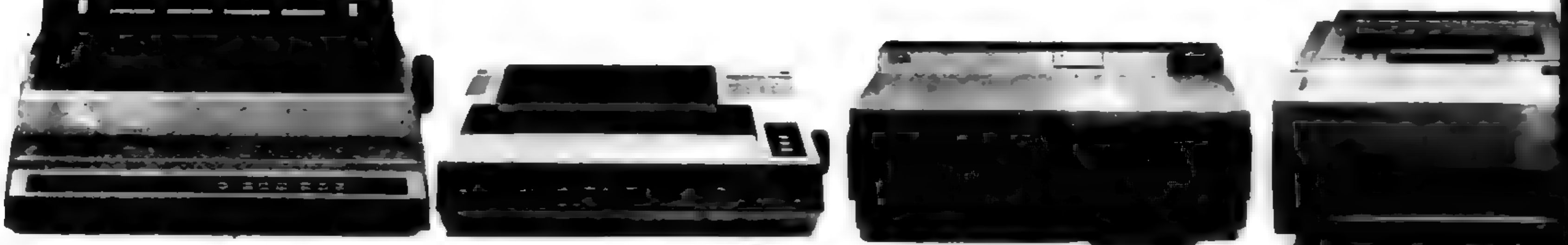

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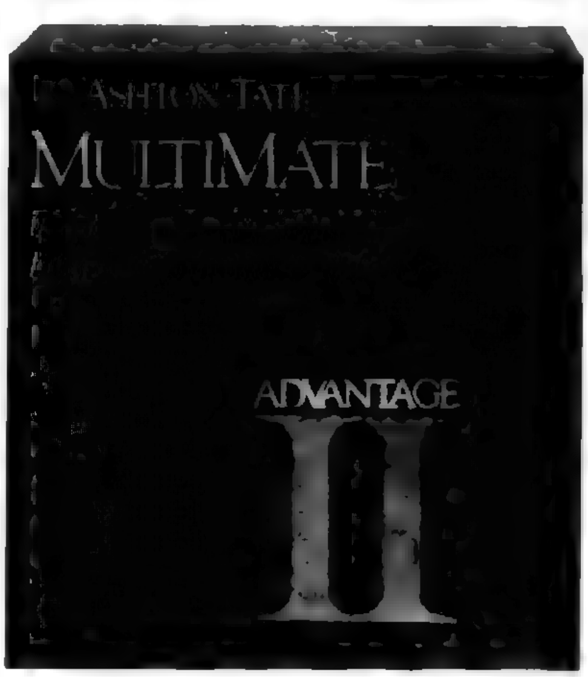

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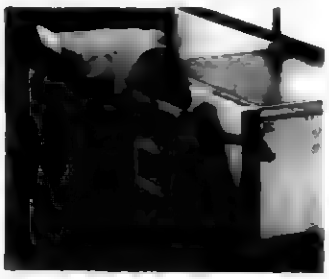

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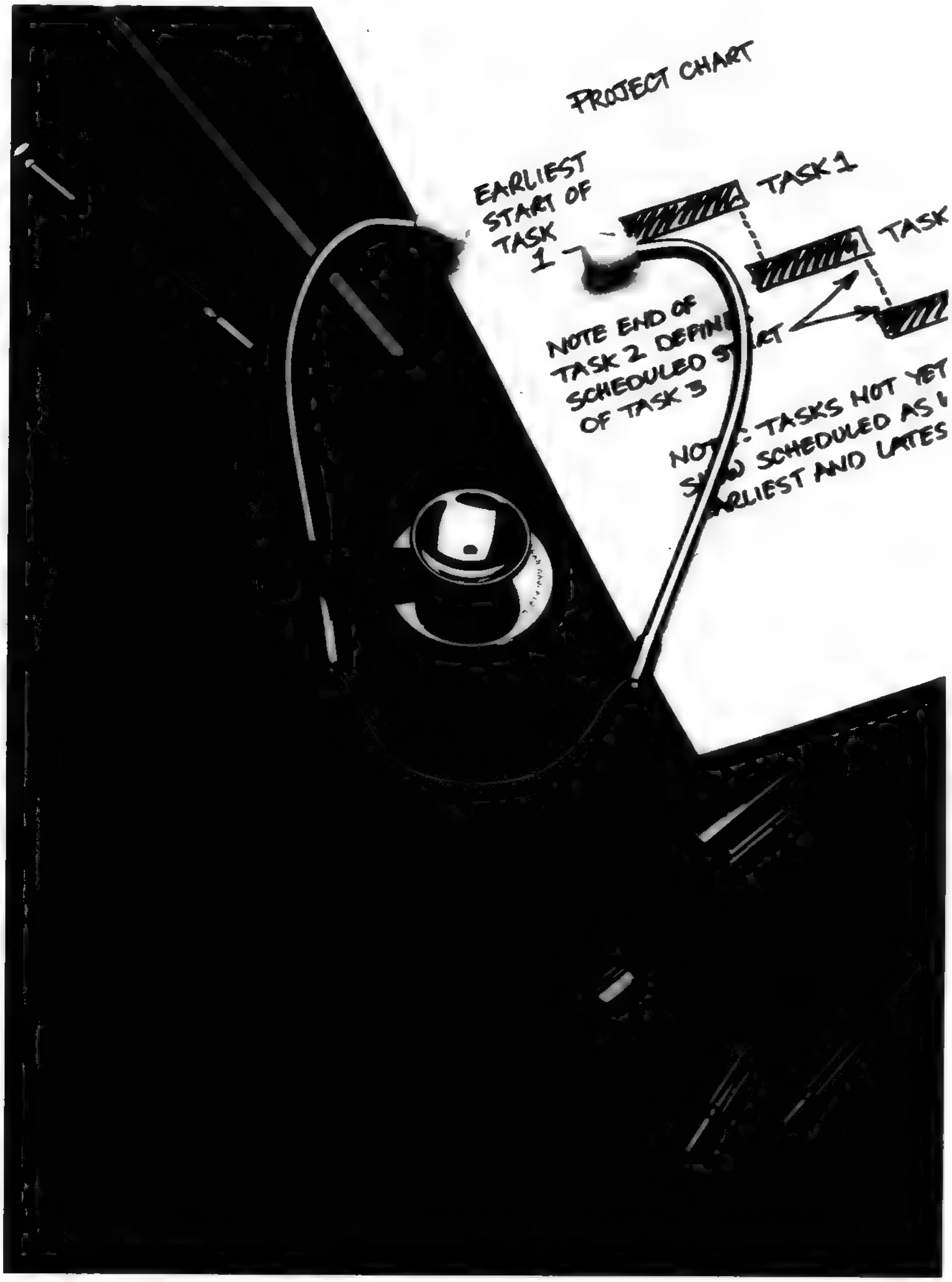

Service doesn't just mean repair anymore. Response in times of trouble, while still crucial, has become just one item in a constellation of support services that includes planning assistance, training and problem prevention.

AUGUST 17, 1987 • SPOTLIGHT NO. 18

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Increased competition for service business has produced broader coverage and has spurred more individualized offerings.

PLANS UNFOLD TO COVER USERS

BY ALEXIA MARTIN

KEVIN POPE

The service requirements of computer equipment users are becoming more complex as systems stretch to accommodate more ambitious and far-reaching applications. The old definition of service as repair and maintenance no longer constitutes an acceptable response.

When a customer in California orders a rental car from Avis Rent-a-Car System for pickup at LaGuardia Airport in New York, for example, that would seem to him a relatively simple process. Behind the scenes at Avis, however, the nonstop Wizard network processes this and thousands more transactions every day from reservation agents in 17 countries.

The network connects more than 8,000 devices — terminals, printers and systems from a variety of vendors — as well as time-sharing services and connections to American Airlines, American Express Co., Citibank NA and others. Sales and marketing personnel tap into the management information system through either the time-sharing system or the information center.

Keeping everything running smoothly in a complex network with multiple applications, multiple sites, multiple vendors and multiple user types requires dedicated personnel and well-managed relationships with system and service providers. No matter how efficient Avis internal staff resources are or how fault-tolerant the technology, computer equipment occasionally malfunctions or requires fine-tuning. As the number of end users increases, their demands also impact service requirements.

Avis currently has maintenance contracts with General Electric Co. and IBM, among others. It uses a variety of approaches to maintenance, based on economics. But what is most important, according to Dave McNicholas, senior vice-president of Avis's systems marketing and development, "is reliability and availability. When we have a malfunction, we want it fixed — we don't want any fumbling in the dark from our service providers."

The combination of complex environments of sophisticated networked systems and increasing numbers of relatively unsophisticated users demands equally sophisticated responses from service providers along with a special sensitivity to individual needs.

For a long time, manufacturers defined service as the ensurance that the product (hardware or software) performed to specification. Given customers' more complex needs, however, manufacturers and independent service organizations are revamping that concept. Service now means total customer support, throughout the life of a system and beyond.

Support begins before the actual sale of the product, with the manufacturer selling the right solution based on an understanding of customer needs and, in some cases, educating and helping customers to understand their needs. It encompasses implementing a solution — planning the process, training technical and nontechnical users, installing hardware and software and troubleshooting during this critical start-up period.

The umbrella term "service" also encompasses providing ongoing support, identifying

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Martin, a consultant at Information Systems Consulting in Los Gatos, Calif., specializes in the development of service and support portfolios. She is the author of the multiclient research study, "Service and Support Opportunities."

Plans unfold

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hardware or software faults — ideally before they cause problems — fixing them and maximizing the effective and efficient use of systems. Actually, as it includes assisting customers to evolve or migrate to more appropriate solutions as they change and grow, service is a never-ending process.

As the computer industry grows increasingly competitive and systems become more similar functionally, manufacturers grow to regard total support of the customer as a way of differentiating themselves from competitors.

Service is also a recession-resistant profit generator. Service revenue reached an average of 27.86% of total revenue in 1986 among 11 computer companies tracked by E. F. Hutton & Co. in its Electronic Data Processing report. Several of the companies said that more than one-third of their revenue is derived from service — Digital Equipment Corp. with 34.6%, NCR Corp. with 35.1% and Control Data Corp. with a hefty 43.5%.

As service revenue, whether defined as just hardware maintenance or as more comprehensive customer support, continues to rise from a third or so to roughly half of manufacturers' revenue (as E. F. Hutton estimates it will), the nature of their business will change to more of a service function, with as much emphasis on process as on product.

This orientation toward process, which integrates service components of maintenance of hardware and software with training and consultative assistance, bodes well for customers.

Anticipating problems

Regardless of whether users get maintenance services from manufacturers or independent service companies, they'll be seeing a lot less of field engineers. Through manufacturing advances, technology is more reliable, and equipment faults can be predicted before they happen via remote diagnostics between computers and vendors' high-tech centers. On-site assistance is being replaced, or at least significantly augmented, by service technology.

"Service technology" is the term used by manufacturers to describe the delivery of service via technology. Tom Bankert, director of service technology engineering services at Data General Corp., says, "Service technology drives productivity, generates new service offerings and allows us to funnel our expertise into customers' systems."

The value for the customer is a more reliable system and lower cost of ownership. The value for the vendor, according to Bankert, is in the ability to "service an increased number of more complex systems in the field without an increase in work force."

The service delivery process starts in product development at which time service engineers, concerned about serviceability and maintainability, contribute to product design. Products are designed so that users can install, diagnose and maintain them. Intrepid users can install most micros and swap components for repair. Even large, multiuser systems such as Hewlett-Packard Co.'s Micro 3000 or the IBM System/36 are sold as user-installable without tools, in large part because of their modular design.

Remote fault diagnosis

System monitoring and error analysis is also increasingly being built into larger systems such as IBM's 3090.

In the movie *2001: A Space Odyssey*, HAL sonorously tells the ship's crew, "I am having difficulty in maintaining contact with earth. The trouble is in the AE-35 unit. My fault-prediction center reports that it may fail within 72 hours." Although such self-monitoring by computers was only recently the stuff of science fiction, it is now very much the stuff of reality.

Service engineers at NCR, for example, use a remote diagnostic tool, Expert Systems Preventive Maintenance (ESPM) on the company's I-9000 products to test customers' failing systems through telephone connections. Using a component called a health monitor, ESPM checks the customer's system for such indicators as repeated memory errors or faulty disk sectors. If ESPM detects any symptom of a pending problem, the error logs are automatically sent to the NCR Remote Support Center. There, an expert system is used to analyze the log and make recommendations.

In many cases, problems can be resolved remotely without having to send a field engineer. When on-site support is needed, service engineers are dispatched with the right equipment to fix the already diagnosed problem. Error logging lets users or vendors identify problems and request service on equipment that is beginning to fail before system performance is compromised. This predictive maintenance is changing the nature of service from a reactive "fix-it" activity to a proactive solution.

On the other end of the customer's remote diagnostic telephone connection is a high-tech service or support center. To reduce costs associated with providing support from multiple local sales/support offices and to leverage expensive telecommunications and expert diagnostic systems, manufacturers

Continued on next page

Firms explore 'help-yourself' attitude in maintenance

Choosing to become a self-maintainer is "a matter of money and politics," says Bob Webber, president of Computer Maintenance Corp. (CMC) in East Rutherford, N.J. "The money piece is that you can make a case to become a self-maintainer, given a certain number of devices." The political issue, he says, is whether data processing, purchasing or even the Help desk should manage the maintenance operation.

Relatively few companies do all their own maintenance on their mainframes and minicomputers. The few who do are mostly regional Bell holding companies or large manufacturing companies with round-the-clock operations and an infrastructure of service technicians.

When organizations have a response-time requirement that cannot be economically met by vendors, they become self-maintainers. When jobs are needed for outdated technicians who are too young to be retired but have too much seniority to be let go, an enterprising manager will attempt to justify performing major computer maintenance in-house. Other reasons cited by companies that are performing self-maintenance are the possession of highly specialized hardware, security requirements or proprietary information.

Some large companies, for which self-maintenance represents too drastic and risky a step, are moving into a middle ground and exchanging contracts for time and materials maintenance.

'Self-insurer'

One company pursuing this course is Syntex, Inc., a major pharmaceuticals research and manufacturing firm based in Palo Alto, Calif. "Syntex is a self-insurer, not a self-maintainer," says Art Keller, director of computing. "We still buy maintenance contracts on our IBM 4381, 3081 and 3090 CPUs, but maintenance on direct-access storage devices, controllers, tape drives and communications gear is performed under time and materials." Keller has saved Syntex more than $400,000 in the last three years. With the savings, he can buy spare parts as backup to protect Syntex operations.

"We do a risk analysis on each device to determine our exposure," Keller says. "We weigh the cost of a spare part against the cost of a maintenance contract. If we're not willing to step up to the cost of a spare part and can't tolerate the risk of being down, then we go with a maintenance contract." For its mainframes, Syntex has signed a minimum maintenance contract that covers weekdays and prime shift, as well as overtime charges for maintenance calls outside this coverage.

"Given the reliability IBM builds into its gear, we feel this approach is much more cost effective," Keller says. "With this approach and with our problem-management and change-management procedures, we provide our users 99.6% availability."

Micro motivation

Self-maintenance is a more common phenomenon in the areas of micros and terminals. Increased reliance on personal computers in business, combined with the unpalatability of paying 10% of the purchase price or more per year for maintenance, is driving companies to consider the self-maintenance option.

INCREASED RELIANCE on personal computers in business, combined with the unpalatability of paying 10% of the purchase price or more per year for maintenance, is driving companies to consider the self-maintenance option.

The information center often serves as the motivating force to develop a hardware maintenance capability. Help-desk staff start by exchanging an entire workstation, monitor or printer and eventually move to board replacement and more sophisticated service. A manager of technical support at a major aerospace company says, "Any time we have five units or more, we maintain them in-house."

Mark Linde, lead analyst in information services for Home Box Office (HBO) in New York, says his operation currently maintains 400 PCs. When HBO started, it had 80 to 90 PCs. "It was more economical than paying a maintenance organization $250 per PC. We had staff already working on teleprocessing terminals and just taught ourselves what we needed to know to maintain PCs."

The decision at HBO to bring maintenance in-house was also motivated by information services' service-oriented philosophy of keeping users comfortable with new technology. "Our end users are more comfortable with us than an outside service organization. We can fix problems with their machines in one to two hours," Linde says.

Having more than 300 units might justify establishing an in-house capability to displace maintenance contracts that average $250 per PC each year. The major costs for self-maintenance include labor, benefits, training and parts. Technicians also need documentation, diagnostic equipment, sources for spare parts and a way to fix components cost-effectively.

A self-maintenance company experiences problems when it owns a wide range of equipment, each piece of which requires a significant investment in spare units or when purchases of new equipment frequently necessitate retraining of technicians.

"We found we had to develop standards for acquisition in order to limit the number of different kinds of micros we would have to maintain," says the aerospace company's technical-support manager.

Buddy system

Computer manufacturers and independent service companies have responded to this trend toward self-maintenance by offering parts banks, board repair, backup service plans and resident personnel.

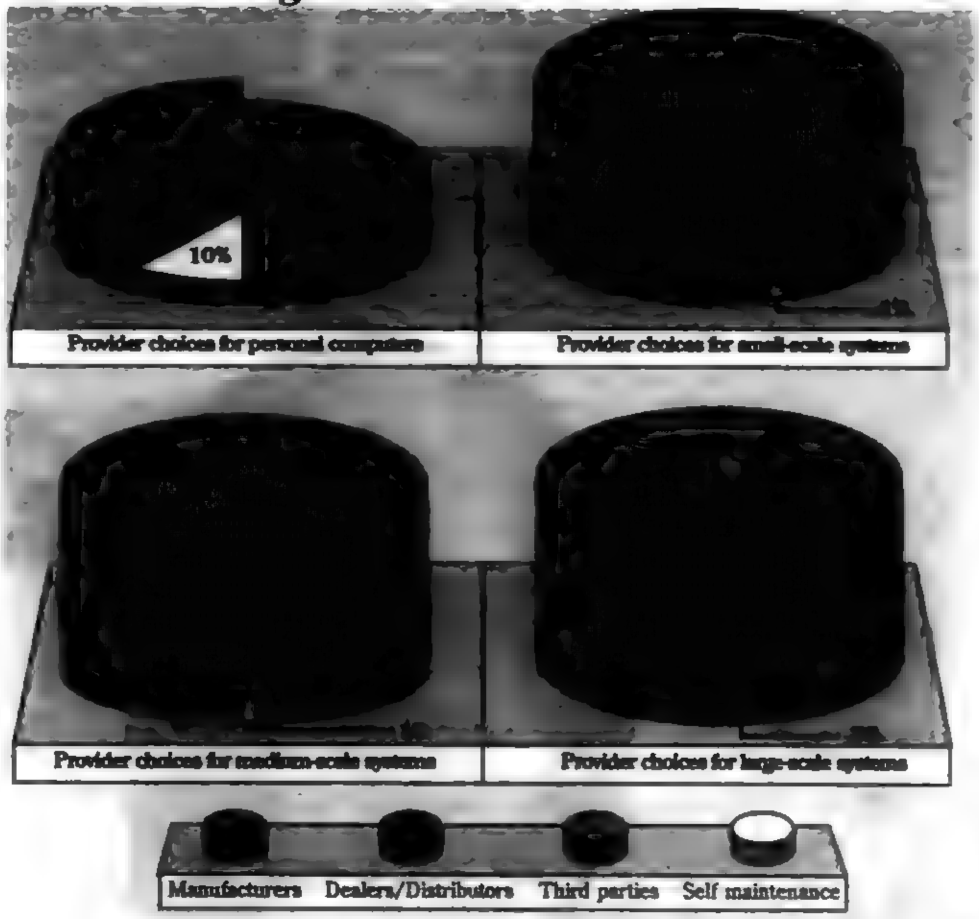
Hewlett-Packard Co.'s Cooperative Support Program, for example, begins with extensive customer service training. The program includes parts and exchange, inventory management guidance, engineering change service notes and phone-in technical assistance. The on-site time and materials assistance of an HP customer engineer is also available.

For the user organization with equipment from several vendors, a relationship with a third-party maintenance organization that has a spare-parts inventory and loaner microcomputers and peripherals will make maintenance life easier. At HBO, Linde's group fixes what it can in-house but sends boards to CMC.

CMC's Webber says, "The self-maintenance company and the independent service company are natural partners to provide responsive and economical service to the user."

ALEXIA MARTIN

Where users go for service



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CW CHART: AMY J. SWANSON

Plans unfold

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increasingly centralize service into national or regional centers. For customers, the value of these centers is that they offer consistent support, regardless of where the customer is located.

Integrated support center

Currently, major manufacturers retain separate hardware service and software support centers. But an emerging trend is to offer a single point of customer contact for hardware, software and networking service and support to simplify problem solving.

A prime example of how integrated support can work is DEC's Colorado Springs-based Customer Support Center (CSC). The CSC houses groups responsible for remedial and advisory support of internal and external hardware and software customers throughout the U.S.

During 1986, the CSC supported 56,000 customers and one million telephone calls. At the center, work groups of hardware and software specialists deliver services such as system problem analysis, preventive hardware services, advisory software product services, remote software remedial support, network monitoring and maintenance support, Decsupport remote delivery (software fixes and updates) and the Digital Software Information Network (a data base of product information).

Behind the scenes

Vendors are increasingly making use of customer information systems. When a call comes in to a service center, the service representative can immediately access background about the account and respond with knowledge about the customer's systems and environment.

These same information systems are used to monitor the time to repair and, depending on company policy, call service escalation procedures into play.

Computer-assisted dispatch speeds service engineers on their way to customer sites. IBM customer engineers are equipped with portable radio terminals to receive service calls. Engineers use the terminals to access an electronic mail system, IBM's Electronic Customer Communication Option (ECCO), and communicate with other IBM parties that can expedite service and correct faults.

Customers with a network maintenance option can log problems directly to ECCO rather than call a toll-free number and monitor the status of problem resolution for themselves.

The days of snippy, unknowledgeable customer support representatives asking, "Have you read your documentation?" may be over. To cut costs and provide more timely information, vendors are increasingly making on-line data bases, originally created for internal use, available to customers.

These data bases contain information about known problems and their associated solutions, installation, use, products and pricing and sometimes provide programs such as configurators or software demonstrations.

All the answers

"Answer every question only once" is the philosophy behind Askinfo, an electronic support delivery system that IBM makes available to customers for the first six to nine months after an equipment purchase.

Eligible customers can search a data base about IBM products, on subjects ranging from VM systems to personal computers. The data base includes commonly asked technical questions and answers, installation information and news items.

If the search does not produce an answer, customers can ask a new question. These questions are routed to an IBM technical support center and are answered by product specialists, normally by the end of the next business day. Questions and suggestions about Askinfo are reviewed by product specialists and are periodically added to the data bases. Askinfo is evolving into the role of IBM's strategic direction for direct customer technical support, replacing telephone support from its Customer Assistance Centers. As of January 1988, no new customers will be provided telephone support.

Service technology is making it possible for manufacturers to reduce on-site calls, keep labor costs low and pass on more attractive terms to customers in the form of cooperative maintenance or self-maintenance options (see story page S2). If on-site services are needed, they will be expedited with the assistance of a field engineer who has been briefed on the problem and is carrying the proper equipment to fix the system.

> THE DAYS of snippy, unknowledgeable customer support representatives asking, 'Have you read your documentation?' may be over.

As more vendors make diagnostic tools available to customers, the option of self-maintenance will appear increasingly attractive. Customers must determine, however, if using their internal labor is truly as cost-effective as contracting with a vendor for service and support.

One of the most significant service trends, due to the complexity of customers' systems environment, is the response from manufacturers and independent service companies alike in providing consultative services.

Vendor as consultant

Service delivery will increasingly be more consultative in nature. Prior to a major sale, manufacturers provide, often for no fee, feasibility studies, needs assessments and cost justification assistance. Planning, design, conversion, customized training and implementation services are sold as part of complex system installations. Other fee-based consulting services include application development and programming, capacity analysis and planning and project management.

IBM's Systems Integration and Professional Services (SIPS) group, for example, offers users the following consulting services:

- Application development assistance consisting of on-site user requirements analysis, design, programming, testing and system implementation.
- Review of customers' project management capabilities and training in IBM's project management process.
- Software installation and testing of IBM packages.
- System integration in which SIPS will manage and perform complex development and installation efforts.
- Solutionpacs: Fixed-fee, predefined offerings that might include software customization, software installation, technical and user education and postinstallation support.
- System programming for operating system or data communications control system offered on-site or from remote sites.
- Conversion assistance for IBM-to-IBM systems or some other manufacturer's system to IBM.
- Data security consulting.
- Information system consulting on data base or system architecture.

SIPS, totaling 1,000 staff members, originated by providing these services to the government. It is currently leveraging its experience and aggressively pursuing large-scale commercial business.

Already, SIPS has begun work with Ford Motor Co. to integrate Ford's current computer systems with IBM 9370s, which will be used as office processors. SIPS will also assist Ford with plans for its future systems directions.

Other manufacturers offer niche consulting services. For example, Steve Kiser, field operations manager of Xerox Systems Consulting and Integration (XSCI), says his group focuses on document processing studies, which embrace desktop publishing, electronic printing and electronic publishing.

XSCI begins by identifying document processing applications and their related benefits. Staff members then develop a strategy and implementation plan. They also design the appropriate systems and facilities and establish the required organizational and operating processes. They train customer personnel in proper practices and procedures and establish publishing standards for controlling and improving performance.

Package design

Selling services, particularly when they include a great deal of intangible consultative services, is not easy. Most major manufacturers had, until recently, offered fairly plain-vanilla services to meet customer needs and pocketbooks.

On the hardware side, vendors offer on-site contractual services available from 8 a.m. to 5 p.m. Monday through Friday, as well as extended hours and day coverages, and carry-in and depot repair services.

Software support for operating systems and generic applications, such as office or data base management, is also offered under a comprehensive on-site contract that includes telephone support and software upgrades and documentation. The latter two are usually also available on a stand-alone basis.

To make consultative services easier to understand and sell, vendors are finding innovative ways to package service and support and also are developing high-profile marketing approaches. The trend in packaging is to provide an integrated service package consisting of some combination of hardware services (site planning, installation and maintenance), software support (account management, telephone support and software/documentation updates), training (for both technical and end-user staff) and a variety of consulting services.

The right solution

Experienced customers, while they may not like it, understand that maintenance and training are required. First-time buyers, on the other hand, particularly end users or office-systems employees, have been led to believe that technology is almost fault-free and that once the vendor installs the system, everyone will be up and running miraculously, beating out their competitors. The reality is quite different.

"OUR USER base has broadened so significantly that it has become a management issue to train and support our users."

KATHY RICHARDS
FIREMAN'S FUND
INSURANCE CO.

One department manager at a major San Francisco bank, watching his people begin to use PCs, moans, "Never has a technology been so crude and required so much training." Selling the right solution, in terms of systems and services, is the first key to customer satisfaction.

Clarifying customer expectations is also critical. Kathy Richards, director of business computing support at Fireman's Fund Insurance Co., headquartered in San Rafael, Calif., laments, "Our user base has broadened so significantly that it has become a management issue to train and support our users."

Such users are becoming more wary of vendors who downplay the need to train. At Hewlett-Packard, sales representatives, assisted by service representatives, work with new customers to make sure they understand what is required of their organization during and after implementation ~~in the~~ way of support and training and how HP will help. Every systems sale made by HP is reviewed by local sales, customer engineering and system engineering management to ensure that the proper product and service mix is sold to meet the customer's application need and level of sophistication.

Most manufacturers provide free site examination, hardware installation and verification that equipment is working with larger systems. Recognizing the implementation period as a critical time to cement customer satisfaction, some manufacturers provide varying amounts of no-charge services, such as planning or design reviews, as part of marketing support. To an increasing degree, implementation services are being expanded and offered as fee-based start-up services. These are available for MIS to use in support of end users and are being refined for use by actual end users outside the direct control of MIS.

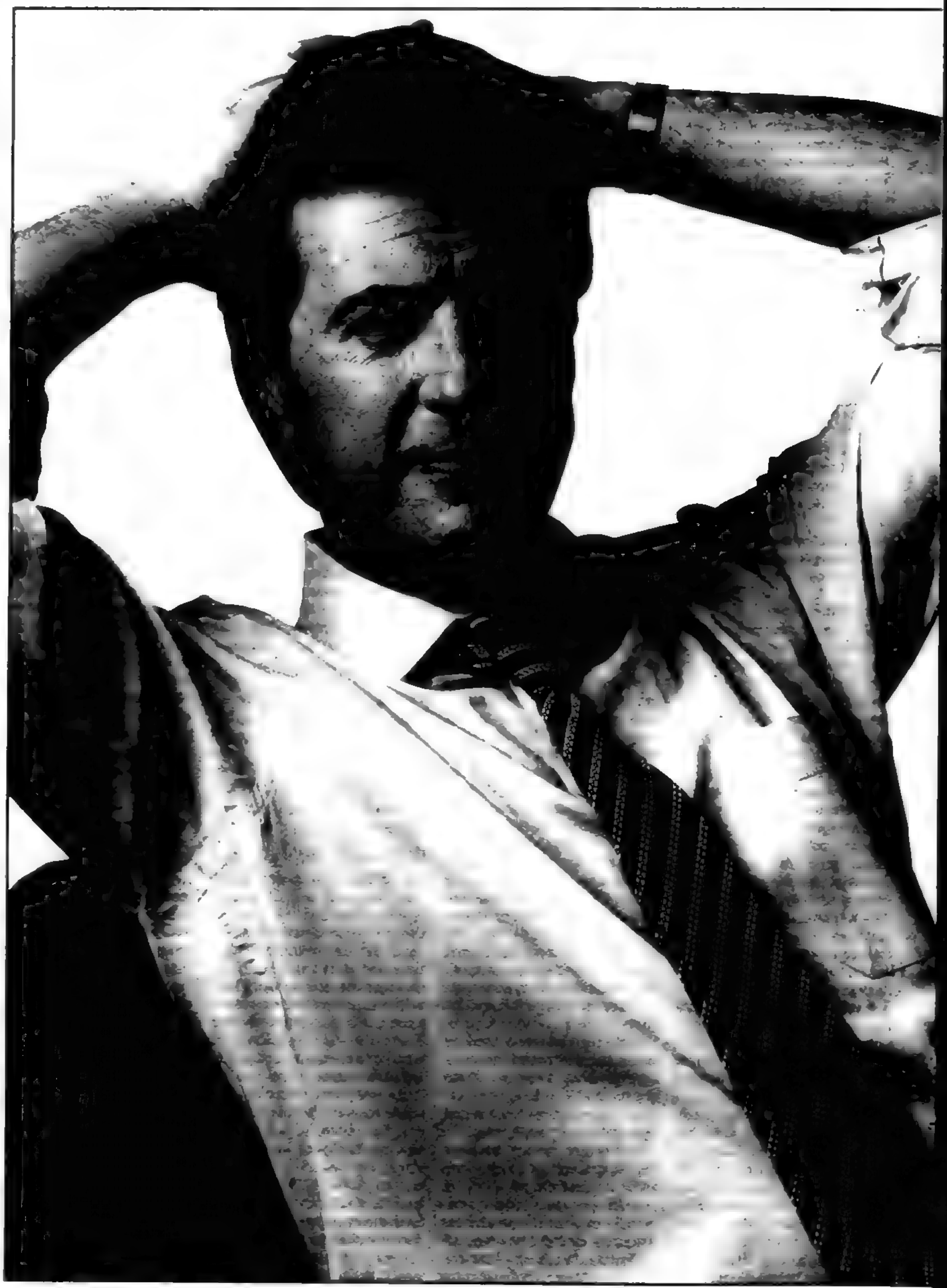
A sampling of services

These start-up services include planning and guidance assistance, training, a first-year maintenance contract and, sometimes, access to a time-sharing system on which the customers' implementation staff can come up to speed. In this area, DEC's services are the most comprehensive and expensive.

HP offers structured Assist programs for $5,700 with a "cookbook" for customers to follow to develop their own implementation approach. Customers develop their own implementation plan and carry it out with HP system engineers assisting at critical points such as hardware and software installation or review of the customer's plans for training and ongoing support.

DG offers a similar approach, with pricing based on system and configuration, reflective of DG's experience with multisite, networked installations.

IBM's Solutionpacs, as an



example of fixed-fee packages consisting of software and support, are offered to simplify the marketing, ordering and installation of specific IBM products such as Netview Program Product, Token-Ring Network or System/36 office series.

Scott Bower, marketing manager for Solutionpacs, says the value to the customer is that "with a fixed price on professional services, the customer knows what he is paying for up front."

A Solutionpac offering may consist of some combination of pregenerated systems and applications software, "snap-on" applications software for standard operating environments, application competency center support, customer support telephone service and customized or fixed-price application integration and customization services, design, installation and education services. While mostly software-support oriented, Solutionpacs also may contain maintenance services and a single point of contact for service for the total offering.

Following a general trend to sell industry-specific hardware and software solutions, manufacturers are beginning to tailor services to industry needs. This trend is most visible for the presales and implementation aspects of the system life cycle. Several manufacturers, notably IBM, DEC and HP, have industry-specific competency centers in which experts assist customers to determine needs and then implement major systems tailored to their companies.

HP Assist comes in industry-specific varieties such as manufacturing, engineering or financial services. IBM's new 75-member Customer Service Sector marketing team is working to develop total service and support packages with a vertical-market focus (banking, finance/brokerage, manufacturing, retail). The strategy will be delivered via Solutionpacs.

Hardware service solutions are not yet industry-oriented. One manager of field services reports, "We don't really see enough commonality of needs among companies in an industry to tailor our hardware services to an industry sector. We always work with customers to tailor service to their specific needs." On the other hand, customers frequently criticize field engineering for its lack of knowledge of their business. With more industry focus and field-service training, vendors can erase this criticism.

FOLLOWING a general trend to sell industry-specific hardware and software solutions, manufacturers are beginning to tailor services to industry needs.

Several manufacturers and independent service companies with general market products are, in fact, assessing customer needs in order to develop industry-specific cradle-to-grave service portfolios.

With these start-up and implementation services continuing to be more industry-specific, customers have the option of contracting with manufacturers. Customers do not have to muster extensive internal staff resources to implement new systems that must be reabsorbed into the organization when the job is finished.

Network services

Given the increased demand for corporatewide and local-area networks (LAN), manufacturers with such products are packaging specific network services that combine hardware, software, training and consulting services. DEC, for example, markets network services from its field services, software services and educational services organizations, according to Will O'Brien, corporate strategic marketing manager of field services. Though the services may come from separate organizations within DEC, the customer receives an integrated solution.

DEC's network services portfolio includes network physical design consulting services, such as site survey, physical layout design and installation planning; network physical installation

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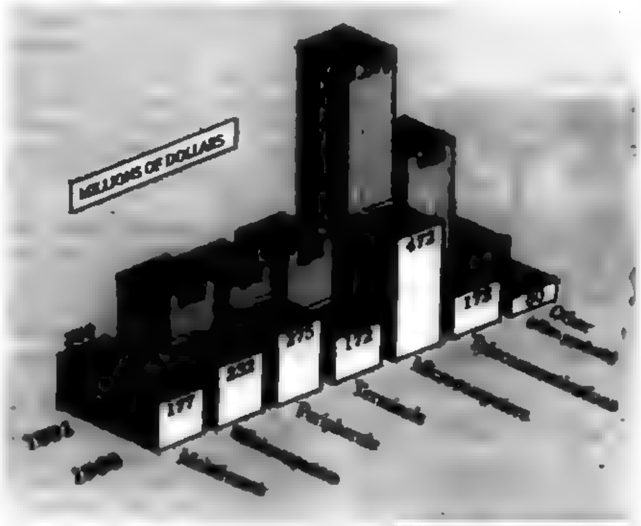
management, in which DEC manages all network installation activities from planning to network acceptance testing of the equipment and functional testing of applications; ongoing maintenance under a DEC service contract; Servpak services — simple, fixed-price planning, installation and maintenance services; and Decsite services — assistance to prepare space for new equipment or when moving equipment to a new site.

The next significant group of players to enter network services, and with true added value, will likely be the regional Bell holding companies and independent telephone companies, working on their own or in conjunction with independent service companies.

The holding companies' added value is their ability to focus on network and systems management, which includes voice communications in addition to high-speed data services and peripherals. Several of these players plan to provide a single point of contact for system monitoring, diagnostics, inventory tracking, implementation coordination, preventive maintenance and system restoral.

Hardware maintenance activities
User expenditures by product category



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Multivendor services

To minimize finger-pointing and maximize the pinpointing of problems in a multivendor environment, manufacturers are extending service options to cover nonlogo systems. If the manufacturer has network products, these are offered under the umbrella of network services or, if not, as the offering of a third-party services arm. Depending on the manufacturer's strategy, these services include maintenance of other vendors' equipment, or at least replacement of such equipment if it is shown to be at fault, or the manufacturer acts as a general contractor through cooperative arrangements with other vendors (usually of noncompetitive but compatible systems).

DEC began servicing non-DEC equipment several years ago under its DEC-compatible service option and currently services more than 1,000 such products. The company would prefer to be seen not in the third-party maintenance business but rather as a total-support provider — a network service provider. O'Brien says, "A customer puts a non-Digital peripheral on a VAX. We are committed to support our customers, and that includes the non-Digital peripheral."

Service engineers may not actually perform the maintenance, but DEC will manage the resolution of the problem, subcontracting to another manufacturer's service operation as necessary for the actual maintenance. The key to remember is that DEC will maintain (or manage maintenance for) non-DEC equipment if that equipment is connected to a DEC system or network.

Honeywell Bull, Inc.'s Customer Service Division's service strategy, prior to the split of Honeywell Information Systems from Honeywell, was to become the single source of "building services" — servicing environmental control and security systems, networked minicomputers (Honeywell minis and others) and popular end-user workstations and peripherals.

Today, according to Dick McDermott, director of Honeywell's third-party service marketing division, the focus is to provide network services and become a general contractor that can address hardware, software and communication maintenance needs in an office, building or plant or in a multisite corporation.

In June, IBM announced to corporate customers that it will help them integrate non-IBM equipment with IBM products across its entire product line. The move is part of a strategy to deliver integrated service management, with the focus on network services. IBM's Complex Systems Organization will act as prime or subcontractor to implement customers' systems, including other vendors' products. On the PC front, IBM's expanded support program provides for replacement of specific non-IBM products diagnosed as causing machine failure with non-IBM spares acquired by IBM. Unisys Corp. is set up to support customers with critical or revenue-generating applications regardless of which vendor's equipment is in place, according to Bob Wilson, director of customer services sales.

Entering the multivendor or third-party service is a profit-generating strategy and a marketing tool for additional system sales. The move to provide such services is under scrutiny by most major manufacturers.

Independents' response

Manufacturers' encroachment onto the turf of third-party maintenance organizations, which prefer the term "independent service companies," is provoking innovative responses from these independents. These companies view the move as an opportunity to show how their services better address customer needs.

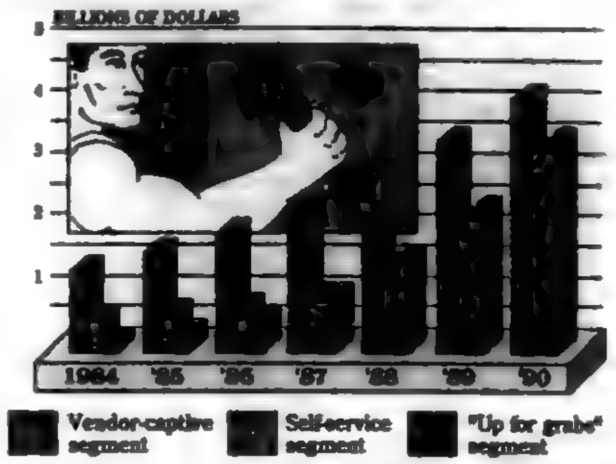
Whereas a manufacturer's expansion into service is a ploy to sell more of its own equipment, says Bill Patch, vice-president of marketing and planning at Sorbus, Inc., "the independent service companies have no ulterior motive. We want to help the customer get the most out of the life of the system."

TRW, Inc. is beginning to market a "service concierge" concept. "We're going after big IBM data centers in a class way," says Jim Larkin, director of sales operations. An account manager will take full responsibility for customer satisfaction at an account and interact with the various service functions within TRW.

Quality service and lower prices have been the hallmarks of independent service companies. Savings realized by customers moving from manufacturers' service contracts to such companies average 15% to 20%. Savings can be even higher for maintenance on older equipment, since some manufacturers raise maintenance prices on such systems. The promise that one party will be responsible for all maintenance is the biggest lure the independent service companies offer. The larger companies maintain mainframes, minicomputers and micros from most major manufacturers. Expanding from single systems, TRW, Sorbus and Intelogic Trace, Inc. are beginning to offer maintenance and consulting services for all equipment on LANs.

The independent service companies will increasingly offer customized programs tailored for multivendor environments, handle problems associated with networks of computers and data communications equipment nationwide and provide software support. High-visibility telephone support and software fixes should make offerings from independent service companies even more attractive. With such services, these companies are capturing about 10% of the total services market.

Revenue trends in network support services
Shares for the major market segments, 1984 to 1990



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> INDEPENDENT service companies "face a serious difficulty — access to manufacturer training, documentation and parts — particularly for the latest products."
>
> D. R. MACNAUGHTON
> BUSINESS DEVELOPMENT INTERNATIONAL

Our research at Information Systems Consulting, a consulting firm based in Los Gatos, Calif., shows that independent service companies, particularly smaller vendors, are providing far superior service to that of manufacturers. Smaller independent companies are capturing customers with more comprehensive service and support.

Pritronix, headquartered in Dallas, is a "customer advocate — representing the customer rather than the product," says Jim Price, Pritronix president and chief executive officer. The firm provides services from the cluster level down. According to Price, "typically, IBM will maintain the 3090 down to the controller but can't afford to give a lot of support below the controller, which is the most mixed vendor environment."

Pritronix's support staff works with a customer to define requirements, review and test product alternatives and make a recommendation. Pritronix "warmware" support staff also implements the system, trains users and maintains it.

Independent service companies, however, "face a serious difficulty — access to manufacturer training, documentation and parts — particularly for the latest products," according to consultant D. R. MacNaughton of Business Development International in Franklin Lakes, N.J.

IBM's support to third parties is generally acknowledged as good. DEC's reputation, on the other hand, is one of being increasingly recalcitrant and difficult to deal with. DEC insists that it provide parts and training to all direct owners of specific products. One astute independent service company executive says, "DEC's recalcitrance and arrogance is fostering creativity. You better believe independent service companies will develop ways to get around them and best them, just because they are arrogant."

Manufacturers entering the multivendor service arena are also finding out for themselves the realities of difficult access to parts, documentation and training. TRW, Sorbus and others have been around for a long time and have addressed the difficulties. While they do not enjoy the same luxury a manufacturer's service arm does of easy access to engineering, source code and logic diagrams, these companies have figured out how to create the same body of knowledge that a manufacturer has of its products by using reverse engineering and other trade secrets. Manufacturers will have to develop comparable knowledge for other manufacturers' products, and they are far behind the independent service companies on the learning curve.

Rick Brusuelas, manager of market research firm Input's customer service program, predicts that the aggressive independent service companies will continue to innovate and shed their reputation of providing just hardware maintenance. "If they don't innovate," he says, "they'll lose market share and see their business potential deteriorate."

Price wars

Making life even more difficult for independent service companies are the price wars resulting from IBM's Corporate Service Amendment (CSA). CSA provides 16% to 36% maintenance discounts to customers willing to accept responsibility for initial problem diagnosis. Whether to become more competitive with DEC or independent service companies, IBM's move has started a price war that should ultimately reward the customer.

Independent service companies, notably TRW, Sorbus and CDC, have countered with their own programs, some cutting prices even further and some offering more favorable terms and conditions [CW, June 1]. Like IBM, TRW has an enterprise approach to the market and recognizes the value of large accounts. It has made that recognition tangible in the form of a TRW Service Plus Amendment, according to Larkin. "TRW's prices are already competitive," he says. "TRW Service Plus Amendment pricing offers an increased discount of 10% to 20% over normal prices."

The company offers favorable terms and conditions with its amendment. It provides seven-day 24-hour service at no additional charge. It offers two-year price protection to customers who sign up for four or five years and offers a price cap of 5% thereafter. TRW also allows 30-day cancellation for poor service. "We take a reasonable approach to customer problem tracking and resolution," Larkin says.

Sorbus's Patch reports that the major difference between his company and IBM is that Sorbus is more flexible in pricing, based on what equipment the customer has. "Our discounting," he says, "is based on total number of sites, density of equipment at a single site and whether the customer has a Help desk to do preliminary problem determination."

Instead of focusing on negative incentives like money down or certification based on hundreds of questions, Patch says, the Sorbus contract has positive incentives such as one month of free service in a two-year contract. Price is an attention getter, but customers cannot afford excessive downtime and are sensitive to quality and a known level of service.

CSA has actually created an opportunity for independent service companies to clarify for customers just what strings are attached to IBM's amendment and thereby get a foot in the door to sell their services. The major independents offer a quality product that is not "just IBM service but cheaper." Shopping around can result in lower maintenance costs and quality service.

Missing: 'Warmware'

Despite the fact that competition is driving prices down, stories of customer dissatisfaction still abound. The most common complaint about service personnel is "they don't understand our business." Customers criticize this lack of understanding particularly when end-user systems are being implemented. In some cases, customers also complain that service personnel do not care about them or their business needs.

In focus groups that address service needs of MIS managers, such as those run by Tony Wolff and Co. in Santa Rosa, Calif., Wolff reports that participants differentiate service from support. When asked to name the animal that best describes their feelings about service, they respond, "[Service is like a] father — he takes care of the equipment," or like "a cheetah — it's strong and quick to meet any situation." When asked to define support, respondents said, "[Support is like a] mother — she comforts me, cares for me and is always there," or "Support is a warm, cuddly koala."

Participants with minimal experience in end-user systems list "someone real nice" or someone "who really wants to help me" as service requirements. Participants from companies that are more experienced with computers respond, "We need help knowing how we can use [services] more effectively," or, "I want highly responsive, technically proficient service."

Wolff concludes that there is an overall segmented market as well as a segmented market within a firm, and "too many vendors fail to understand the qualitative aspects of service and support" for these markets.

"Vendors must do their homework on technology-based service solutions because we are hitting people in their hearts," he says. Service providers — manufacturers and independent service companies alike — need to continue their quest for reasonable prices, quality and excellence in service. In addition, they must express empathy for their customers.

Despite an emerging trend to provide specific implementation support during the critical introduction phase, manufacturers can still do more to cement a long-term partnership. Support can be defined as "to give courage, faith or confidence to, to assist, to further and to forward." Vendors that expand the nature of service to include such support will forward not only their customers best interests but their own as well. ●

Weak connection to customers hobbles network services

BY DICK MUNN

The market for network support services will probably amount to $9.2 billion in 1990, but the extent to which vendors providing network support services will profit from this growth is questionable, because vendors are having a difficult time establishing a separate identity and value for network support services.

This market can be divided into three segments — a vendor-captive segment, a customer self-service segment and an "up-for-grabs" segment.

The vendor-captive segment consists of those services for which customers normally turn to their equipment vendors for support. Customer self-service is fairly self-evident. The up-for-grabs segment is made up of those services either performed by vendors with marginal presence in accounts or services that customers would be willing to give up and prefer to have vendors perform.

Vendors with strong equipment presence in an account will most likely retain the majority of service and support business on their equipment.

Customers as competition

At the same time, customers themselves are a significant source of service and support, and it is unlikely that vendors will ever replace customers' self-service in a significant percentage of cases. Based on a 1987 survey conducted by The Ledgeway Group, sent to communications and network customers, it appears that the customer self-service segment is growing faster than anticipated. Vendors seem to be having difficulty establishing a separate identity for their service and support offerings and gaining recognition for and acceptance of the value of those services.

During the past few years, more vendors have been offering a portfolio of network support services including the following:

- Network design consulting.
- Site construction and cable-laying.
- Additions, moves and deletions of network components.
- Integration of various network components and certification that the network is performing to specifications.
- Assistance in establishing network control center procedures.
- Connecting or bridging existing networks.
- Implementation assistance for new technologies.
- Maintenance on network components.
- Network performance, analysis and capacity planning.
- Backup technical support.
- Network software support.
- Remote network monitoring and/or problem management.
- Service at remote network sites.

Respondents to Ledgeway's customer survey indicate that approximately 70% of their network or communications maintenance and support services are provided by in-house staffs. When asked if their vendors had made them aware of the special maintenance and support services available to them, 12.2% of the respondents answered "no," 21.4% answered "partly" and 66.3% responded "yes." In

Continued on page S16

Munn is president of The Ledgeway Group, a Lexington, Mass., market research and consulting firm that specializes in the service and support industry.

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IBM's CSA: It always pays to scrutinize the fine print

BY DON GOODSPEED

In October 1986, IBM summoned its largest account teams to announce a new maintenance offering, the Corporate Service Amendment (CSA). Because of the low number of customers willing to leave their existing special test maintenance offerings, such as the Enterprise Maintenance Amendment (EMA) and the Customer-Managed Network Amendment, IBM found it necessary to take the following additional actions:

- In 1987, marketing representatives were assigned a quota for maintenance agreement revenue sales.
- On Feb. 3, network discounts increased by a weighted average of more than 12%.
- On March 31, a major CSA overhaul was announced, providing free 21-shift coverage, no termination charge with notice, fixed-percent upper limit contract escape points and an additional 5% discount for a five-year contract.

It appears from client surveys that the March CSA enhancements have been enough to dispel user apprehension about the System Option in the maintenance agreement. However, feedback indicates several more improvements will have to be made before large numbers of customers will sign up for the Network Option. Many IBM customers are currently using a potpourri of service approaches on network devices, including third-party, self-service and no contracted coverage.

The CSA, undoubtedly, was approved at IBM corporate headquarters with two purposes in mind: Customers assuming some of the IBM maintenance tasks should receive a portion of the cost they have shouldered in the form of a published discount, and the CSA could provide a strategic block for the significant and growing competitive pressures of the third-party service industry.

One size fits all

IBM's October 1987 withdrawal of most current special offerings indicates it would like the CSA to become a one-size-fits-all approach. The question remains as to whether knowledgeable customers will accept this standardized approach or take their requirements to third parties for customized maintenance solutions.

By publicly announcing the CSA, IBM declared its long-range maintenance direction to its customers as well as the industry. This declaration seems to have motivated IBM's competition to provide more creative, customized solutions that carry less restrictive conditions.

During the past two months, most third parties have been declaring their own maintenance directions and are offering up to 20% lower prices than the CSA and often guarantee service satisfaction levels.

It appears that with the five-year CSA, IBM has attempted to deliver a knockout punch to the other players in the service arena. Users should be concerned about the broad implications of reduced competition giving total account control back to any manufacturer. The aggressive pricing generated by the third parties has forced IBM and other manufacturers to discount their high-margin maintenance business. The absence of such competition would reduce the need for further special deals and continued pricing concessions.

Long qualifying round

IBM customers report that meeting the CSA contractual requirements to become a qualified location is neither quick nor effortless. Clients and surveyed companies are reporting significant time differences for their local IBM team to implement the agreement. It is apparent that CSA implementation is almost totally dependent on the knowledge, organization and planning of the local marketing team.

After IBM receives a written CSA request, the company performs a detailed 372-question on-site review. (A total of 199 questions address the network option.) Numerous clients have indicated that 30% to 40% of these questions are not relevant to the actual maintenance task or its delivery.

Apparently, IBM is attempting to ensure that customers can and will perform systems- and network-management disciplines, which will allow it to preserve appropriate service margins.

Experienced users know IBM usually does not give away revenue without expecting something in return, and the CSA is no exception. Under this contract, users will earn their discounts, and IBM will secure a guaranteed maintenance revenue stream for up to five years.

The Customer Management Control Procedures Exhibit (CMCPE), as described in the CSA contract, is an all-inclusive utopian view of systems management detailing the customer's responsibility under the contract.

For a number of years, IBM has been studying systems management and how these associated disciplines can affect its service delivery costs. Few experienced large-systems users would argue against the need for effective change-, system- and network-management controls. One wide-open question remains, however: How much systems management is required to effectively manage an account?

It is one thing if the CMCPE is just a legal contractual view of customer responsibilities. However, if a customer must accomplish all items as outlined and to the level stated, it is quite another.

In the past, IBM has seldom enforced the unique terms and conditions of its maintenance agreement and its attachments. However, few prior offerings had fixed discounts equivalent to those provided by the CSA. When IBM describes change, problem, and network user responsibilities contractually and the word "must" appears 29 times, it is safe to assume not only that users will be expected to take on many maintenance tasks but also that there is possibly a change coming in IBM's enforcement practice.

> IT APPEARS that with the five-year CSA, IBM has attempted to deliver a knockout punch to the other players in the service arena.

All IBM users should understand and evaluate the CSA along with other third-party proposals; today there is no reason to pay any manufacturer's list prices.

The contract's requirement that users assume some additional maintenance-related activities needs to be quantified and prorated into other CSA fees to establish the net discount. Users must figure in all additional costs associated with the transfer of the maintenance work load.

Additional tasks users may be required to assume in order to comply with the new CSA contract requirements include training of staff and end users for set-up and use of the Electronic Customer Control Option, plus the added logging, reporting and associated administrative activities.

No price protection

A termination charge will be billed for all machines withdrawn from the CSA contract. It becomes the customer's responsibility to track, monitor and document why the charge should not apply. No termination charge will be levied if advance notice (90 days for three-year contracts, 180 days for a five-year contract) is provided to IBM.

The CSA upper limit provision offers no actual price protection. It does provide customers a contract exit if any and all combined pricing actions on each machine type have exceeded 7% or 3.5% when measured across the total CSA-designated machine inventory. The customer is responsible, however, for tracking and identifying whether either of these limits has been exceeded between anniversary dates of the CSA contract period. They then have the following three options available:

- Remove the machine type from the contract with no termination fee and pay the list price.
- Contract with another vendor for this specific product type.
- Pay the new IBM price and stay with the CSA.

For now, IBM appears to have stabilized its CSA offering, and with the exception of some minor fine-tuning to meet competitive offers, don't look for any significant changes in the near future. Even if users are currently considering other vendors or options, it will take time to secure proposals and evaluate any changes. Provided the initialization costs don't push the break-even period to more than a few months, it would be wise to get what you can now and execute the System Option while the dust continues to settle on competitive responses.

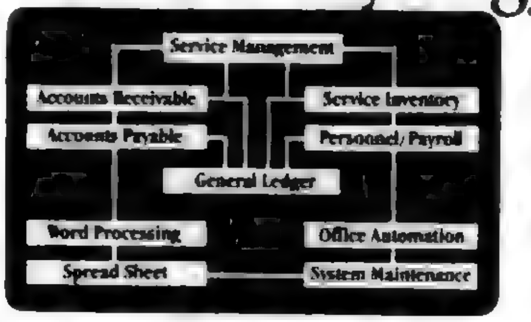
A sound plan of action could include the following steps:

- Execute the five-year System Option.
- Shortly after execution, give a six-month termination notice.
- Forcefully manage the initialization process.
- Try to negotiate the elimination of all initialization fees.
- Look for options on network product service.

A common question users ask is this: "If we take the CSA discount offering, will we then receive a lower level of service?" IBM's National Service Division must reduce its maintenance delivery costs, and one of the primary ways is to transfer work to customers and drive down the head count in the field. This is a thin line to walk, and users should pay close attention to the trends.

Top-quality service comes to those who ask, insist and, if necessary, demand. It's up to each user to manage his own maintenance program if he is truly interested in price and performance. •

Goodspeed is president of Computer Maintenance Consultant Ltd. in White Plains, N.Y. He spent 24 years with IBM in its U.S. and European services divisions.



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Extended reach: A case for sharing

BY DONALD BLUMBERG

As the market demand for viable, cost-effective equipment service and support has grown, so has the use of independent service vendors.

In a number of markets, including data processing, office automation and telecommunications, the blurring of individual technologies — coupled with an increase in networking and connectivity of individual components — as well as multivendor environments has generated a need for independents to deliver service. Customers also insist that service be defined by their needs, rather than the manufacturer's, and on a single point of contact, particularly for networked equipment.

Despite the significant growth opportunities these trends present for a wide range of service organizations, many potential market entrants are scared off by what they perceive to be manufacturers' unwillingness to cooperate with independent service organizations in terms of providing parts, documentation, training and related support. Many of these organizations believe that manufacturers can and will withhold such support from them, thus restricting or limiting the opportunity for independent service.

Manufacturers as well hold their own varying opinions concerning independent service organizations and have adopted certain views as to whether they should support them.

Explanations from beth a market and a legal basis may help clarify manufacturers' and distributors' decisions on one hand and those of independent service organizations on the other.

Economic arguments

A number of strong economic arguments make a case for manufacturers to support independent service organizations.

In the first place, users indicate that high-quality and cost-effective service is a critical factor in equipment selection. It follows that the greater the number of qualified service organizations available for a particular class of equipment, the greater the demand for that equipment will be.

In addition, users are increasingly demanding a single-vendor point of contact for service, but many manufacturers are reluctant to provide a fully integrated service that includes maintenance of equipment manufactured by other organizations. It is, therefore, to the manufacturer's advantage to ensure that the integrated-service vendors offering total service are capable of servicing its equipment.

Furthermore, when an integrated-service vendor becomes the service agent for a particular user, the cost to support equipment it cannot directly service is considerably higher than normal. The service vendor may attempt to force the user to replace the equipment it cannot support with equipment from a vendor that is willing to provide support to the independent.

> A GROWING number of users will demand a single service source, and more manufacturers will provide service to independent service organizations.

Ultimately, a growing number of users will demand a single service source for all equipment, and a growing number of manufacturers will provide service to independent service organizations.

Currently, users contracting with independent service providers — including manufacturers such as IBM, Xerox Corp. and Digital Equipment Corp., which are increasingly providing such services — are in the minority, representing perhaps 23% of the market. Research clearly shows, however, that more users are interested in buying service independent of the product from organizations that offer both product and technology and service in parallel.

Eventually, manufacturers will be forced to offer service as a separate line of business, thus reducing the opportunity for a full tie-in between service and product and eliminating any direct economic advantages that might accrue as a result of withholding parts, documentation, training and refurbishment capabilities to independent service organizations.

Legal arguments

More independent service providers are seeking legal means to force manufacturers to cooperate with them. These legal actions have been based on alleged violations of the Sherman Antitrust Act, fair trade practices, laws, patent issues and defamation. Two current cases, *Datagate, Inc. v. Hewlett-Packard Co.* and *Allen Myland, Inc. v. Digital Equipment Corp.*, represent attempts to resolve whether manufacturers can legally withhold support services from independent service organizations.

The resolution of these issues will ultimately depend on the existence of an independent, relevant market structure for service and the determination of whether the individual manufacturer, by withholding service and support, has created a monopoly position or is engaging in unfair trade practices.

Another question is whether an individual manufacturer's strategy for service support inhibits market entry or participation or creates a unique separation of pricing.

It is interesting to note that a similar set of cases has already been heard in connection with the servicing and support of heating, ventilation and air-conditioning (HVAC) controls in the U.S. market. A few years ago, contractors involved in the installation and servicing of these controls, manufactured by Trane Co., Carrier Corp. and other HVAC manufacturers, attempted to resolve this issue in the courts.

In the end, the cases were settled out of court by the participants without final resolution by the courts in favor of the service contractors. Individual agreements between each manufacturer and the contractors provided the service organizations with access to parts and other support requirements. Although not legally binding, that precedent suggests the question will be resolved in favor of the independent service organization.

In the UK, similar legal questions were considered within the year. In one case, automobile manufacturers attempted to halt parts suppliers from indiscriminate aftermarket selling on the grounds of patent infringement. That case was resolved in favor of the parts suppliers. In another, DPCE, a major third-party manufacturer, obtained a ruling that ICL PLC, a major computer manufacturer in the UK, must make available the error-logging and diagnostic support software for its operating system.

In general, legal arguments have tended to support the independent service operators, particularly when the manufacturer can be shown to be engaging in monopolistic or unfair trade practices or attempting to control the service aftermarket.

A growing economic and logical rationale, as well as a potential legal precedent, is evolving that will prevent manufacturers from witholding support services from third-party maintenance suppliers.

Cooperation pays

Independent service organizations should recognize that a broad base of legal regulations exists that prevent or circumvent manufacturers' attempts to monopolize service activity. Manufacturers engaging in such practices should also seriously reconsider their position with respect to the quality of service and support of independent service organizations.

In the long run, it is to a manufacturer's disadvantage to withhold support. In fact, providing parts, documentation, training and other support to qualified independent service organizations at a standard price should lead to a significant increase in profitable revenue from product sales.

An expansion of the general service industry to support each manufacturer's product line will enhance acceptance of the individual manufacturer's products. Manufacturers that attempt to capture a major share of the service market can best reach this goal by creating a strategic, independent service line and competing on the basis of high-quality service. ●

Blumberg is president of D. F. Blumberg & Associates, Inc. in Fort Washington, Pa. He is currently serving as an expert witness in one of the cases mentioned in this article.

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GROUP

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INTERVIEW

MARKETING FIELD SUPPORT

George Keller is executive vice-president of the Association of Field Service Managers International, an organization with almost 5,000 members in 23 countries representing some 1,500 high-technology service organizations. His previous experience includes 31 years at IBM where he last held the position of vice-president of new business development in the customer-service division. Keller recently spoke with *Computerworld Spotlight* Senior Editor Joanne Kelleher.

What would you say your members consider to be their most pressing business concern?
The largest business concern that members see today is the changing technology and problems associated with it. Most large companies are losing people rather than hiring them. What's happening is the technology is becoming so reliable that they can take care of a lot more equipment with a lot fewer people. At some point, however, the companies don't want to let people go because, although they don't have the hardware work load, they need critical mass. Let's say you have a couple of thousand people working for you and that allows you to give a response time to your customers of two hours. If the work load goes down and you get rid of too many people, at some point you can no longer respond in two hours. Consequently, some companies are trying to find new things for their people to do so they can keep their people and keep the critical mass up.

What are some of the new things these companies find for people to do?
Obviously, software maintenance. Also integration — they are selling integrated service agreements, where they will take responsibility for all of a company's equipment. Some are doing site planning for computer installations. In fact, one of our member companies has architects on its staff. Another sells disaster insurance. And all of them now are doing what they call "service marketing" — marketing service as a product, as if it were a piece of hardware.

The concept of field service is really being redefined, isn't it?
Yes, it is. It's becoming a lot more support-oriented. In fact, our organization has been considering changing — and will soon change — our name from field service to field support, because the traditional hands-on service is going away, and more support-type services are coming along. For example, almost every computer store you go into today has a service manager and a service staff. In many cases, these people also do the customer training. So, we in the industry are selling training quite a bit. This is true of the larger service organizations, as well as the dealerships.

There's another new trend, actually an old trend that has come back, particularly in personal computers and terminals. More customers are doing their own servicing. We estimate that by 1990, 10% of the customers will do their own servicing.

What this means is you have to be geared to support the customer — through toll-free numbers and training schemes and things of that nature. It also has technical design implications, because you have to design the machines so the customer can take care of them. This trend of self-maintenance has come and gone over the years.

So self-maintenance may be a phase or a fad?
It may be. The one area where it is definitely not going to be a fad is in biomedical equipment. Manufacturers just cannot deliver the response time needed by hospitals. It is common in the computer industry to talk about response times of one, two or three hours, but in a hospital, they talk about minutes. If you are on the operating table and the electrocardiogram goes out, it is not very consoling to think that someone will be there in two hours. In order to get the quality of service they need, [hospitals] are having to do their own.

Can we expect to see more customized service offerings?
Yes. Some that I mentioned already include software maintenance and site planning. And a new offering that is getting very popular — service for a multivendor environment. For example, if you have Digital Equipment Corp. and IBM and two or three other vendors' products intermingled, they'll come in and take over the whole service.

Is the practice of providing multivendor service becoming the norm?
Yes, single-vendor service is becoming more common. That's the big sales point of third-party services. I don't know that companies will not survive if they don't offer it, but if they want to maintain their service presence, it is critical. You'll find that every major manufacturer now is doing third-party service of some kind.

And most of the independents as well?
The independents are doing it as well, but what is happening there is that they are realizing that to get the really big accounts they have to have national or international service. So some of them are joining together to have that national presence.

So we may be seeing the end of regional service operations?
I think you are gettting darn close to it. You are seeing them merge with Sorbus and TRW and firms like that.

How intense is the competition between vendor providers of service and independent service organizations?
Since the manufacturers have started having integrated service agreements, it is very intense. And almost every major manufacturer today is servicing equipment other than its own.

What shape do you think that competition is going to take?
I don't think you'll see price wars, but you will see declining prices — or more service for the same money.

What kind of increase do you expect in the number of independent service organizations?
If you asked that question of five different service executives from five different service areas, you would probably get five different answers. Two or three years ago if you had asked me that question, I'd have said, "Yes, it is going to continue to grow." At that time, the manufacturers had not started servicing other people's equipment.

We were predicting that by 1990 almost all the major manufacturers would have gone into third-party service, and they came in much faster than we expected. So the competition from the manufacturer is heating up, and it is not clear any longer that that is a great opportunity.

Are service providers as confused about pricing as users are?
I would say service providers have been in that situation, but now they are getting their heads together. In the past, they just took the manufacturer's price and reduced it by some amount and hoped they made it. Now, you're starting to hear them say things like, "I develop a cost stream, decide what margin I want and then price it for that."

George Keller ALAN WITSCHONKE

Conversely, I think major manufacturers are starting to take the competition into account. Where they would blindly price for some margin before, they now say, "Well, I would like to do that, but let's consider the competition, and maybe I'll have to give up some margin."

How much leverage do users have in dealing with a service provider?
Tremendous leverage, because they have many alternatives.

How can they exercise that leverage?
I think the right way to do it is to first set their own objectives for what they need, then have companies come in and see how they can satisfy those objectives. Cost ought to be a part of that satisfaction. ●

Software is flexible backbone of product support operation

BY PATRICIA CINELLI

In an increasingly competitive business in which customer satisfaction is the key to profits, the installation of a mainframe field-service software system has made a positive difference in Wyse Technology's product support division.

In January 1987, Wyse decided to install several modules of Fieldwatch, a software system designed and marketed by The Data Group Corp. in Burlington, Mass., in its field-service management division. "We now have visibility in our day-to-day operations and are much more able to pinpoint any discrepancies or problem areas," says Jim Prather, director of product support at Wyse in San Jose, Calif. With the software in place, Prather explains, it is much easier to examine appropriate costs and track performance.

Wyse has either implemented or is reviewing five of Fieldwatch's six interactive modules. The company is already using Dispatch Plus, the central module of the software system, which tracks and controls the dispatching process. It also uses Scheduling Plus, which handles the scheduling of corrective and preventive maintenance, equipment installation and deinstallation, field engineering changes and equipment moves.

Another module Wyse purchased but has not yet implemented is Repair Center Management Plus, which tracks and controls all aspects of the repair function including parts, work orders, inventory and billing. An additional component now under evaluation is the Technical Assistance Center Plus module, which would be used by Wyse's technical support group.

Breaking the mold

According to Prather, Wyse is not a classic field-service organization. Because of the diversity of its products and customers, the company needs special properties in a field-service management system. Wyse manufactures a broad range of microprocessor-based products. It designs and builds systems based on Intel Corp.'s 8088, 80286 and 80386 chips, as well as monitors products for itself and its Amdek Corp. subsidiary.

Wyse provides products and services not only to resellers but also to OEMs and distributors, and it also has agreements with third-party companies that perform services for its customers and bill back to Wyse. That, according to Prather, is one of the unique requirements Fieldwatch meets. "Most companies don't deal with third parties," he says. "They keep everything in-house. Since we do, we need to accommodate third-party payments within a system."

In addition to facilitating the tracking of third-party service activity, the management software has eased some of the stress of rapid growth. Wyse recently opened its first international depot in London. Four more overseas sites are scheduled to begin operation within the next 90 days, with a total of 12 to 15 locations becoming functional this year.

This kind of growth would be impossible, Prather says, without a system like Fieldwatch as a backbone.

"Everything is pretty much set up by the time we open the doors at a new location," he explains. "Management can quickly spot inventory problems or identify costs that are out of line."

While generally pleased with Fieldwatch, Prather says he can see room for improvement. "I would like to see a stronger report writer," he says. "Because the software is set up to accommodate varying types of service organizations, it is not terribly specific. We have to go in and do our own reports."

No decline, no increase either

Because of the growth and decentralization that has taken place since the management software was implemented, Wyse has not experienced a decline in labor costs, Prather says. But, he adds, the software has allowed the company to handle more service with no reduction in quality or increase in personnel.

A growth in the profit margin within the product support division has not yet materialized, but, Prather maintains, Fieldwatch has helped Wyse recognize and pinpoint areas that need attention. He expects profitability to improve as a result of increased accountability in the future.

"Now," he says, "we can look at repairs by product type and monitor labor and parts usage for particular products and types of repair. If we find something that sticks out, it's much easier now to make changes."

Good service, Prather explains, is one way of distinguishing yourself in a crowded product category. This is a major reason for trying to be as comprehensive and creative as possible in service and support. "A customer's reason for being dissatisfied should never be service," he says. ●

Cinelli is a free-lance writer based in Washington, D.C.

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Customer's market prevails as fierce competition rages

BY JEFFREY MILLER

Are you spending more for equipment, network and software service yet enjoying it less? If so, don't fret.

Today's high-tech service customer has an unprecedented chance to get more service for the dollar. To capitalize on this opportunity, however, most companies need to rethink and restructure their service management approaches.

The raging battle for service market share will intensify as the manufacturers' previously captive customer base is challenged by increasingly competent and aggressive third-party service providers, including other major manufacturers. Manufacturers' dominance of the postsale service market for their own products will continue, but some losses in market share will occur as third-party service firms expand the breadth, quality and price competitiveness of their service offerings.

> FEW MAJOR companies manage, or even analyze, their service spending on an enterprise basis. Instead, such spending gets buried in divisional MIS or departmental budgets, where it is considered an uncontrollable overhead item.

What have been healthy profit margins may become a fatality of intensifying head-to-head competition, forcing some consolidations (via mergers) among service firms. Due to increasingly prohibitive entry barriers, new manufacturers will offer service arrangements through existing firms rather than invest in building their own nationwide service capability.

Customer benefits

From the customer's standpoint, these competitive trends are good news. Customers' bargaining power will increase as vendors compete more aggressively for their service business.

Switching costs (that is, the trouble and risk of moving from your current service provider to a new one) will diminish as the offerings and capabilities of third-party servicers improve.

Concurrently, service options will proliferate as providers attempt to differentiate themselves by offering customized service programs with features such as guaranteed response time, assistance in self-service and so on.

Most companies are only beginning to capitalize on the newfound bargaining power these changes have created.

The lost advantage

Few major companies manage, or even analyze, their service spending on an enterprise basis. Instead, such spending gets buried in divisional MIS or departmental budgets, where it is considered an uncontrollable overhead item.

Despite rising costs, the issue of service management receives little executive management attention in annual budget processes and generally is not even mentioned as a strategic issue in long-range business or MIS planning efforts.

Frequently quoted anecdotal support for anticipated trends toward customer self-service (such as Citibank NA providing its own service for its automated teller machines) are not supported by broad-based factual evidence.

In fact, direct observation at Arthur Andersen & Co., corroborated by service vendor surveys, suggests the opposite is true. Very few companies have evaluated — and even fewer are doing anything about — self-service or low-cost alternatives to traditional on-site service, except in certain product categories such as personal computers.

The service buying process is comparatively unsophisticated in many companies, as indicated by limited awareness of alternative service providers and a surprising absence of basic purchasing disciplines, such as those used for other large-scale procurement activities.

Three major implications arise from this: First, the erosion of power from providers of high-tech service is the result of permanent structural changes in the industry (analogous to the structural changes in the automobile industry that resulted from worldwide competition), but the resulting opportunities have not been capitalized upon by the major beneficiary, the service customer.

Second, a key aspect of these changes is that the shift of power to the customer side presents opportunities that should be viewed strategically — not opportunistically.

Third, while some companies may respond with an objective of cost reduction/control, the enlightened customer will take a more balanced view, one that is oriented toward service customized to long-term needs within a cost structure that may actually increase if so warranted by the requirements of the business. Overall, the balance of service cost and quality should align more closely with business and corporate objectives.

Action plan

The challenge for service buyers is to formulate a meaningful response to the indisputable strategic opportunity that is emerging from the service industry's transformation.

The first step is to cast aside your traditional view of service as an invisible, and largely uncontrollable, drain on company expenses.

Adopt an aggressive "enterprise" view of service management within the company, with an attitude that you intend to do something about it. That "something" may be stated as an overall objective, perhaps along the lines of "improving value received for each service dollar spent."

Responsibility for rethinking your company's traditional service management approach may be delegated to a cross-divisional task force or to a designated service management coordinator. Whether a task force or a "czar" makes more sense for your company is a matter of structure and style and is not a crucial issue at this point — but assignment of responsibility is.

Once named, the service task force or coordinator should begin with an in-depth assessment of your company's current service management status, asking questions such as the following:

- Who and where are the service buyers and decision makers?
- How much is being spent and with whom?
- What are the contract terms, and how do they compare with

Continued on page S16

Miller is a senior partner with the Management Information Consulting Division of Arthur Andersen & Co. He was co-author of a major study, *Future Trends in Service of Electronic Products*, published jointly by that firm and the Association of Field Service Managers.

Third parties promote choice

BY REBECCA SEGAL

Computer users today have a real choice when it comes to selecting maintenance and support providers. Independent service companies, many of them offshoots of equipment vendors' service organizations, offer an array of hardware maintenance programs at lower rates than the typical equipment vendor.

Roughly 10% of all maintenance activity in the U.S. is now performed by independent service firms, and indications are that satisfaction with these providers is high.

In a recent survey by Framingham, Mass.-based International Data Corp., users of third-party maintenance were asked to indicate their reasons for choosing that type of service. More than 78% mentioned "cost of service." On a scale of 1 to 5, "5" being "extremely satisfied," independent service users rated their satisfaction with the price at 3.7 vs. 3.2 for manufacturers' users. In other areas, such as the vendor's overall hardware repair capability, users of independent and manufacturers' service organizations rated their providers roughly equal.

Users of independent service were more satisfied than manufacturers' users with overall value of service relative to price, and about 37% of users of independent service firms said the value of the service received was greater than the price paid. Only 24% of manufacturers' users made this claim. On the flip side, more than 32% of manufacturers' users felt the value of the service received was less than the price paid.

About one-third of the users surveyed cited a "dissatisfaction with the manufacturer's service" as a reason for choosing independent maintenance.

The hard sell

The question is, why doesn't more than 10% of the user population rely on independent service companies?

One major reason is that equipment manufacturers are becoming increasingly aggressive when it comes to hanging on to their customers for the provision of service and support. Many of the major computer vendors not only service equipment they did not manufacture for their own accounts but actually seek out independent maintenance accounts as a separate line of business. Companies such as NCR Corp., Xerox Corp. and Control Data Corp. compete with "service-only" companies like TRW, Inc. and Sorbus, Inc. for maintenance contracts on a variety of equipment.

Both IBM and Digital Equipment Corp. will service nonmanufactured peripherals attached to their own systems. IBM will perform this type of work in the personal computer area only. Overall account management, which means that one vendor will oversee the service of an entire mixed-vendor system (but not necessarily take a screwdriver to all of the equipment), is increasingly offered by most manufacturers.

The whole system

Independent service companies have gained credibility during the past few years for high-quality products. The product, however, is essentially devoted to the maintenance of hardware — not to the maintenance of an entire system, which includes hardware, software and communications. Software, on the other hand, is an area of increasing focus for the computer vendors.

While recognizing the need to supply more in terms of overall customer support, most independents are unsure as to the best way to package and provide these services.

Equipment manufacturers are also beginning to chip away at the price advantage independent service firms have long enjoyed. Most third-party firms will typically undercut the manufacturer by as much as 25%, but recently announced discount programs such as IBM's Corporate Service Amendment will begin to narrow the gap.

At a more tactical level, most equipment sales representatives will try to sell a service contract at the same time the equipment sale is made. Vendors that have traditionally maintained a separate sales organization dedicated to service have turned to a single sales force selling a total end-user solution, including service and support.

End users do have a choice in where to go for service. Recognition of this has not necessarily increased the percentage that chooses independent service, but it certainly has heated up the service market and made equipment manufacturers try harder to maintain their customer base. •

Segal is director of the Customer Service Program at International Data Corp. in Framingham, Mass.

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Service for large-scale hardware

COMPANY	MAINTENANCE SERVICE PRODUCTS/PACKAGES	DISCOUNT PLANS OFFERED	REQUIREMENTS FOR QUALIFICATION	NUMBER OF SERVICE REPS OR ENGINEERS	HARDWARE SUPPORTED	ON-SITE SERVICES	SOFTWARE SUPPORT	REMOTE DIAGNOSTICS	GUARANTEED RESPONSE TIME	GUARANTEED UPTIME	SPECIAL PROVISIONS FOR CRITICAL RESPONSE	GEOGRAPHIC AREA COVERED	CONSULTING SERVICES OFFERED	TRAINING OFFERED	HOURLY RATES FOR MAINTENANCE/REPAIR
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Concurrent Computer Corp. (201) 758-7500	Hardware maintenance, software support, education and training, consulting, supplies, depot repair and exchange, configuration management	Yes, 4% to 20%	Dollar volume, multiyear discounts, national and major account contracts	650 service reps, 550 field engineers	All Concurrent Computer hardware, various third-party equipment	Primary, comprehensive, limited, catastrophic, resident hardware and software contracts	Yes	Yes	Yes	Optional, 95% to 98%	Optional	Worldwide	Hardware and software specialized systems support	Yes	$110-$130
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Cosmic Enterprises, Inc. (617) 435-6967	On-site maintenance, per-call services, factory repair center, contract services, module express services	Yes, 10% to 60%	Volume educational services and frequent customer discounts	24 service reps	All DEC hardware, more than 100 DEC compatibles	On-site maintenance, contract maintenance, per-call services	No	Yes	Yes, 4 hours depending on location	—	Yes, depending on contract	U.S., Bermuda	Hardware and software consulting services	Yes	$60-$98
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Dataserv Computer Maintenance, Inc. (800) 328-6729	Contracts tailored to customers' needs	Yes	Varies	200 service reps, 550 field engineers	All IBM hardware	All maintenance services	Yes	Yes	Yes	Yes	Yes	U.S.	Installation planning	Yes	Contact vendor
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Diebold, Inc. (216) 497-4757	Full service seven days a week, depot services, installation, first- and second-line maintenance	Yes, varies	Varies	2,700 service reps	All Diebold hardware, General Automation hardware, IBM 3270s, all IBM PCs	Maintenance service and repair, module swap, on-site depot service	Yes	Yes	Yes, depending on customer requirements	Optional	Yes, according to need	U.S., London, Hong Kong	Identifying requirements, aid in developing coverage, disaster recovery planning	Yes	Contact vendor
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
GE Computer Service (404) 843-6300	Solution-oriented, multivendor approach, on-site and depot repair, inventory management, procurement, deinstallation, leasing	Yes, varies	Volume	1,100 service reps	More than 20,000 devices	Installation, repair, deinstallation	No	Yes	Yes, according to contract	Yes, according to contract	Yes, according to contract	U.S., Puerto Rico, Canada	Consulting in all areas of maintenance	Yes	$90-$100
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Hewlett-Packard Co. Contact local HP office	System services, workstations, network services, maintenance on all	Yes, 5% to 20%	Volume	—	All HP hardware, selected third-party network products	Installation, calibration, maintenance, network configuration and checkout	Yes	Yes	Yes, according to contract	Yes, 99% on critical response	Yes	Worldwide	Network design and performance, system design and performance, network and system implementation, system management	Yes	$92-$145

The companies included in this chart responded to a recent telephone survey conducted by *Computerworld*. Further product information is available from vendors.

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COMPANY	MAINTENANCE SERVICE PRODUCTS/PACKAGES	DISCOUNT PLANS OFFERED	REQUIREMENTS FOR QUALIFICATION	NUMBER OF SERVICE REPS OR ENGINEERS	HARDWARE SUPPORTED	ON-SITE SERVICES	SOFTWARE SUPPORT	REMOTE DIAGNOSTICS	GUARANTEED RESPONSE TIME	GUARANTEED UPTIME	SPECIAL PROVISIONS FOR CRITICAL RESPONSE	GEOGRAPHIC AREA COVERED	CONSULTING SERVICES OFFERED	TRAINING OFFERED	HOURLY RATES FOR MAINTENANCE/REPAIR
Honeywell Bull, Inc. Customer Service Division (617) [illegible]	Hardware support services, software support, customer assisted maintenance (walk-in, mail-in, dispatch), premium service, accelerated 2-hour response	No	N/A	3,500 service reps	Honeywell DPS 6, DPS 6 Plus, DPS 8, 88, 90, 800, DPS 7, 7,000	Installation, deinstallation, remedial maintenance, preventive maintenance, extended hardware maintenance	Yes	Yes	Yes, premium service option	Optional, based on contract	Optional (standard with premium service)	U.S.	Site planning	Yes	[illegible]
IBM Contact local IBM office	Maintenance agreement, warranty, hourly service	Yes	Customer management control proceed, cluster of machines, extended term	—	All IBM hardware, selected non-IBM products	On-site repair, on-site exchange	Yes	Yes	Yes (special option)	Yes (special option)	Yes (special option)	U.S., Puerto Rico (worldwide)	—	Yes	$115 - $250 (hourly)
Intelogic Trace, Inc. (800) [illegible]	Shared-risk maintenance, guaranteed response times, time and materials billing, contract on-site maintenance	Yes, 10% to 20%	Volume	[illegible] field engineers	IBM Series 1 and System 34, 36, 38, all Datapoint minicomputers	All maintenance	Yes	Yes	Yes, according to contract	Yes	Yes, includes putting a technician on site	U.S.	None	Yes	[illegible]
Integrated Systems Group, Inc. (818) 502-1414, (800) 847-5800 (in Calif.)	Field service, depot repair, installation, warranty	Yes	Volume	50 service reps, 35 field engineers	All DEC PDP and VAX hardware, all Convergent Technologies hardware, Unisys 5000 series, General Automation Zebra, all Alpha Micro systems hardware	Full field maintenance on all hardware	Yes	No	Yes, 4 hours	Yes, as required	Yes, extended hours of coverage	California	Hardware and software consulting services	Yes	$80
[illegible] Computer Group (714) [illegible]	Basic package with up to 8-hour response time, constant support, on-site support	Yes, 5% to 20%	Quarterly prepayments, semiannual and annual prepayments	7 service reps, 12 field engineers	All DEC hardware and compatible peripherals, PDP-11/73 through VAX-11/780 systems	Tailored to the needs of individual customers	Yes	Yes	Yes, 4 to 24 hours (depending on contract)	No, work done on best-effort basis	Yes, technicians on call 24 hours a day	Los Angeles County, Orange County, San Diego County	Hardware and software (available on request)	Yes	[illegible]
McDonnell Douglas Field Service Co. (800) 826-4944	Basic, Basic Plus and Critical coverage including on-site response, guaranteed 4-hour response, continuous work-through	Yes	Multiple sites	More than 500 service reps	More than 90 models	Hardware maintenance	Yes	Yes	Yes, according to contract	No	Yes, depending on contract	U.S.	None	Yes	$100
[illegible] Support Group (713) [illegible]	On-site service, remote technical service, depot repair, logistics support, repair kit development and management, customer technical training, product analysis	Yes, 15% to 30%	Yearly contracts	[illegible] service reps	DEC and all compatible hardware	Equipment installation and deinstallation, preventive maintenance, per-call maintenance, warranty service, environmental service and support	No	Yes	Yes, 4 hours	Optional	Yes, on a cause-and-effect basis, can completely replace the system if necessary	National	Product analysis and testing, product evaluations	Yes	[illegible]
NCR Corp., Customer Service Division (513) 439-8600	Standard on-site, partnership, site-based and single-vendor maintenance, network services, disaster backup, depot plan on peripherals	Yes	Varies	More than 6,000 service reps, more than 5,500 field engineers	All NCR processors and more than 50 models of non-NCR hardware including Convergent, IBM, Compaq and Wyse	Variety of service coverage hours, field engineer on site, modifications, preventive and remedial maintenance, diagnostics, training, installation, deinstallation	Yes	Yes	Yes, varies	Yes, varies	Yes, special escalation policy	Worldwide	Site survey, hardware configuration, hardware consultation, site preparation and management	Yes	$88-$156
Prime Computer, Inc. (617) [illegible]	Preferred, basic and deferred on-site service	Yes, 5% to 25%	Multiple systems at same site and minimum monthly maintenance charges $2,000	[illegible] service reps	All Prime 50 Series and Prime Unix-based hardware products and associated peripherals	Preferred two-hour response within 25 miles of metropolitan service center, four-hour response within 100 miles, service for customers with multiple terminals and workstations	Yes	Yes	Yes, part of preferred service	No	Yes, in preferred service	Worldwide	Customized services (upon request)	Yes	[illegible]
Quadtronix, Inc. (213) 212-5656	Maintenance, preventive maintenance and one-hour response	Yes, up to 30%	Size and dollar amount of contract	45 field engineers	All IBM mainframes and minicomputers, all Storage Technology hardware, all Memorex hardware, all Telex Computer Products hardware, all Wang hardware	—	Yes	Yes	Yes	Yes	Yes	Southern California	Site planning and maintenance management	Yes	$125
Servcom (an Alcatel Information Systems, Inc. division) (800) [illegible]-1400	On-site service option, on-site warranty extension option, deferred on-site service option, scheduled on-site service option, centralized deferred on-site service option, depot repair, installation, deinstallation	Yes	Volume	[illegible] service reps, 500 field engineers	Supports more than 400 types of data communication and information processing systems	Remedial service, installation, preventive maintenance, system upgrades, warranty coverage, deferred scheduled time and materials, relocation, extended hours coverage	Yes	No	Yes, on individual basis	Optional, on individual basis	Optional, on individual basis	U.S., Canada	Training and documentation services	Yes	[illegible]
Sorbus, Inc. (215) 296-6000	On-site service, carry-in service, 24-hour service package	Yes, varies	Varies	1,000 service reps, 1,600 field engineers	All IBM and MAI Basic Four hardware	Preventive maintenance	No	Yes	No	No	No	U.S.	Equipment selection, facility management	No	Contact vendor
Telex Computer Products, Inc. (918) 627-1111	On-site, mailback, technical assistance center	Yes, up to 30%	Product volume and density discounts	1,300 service reps, 2,000 field service engineers	Controllers, terminals, intelligent workstations, PBX products and peripherals	Basic, extended, complete services	Yes	Yes	Yes	Optional	Optional	U.S.	None	Yes	[illegible]-$140
TRW, Inc., Customer Service Division (800) 257-7464	On-site contracts, resident technicians, mail-in service, carry-in service	Yes	Volume	2,500 service reps	All DEC VAX equipment, all IBM mainframes except the 3090	Service concierge	Yes	Yes	Yes, according to contract, (average is 4 hours)	No	Yes, based on customers' need	U.S., Puerto Rico	Site preparation to installation	Yes	Contact vendor

COMPANY	MAINTENANCE SERVICE PRODUCTS/PACKAGES	DISCOUNT PLANS OFFERED	REQUIREMENTS FOR QUALIFICATION	NUMBER OF SERVICE REPS OR ENGINEERS	HARDWARE SUPPORTED	ON-SITE SERVICES	SOFTWARE SUPPORT	REMOTE DIAGNOSTICS	GUARANTEED RESPONSE TIME	GUARANTEED UPTIME	SPECIAL PROVISIONS FOR CRITICAL RESPONSE	GEOGRAPHIC AREA COVERED	CONSULTING SERVICES OFFERED	TRAINING OFFERED	HOURLY RATES FOR MAINTENANCE/REPAIR
Unisys Corp. (215) 542-4004	Environmental facilities planning, third-party maintenance, network consulting, depot and over-the-counter repair, hardware and software maintenance	No	—	8,500 service personnel	More than 40 different hardware types supported	Full range of on-site hardware and software support services and maintenance, network support, installation planning and support	Yes	Yes	No	No	Yes, on-site coverage	U.S.	Facilities and capacity planning, networking, software application, disaster protection, general systems programming, training and education	Yes	$125-$200
Unitronix Corp. (201) 231-9400	In-house repair, on-site repair, hardware installation by contract or time and materials	Yes	Volume	8 field engineers	All DEC hardware, CDC disk drives, Fujitsu disk drives, all Emulex hardware	Full maintenance service	Yes	No	Yes, 4 hours	Optional	Yes	New York, New Jersey, Eastern Pennsylvania	—	Yes	Contact vendor
Wang Laboratories, Inc. (617)459-5000	Maintenance contract on-site, carry-in service, maintenance time and materials, software subscription, telephone and on-site contracts, warranty installation, cable services, media services and purchases, software per incident, customer-inquiry hot line, media conversion	Yes	Based on single-site volume, single billing, call screening	3,388 service reps, 5,539 field engineers	All Wang hardware	Resident on-site engineers, on-site call, prime and additional shift coverage, same-a-day warranty, time and materials installation, site preparation	Yes	Yes	Yes	Yes, 98% to 99%	Optional, based on customers' requirements	Worldwide	Presales and sales support	—	$120-$160

Customer's

FROM PAGE S12

those obtained by others, especially other companies considered to be peers?

- How well are current vendors performing in terms of basic service metrics such as response time and downtime?
- What do key users think about the service being provided, relative to their needs?

What about tomorrow?

Once the situation is understood, the task force can look to tomorrow's service environment. Consider how service needs will be influenced by the company's business strategy, such as changes in business mix, acquisitions, divestitures and decentralization of responsibility.

Current information technology initiatives — sales force automation, warehouse automation, customer electronic order entry — should also be assessed for their potential impact. Projecting from current trends, it should be possible to estimate how much is likely to be spent on service three, five or even more years from now.

The key to properly evaluating your options is to think strategically and creatively about needs and potential solutions that may lead to a future competitive advantage. The possibilities can range from "status quo" (that is, no change of the vendor mix or working relationships) to the relatively rare and risky (but low-cost) alternative of providing your own service.

In between lie the more typical scenarios such as solicitation of competitive bids through a formal request-for-proposal process, which can potentially result in vendor changes for particular classes of equipment. Alternatively, some companies have chosen to hire a firm to perform total service management for them, commonly called site service management or integrated facilities management.

Each of these options, as well as other variations your analysis may identify, has its pros and cons. The value of the exercise is in the articulation of the options and in the assessment of their advantages, disadvantages and risks. This process is the only way to secure a service management strategy that achieves the best match with business goals.

> YOU WILL find today's marketing-oriented service providers open to considering a range of mutually beneficial alliances.

Short-term cost reductions at current service levels are one possible result of this process, and you may be surprised by the number of competent service firms willing to underbid your current service provider in order to gain your business.

A better solution, however, may be a strengthened alliance with your service providers, one that provides a combination of controllable (and possibly reduced) costs along with an improved understanding of, and responsiveness to, your company's service requirements. Again, you will find today's marketing-oriented service providers open to considering a range of mutually beneficial alliances.

IBM's Corporate Service Amendment is an example of how a service provider may attempt to achieve mutually beneficial long-term relationships with its customers.

The power at hand

Creativity in redefining the service relationship can clearly result in customized, more responsive service. Costs can be controlled and possibly reduced. Your service vendor, with your cooperation, can meet your needs more effectively, enabling it to maintain the profit margins it needs to stay in business.

The current restructuring of the high-tech service industry places service customers in a more powerful position than ever before. If you wish, you can use your newfound power to reduce your service costs, and you will find an abundance of new vendors eager to gain your business at a discount price.

A more strategic approach will build on a broad, but in-depth, assessment of future service needs, balanced by issues of affordability. This process will identify opportunities to forge a long-term alliance with a current or new service provider. "Win-win" will be the framework of this alliance, and more responsive service at a fair, and possibly reduced, price will be the result — both now and in the future. ●

Weak

FROM PAGE S7

other words, almost one-third of the customers have no, or only partial, information on the various service and support plans available to them.

In general, respondents express a lack of acceptance of pay-as-you-go, or service-for-a-separate-fee, pricing policies. A few pay-as-you-go services, however, earned strong acceptance, including the following:

- Maintenance on network components.
- Site construction and cable-laying.
- Adds, moves and deletions of components.
- Service at remote network sites.

Services with especially poor service-for-a-separate-fee acceptance include network design consulting and the integration of various network components and certification that the network is performing as specified. Other services fall between those two groups.

Call for help

Although customers are turning out to be fairly self-reliant, vendors do play an important role in service. When asked if they had to do it over again, 20.3% indicate they would use more vendor help, 27.3% "were not sure" and 52.4% said they would not. Services that customers would have liked more help with included network design consulting, technical support and training.

Ledgeway's study also found that the criticality of the network was the main distinguishing factor of service strategies. Those with extremely critical networks tend to rely on their staff for diagnostic support and problem solving, establishment of a disaster recovery plan and the design of redundancy into critical network elements.

Customers with moderately critical networks tend to rely on staff for diagnostic support and problem solving, contract with vendors for standard hardware and software services and purchase network diagnostic and monitoring tools to help staff service and support their network as their primary strategies.

Either many vendors have not clearly thought out what their network service and support strategy should be or there is a substantial "disconnect" between service and support organizations and the marketing/sales arms of vendors.

In an earlier focus group with local-area network (LAN) users, participants were asked if they had been approached to purchase any of a variety of network support services from their LAN or communications vendor. All 10 participants answered "no."

Customer service organizations need to take stronger measures in several areas. They must establish a clear identity for their portfolio of network and communications support services, educate customers to establish value for those services, train and motivate the marketing/sales arm of their company to properly present that portfolio of support services as well as the pay-for-service-separately pricing practices. ●

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"We advertised in Computerworld, Computerworld's SPOTLIGHT section and Computerworld card decks. And the results from all three were excellent."

— Mark Potenzone
Westinghouse Management
Systems Software

Mark Potenzone is National Sales Manager for Westinghouse Management Systems Software. This group within Westinghouse markets IBM mainframe productivity enhancement software and operating systems software.

Westinghouse has taken advantage of three advertising opportunities that *Computerworld* offers, much to Mark's — and the company's — satisfaction.

"We've done mostly image advertising in order to create awareness of this group. The name 'Westinghouse' is certainly recognizable, but not as a major software supplier, even though we've been in the software business for nearly 20 years.

"We chose Computerworld *partly because of personal experience. As a software professional, I've read it for as many years as I've been in the business, and so has everyone I've worked with. In fact, I can't imagine a computer professional NOT reading* Computerworld.

"We advertised in Computerworld, Computerworld's SPOTLIGHT *section and* Computerworld's Card Decks. *And the results from all three were excellent. We've seen what advertising in* Computerworld *can do, so there was no surprise there.* SPOTLIGHT *also delivered very pleasing results. Because it is a special pull-out section devoted to one subject, it makes sense that when we advertised in their Network Software issue, we were reaching our customers and potential customers — exclusively.*

"The Card Decks did well for us, too. Those cards are very cost efficient and we got hot responses. If someone is going to take the time to fill one out, then he or she is interested. The result is a qualified lead.

"The combination of these three vehicles gives us the best of all worlds. Computerworld *and* SPOTLIGHT *complement each other. The cards reinforce our published ads, it couldn't be better. That's why we're working on new ads for our next* Computerworld *campaign."*

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COMPUTERWORLD

IBM revs up 3090s — with a hitch

INSIDE

Lack of advance notice riles users

Rolls out biggest mainframe ever

SYSTEMS & PERIPHERALS

HARD TALK

Pat Rizziello

Cleaning up 3480's act

Two key selling features of the IBM 3480 tape cartridge system are their controlled tape drive cleaning and the elimination of cleaning maintenance for cartridges.

IBM took a step in the right direction with the cleaning cartridge concept; the footage measurement is progress when compared to the 11th commandment: "Thou shalt clean tape drives every four hours, whether they need it or not."

I have been in centers where drives should be cleaned every two hours and ones where cleaning is dependent on an operator running to K-Mart for the Blue Light Special on Q-tips.

IBM tested extensively to establish when to clean the drives; its instructions are similar to automobile manufacturers' oil change recommendations of, for instance, every 7,500 miles or 3 months. The drive cleaning logic is based on footage and/or a weekly use level, whichever comes first.

IBM must design a better system than dotting the cleaning

Continued on page 50

IBM systematic on publishing

Fledgling unit works up PC-to-mainframe approach in booming market

BY JEAN S. BOZMAN
CW STAFF

BOULDER, Colo. — IBM is taking a systems approach to publishing — coordinating the development of its personal computer and workstation products with host systems' existing publishing applications at the company's publishing systems facility here.

The vendor says it hopes to create a seamless integration of publishing throughout a corporation, gaining an edge against competing products from Apple Computer, Inc. as well as manufacturers of IBM Personal Computer look-alikes.

Jeff Mason

"The strategy of combining PC and host solutions is clearly an advantage to us," says Jeff Mason, general manager of IBM's Publishing Systems Business Unit. "We think we will be very competitive at each edge of the offerings."

IBM says it intends to link off-the-shelf products, like its Personal System/2 line and RT Personal Computers, with host-based publishing systems via software. Host-based software would convert PC-generated

Continued on page 48

Data View

VAR* shares

Hardware manufacturers slice up a $4.3 billion market

	Market share
IBM	21.4%
Digital Equipment Corp.	14.6%
Hewlett-Packard Co.	8%
NCR Corp.	5.2%
Texas Instruments, Inc.	5.1%
AT&T	4.2%
Unisys Corp.	4%
Data General Corp.	3.4%
Compaq Computer Corp.	2%
Zenith Data Systems	1.6%
Prime Computer, Inc.	1.3%
Others	29.2%

*Value-added reseller

INFORMATION PROVIDED BY INTERNATIONAL DATA CORP.
CW CHART

Mosaic disaster recovery package offered for micros

CAMBRIDGE, Mass. — Mosaic Computer Security, Inc., a Mosaic Software, Inc. subsidiary, recently rolled out a personal computer-based software package that is intended to guide a data center though a disaster recovery.

"We use the PC instead of the mainframe because there is a better chance it will be available in a disaster," said Michael Jingozian, Mosaic Computer Security's president. The program requires an IBM Personal Computer or compatible with 640K bytes of random-access memory and a hard disk.

Jingozian said his staff interviewed numerous consultants in order to determine the essentials of disaster recovery.

The program contains a list of procedures, including the following: who does what; what applications must be done first; how to bring up operating systems; procedures for equipment salvage; how to bring up a telecommunications network; and how to bring up backup storage.

Mosaic Computer Security provides in-house training, which normally takes three days. "Employees have to be aware there is a plan, and people have to be trained. It takes a commitment by senior management," Jingozian said.

The program, priced at $12,000 for a site license, is available immediately.

Imaging system hits 160 MIPS

BY STANLEY GIBSON
CW STAFF

PLANO, Texas — Claiming to offer performance of 160 million instructions per second (MIPS), Visual Information Technologies, Inc. recently announced a desk side image-computing system.

The Vitec Image Computing System can incorporate information from photographs, seismic data or medical CAT scans and allows users to work with the images interactively, the vendor said.

The processor attains its MIPS performance through several custom-made parallel image-processing chips, each of which can perform 40 MIPS in image-processing applications. A single chip contains eight 5 MIPS processors that perform in parallel. Four such chips in a system offer performance of 160 MIPS, explained Jim Fontaine, vice-president of marketing for Visual Information Technologies.

An advantage of the Vitec

Continued on page 49

Inside

- Itran inspection board boasts 64-level gray-scale processor. Page 54.
- MDB adds shock-protected disk subsystem. Page 54.

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Publishing

FROM PAGE 47

documents to a standard markup language, enabling host processors to assemble a final, standard document no matter where the documents originated.

The fledgling publishing unit, formed one year ago to give IBM a quick break into the $1.2 billion market, just began shipments of two publishing Solutionpacs last month. Because it got a late start, IBM says, the company plans to build the new publishing business on two large bases of installed IBM machines: PCs and mainframes.

IBM is searching for a considerable chunk of the market, which is expected to grow to $6 billion by 1990. "We are interested in publishing because it is a growth industry," says Damon Trimble, a senior marketing specialist.

Going steady

To speed development of publishing-related hardware, software and peripherals, the publishing business unit will use IBM's marketing and development teams as needed. "We're not married to IBM — but we're certainly dating," Trimble says. "We would like to be close to them, but we are free, as an independent business unit, to actively seek outside products to fill the product gaps." Once the products are ready, IBM's sales force will promote and distribute them.

Parent IBM is never far away from the business unit, according to publishing officials. General managers of IBM mainline divisions, including the Entry Systems Division, sit on the board of the publishing business unit in order to expedite PC hardware developments needed in the publishing area.

For the moment, IBM is offering end users publishing solutions for both the desk top and the host machine under IBM's VM. But as time goes on, host-based and PC-based systems could merge. "Today, you've got personal publishing on the desk top," Trimble says. "Tomorrow, it won't matter where it is." That would be especially true for users on a corporate network, who might receive publishing support from a mainframe 500 miles away from their desk tops.

Limited edition

So far, IBM has limited desktop publishing offerings to IBM PC AT and PS/2 Model 30 users. Called the Personal Publishing Solutionpac, the package teams a PS/2 Model 30, an IBM 4216 printer and Microsoft Corp. Windows applications. That system costs $8,553.

The printer and the software can also be added to a user's AT as a field upgrade that costs $5,793. Versions for the PS/2 Models 50, 60 and 80 have not yet been announced.

"We've put all of our desktop publishing products on a standard PC platform," Trimble says. "But while these are standard products, we're going to integrate them as much as possible in favor of IBM." One example of IBM's unique integration is the inclusion of an Adobe Systems, Inc. Postscript board within the PC's housing rather than in the printer [CW, July 27]. The design is said to boost performance and speed output to the printer.

On the host end, IBM announced the Publishing System VM Edition in April, which supports the preparation of documents composed by more than one author and under IBM's Advanced Function Printing software.

After formatting, the documents can be printed by IBM 3812 and 3820 Pageprinters, the IBM 3800 laser printer or an IBM 4250/II Electrocompositor, which produces camera-ready masters.

"A host-based markup language will allow customers to handle relatively lengthy documents and to generate global changes throughout a text," Mason says. "It's a very important feature in any industrial strength kind of system."

The host in question can be an IBM 3090, 4300 or 9370 running IBM's MVS, OS, VM or DOS, all of which support the firm's Document Composition Facility — the anchor of all host-based IBM publishing solutions. Mason says that IBM now offers the host-based markup language and that the company is adapting it for workstation applications. Solutionpacs for operating systems other than VM have not yet been announced.

The desk top presents a different set of challenges, Mason adds. The individual author wants to print out what appears on the screen. That capability, called what you see is what you get (WYSIWYG), is recommended for department newsletters, presentations and the like, Trimble says.

IBM suggests a more standard format, designed by corporate committees, for large enterprises that create large documents such as product manuals and insurance policies.

For such applications, the distinction between desktop and host-based systems may blur by the 1990s, Mason suggests. "Over time, we would see migrating the capability of desktop publishing to the higher capacity system," he adds. A development team of more than 100 IBM staffers in Boulder is working to give host-based systems the flexibility of PC-based systems and the ability to structure files sent from PCs to host systems.

It may be a year or more before IBM's integrated systems are full-featured. Missing now are desktop products that can produce documents compatible with final-form markup language commands and host-based systems that can produce WYSIWYG files.

The lack of flexibility means that for now, users must match their application to the host or the PC system of choice. "Where a document starts is a function of the type of work, the complexity of the document and how many authors there are," Mason says. "You can do long documents on the personal publishing system as well as short documents on the host-based system."

Rising interest

Since April, more than 100 IBM customers have bought the new solutions, according to Merry Quackenbush, director of media industry and publishing systems for IBM. Quackenbush, who designs the publishing industry marketing programs, says that especially strong interest has come from corporations in the insurance, pharmaceutical, automotive and retail fields.

IBM is prepared to brief any interested customers at its Boulder campus and at an executive briefing facility in Dallas. But the company is also training more than 200 publishing specialists who will be stationed at IBM branch offices nationwide. "The specialist support is included with the sale of the Solutionpacs," Quackenbush says. "Our publishing specialists are the first line of defense for the customer."

IBM pioneered the combination of workstation and host-based publishing for internal use. IBM produces 5,000 books, reports and manuals each year, Trimble says, that are prepared by 1,700 technical writers at 25 IBM facilities around the world. IBM creates one million camera-ready masters a year, placing the firm second only to the federal government as the largest in-house printing operation, IBM says.

Imaging

FROM PAGE 47

system is that it incorporates components that previously often had to be configured by a customer. "System integration is a big problem for end users," Fontaine said.

The system will be sold in two models. The Model 120, with 10M bytes of image memory, 160-MIPS performance, 1,280- by 1,024-pixel display resolution and 4M bytes of application memory is priced at $88,000; the Model 100 offers 6M bytes of image memory, 640- by 480-pixel display resolution, 122-MIPS performance and 4M bytes of application memory for $68,000.

Both systems include a color monitor, 140M bytes of hard-disk storage, streaming tape backup, keyboard and mouse. The Vitec Image Computing System was designed for OEMs and end users and is scheduled to be available primarily to OEMs in the fourth quarter.

XEROX

They raved about Version 1.0. Now read about Version 1.1.

Xerox Ventura Publisher, the easily mastered, industrial-strength publishing genius that runs on a standard IBM XT or AT, or compatible, just got better. Version 1.1 offers 80 significant enhancements for short document handling; text, graphics and font support; and broader output capability.

Xerox Ventura Publisher already gets raves for long documents; now Version 1.1 offers 20 additional features for producing short documents. There's automatic kerning, support for multicolumn frames, improved hyphenation, cropping and sizing of art, on-screen rulers, and automatic letter spacing, to name a few.

For documents of any length, page layout and type control have been raised from excellent to sensational. Pictures are now anchored to text during batch pagination. Documents up to 128 chapters in length, each containing 150 to 300 pages of text, are easily handled. The result is a desktop publishing package that can be judged by printing industry graphic standards.

To the longest list of text and graphics input support in desktop publishing comes even greater capability. Version 1.1 adds word processing interfaces for XyWrite, Displaywrite III and IV and DCA files. There's graphic conversion for more than 500 graphics packages based on a dozen file formats, including Macintosh "PICT" and image files. Plus downloaded PostScript fonts, conversion of H-P Soft-fonts and support for Adobe screen fonts.

This new release makes Xerox Ventura Publisher the first desktop publishing program to support the industry-standard page-description languages: PostScript and Interpress. That means total compatibility with all popular laser printers, including, of course, the Xerox 4045 Laser CP and the Xerox 4020 Color Ink-Jet Printer.

Team Xerox

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For more information about Xerox Ventura Publisher 1.1, stop by any computer store featuring Xerox software, contact your local Team Xerox sales office, or call 1-800-TEAM-XRX, ext. 213B.

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Cleaning up

FROM PAGE 47

cartridges or magically calculating that if you clean *X* times with a cleaning cartridge the drive "should" last six months. One data center tapped into its system management facility data to produce a CLEAN message when 20 or more temporary errors occur. Why didn't IBM think of that?

I question the logic of cleaning 3480 drives, but not the media. Why clean the drives? Because they are dirty. Why are they dirty? Contamination from the cartridge media.

Tape maintenance equipment manufacturers contend that 90% of all tape problems are a result of contamination of the tape surface and that 80% of the contamination is from the tape itself. The physical damage inflicted on the 3420s, such as "z" folds, edge creases, high-speed rewind creases and reflector-spot impressions should not be a problem with 3480s.

IBM contends that adaptive cross-parity error correction should eliminate most errors. It has eliminated the majority of hard fails. But how many are hidden and corrected on the fly? Minor problems, which indicate future problems, are masked by a combination of better error recovery and the use of a buffer.

Data center managers agree that the 3480 is a tremendous improvement over the 3420's tape failures. By combining the drives with the media, the environment inconsistencies are reduced. The enclosed cartridge eliminates exposure to external contamination. The 3480 drives have limited contact with the physical media, thus reducing drive problems due to misloads or tension.

But contamination from the tape is going to grow, and a method is needed to identify that contamination and reduce or remove it.

I have seen data centers come to a screeching halt because of media failures. These problems don't happen overnight. I like to compare media failures with a serious problem I once had with carpenter ants. When I saw the first ant, I assumed it followed me in through the front door. When I saw the second, I thought, maybe the back door. When I spotted them daily and ran out of doors and excuses, it was too late.

Normally, carpenter ants are hidden inside your walls munching away, until one day the wall falls down — *then* you realize you have a problem.

Many data centers monitor software reports to identify the drive or media that caused a failure. This fixes the problem, but only after the fact. Many data centers are in the business of rebuilding the walls. Use a good exterminator before you see the ants. A regular maintenance program detects the first trace of the problem. Think of yourself as the exterminator and error correction codes as the ant trails.

Stitch in time

Many people in data centers argue it is cheaper to replace a tape than to run a maintenance program. Track records prove data centers that have eliminated media maintenance experience an increase in media failures. The performance decline happens gradually, not overnight.

Then, someone compares the increase in tape failures — and suddenly you wake up. What do reruns cost in time, money and frustrated users? What is the financial impact to your company or legal repercussions resulting from lost data? IBM acknowledges those concerns, but its idea of a maintenance program is physically dotting the media when failures occur.

I believe in preventive maintenance for both drives and media. Your criteria should be based on age, use and failure standards, such as erase, temporary and permanent, that are acceptable and work for your data center.

Finally, if you spot any type of trend, don't ignore it or hope it will go away like my carpenter ants. They hibernate.

Rizziello is owner of Tape Library Consulting, a Yardville, N.J., firm specializing in computer tape library management.

On June 16th, IBM announced several NEW COAX A terminal products.

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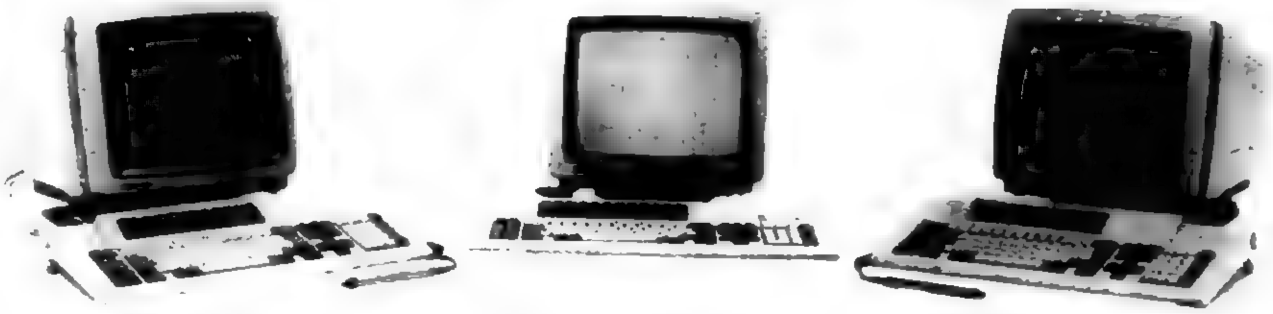

191D - A 3191D terminal product with three screen sizes.
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192L - A full color product with lightpen.
191E - A 3191E terminal with three screen sizes.
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V-SERIES SMARTMODEM 9600 AND V-SERIES SMARTMODEM 2400

Hayes V-series Smartmodem 2400B

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V-series modems come in stand-alone versions (V-series Smartmodem 9600™ and

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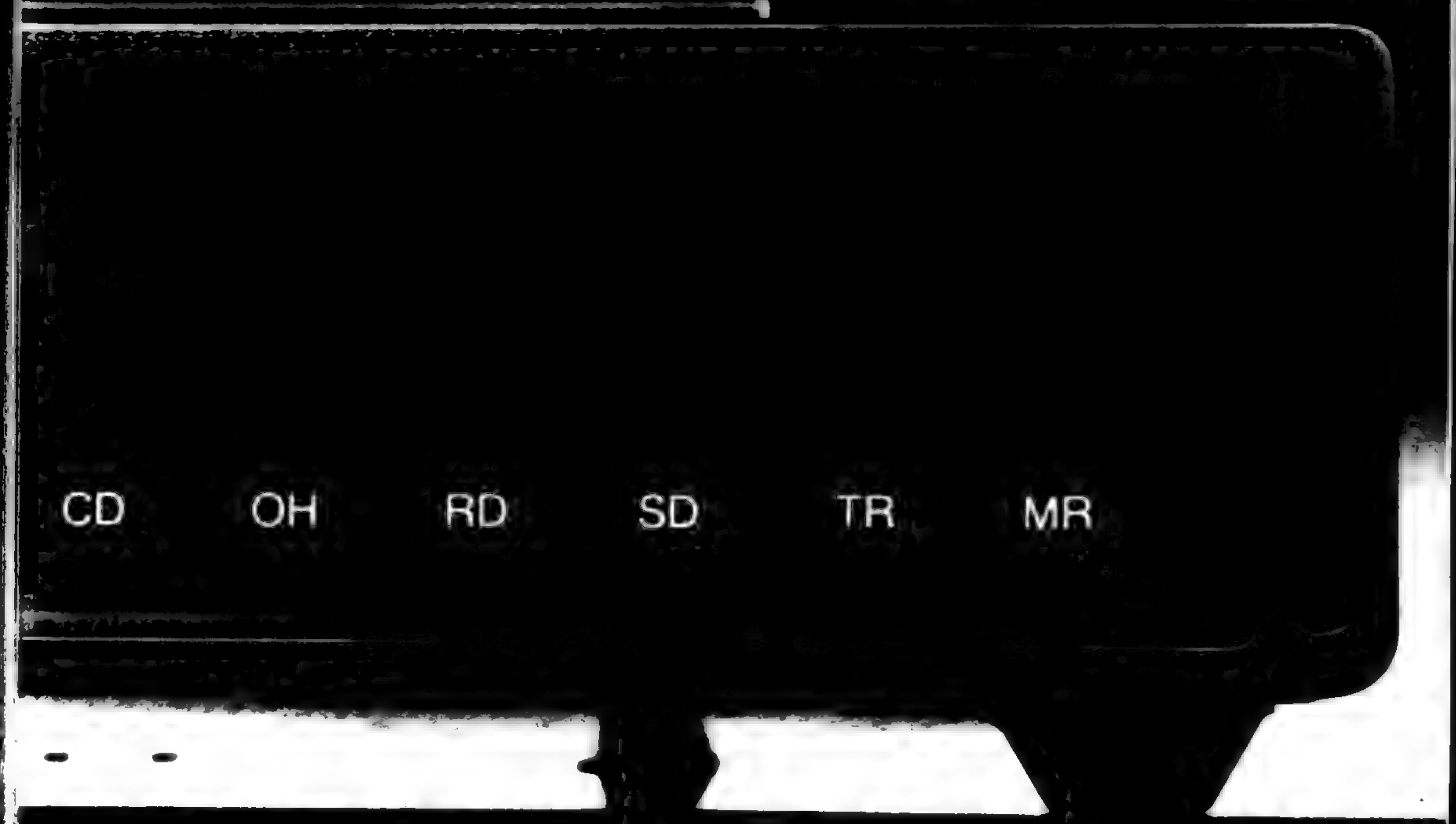

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Hayes Microcomputer Products, Inc. P.O. Box 105203, Atlanta, GA 30348.

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NEW PRODUCTS

Processors

A computerized manufacturing inspection product said to incorporate gray-scale vision technology has been announced by **Itran Corp.**

The **MVP 2000** is a printed-circuit board with a 64-level gray-scale image processor at its core. It provides font- and character-quality verification and features 4M bytes of memory and eight full gray-scale image buffers. The vendor said it can make measurements to an accuracy of one part in 5,000.

The MVP 2000 is priced at about $20,000.

Itran, 670 N. Commercial St., Manchester, N.H. 03101.

Data storage

A removable shock-protected disk subsystem called the **Data Shuttle 2000** has been introduced by **MDB Systems, Inc.**

The Data Shuttle 2000 contains one or two disk canisters that provide shock isolation for 5¼-in. disk drives mounted within them. The systems can be provided with or without controllers with one or two disks. Each canister can house a disk with capacity up to 760M bytes of unformatted data.

The Data Shuttle 2000 is priced from $5,115 to $15,950, depending on disk drive and controller usage.

MDB Systems, 1995 N. Batavia St., Orange, Calif. 92665.

Terminals

A high-resolution monochrome workstation featuring a system-addressable parallel printer port and IBM System/34, 36 and 38 compatibility has been unveiled by **Decision Data Computer Corp.**

The **3496 Workstation** consists of a 14-in. monitor, either a 102- or a 122-key keyboard and a small logical unit. The parallel printer port permits placement of a system-addressable, personal computer-graphics compatible printer adjacent to the workstation.

The 3496 Workstation costs $1,295.

Decision Data Computer, 400 Horsham Road, Horsham, Pa. 19044.

Printers/Plotters

A six-pen desktop color plotter for A- and B-size graphics has been introduced by **Fujitsu Component of America, Inc.**

Imagegraph is said to be fully compatible with Hewlett-Packard Co.'s HP 7475A. It features a Centronics Data Computer Corp. parallel port and an RS-232C serial port. It executes HP Graphics Language commands and plots on media such as paper, coated paper, transparency and polyester drafting film.

Imagegraph is priced at $1,200.

Fujitsu, 3320 Scott Blvd., Santa Clara, Calif. 95054.

An 18 page/min laser printer featuring 78 resident fonts has been announced by **Kyocera Unison, Inc.**

The **F-3010** offers seven printer emulations, including the NEC Corp. Spinwriter 3550, the IBM Graphics Printer and the Hewlett-Packard Co. Laserjet Plus. Other features include four port options and two paper trays.

The F-3010 costs $8,395.

Kyocera Unison, P.O. Box 3056, 3165 Adeline St., Berkeley, Calif. 94703.

Input devices

A family of scanners designed for converting line-art drawings into computer-aided design (CAD)-compatible or standard raster formats has been announced by **Ana Tech Corp.**

The scanner family, called **Eagle**, features a patented document analyzer for converting captured raster data to vector formats in real-time. Output is switch-selectable between raster and vector formats.

Prices for the seven Eagle scanner models range from $45,000 to $90,000.

Ana Tech, 10499 Bradford Road, Littleton, Colo. 80127.

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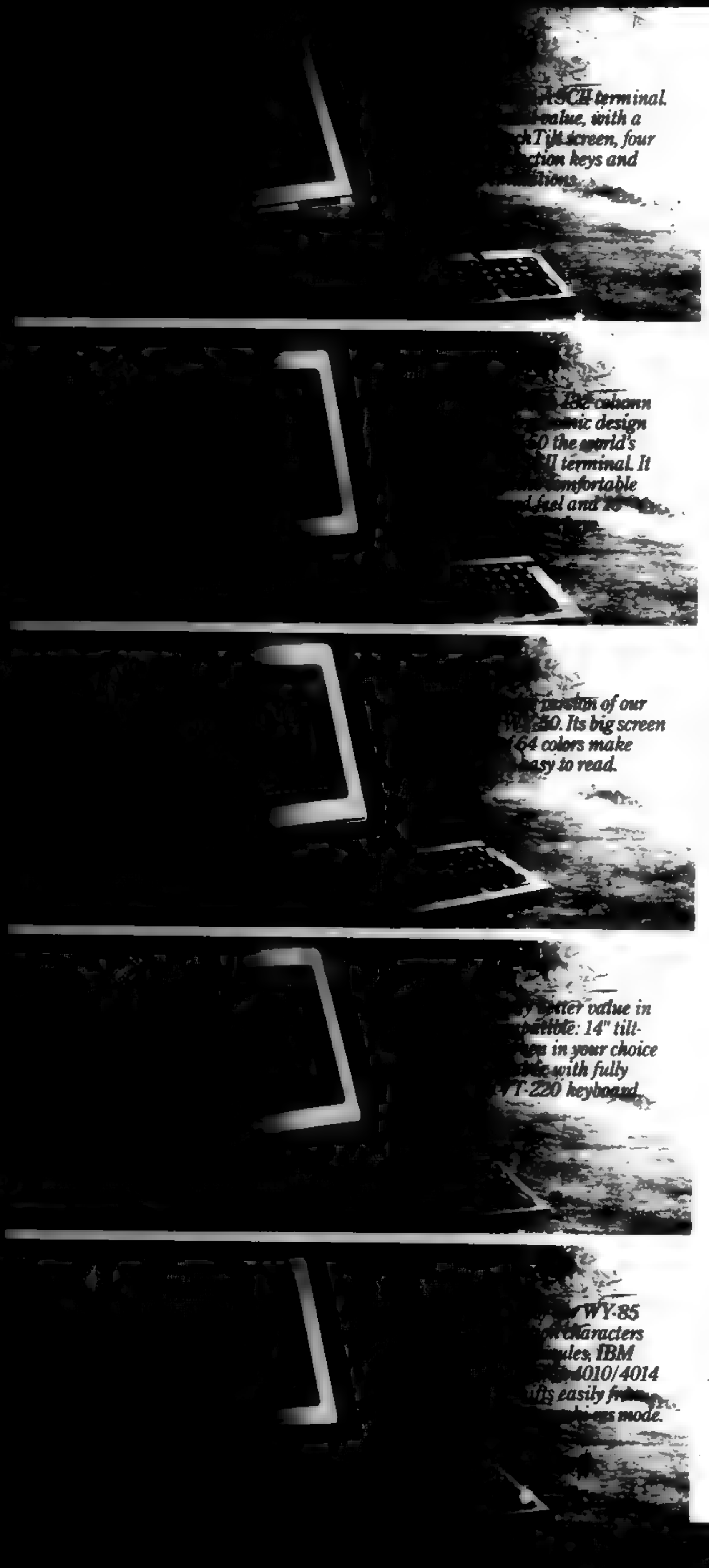

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Will AI fit onto a PC?

Despite the 386, despite expanded memory, the debate rages on

BY MICKEY WILLIAMSON

Only two years ago, the artificial intelligence research community held the view that AI applications would never run on a personal computer. In fact, the community feared that to suggest such applications be thus downsized would bring about a return of the "AI Winter," a drying up of research and venture funding.

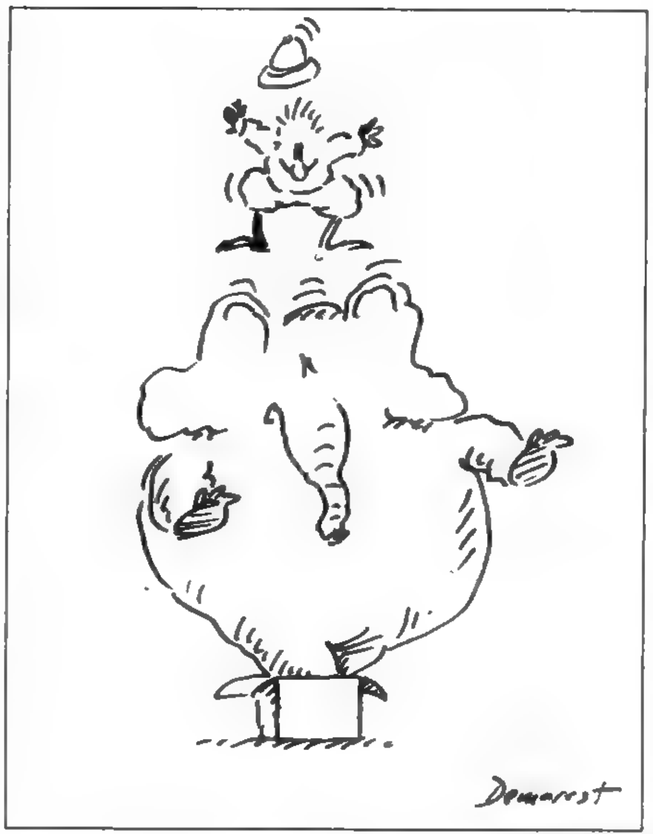
Today, however, the picture is very different. At the annual conference of the American Association for Artificial Intelligence held in Seattle last month, Patrick Winston, head of the AI laboratory at MIT, recalled a time in 1967 when "the world's biggest memory" — 1M byte — was installed in MIT's Digital Equipment Corp. PDP-6.

"By the standards of that time," Winston said, "the amount of memory that I carry back and forth to work every day on my PC would cost between $10 million and $20 million."

As far as hardware is concerned, today's generation of PCs possesses the performance characteristics, memory size and speed required for most AI applications.

Shatters myth

"If we ever felt there were some computational limitations to PCs, it seems to me that the 286 we see today goes a long way toward resolving that," says Larry Geisel, president and chief executive officer of the Intelligent Technology Group in Pittsburgh. "The 386 just totally shatters the myth of computational capacity," he adds, referring to Intel Corp's 80286 and 80386 microprocessor chips.



CHRIS DEMAREST

Not everyone in the industry shares that view, however. David Pensak, research supervisor for computer science at Du Pont Co., says, "It is a constant fight to get people to realize that someday even the 386 machines may not be sufficient for things that really have a big dollar impact on the company."

Pensak says he sees PCs as "great pedagogical tools, less intimidating by far than sitting down with a LISP machine or trying to learn Inference Corp.'s ART or Intellicorp's KEE system for your first time through."

But Pensak says he worries about systems that have no room to grow, saying that concern for upward migration should be of paramount consideration in any AI development project.

At the Carnegie Group, Inc., a Pittsburgh AI consulting and software firm, "We look at the 386 as being in an approximate class with a Sun workstation," says Lawrence Rostetter, vice-president of marketing and services, referring to Sun Microsystems, Inc.'s products. "They will have both memory capacity and disk capacity to take on some fairly serious applications."

But for the kind of manufacturing and industrial applications his company specializes in, Rostetter says, "Systems below the 286 don't have the horsepower, and, in many cases, the 386 in its current configuration won't do either, because it doesn't have enough memory."

The system at hand

Information systems organizations considering expert systems development can use the following guidelines when choosing a machine for development and deployment of AI applications:

- Make the system fit on existing hardware, if possible.
- Data base size and complexity are the governing factors when a company is considering natural language applications.
- All other things being equal, start with a PC for both development and deployment. PCs are less expensive and more accessible — therefore they are preferable if powerful enough for the application.
- Never lose sight of the possible need for upward migration.
- Security requirements, shared access or the need to deal with large or complex data bases may tip the balance away from the PC.
- The need for the expert

……

- **Pro: You can be clever with memory use**
- **Con: No room left to grow**
- **Step 1: What system do you have now?**

Williamson is a technical journalist and consultant based in Warwick, R.I. She is author of *Artificial Intelligence for Microcomputers.*

system — and the person who uses it — to travel from site to site weighs heavily in favor of a PC-based system.

- In any case, a detailed and realistic benefit analysis is called for, taking into account the possibility that intangibles may be a larger factor than in traditional application projects.

Beyond these simple guidelines, questions about the suitability of PCs for AI applications boil down to one set of considerations where natural language data base query is concerned and a somewhat different, more complex set in the case of expert systems. Some general considerations apply to both.

Most important is the kind of computing system already at hand. The goal is to make the techology fit in with the way the organization is structured, says Saj-nicole Joni, director of consulting services at Gold Hill Computers, Inc. in Cambridge, Mass.

"Given even the most powerful PCs, there are other things to look at," she says. "You have to understand how the corporation already does its work." If an organization needs to run departmental-level machines because that is how the company is organized, she explains, then any AI system will have to be delivered on that level machine. If the organization needs a knowledge base shared by many end users or one that raises major security requirements, it would be hard to deliver in a PC environment or a single-user workstation environment.

Whereas natural language processing systems always depend on the existence of a data base, expert systems may or may not. They can, therefore, stand alone, accepting input data from external sensors, spreadsheets or a user. Or the systems can be just one part of a large application, most of which has nothing to do with AI.

> "IF WE ever felt there were computational limitations to PCs, the 286 we see today goes a long way toward resolving that. . . . The 386 just totally shatters the myth of computational capacity."
>
> LARRY GEISEL
> INTELLIGENT TECHNOLOGY GROUP

Expert system story

Geisel's company is developing a set of expert system development tools, and his pro-PC view, understandably, reflects the expert system perspective.

The natural language viewpoint is somewhat different, as expressed by Larry Harris, chairman of Artificial Intelligence Corp. in Waltham, Mass., publisher of the mainframe product Intellect.

"Has the 386 changed anything? Not yet, but it will," he says. "Not yet because the address space limitation is still there until the real operating system [IBM's OS/2] comes out."

Robert Keller, president of Renaissance International Corp., a Harvard, Mass.-based AI training and support company, says he believes otherwise, arguing, "If you're trying to do straightforward retrieval and presentation kinds of things, the PC is good enough. But the natural language products that are available for the PC are not outstanding." As Harris points out, the main function of a natural language system is to form a bridge between the user's conceptual view of data and the data base management system's logical view.

End users themselves can tell the natural language system what they want to know and let the software figure out how to write the query to the data base. While MIS concentrates on maintaining the data, self-sufficient end users put the data to work in running the business.

Most often, this kind of data retrieval and analysis depends on a large and complex data base — too large and too complex to reside on a PC. Sometimes it is possible to download a portion of the mainframe data base and use a PC-based natural language query system to frame the queries.

But, Harris notes, there is a Murphy's law of data query that says, "Whatever level of abstraction the data is stored at, the user wants some other level."

If data is stored at the transaction level, for example, the user wants a summary by product line or by region or by fiscal quarter. Training a natural language query system to deal with problems of that sort is a major task in itself, and the resultant lexicon may be too large for a PC to handle. Add to that the fact that most large data bases are shared by many users and that PCs are not yet very good at sharing data.

"As soon as you start sharing the data base, you're probably better off doing it on the mainframe, simply because, then, the MIS organization has better control over the lexicons and over access to the data," Harris says. Harris says he sees IBM 9370s and mid-range DEC VAX computers as ideal for this kind of application because they are made for departmental computing and can handle large data bases.

Just be more clever

All this is not to say that natural language systems have no place on a PC. "There isn't anything that says you have to use this much memory for a particular problem," says Jeff Von Limbech, author of Clout, a PC-based natural language from Microrim, Inc. in Redmond, Wash.

There are two kinds of data that might strain the memory capacity of an average PC. One is the set of system rules — the intelligence of the system itself — that the machine uses to interpret end-user queries. The other is the language's vocabulary of English words, including definitions, synonyms and alternate word forms (such as plurals and past tense).

Von Limbech acknowledges that Harris's mainframe-based Intellect language contains extra instructions to handle queries that are grammatically incorrect and somewhat cryptic. And, he says, "The thing that's hard to do is store a knowledge base that contains enough knowledge to let the system act intelligently. That's a problem on all systems, but it's aggravated on PCs."

But Von Limbech argues that product developers at Microrim short-circuited the problem by using a set of expert system rules that optimized the use of memory. That way, he says, Clout can achieve comparable results using much less memory.

Gary Hendricks is president of Symantec Corp. in Cupertino, Calif., publishers of Q&A, a PC-based natural language. He contends that vocabulary size is not a real obstacle to PC use either. "Forty percent of the writings of Shakespeare use only 100 of the most frequently used English words, and it falls off rapidly after that," Hendricks says.

Solution by default

Often, especially where inferencing technology is involved, the hardware choice revolves less around what is best and more around what is available. At Du Pont, where some 70 knowledge-based systems are in routine use and another 500 are in various stages of testing, about half run on PCs. The question, according to Edward G. Mahler, Du Pont's Wilmington, Del.- based manager of AI programs, has been answered "by default."

"The places where you don't use a PC for AI is where you have a minicomputer with a lot of terminals installed and people don't have PCs," he says. In the manufacturing world, that is how things are set up, Mahler says, so about half of Du Pont's applications are on terminals connected to minicomputers. "But not because they weren't doable on PCs," he says.

Today, despite limitations in hardware and software tools available, hundreds of serious-minded expert systems run on PCs in finance, engineering, manufacturing and even in the pure sciences. The following systems are all PC-based:

- Honeywell, Inc.'s technicians use a proprietary system called Mentor, which runs on laptop and transportable computers to guide them in performing maintenance procedures and low-level diagnostics on the air-conditioning equipment they service in the field.
- Beckman Instruments, Inc. provides scientists with Spinpro to help them prepare specimens for analysis using ultracentrifugation techniques and with Peppro to help them plan experiments in peptide synthesis.
- Cost center managers at Texas Instruments, Inc. use an expert system developed by the company's Defense Systems and Electronics Group to do the analysis and write the reports required to justify the purchase of capital equipment.
- Auditors for Coopers & Lybrand, the accounting and consulting firm, carry Expertax on their portable computers when they visit clients to aid in tax planning.
- Technology Applications, Inc., a Jacksonville, Fla., consulting company, deploys PC-based expert systems that

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- Ford Motor Co. uses a PC-based expert system to monitor the application of vinyl side moldings in its Taurus automobiles.

Each of these systems is deployed on a PC for good reason. Some — such as Mentor, Expertax and the space station system — require a machine that is light and easy to transport. Others, such as Beckman Instruments' products, run when the only available computer is likely to be a PC.

However, not all of these products were developed on the machines on which they were ultimately deployed. Beckman's Phil Martz did the knowledge acquisition and rule writing for Spinpro on a Decsystem 20, while his partner, Matt Heffron, wrote the system's inference engine on a Xerox Corp. 1108.

The minicomputer-based system consisted of 1,100 rules, and Martz faced the task of condensing that knowledge into about 400 rules. He did this by generalizing from groups of specific rules. Now, he says, Spinpro "is running right at the edge of 640K bytes." Is the PC adequate for the job? "Yes," Martz answers, "just barely."

More often, however, expert systems development begins on the PC and migrates upward, either because the PC proves too limited or because the ultimate users have terminals, not PCs, on their desks.

Harry Reinstein, president of Aion Corp. in Palo Alto, Calif., whose Aion Development System, a group of inference-based application development tools, runs on PCs and IBM mainframes, says the PC version has become a major portion of the company's product line for one reason: "People are telling us there is a tremendous economic advantage to building their mainframe applications on a PC and then porting them to IMS or VM or CICS for final testing and delivery," he says.

The price of admission

There are two good reasons to begin development on the PC, regardless of the machine targeted for delivery. The first applies to organizations that do not already own an AI development workstation. The price of admission to high-end AI development for a single programmer can approach a quarter of a million dollars, according to Intelligent Technology Group's Geisel.

Companies should plan to spend at least $40,000 for the workstation and an additional $30,000 to $60,000 for development software.

Add to that "a training cycle, the formal portion of which is at least two weeks spent away from home, and the reality of which is up to a year spent in on-the-job training trying to figure out how to master the whole thing," Geisel says. "I'm sure there are some applications out there for which that investment is justified," he says, "but why limit yourself to only those applications?"

But even in situations in which cost is not the issue, an effort should be made to develop on the PC those systems that will be delivered on that machine.

When you have spent six to 10 work-years developing an application, being told to rework it for a totally different environment is "quite a setback," says Steven Rausch, vice-president and general manager of Technology Applications, Inc. in Jacksonville, Fla.

> "IT IS a constant fight to get people to realize that someday even the 386 machines may not be sufficient for things that really have a big dollar impact on the company."
>
> DAVID PENSAK
> DU PONT CO.

The major hardware argument against using PCs — the lack of memory capacity — can often be overcome by adding expanded memory boards and using software designed to take advantage of the extra capacity.

On Microsoft Corp.'s MS-DOS, 30M-byte disk storage capacity may be the limiting factor in cases in which the system must draw inferences about the contents of a very large mainframe data base if portions cannot be downloaded to the PC for reasons of data integrity or security or because the data is stored in a form not accessible to the PC.

Real-time limitations

But a more serious problem with PC-based expert systems concerns the software. Many low-end development tools are well engineered and surprisingly capable, but they may prove inadequate for some kinds of projects — where a response is required in real-time measured in seconds rather than minutes or hours, for example, or where highly complex kinds of knowledge representation and inferencing are involved.

But even that is changing. Technology Applications has started shipping Keystone, an MS-DOS-based development system with a look and feel very close to that of Intellicorp's KEE, which runs on high-end symbolic processing workstations. TI has produced a graphics extension to its Personal Consultant Plus that displays input from external sensors in dials and gauges in a manner similar to the active images feature of Inference's ART.

Gold Hill Computers' Goldworks furnishes a flexibility of knowledge representation schemes that can answer the needs of most complex knowledge bases. And even low-end development systems such as 1st-Class from Programs in Motion, Inc. in Wayland, Mass., Insight 2 Plus from Level Five Research, Inc. in Indialantic, Fla., and Exsys from Exsys, Inc. in Albuquerque, N.M., are meeting the needs of companies such as Du Pont in building expert systems that perform useful, if unspectacular, tasks.

'Their own way'

The best approach seems to be to put the expert system as close as possible to the ultimate user, on the machine with which the user is already familiar. Gold Hill Computers' Joni remembers cases in which portions of a mainframe-based expert system reside on PCs so that users can customize the system to their own way of doing things.

"You may have three different brokers who do things in three different ways," she explains. "It would be smart if the system at their end could be customized to their working style, but you wouldn't want them touching other parts of the system. So it makes sense to distribute the end-user portion to their personal computers." There is, Joni adds, no threshold number of rules or processing speed that can be used to determine where the expert system should reside.

But it is often possible to free up mainframe processor time by making the expert system available on PCs. But, she cautions, "You can do it badly — that is, write a system where you download things onto the PC and the mainframe is still slow. But it's technologically possible to off-load processing to the PC."

When a large number of users are connected to the mainframe, she explains, "a lot of what the mainframe spends its time on is going around looking to see who is ready for it. There's a lot of waiting time, sitting and doing nothing, waiting for input." When the mainframe is near its capacity, she adds, an expert system's inferencing is much better done locally.

On the other hand, Katherine C. Branscomb, senior vice-president of marketing and sales at Aion, points out that many companies buy a mainframe to do a particular application and may run that mainframe just 60% or 70% of the time. "If they have extra capacity on the big box, then their incremental costs of running the expert system there rather than on the PC might be a lot less," she says.

Choosing delivery vehicles

It seems clear that the technology is moving toward the day when inferencing techniques will be embedded in most business applications, and the question of their venue will be moot.

"One day, the term 'expert systems' will be like the term 'wireless telegraph,'" says Avron Barr, founder of Aldo Ventures, a Palo Alto, Calif.-based venture capital company specializing in expert systems applications.

Above all, Aion's Reinstein cautions, remember that there is no magic in AI technology.

There is undoubtedly a benefit in making machines better able to reason, but in truth, information systems organizations have for a long time been building applications that are extremely knowledge intensive. "Technology doesn't let you solve problems you don't know how to solve," Reinstein says. "It just changes the economics and the practicality of solving problems you do know how to solve." •

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Survival of the fittest

"There will be no information systems shop in 1992."

Thus spoke consultant Richard Dooley, president of The Dooley Group, earlier this summer. And thus say many others as well.

Dooley's remark made sense in its complete context, although it's easy to misunderstand him. If we think of the MIS shop as a room full of boxes, Dooley may be right. The room full of boxes might disappear — by 1992, 1997 or whenever. But the MIS shop in the broader sense — the place where people deal with systems of information — will not disappear. It will become even more important than it is now.

Consider history. A few decades ago there were no dial telephones. A call from one extension to another down the hall had to be placed by an operator. Companies had rooms full of them.

Today, these rooms have been replaced by a few lonely souls. An observer who saw this coming might have predict-

Continued on page 61

Schwab feels MIS growing pains

Firm recruits with radio; DPers licensed as security traders

BY JAMES A. MARTIN
CW STAFF

SAN FRANCISCO — In recent years, Wall Street's rising tides have continued to make waves for Charles Schwab & Co.'s information systems staff.

In order to keep up with the stock market fever as well as with its own enormous growth, the discount brokerage company is planning to double the size of its 250-employee data processing staff within the next 18 months.

Schwab managers face the formidable problem of building a strong information processing staff to manage the firm's rapid expansion in a region where qualified programmers and other DP support personnel are scarce. The company is taking the unusual step of using radio and newspaper advertisements to invite those interested in an information processing career at Schwab to attend an open house.

"We're looking for more entry-level people at this point, because we like to promote from within," says Woodson M. Hobbs, executive vice-president of information systems.

Another initiative is to offer the DP staffers the chance to expand beyond the traditional roles of end-user support, programming, applications development and the like by encouraging them to become registered stock traders.

Of the 250 information systems staff, some 30 to 50 are registered traders, according to Hobbs. The goal is to allow the Schwab DP staff to better integrate with the end users, better understand their business and become more promotable in the process.

Woodson M. Hobbs

"In the information center, you deal with the financial traders and business analysts a lot, and it's important that you understand their business," says Dawn Lepore, vice-president of Schwab's applications development and support. "Being a registered trader also gives you more credibility with the end users."

Knowledge of the stock market and trading is helpful in designing sophisticated applications for traders and analysts, according to Sheri Anderson, vice-president of Schwab's data center and one of the registered traders.

"I was able to do some planning and suggesting for applications rather than depending on the end users to come up with the ideas themselves," Anderson says.

It's not a career change

So far, few if any of Schwab's DP staff have moved over to stock trading full time, Hobbs says. "We do hire people from other parts of the company, and we would like to transfer people from information systems to other areas, but for the most part, computers are their career, and that's where they tend to want

Continued on page 63

Data View

Electronics earnings

Data processing salaries as of March 1, with rate of increase from the previous year, as reported in a survey of members of the American Electronics Association

Position	Salary	Increase
Software development manager	$58,404	4.5%
MIS manager	$53,368	2.7%
Computer operations manager	$44,364	2.8%
Senior systems analyst	$40,692	3%
Intermediate systems analyst	$35,244	4.4%
Computer operations supervisor	$32,256	4.6%

INFORMATION PROVIDED BY THE AMERICAN ELECTRONICS ASSOCIATION
CW CHART

Back to school with Xerox: Recycling technical workers

BY DAVID A. LUDLUM
CW STAFF

ROCHESTER, N.Y. — Managers of a Xerox Corp. facility located near here are confronting a surplus of traditional technical talent and a need for computer professionals by "retreading" employees through an educational venture with a local university.

Through its Critical Skills Training Program, the Xerox Business Products and Systems Development Group in nearby Webster, N.Y., is attempting to boost the ranks of its computer professionals while avoiding layoffs and hanging on to valued employees.

Through the program, selected employees pursue a full-time, year-long customised program of study devloped by Xerox and

Continued on page 62

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Survival

CONTINUED FROM PAGE 59

ed the demise of the corporate telecommunications function.

Did the function die? Of course not. Hardware operation has been distributed to users. The telecommunications function is no longer as visible as it once was. Callers no longer need to involve their staffs in even the simplest of phone calls. But the function has not disappeared; it has evolved.

Today's telecommunications managers are concerned with new issues: selecting carriers, network topologies, statistical vs. time-division multiplexing and packet-switching services. Today's telecommunications managers function behind the scenes to all but a few of their customers. But their functions have a greater impact on the organizational bottom line than ever before.

Users taking over

The same is happening in MIS. Users are increasingly responsible for running their own systems. They have managed their own desktop micros for years. They are increasingly responsible for departmental computing as well.

The fraction of corporate computing power in central sites is steadily dropping. By 1992, or some other date, this fraction may approach invisibility. After all, how much computing power is needed to add up a division's profit-and-loss statements? By 1992, that much power will fit into a wristwatch. The day of gigantic mainframes tended by white-collar armies behind glass windows will go the way of operators asking, "Number, please?"

But this does not reduce the importance of the information systems function. Information processing hardware has become easier to deal with, but information itself has become more complex. Information processing today is vital to corporate life.

So it is with computers. No longer can computers be replaced by armies of clerks. Expert systems to configure superminis, computer-aided design systems to design very large-scale integration chips, "just-in-time" scheduling systems in an automobile plant — all transcend human ability.

There will always be a need for information specialists to create and monitor the information structures that make such systems possible. In fact, distribution of hardware power to end users makes specialists even more necessary; end users tend not to worry about such aggravations as data consistency and integrity.

What does this all mean? Tomorrow's MIS chief will be less of a data processing manager. Users will increasingly manage their own data processing. But the MIS chief's job will not disappear. The required skills will increase, not decrease. The title of chief information officer will become more descriptive of the facts. It is in managing information that MIS professionals can, should and will make their greatest contributions.

Today's MIS executives must prepare themselves to deal with this transition.

Mallach teaches at Boston College School of Management and is a consultant to top user and vendor executives. Much of his consulting work involves systems selection and competitive analysis.

Survey indicates MIS moving into OA role

Managers gradually accepting broader duties, responding to staffers' needs

MIS managers are increasingly involved with streamlining office operations as they belatedly take a leading role in office automation, according to a recent survey.

In a survey of members of the Data Processing Management Association, 80% said streamlining office operations is their key responsibility, according to the Office Technology Research Group (OTRG), which commissioned the survey.

That view reflects a growing involvement by data processing managers in office automation, according to John Connell, executive director of OTRG, which conducts research on behalf of corporate members.

Initially, DP managers sought to automate certain office operations by "pulling them out of the office and putting them in the data center" and shied away from close involvement with office workers, Cornell said.

Controlling OA purchases

But over time, managers have gotten more involved with office automation through controlling purchases of equipment, he said.

"When you get out in the office, you have to concentrate on the work being done and the people," he said. "You have to know how the equipment is affecting business. Reluctantly, and now perhaps with a little stronger enthusiasm, MIS people are concerning themselves with how offices operate."

The survey also found that DP managers expect users to play a more active role in charting their companies' computer equipment strategies but not in more technical realms such as programming.

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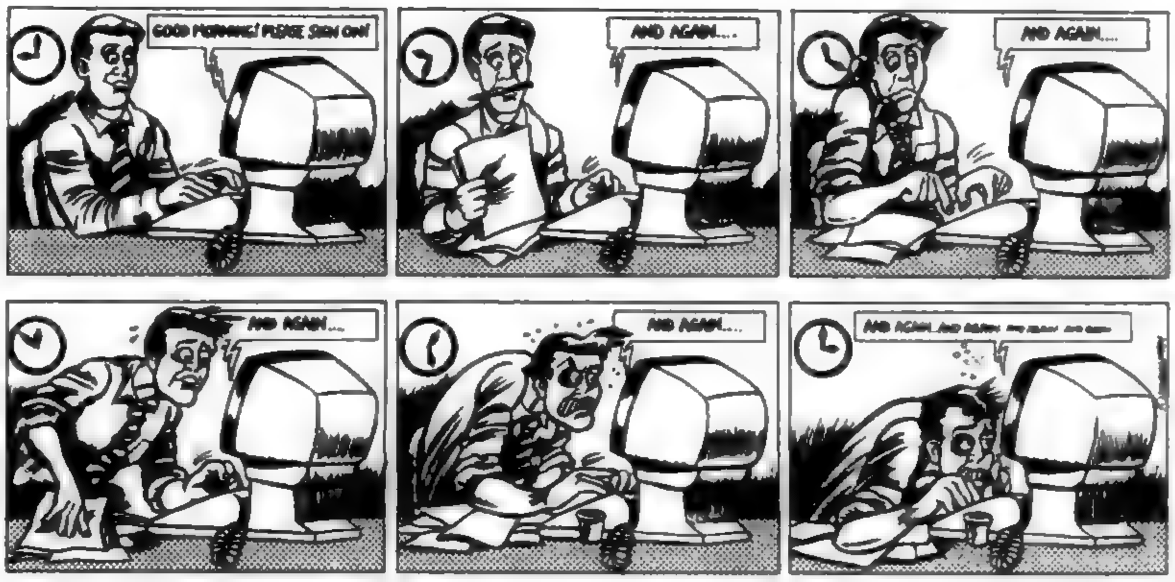
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Back to school

CONTINUED FROM PAGE 59

the Rochester Institute of Technology (RIT) and conducted by RIT faculty members, while continuing to receive their regular salary and benefits.

"They're Xerox employees. They just don't come to work," says Norman Deets, human resources manager for the Xerox group.

Most of the 41 workers who have completed the program are working in product development, although a few are in MIS, according to Deets.

The Xerox program is similar to one conducted by RIT and Eastman Kodak Co. a few years ago, although the 50 Kodak employees involved — generally chemists studying computer programming — worked part-time while studying for six months. Both efforts are similar to "bridge" programs RIT offers to the public to prepare students for graduate study in computer science.

The program has cost the Xerox group about $150,000, excluding the participants' salaries and benefits, for each of the three years it has been conducted.

Managers report positive results overall, although the programs engender obvious challenges in choosing which employees will be eligible and in hanging on to the ones who complete the studies.

Skimming the cream

"One of the problems with these programs is, it's difficult to choose the students for them. You've got to choose good ones, because they're the ones that will take to the training. But what manager wants to give up his best people?" says Peter Anderson, chairman of RIT's Computer Science Department.

"And it's delicate — who do you choose, and how do you choose them? That's hard on the managers," adds Anderson, who has conducted similar programs at the New Jersey Institute of Technology in Newark.

Kodak and Xerox both launched their programs in the wake of massive layoffs aimed at trimming their work forces in the face of sharp competition for mature markets from Japanese rivals.

Amid such layoffs, the offer to retrain current employees for computer careers rather than hire new workers avoids a further drain on employee morale, says Jean Lombardi, manager of Xerox's program.

The programs also allow overstaffed companies to make use of good employees while avoiding expensive "golden handshake" incentives for early retirements, Anderson says.

Xerox culled the 41 employees it has retrained since 1983 from about 200 applicants. Most of them had training in math, science or engineering and were working as mechanical engineers, chemists, designers and planners.

Xerox puts applicants through tests for aptitude and mathematics. Managers have found a strong correlation between math ability and success with the studies and that the chances of success for those without an engineering or other technical background are not great, Lombardi says. "It's a very intensive and kind of grueling program. It's not an easy thing to do," she says.

A Xerox manager must accept an employee for a specific position before the worker begins the studies. A "mentor" in the department in which the employee will work helps oversee his transition. Xerox regards the graduates as having completed undergraduate studies in computer science.

The program provides something "halfway between a major and a minor" in undergraduate computer science — sufficient preparation for pursuing a master's degree in the field at RIT, as some graduates of the program have done, Anderson says.

To date, only two of the 41 graduates of the Xerox program have left the company, according to Lombardi. One departure involved a family relocation, while the other represented "out-and-out thievery" of a worker by officials of another company who read an article describing his retraining, she says.

Executive hiring outlook murky

NEW YORK — Employers' demand for senior managers declined in the second quarter, and companies may hold off on hiring executives, according to Korn/Ferry International, a management search firm.

Demand for senior managers fell 5% from a year earlier in the second quarter, following a first-quarter gain of 12%, according to the quarterly survey.

In a statement, the firm reported "a continuance of high levels of hiring activity after two exceptionally strong quarters," with vacancies almost equally divided between new and existing positions. President Richard M. Ferry characterized that situation as an indication of confidence in the economy.

But Ferry cautioned that the long-term view is murkier. "We are starting to detect a growing concern among corporations about their future hiring plans. Many are rethinking plans for expansion and may be putting hiring plans on hold in the foreseeable future," he said.

Among industries, financial services was the dominant source of demand for executives, accounting for a record 32% of the total in the second quarter. Finance accounted for 19% of demand. Information systems accounted for 2%, changing little from recent quarters.

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Schwab

CONTINUED FROM PAGE 59

to stay," he says.

Schwab, which has 2,500 employees, is a highly visible brokerage firm that grew from $40 million in revenue in 1982 to $280 million in 1986, thanks to its role in pioneering the discount brokerage business, a stock market bull that has continued to rage and a successful marketing campaign that made Schwab a household name.

Schwab recently regained its independence from Bankamerica Corp. through a $150 million leveraged buy-out. After years of independence, it was acquired by the troubled banking company in 1983 but sought to chart its own course again last year.

In the past year, the company's host computer capacity has more than doubled through three installations.

Last summer, for example, Schwab's San Francisco headquarters ran its brokerage accounting, on-line order entry and corporate processing on two IBM 3090 Model 200s. In October, those mainframes were traded for one 3090 Model 400. In April, a 3090 Model 180 was brought on-line and was replaced in July by another 3090 Model 400. An IBM 3083 has been used in New York throughout.

Although Schwab has always been mainframe-oriented, microcomputers are playing a growing role in the company, especially IBM's new Personal System/2 line.

"Our philosophy was always, 'If it can be done on the host, do it,'" Hobbs says. "We're not strong proponents of local-area networks (LAN) either, because they're not host based." But the current mainframe cost of $130,000 per million instructions per second (MIPS), compared with $5,000 per MIPS on a personal computer, "means we've got to start moving toward PCs. We don't have any choice," he says.

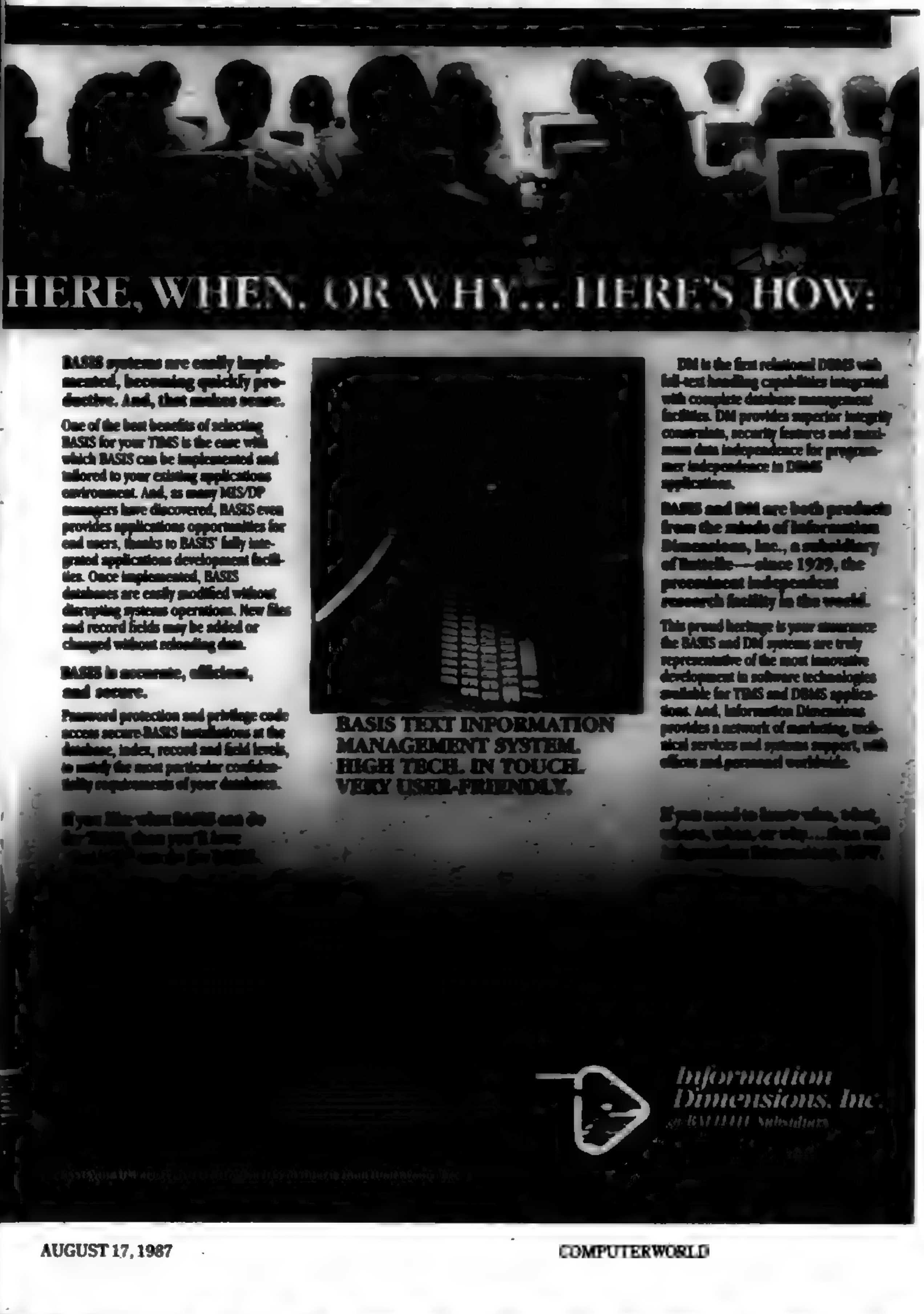
Chooses PS/2 as standard

Schwab currently has some 500 IBM Personal Computers, with one in each of its 120 branch offices. The company has ordered about 30 PS/2 Model 50s and says it plans to standardise on the Model 50 for all future microcomputer purchases. Later this year, it will be installing IBM's Token-Ring LAN on an experimental basis.

While the stock market is often hectic these days, it has slow periods as well, providing Schwab with some respite. "There's been so much momentum built up during the heavy periods that when it's a little quieter, we can finally finish projects that were started," Hobbs says.

"There are a lot of growing pains that occur during those periods, and when a lull comes, you stop hiring and catch up on projects and wait for the next busy period.

"That's probably not the ideal way to run a business," he adds, "but we're not allowed to tell the stock market how to grow."



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CALENDAR

AUG. 23-29

Image Scanning and Processing. Monterey, Calif., Aug. 23-25 — Contact: Gail Montgomery, Institute for Graphic Communication, 375 Commonwealth Ave., Boston, Mass. 02115.

Share 69. Chicago, Aug. 23-28 — Contact: Share, Inc., 111 E. Wacker Drive, Chicago, Ill. 60601.

Tex Users Group's Annual Conference. Seattle, Aug. 24-26 — Contact: Tex Users Group, c/o American Mathematical Society, P.O. Box 9506, Providence, R.I. 02940.

The Omni User Second Annual Technical Conference (on IBM's System/34, 36 and 38). Chicago, Aug. 25 — Contact: The Omni User, P.O. Box A 3031, Chicago, Ill. 60690.

The Computer and Automated Systems Association of the SME clinic on Voice Recognition Applications in Manufacturing. Chicago, Aug. 25-26 — Contact: Nancy A. Loerch, Society of Manufacturing Engineers, P.O. Box 930, One SME Drive, Dearborn, Mich. 48121.

First Conference on Speech Technology in Healthcare. San Francisco, Aug. 26-27 — Contact: Registrar, Institute for Medical Record Economics, 121 Mount Vernon St., Boston, Mass. 02108.

Software Contracts. Seattle, Aug. 27-28 — Contact: Registrar, Batelle Seminars Program, P.O. Box C-5395, 4000 N.E. 41st St., Seattle, Wash. 98105. Also being held Sept. 14-15 in Boston.

AUG. 30-SEPT. 5

The National Conference on Network Publishing. Dallas, Aug. 31-Sept. 2 — Contact: Interactive Features, Inc., 28½ Cornelia St., New York, N.Y. 10014.

Show CASE Conference II. St. Louis, Sept. 1-2 — Contact: Donna Skaggs, Center for the Study of Data Processing, Campus Box 1141, Washington University, One Brookings Drive, St. Louis, Mo. 63130.

Computer Aided Publishing CAP'87

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West. Los Angeles, Sept. 1-3 — Contact: Computer Aided Publishing CAP, Suite 200, 90 W. Montgomery Ave., Rockville, Md. 20850.

5th Anniversary PC Expo. New York, Sept. 1-3 — Contact: PC Expo, 333 Sylvan Ave., Englewood Cliffs, N.J. 07632.

Thirteenth International Conference on Very Large Data Bases. Brighton, England, Sept. 1-4 — Contact: VLDB 87, The Conference Department, British Computer Society, 13 Mansfield St., London, UK W1M 0BP.

SEPT. 6-12

Banque '87 — The 6th European Trade Fair for Techniques and Organization in Banking. Copenhagen, Sept. 7-9 — Contact: Bella Center A/S, Center Blvd., 2300 Kobenhavn S, Denmark.

SIBOS: SWIFT's International Banking Operations Seminar. Montreal, Sept. 7-11 — Contact: Euan R. Sellar, Public Relations Department, Society for Worldwide Interbank Financial Telecommunication S.C., Ave. Ernest Solvay 81, B-1310 La Hulpe, Belgium.

12th Annual National FSI User Conference. Dallas, Sept. 8-11 — Contact: Forum '87, Elizabeth Joyce, Marketing Coodinator, Suite 700, 2777 Stemmons Freeway, Dallas, Texas 75207.

Decworld '87. Boston, Sept. 8-18 — Contact: Public Relations Department, Digital Equipment Corp., 200 Baker Ave., Concord, Mass. 01742.

OSI Meeting for Government Users. Gaithersburg, Md., Sept. 9-10 — Contact: Joan Wywra, Room B218, Building 325, National Bureau of Standards, Gaithersburg, Md. 20899.

Financial Investment Management Exposition and Conference. New York, Sept. 9-10 — Contact: FIM Conference, Flagg Management, Inc., P.O. Box 4440, New York, N.Y. 10163.

1987 Capital Microcomputer Users Forum. Washington, D.C., Sept. 9-10 — Contact: Jackie Voigt, National Trade Publications, Inc., Suite 400, 2111 Eisenhower Ave., Alexandria, Va. 22314.

The Desktop Publishing Conference. Santa Clara, Calif., Sept. 9-12 — Contact: Seybold Seminars, 6922 Wildlife Road, Malibu, Calif. 90265.

Distribution/Computer Fall Expo '87. New Brunswick, N.J., Sept. 10-11 — Contact: C. S. Report, Inc., P.O. Box 453, Exton, Pa. 19341.

SEPT. 13-19

Vaulting the Barriers to EFT Success. Washington, D.C., Sept. 13-15 — Contact: Linda Munday, Electronic Funds Transfer Association, Suite 1000, 1726 M St. N.W., Washington, D.C. 20036.

13th National Conference of North American Honeywell Users. Cincinnati, Sept. 13-17 — Contact: Les Pacca, NAHU, P.O. Box 2037, Willingboro, N.J. 08046.

The First Annual Conference on Expert Sytems in Financial Institutions. New York, Sept. 14-15 — Contact: Institute for International Research, Inc., Suite 600, 9301 Wilshire Blvd., Beverly Hills, Calif. 90210

Atre Annual Forum on Data Base. New York, Sept. 14-16 — Contact: Atre International Consultants, Inc., P.O. Box 727, 16 Elm Place, Rye, N.Y. 10580.

Data Storage 87. Santa Clara, Calif., Sept. 14-16 — Contact: Forum Management, Cartlidge & Associates, Inc., Suite M-259, 1101 S. Winchester Blvd., San Jose, Calif. 95128.

7th Annual Conference on Control, Audit & Security of IBM Systems. Chicago, Sept.

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14-17 — Contact: MIS Training Institute, 4 Brewster Road, Framingham, Mass. 01701.

Integrated Manufacturing Solutions '87. Long Beach, Calif., Sept. 14-18 — Contact: Intertec Communications, Inc., Building 33-34, 2472 Eastman Ave., Ventura, Calif. 93003.

1987 Electronic Printer and Publishing Conference. Miami, Sept. 14-18 — Contact: Jean O'Toole, CAP International, Inc., One Snow Road, Marshfield, Mass. 02050.

ICCC-ISDN '87 . . . Evolving to ISDN in North America. Dallas, Sept. 15-17 — Contact: International Council for Computer Communication, c/o Bell Communications Research Corp., Room 1B349, 290 W. Mount Pleasant Ave., Livingston, N.J. 07039.

CAM-I Industrial Automation Standards Conference & Workshop. Chicago, Sept. 15-18 — Contact: Annette Van Hauen, Computer Aided Manufacturing-International, Inc., Suite 1107, 611 Ryan Plaza Drive, Arlington, Texas 76011.

Workshop on Computer-Assisted Map Analysis. Corvallis, Ore., Sept. 16-17 — Contact: Joseph K. Berry, School of Forestry and Environmental Studies, Yale University, 205 Prospect St., New Haven, Conn. 06511. Also being held Oct. 24-25 in Berkeley, Calif.

Information Systems Consultants Association's Second Annual Conference and Consultants Market. Atlanta, Sept. 18-19 — Contact: ISCA, Inc., P.O. Box 467190, Atlanta, Ga. 30346.

SEPT. 20-26

Interex North American Conference of Hewlett-Packard Co. Business Computer Users. Las Vegas, Sept. 20-25 — Contact: Interex Conference Department, 680 Almanor Ave., Sunnyvale, Calif. 94086.

Management Information Systems for Strategic Advantage. Philadelphia, Sept. 20-25 — Contact: Registrar, Office of Executive Education, 200 Vance Hall, The Wharton School, University of Pennsylvania, Philadelphia, Pa. 19104.

Systems Integration in Multivendor Environments: Dataquest, Inc.'s Business and Office Systems Conference. Littleton, Mass., Sept. 21-22 — Contact: Marina Pettijohn, Dataquest, 1290 Ridder Park Drive, San Jose, Calif. 95131.

Integrated Services Digital Networks. San Francisco, Sept. 21-22 — Contact: Customer Service, Frost & Sullivan, Inc. 106 Fulton St., New York, N.Y. 10038.

CD-ROM Expo. New York, Sept. 21-23 — Contact: IDG Conference Management Group, 375 Cochituate Road, Box 9171, Framingham, Mass. 01701.

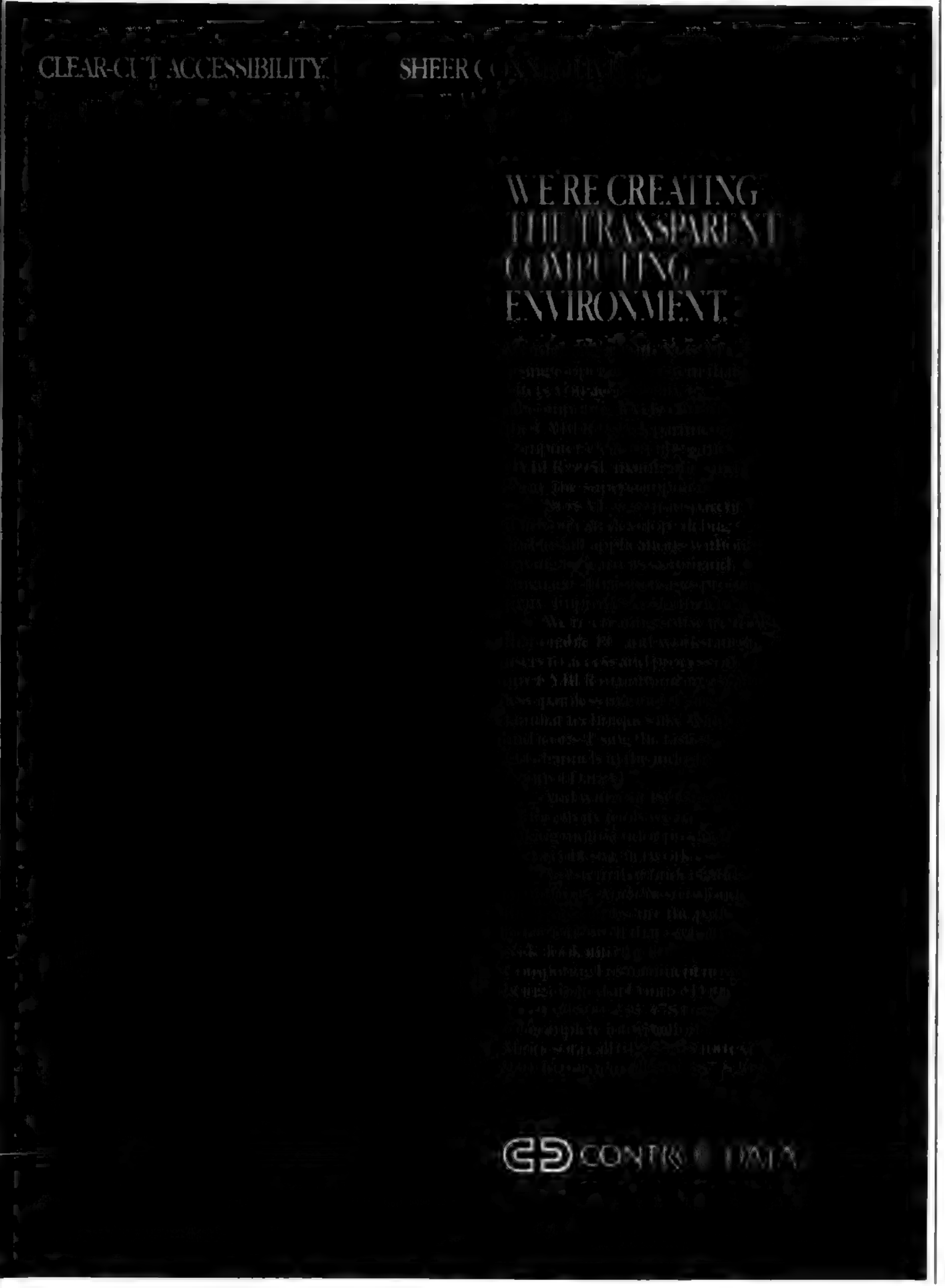
Corpcon Corporate Microcomputer Exposition and Technical Conference. Los Angeles, Sept. 21-23 — Contact: Corporate Expositions, Inc., P.O. Box 3727, Santa Monica, Calif. 90403.

Office Technologies Conference. Los Angeles, Sept. 21-23 — Contact: Corporate Expositions, Inc., P.O. Box 3727, Santa Monica, Calif. 90403.

Engineering Workstations Conference. Los Angeles, Sept. 21-23. Contact: Corporate Expositions, Inc., P.O. Box 3727, Santa Monica, Calif. 90403.

CSM '87: Conference on Software Maintenance. Austin, Texas, Sept. 21-24 — Contact: The Computer Society of the Institute of Electrical and Electronics Engineers, 1730 Massachusetts Ave. N.W., Washington, D.C. 20036.

10th National Computer Security Conference. Baltimore, Sept. 21-24 — Contact: Linda Muzik, Attn: C421, National Computer Security Center, 9800 Savage Road, Fort George G. Meade, Md. 20755.



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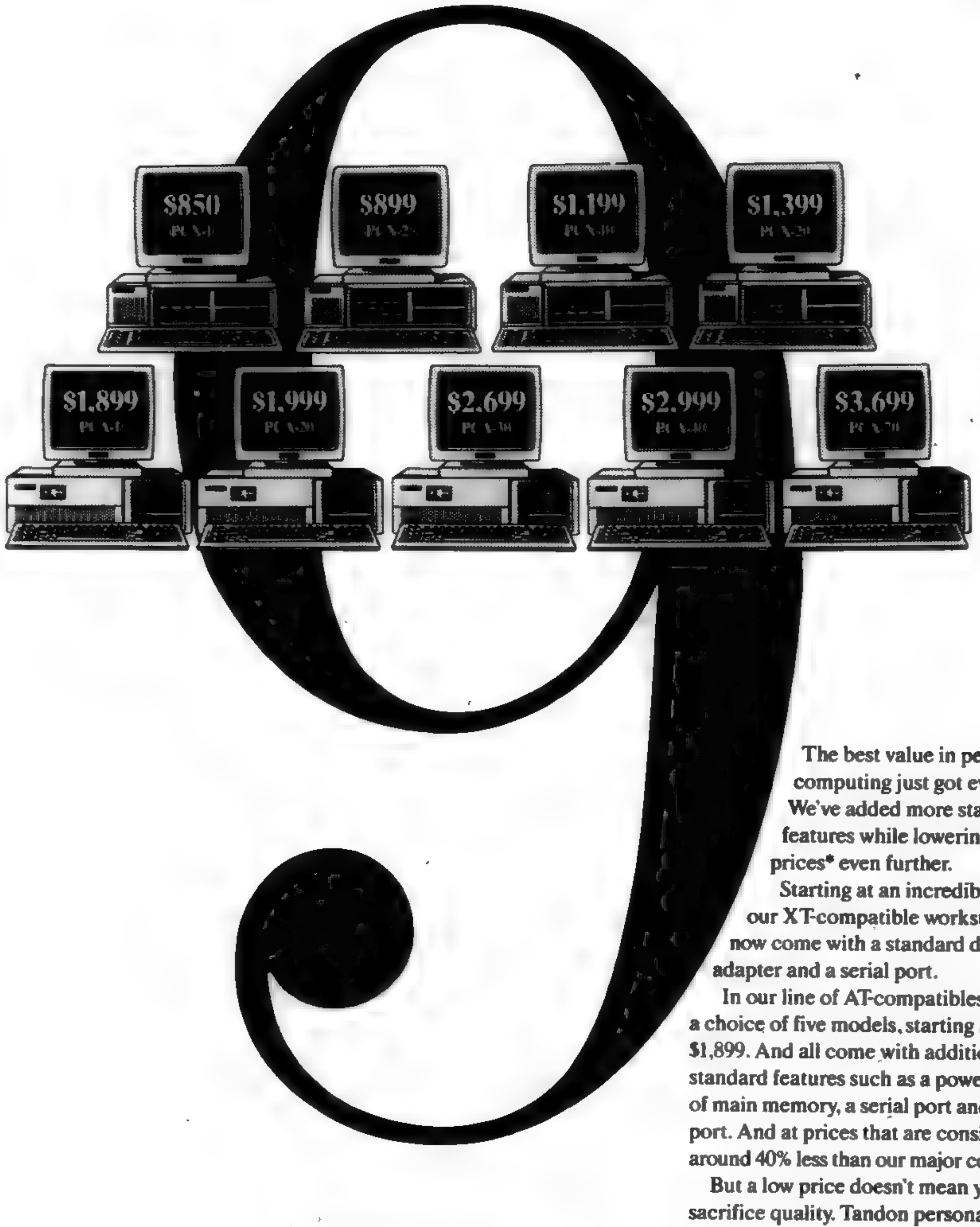

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COMPUTER INDUSTRY

INDUSTRY INSIGHT

James A. Martin

Small drives, big dreams

There are big expectations for the small hard disk drive industry.

The crystal ball, perhaps the most widely used technology in Silicon Valley today, reveals that sales of 3½-in. Winchester disk drives should reach $1 billion this year and should double in 1988 and again in 1989.

There's so much optimism about the smaller disk technology that pundits expect the 3½-in. disk to quickly surpass its big brother, the 5¼-in. hard disk, which is still largely the microcomputing standard.

Dataquest, Inc., for example, says shipments of 3½-in. hard disks this year will be 2.5 million units, compared with 6.1 million 5¼-in. disks. The tables will turn by 1990, however, when 8.9 million 3½-in. disks will ship, compared with 4.9 million of the larger disks, they say.

Wunderkind?

Perhaps the company most excited about this industry is Conner Peripherals. Barely two years old, the San Jose, Calif.-based firm is being touted by some as the emerging leader of the 3½-in. high-capacity hard disk drive market and *the* player to watch.

Finis Conner, chairman and chief executive officer, is known as a good salesman with a strong hard disk drive background that includes duty at Memorex Corp. and Shugart Associates, Inc., formerly owned by Seagate Technology, Inc.'s top man, Al Shugart. Shugart and Conner cofounded Seagate, but Conner left in 1985 over what were politely described as "creative differences."

Conner built his company with some top former executives of Miniscribe Corp. and with the financial backing of Compaq Computer Corp. The company began shipping its first product last year, entered full production earlier this year and, after only some 18 months in busi-

Continued on page 72

Semiconductor firms battle on

Intel locks horns with AMD to block 80286 microprocessor production

BY JAMES A. MARTIN
CW STAFF

SANTA CLARA, Calif. — Intel Corp. last week deepened its legal dispute with Advanced Micro Devices, Inc. (AMD) by seeking to rescind AMD's licensing rights to Intel's 80286 chip.

Intel requested that Judge Barton Phelps, an independent arbitrator here, block AMD from becoming a second manufacturing source on the 80286.

The request was made immediately prior to AMD's announcement last week of its 16-MHz 80286 microprocessor, which is based on Intel technology. AMD said it plans fourth-quarter volume shipments of the chip, which is faster than Intel's 12.5-MHz 80286.

AMD also said the new chip is a less expensive alternative to the Intel 80386. AMD's pitch contends that, because new Microsoft Corp. operating software that will tap the full potential of the 386 will not be available until late next year, microcomputer vendors should be able to offer higher processing speed without the more expensive 386 chip.

Intel's action was the latest skirmish between the two Silicon Valley semiconductor firms. In April, Sunnyvale, Calif.-based AMD charged that Intel had not complied with the firms' 1982 technology exchange and second-source agreement. Intel, in turn, told AMD that it would terminate the 10-year agreement next year [CW, April 20] and become the single source for the 386.

According to Dataquest, Inc., AMD supplied 18% of the 2.74 million 286 units shipped in 1986, while Intel supplied 73%.

AMD Chief Executive Jerry Sanders said at a shareholders' meeting last week that AMD plans to vigorously fight Intel's efforts to cut the company out of the 286 and 386 markets.

CIS buy-out prompts CMI exec exodus

BY CLINTON WILDER
CW STAFF

BLOOMFIELD HILLS, Mich. — The top six executives of computer leasing firm CMI Corp. recently resigned after withdrawing their effort to block the sale of CMI to competitor Continental Information Systems Corp (CIS).

CMI President and Chief Executive Officer Edward Cherney, who has resisted the $50 million CIS buy-out since it was announced in late May, dropped his appeal of a recent court decision that upheld the sale of all CMI stock to CIS [CW, July 27]. Cherney's action removed the last hurdle for Syracuse, N.Y.-based CIS to acquire CMI and create the second giant player in

Continued on page 70

Carnegie appoints Yablonsky CEO

BY JEAN S. BOZMAN
CW STAFF

PITTSBURGH — The Carnegie Group, Inc. last week formally named Dennis Yablonsky, the former president of Cincom Systems, Inc., as its new president and chief executive officer. Yablonsky, 35, had recently and suddenly announced his resignation from Cincom after 12 years of service [CW, Aug. 10].

Yablonsky's selection as president and CEO marks the end of an exhaustive six-month search conducted by Carnegie and Egon Zehnder International, a New York executive search firm, according to Mark Fox, acting president at the Carnegie Group.

Dennis Yablonsky

The Carnegie Group, with a projected $13 million in 1987 revenue and 150 employees, combines conventional manufacturing software with expert systems technology to create custom solutions.

Founded by four Carnegie-Mellon University professors in 1983, the firm has been without a president since February. At that time, three-year President Larry Geisel resigned to head a Control Data Corp. spin-off called Online Services. Geisel's new firm, since renamed Intelligent Technology Corp., also op-

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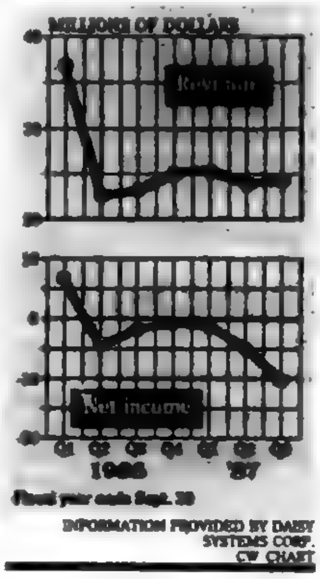
- 3Com says it will target large corporate users in 1988. Page 69.
- Teradata fares well in initial public offering. Page 70.
- Contel completes acquisition bid for Equatorial Communications. Page 70.

Daisy Systems' star loses its shine

A downward slide

Daisy Systems' losses have mounted as sales have stayed flat



Fiscal year ends Sept. 30

INFORMATION PROVIDED BY DAISY SYSTEMS CORP.
CW CHART

BY JULIE PITTA
CW STAFF

MOUNTAIN VIEW, Calif. — Once considered a star performer and a pioneer in the market for computer-aided engineering (CAE) workstations, Daisy Systems Corp. has fallen far and fast in the past 18 months.

Although the $74 million on Daisy's balance sheet appears to be enough to ensure its survival, industry analysts say the firm faces a major challenge in regaining its momentum in the increasingly competitive CAE market.

Industry watchers say that Daisy's problems have not been the result of stiff competition but can be blamed on poor strategic decisions. "It wasn't the competition that killed Daisy," says David Wu, an industry analyst for S. G. Warburg & Co. "It was Daisy that hurt itself."

Daisy has watched its piece of the pie being nibbled away by firms like Mentor Graphics Corp. and Valid Logic Systems, Inc., resulting in six consecutive losing quarters for Daisy. Revenue has stagnated. Most recently, Daisy posted a $10.5 million loss for its third fiscal quarter ended June 30 on net revenue of $24.1 million.

Company officials, who declined to be interviewed, have said that Daisy will not return to profitability this year.

Founded in 1980, Daisy introduced its first product line, the Logician workstation series, in 1981. Targeted at CAE applications such as the design of printed-circuit boards, integrated circuits and application-specific integrated circuits, the Logician featured both proprietary graphics chips and a proprietary operating system called Maestro.

Although Daisy's Logician offered impressive applications for the engineering market, the software product line "lacked discipline," says Robert Herwick, industry analyst for Hambrecht & Quist, Inc.

"Different programs were written in different languages," Herwick says. "They were very author-unique. Integration and maintenance were very difficult as a result."

The decision to go with a proprietary system was key to the problems Daisy later encountered, industry watchers say. While Daisy pushed its internally designed Logician, its primary competitor, Beaverton, Ore.-based Mentor Graphics, opted to go with a standard platform.

Missed the change

Daisy "was pushing their own proprietary hardware as the industry was changing to standard platforms," Wu says. "As the industry moved to Unix, Daisy offered Maestro. They didn't change; they got caught."

Continued on page 72

U.S., Japan reach trade accord

BY MITCH BETTS
CW STAFF

WASHINGTON, D.C. — The U.S. and Japan recently reached a trade agreement intended to break down some of the barriers U.S. vendors face when trying to sell supercomputers in Japan's domestic market.

The accord between U.S. Trade Representative Clayton Yeutter and Japanese Ambassador Nobuo Matsunaga reforms the Japanese government's confusing and biased procurement rules, officials said.

However, industry sources said the agreement will produce only a few token sales and fails to address U.S. complaints about heavy discounting by Japanese vendors.

"I'm not optimistic. When they sell the machines and the Japanese take delivery, then I'll believe it," said Richard A. Shaffer, principal of Technologic Partners, a high-tech consulting firm in New York. He said efforts to open Japan's semiconductor and telecommunications markets have not been successful.

A spokesman for Cray Research, Inc., the Minneapolis-based vendor that has been trying the hardest to sell in Japan, called the agreement "a very positive signal." But, he said, Cray "still must wait and see what kind of enhanced business opportunities result from the agreement." Cray has about 65% of the worldwide market for supercomputers, but its share of the Japanese market is said to be 15% to 20%.

The reforms allow U.S. vendors to participate in the early stages of procurement, allow companies more time to prepare their bids and prohibit discrimination against U.S. products.

However, Yeutter acknowledged that the accord does not resolve complaints about price discounts of up to 80%, which Japanese firms offer to academic institutions. "Japan has expressed its intention to discuss with us the discounting activities of Japanese companies so that we can achieve a genuinely competitive market for supercomputers," he said.

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Yablonsky

FROM PAGE 67

erates in the Pittsburgh area.

While Yablonsky does not claim to be an expert on artificial intelligence, he does have expertise in marketing and manufacturing software, including Cincom's Control:Manufacturing package.

Although it is unrelated, Yablonsky's career move mirrors the 1986 job change of former Cullinet Software, Inc. President Robert Goldman. Like Yablonsky, Goldman received his management grooming under the founder of a mainframe data base software company, then left for the top post of a younger AI firm. Goldman is CEO of Artificial Intelligence Corp.

Perhaps the key qualification for the Carnegie Group was Yablonsky's proven ability to preside over the growth of a firm. "We wanted someone who could take us from where we are now to a company that is over the $100 million mark," Fox said.

Privately held Cincom's revenue went from $89 million in 1985 to a projected $120 million this year. Yablonsky had served in a variety of managerial roles since he joined Cincom in 1975; he became president in October 1984.

Yablonsky will have greater control over the Carnegie Group than he did over Cincom, he said. He will also have an equity position in the privately held firm — something he did not have at Cincom. "Everything that happens will be my call, and that opportunity did not present itself at Cincom," Yablonsky said.

Cincom founder and Chairman Thomas Nies and a group of longtime managers will run day-to-day operations. No organizational changes are planned.

3Com says large users top priority list

BY PATRICIA KEEFE
CW STAFF

SANTA CLARA, Calif. — 3Com Corp., recently outlining its market strategy, said it plans to focus strongly on the needs of large corporate users in 1988.

Those plans were further bolstered by last month's announced intent to merge with Bridge Communications, Inc., a vendor of terminal-to-host networks that relies on direct sales to users.

While speaking to a recent gathering of securities analysts, 3Com executives stressed the importance of providing communications outside the work group. 3Com has traditionally focused heavily on interdepartmental computing.

The network vendor's two-pronged strategy rests heavily on development of a corporate accounts program. Observers expect 3Com to take advantage of Bridge's direct sales force while maintaining a viable reseller organization.

Another key to the strategy is the planned introduction of 10 products in 1988 that will link 3Com's work group networks to the mainframe environment.

3Com is especially concerned about large accounts because it thinks those accounts are the opinion-setters for smaller accounts trying to decide between network options, said Nate Brookwood, the San Francisco-based director of industry services for D. H. Brown Associates.

The corporate accounts program will not involve direct sales but is designed to get 3Com resellers to focus more heavily on larger accounts by working closely with 3Com sales personnel.

Luring the heavies

To attract large accounts, 3Com is dependent both on providing its users with an upward migration path via Bridge products and next year's product line-up, which will likely include products based on Transmission Control Protocol/Internet Protocol, CCITT X.25 and IBM Systems Network Architecture, analysts said.

3Com President William Krause hinted that some of these products may be delivered through alliances or acquisitions. Krause said the first such announcement will involve a joint marketing agreement with Digital Communications Associates, Inc. but refused to elaborate.

D. H. Brown's Brookwood expressed concern about 3Com's relying too heavily on reselling products through third parties. "Large accounts want a single source, and a lot of retailers don't have the capability to perform complex system integration," he said.

EXECUTIVE CORNER

A. Daniel Pigott has been appointed vice-president of **NCR Corp.** and president of **NCR Comten, Inc.** He replaces William J. Gotschall, who has resigned to pursue other interests. Pigott will have overall responsibility for the general management of all NCR Comten communications products.

Pigott was previously general manager of NCR's Wichita, Kan., engineering and manufacturing center, a position he had held since 1980.

Software Publishing Corp. announced that **Janelle Bedke**, formerly chief operating officer, has been named president. In addition to managing research and development, marketing, sales and manufacturing, Bedke will now be responsible for finance and human resources. She will continue reporting to Fred Gibbons, who remains chairman of the board. Bedke ran the Mountain View, Calif., software firm for much of 1986 during Gibbons' recovery from a stroke suffered in late 1985.

Storage Technology Corp. announced that **William T. Treadwell** has joined the company as vice-president of Americas/Pacific operations. Previously, Treadwell was vice-president of federal systems for Zenith Data Systems, a subsidiary of Zenith Electronics Corp.

Scientific Computer Systems (SCS) has named **Barry Rosenbaum** president of the company. He reports to Jack Hugus, SCS's chief executive officer. Before joining SCS, Rosenbaum was vice-president of international operations for Convex Computer Corp. in Richardson, Texas.

Cordata Technologies, Inc. founder **Robert S. Harp** resigned as chairman and senior vice-president of product planning, reportedly over differences with Cordata's majority owner, the Daewoo Group. Harp founded the microcomputer firm as Corona Data Systems in 1981.

Artificial Intelligence Corp. of Waltham, Mass., announced the appointment of **Thomas E. Nelson** as vice-president of systems development. Nelson will play a key role in the development and release of the company's new IBM mainframe-based expert system shell. Nelson was with Cullinet Software, Inc. from 1974 to 1986.

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Contel finalizes Equatorial buy-out at $56M

BY JAMES A. MARTIN
CW STAFF

MOUNTAIN VIEW, Calif. — Equatorial Communications Co. agreed last week to be acquired by Contel Corp. in Atlanta for $56 million, or $3.75 a share.

Originally, Contel had offered Equatorial $4 a share but revised its offer to $3.50 a share, partly as a result of three outstanding shareholder class-action lawsuits against Equatorial. The two companies agreed on the final offer after further negotiations last week.

The three suits — two of which were filed in 1986 and the third earlier this year — alleged that Equatorial violated federal security laws by releasing misleading financial information to the public. The suits are still pending and are in the discovery phase, according to Osa Mok, assistant treasurer for Equatorial.

Another potential reason behind Contel's reduced offer, according to analysts, is Equatorial's recent financial reports. Equatorial just reported revenue of $14.1 million for the second quarter, compared with $13.9 million for the same 1986 quarter. The firm suffered a net loss of $2.6 million, or 17 cents per share, compared with a net loss of $3.5 million, or 24 cents per share, the year-earlier period.

For the first six months of fiscal 1987, revenue was $26 million, compared with $32.8 millionin fiscal 1986. Net losses were $5.9 million, compared with $3.6 million the previous year.

Kenneth Bomar, corporate spokesman for Contel, said the company was aware of the shareholder lawsuits and the net losses before the first offer was made last month [CW, July 13]. The revised proposal, which is about $4 million less than the original $60 million offer, is a result of Contel's continued assessment of Equatorial. "We're always studying a potential partner and trying to keep a current evaluation of where they stand," Bomar said.

Teradata offer drums up $68M

LOS ANGELES — Teradata Corp., a maker of data base machines, received a warm welcome from investors last week when it raised $68 million from an initial public offering.

Some analysts said they were surprised Teradata fared so well, in part because technology stocks had been getting a lukewarm reception in some recent initial public offerings. Also, Teradata's market of data base machines has been pegged with an uncertain future by many analysts.

Teradata's 3.4 million shares sold for $20 each, although it had been expected that the selling price would fall between $16 and $19. The closing price last Tuesday, the day the stock was offered, was $23.75 in national over-the-counter trading, while the high that day reached $24.25.

Of the shares sold, the company offered 2 million; other shareholders sold the remainder. Teradata's founders and a group of private investors still control approximately 76% of the company.

CIS buy-out

CONTINUED FROM PAGE 67

independent computer leasing, behind Rosemont, Ill.-based Comdisco, Inc.

The acquisition will be finalized this week, said Paul Brooks, CIS's director of marketing. Although Cherney's resignation was not a surprise, Brooks said CIS was disappointed in the mass exodus of other top executives. "We had hoped that some would stay on in some capacity," Brooks said. Cherney could not be reached for comment.

The $350 million company is currently in limbo as it awaits a new management structure to be put in place by CIS.

CIS has a transition team headed by Vice-President of Business Development Robert Horstmyer on-site in Bloomfield Hills. "There is no central point of reporting right now," a CMI spokesman said.

Other CMI executives who resigned were Lloyd Marks, senior vice-president of marketing; Gary Smith, senior vice-president of markets; Frank Chartier, executive vice-president of financial services; Jim Feeney, senior vice-president and general counsel; and Dennis Grice, senior vice-president and chief financial officer.

The acquisition involves the transfer of CMI stock to CIS by the two majority owners of CMI, financial services firms Torchmark Corp. and Stephens, Inc.

Cherney's original suit had claimed that Torchmark and Stephens did not have the right to sell the 30% equity position held by CMI management. CIS announced last week that the Cherney-led management group reached a settlement with Torchmark and Stephens and conveyed its stock to the two companies.

The management group had originally offered to buy the company for $45 million, but Torchmark and Stephens agreed to the higher offer from CIS [CW, June 1].

CIS, which completed a successful stock offering earlier this year to raise cash, will also refinance $55 million of CMI's debt to Torchmark.

You're looking smarter than ever, MIS!

JCPenney Company's MIS department shares the inside story on creating a successful Executive Information System using an outside data service.

"We've actually had department heads from throughout the corporation walk into MIS and say, 'Hi! I like what you're doing and we need to get on your system.'

"All in all, I'd say we're on the right track," says Bill Friel, Vice President of MIS for JCPenney Company.

With a modest "We're on the right track," Friel sums up the tremendous success of JCPenney's Executive Information System (EIS), *now serving over 30,000 users.*

What's the secret to their success? And how can you make your department look as good when designing *your* system, the most visible MIS activity since introducing PC's to the Executive Suite?

The secret is that there's no secret at all.

Robert Capone, Senior Vice President and Director of Technical Operations, explains that when the EIS was designed in 1983, "We already had an extensive internal network. Our problem was how to improve the value of our existing decision support system.

"The obvious answer was to provide more of the information people really need. That meant adding external data, which led us to Dow Jones News/Retrieval®."

Take the "easy way out."

Capone found that Dow Jones News/Retrieval offered an easy, economical way to integrate reliable external data.

"It's there, the systems exist. It's easy to integrate. It's not very expensive—less now than when we installed it. And it fits the needs of a very broad user base," he says.

Dow Jones News/Retrieval is an online information service of Dow Jones & Company, Inc., publisher of *The Wall Street Journal*. It offers over 40 business and financial databases, including exclusive online access to the full text of *The Wall Street Journal*.

Capone remembers, "We experimented with various means of dial-up connections, but they were not convincing."

Robert Capone
Senior Vice President

Robert Northam
Chief Financial Officer

Al Lynch
Director of Planning and Research

"You're looking smarter than ever, JCPenney," is more than advertising, it's how users throughout the company view their MIS department, and the EIS they've created. Dow Jones is a major reason it rates above average.

To guarantee absolute reliability, JCPenney Company pioneered the technology for connecting to Dow Jones via a dedicated line and worked out an attractive pricing structure.

Other corporations, such as ConAgra and IBM, have followed their lead.

"It wasn't very difficult at the time," Capone says. "Today it would be even simpler."

What are the users saying?

Capone uses the service daily as a kind of executive security blanket. "I take a few minutes in the morning to look at the headlines and make sure I'm well informed. It really starts the day off right."

But what do others outside of MIS think of the decision to bring Dow Jones News/Retrieval inside?

JCPenney's CFO, Bob Northam, agrees wholeheartedly: "It's very timely and simple to use. In meetings, I can easily call up figures for immediate on-the-spot analysis."

Al Lynch, Director of Planning and Research, calls it "...one of the most powerful tools in our system. Thank goodness for the corporate insider trading data. It showed us some things that influenced a major deal. It can pay for itself very quickly."

Heather May, a coordinator for new business activities in Lynch's department, uses Dow Jones News/Retrieval because "...I believe in gut reaction. When my instincts say 'go to Dow Jones,' that's where I go. It sounds like habit, but there's a reason it became habit: I've found it works."

"It's a definite necessity," says Raul Consunji, a financial analyst at the company. "There's a lot of credibility in the name 'Dow Jones,' and no way to get along on the job without it."

Holly Clemente, manager of the Investor Relations Department adds, "This is a great way to obtain information quickly. Without it, everything would be done manually, and that shouldn't be the case in this day and age."

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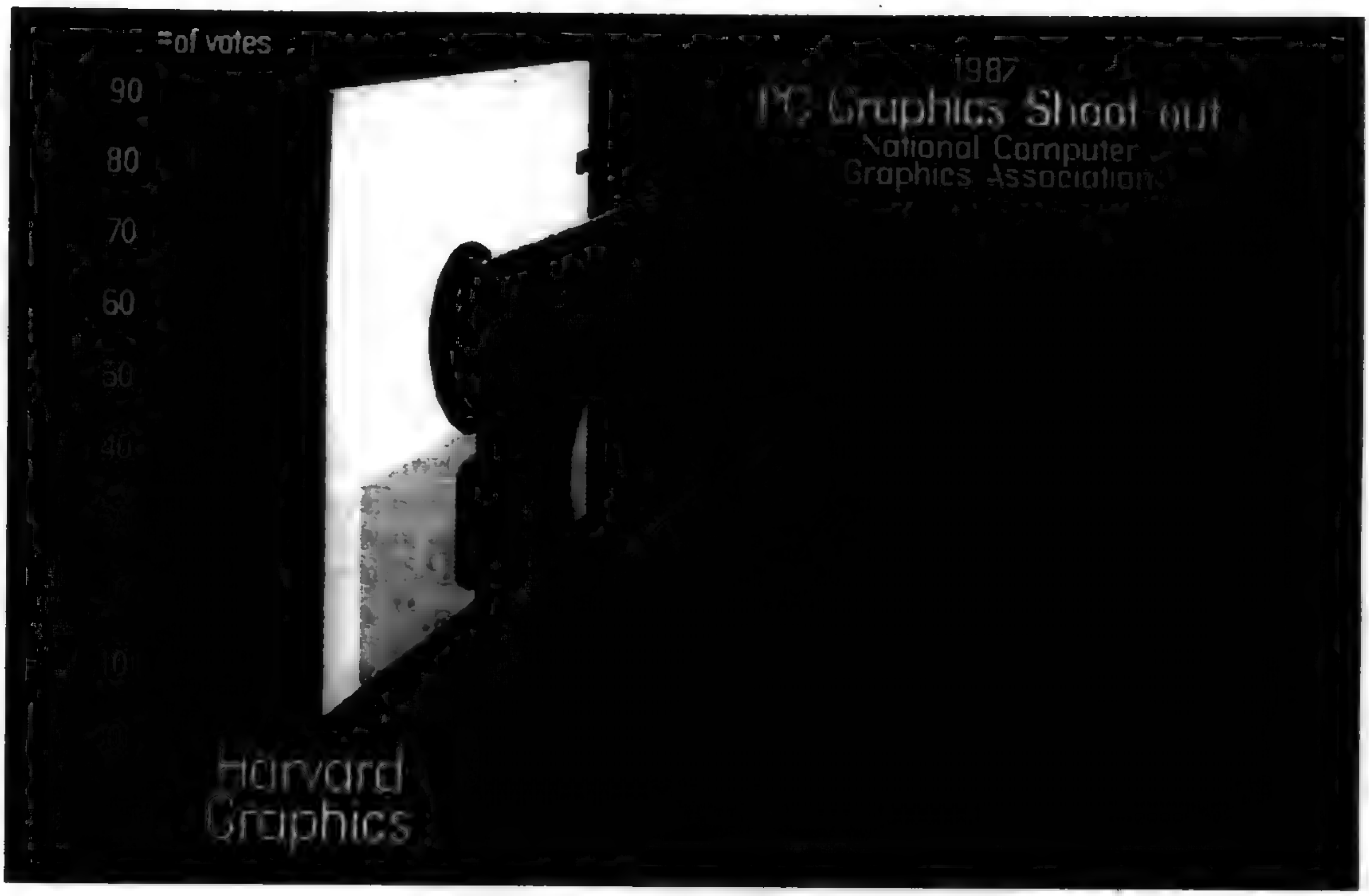

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New Harvard Graphics took on the competition at the National Computer Graphics Association's 1987 Shoot-Out, and won. Hands down.

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Small drives

CONTINUED FROM PAGE 67

ness, had revenue of $20 million and net income of $1.5 million in its most recent quarter, ended in June.

Although Miniscribe is said to be the overall 3½-in. drive industry leader today, Conner Peripherals is on top of the high-end small-form-factor market and could very well take the top spot in the entire 3½-in. industry.

"Conner has an experienced group of people, they've done this kind of thing before and they're not about to make the same mistakes," said Phil Devin, a disk drive analyst for Dataquest.

But Conner Peripherals will have plenty of company in the market, notably old rival Seagate and Maxtor Corp. Maxtor recently announced a 170M-byte hard drive that tops Conner Peripherals' 100M-byte drive.

Conner's formula for future success is to stick with the product he knows as well as to expand his company's financing and customer base. Compaq today accounts for 75% of Conner Peripherals' total sales, with the rest divided among distributors. By next year, however, Compaq should constitute only about 50% of sales, with the remainder coming from distributors and other large OEM accounts that Conner is currently negotiating.

Conner says his company can do battle with its competitors on a price/performance basis by buying parts from overseas manufacturers and assembling the total product in San Jose. The Conner Peripherals drives are said to have more servo information in each data sector and fewer parts than their competitors, which keeps the products' costs down.

Despite the glowing expectations and optimistic crystal balls, it remains to be seen exactly how Conner Peripherals will meet the challenges it faces.

The 3½-in. hard disk is still several years away from widespread acceptance and implementation. Conner Peripherals currently has no plans for optical disk drive technology, which many of its competitors — including Seagate — are seriously investigating.

Most importantly, Conner Peripherals must acquire additional large OEM accounts if it is to survive and prosper. The firm must also be able to produce high-quality disk drives at competitive prices, and many observers speculate that Seagate could gain the upper hand here with its reputation for price competitiveness.

There's speculation that down the road, semiconductors with dynamic random-access memory and erasable programmable read-only memory could replace rotating memory. The 3½-in. hard disk may shrink to 2½ in., bringing manufacturing and engineering changes.

All told, the common denominator for success is how well Conner Peripherals — or any computer company, for that matter — watches its market and listens to its customers. And that makes crystal ball-gazing a very popular activity.

Martin is a *Computerworld* West Coast correspondent.

Daisy Systems

CONTINUED FROM PAGE 67

By late 1985, Daisy was in turmoil. Mentor Graphics was able to capitalize on Daisy's mistakes, bringing with it a focused marketing approach, which Daisy lacked. While Mentor has concentrated its efforts on key accounts, "Daisy has had a quick-hit marketing approach," Herwick said. "There was a little too much smokestack-chasing rather than picking large key accounts."

For fiscal 1986, Mentor's sales reached $174 million while Daisy's lagged at $107 million. "Mentor is the market leader," said Rick Ruvkun, an analyst at Morgan Stanley & Co. "They were the only vendor to port their software to standard platforms, and that has given them the advantage."

Daisy has spent much of the last year and a half refocusing and restructuring. Last August, Aryeh Finegold, one of Daisy's three cofounders, was fired as president and chief executive. Replacing him as chairman and chief executive was longtime Daisy board member Max Palevsky, while Daisy cofounder Harvey Jones became president. Palevsky later relinquished the chief executive title to Jones, although he stayed on as chairman.

Musical chairs

Another shake-up occurred last April when Norman Friedmann, a former founder of data base software house Cordura Corp. and a Daisy board member, became chief executive as Jones left. Daisy recently began shipping a new family of Intel Corp. 80286- and 80386-based workstations, reversing the firm's strategy of using internally designed hardware.

In the mid-range, Daisy is considering the Sun Microsystems, Inc. Sun-3 and Sun-4 as platforms, sources said. Daisy is expected to reach an agreement with Sun sometime within the next nine months.

"If you support a broad line — IBM, Sun and the [Digital Equipment Corp.] VAX — you're a safe bet for the customer," Warburg's Wu said. "But, it'll take nine months for all those things to come together. Until then, they've got enough cash to keep them alive."

Hambrecht & Quist's Herwick said Daisy's road to recovery will be "a challenge" at best. "They've got all the things in place to turn it around," he said. "Can they grow back to be a $200 million company? That's the question for Daisy."

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Phil Thomas is President of Thomas Business Systems of Boca Raton, Florida. Thomas Business Systems buys, sells and leases new and used IBM, DEC and Data General equipment. They've been doing so for 10 years.

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Women making strides in MIS

Old chauvinism fading as young men attain management positions

BY ROSE MULA
SPECIAL TO CW

While opportunities for women in MIS are better than they were five to 10 years ago, many qualified women in the field still experience inequities.

Occasionally, a man will command a higher salary than a woman doing the same job, says Suzanne Gordon, MIS manager for SAS Institute, Inc. in Cary, N.C. "I don't think there is a conscious prejudice, but it sometimes exists," she says.

The sources of traditional attitudes about women in MIS are often the older men within the department. Younger male MIS professionals tend to treat women more equally, Gordon says.

Gordon attributes this trend to younger men having been conditioned through their experiences at college, where they had large numbers of women in their classes, to accept women as equals. "A few of the older men still have chauvinistic attitudes," she says. "But it's getting better because as the younger men grow into management positions, their philosophy is rubbing off on the diehards."

Whatever chauvinism remains, Gordon says, is quite subtle. "For instance, one of the older men might occasionally slip and call you 'Honey.' But all in all," she adds, "the situation is nowhere near as bad as in the engineering industry, which is still about 90% male."

Women also find it harder to achieve high-level management positions, says Beth Ranney, senior program director for the American Management Association and president of the Association for Women in Computing.

The reason for this difficulty is something Ranney calls "M&M" — marriage and maternity. "Companies perceive women as not being 'stayers,' " she says. "Not only do women leave jobs to get married and/or have babies; many switch careers."

In business for themselves

Until recently, women entering college were guided into the social services professions, Ranney says. Many found their positions unfulfilling and switched to business. But this switch resulted in even more disenchantment because of the less important and underpaid roles women were expected to play. Many women have left these business environments to start their own small consulting businesses.

"Most women in these consulting positions don't 'build' a company. They just make a position for themselves," Ranney says. The trend toward independent consulting strengthens the perception that women do not exhibit stability in the corporate environment. Because of this perception, Ranney says, she feels it's difficult for women to advance to management levels in MIS, even though equal rights legislation opened the door to entry-level positions.

> "A FEW OF THE older men still have chauvinistic attitudes. But it's getting better because as the younger men grow into management positions, their philosophy is rubbing off on the diehards."
>
> SUZANNE GORDON
> SAS INSTITUTE, INC.

Myrna Sameth, a past president of the Association for Women in Computing, is one of those women who left the corporate jungle to establish her own microcomputing consulting firm, Bentley Associates, in New York. "Most of my clients are small businesses, so I don't have a finger on the pulse of 'Corporate America,' " Sameth says. "But in the smaller firms, chauvinism and the old-boy network are alive and well, even though they're not acknowledged."

Good opportunities do exist for women in the MIS departments of small businesses, Sameth says, but male managers still talk about "the girls."

"You don't often see that in the corporate environment any more," she adds, "but that is mainly because they are trained not to act that way. So the question is, How much is indoctrination and how much is real?"

Room near the top

Despite the obstacles to attaining high-level positions, women can still achieve significant posts within MIS, says consultant Naomi Karten.

"Being in the right place at the right time and being good at what you do will get you a good job in MIS, whether you are male or female," Karten says.

Karten started her MIS career as a project leader for Blue Cross/Blue Shield of Massachusetts in the late '70s. "At that time, all the other project leaders were male," she says.

Her only problem was feeling a bit awkward in meetings. "Being the only female, I felt I had to be very careful about what I said because it stood out that much more," she adds.

Karten says she owes a great deal to the organization's open-minded managers who encouraged her to express her ideas and gave her valuable feedback and, more importantly, confidence.

She was eventually promoted to become the only woman among a dozen department managers. During the next few years, several other women joined the managerial ranks.

"I don't know if it was because they were becoming more aggressive and more able or because the company was trying to prove it wasn't biased — or maybe a combination of factors," Karten says. "But it was great to see so many of these capable women suddenly being formally recognized."

The key to success for women in MIS is to rely on their own ideas and qualifications and, above all, not to emulate men, Gordon says. "Women tend to respond intuitively to situations, as opposed to men, who typically respond pragmatically — and that is good," she says. "In my situation here, my boss has three women and two men managers reporting to him. The combination of our approaches to problems works out beautifully."

Mula is a Waltham, Mass.-based free-lance writer.

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For further information contact:

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LINCOLN NATIONAL CORPORATION

Human Resources
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Corporate Data Processing Recruiter
1300 S. Clinton St., P.O. Box 1110
Fort Wayne, IN 46801
EOE M/F/H

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All applications/resumes should reference position #IT132 and must be received by August 31, 1987. Reply to:

Department of Information Technology
110 South Seventh Street, Third Floor
Richmond, VA 23219
Attention: Personnel
EOE/M-F

DATA PROCESSING

Advanced Systems Division

DATA PROCESSING OPPORTUNITIES

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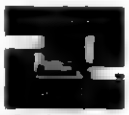
Please send your resume to: Steven Martin, NORTHROP ADVANCED SYSTEMS DIVISION, Employment Office, Dept. CW2522, P.O. Box 1138, Pico Rivera, CA 90660-9977. Northrop provides its employees with a competitive, comprehensive benefits package.



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NEW FLORIDA DATA CENTER

Outstanding high tech MVS/XA environment awaits 3 P/A's and 1 S/A in Florida. Applicants must have 3+ yrs. exp. in MVS/COBOL w/DB or TP exp. Financial applications a plus. Salaries begin at $30K, plus full relocation.

For the past 20 years we have been retained by several international billion dollar corporations to aid them in their search for DP professionals. In addition to our new data center client, we are also currently on search for 6 major southeast corporations who require various skills including LINC, MRPII, MODEL 204, IMS DBA, CICS, and "C".

To explore these or other opportunities in the south contact: CRITERION, INC., Attn: Director of DP, 5420 Bay Center Dr., #105CW, Tampa, FL 33609, (813) 879-1214.

INFORMATION EXECUTIVE

Capitol American, Cleveland's largest life insurance company has grown at a 40% compounded rate over the past decade and will grow another 40% this year. To keep pace with the information needs of a fast growing entrepreneurial company, we need to expand our ability to diagnose relevance from summary data. We are seeking a highly skilled MIS Consultant or Operations Manager to fill the newly created position of Information Executive. Reporting directly to the Senior Vice President of Operations/MIS, the Information Executive will need to demonstrate:

- ● Superior Analytical Skills.
- ● Verifiable achievements in an operations or "Big 8" consulting environment.
- ● Fluency in COBOL, D-Base III, LOTUS 1-2-3 and skill in relating PC's to mainframe. Artificial intelligence knowledge a plus.
- ● Excellent verbal and written English language communication skills.
- ● Insurance background and working knowledge of statistics.
- ● B.A. Academic background will include Accounting and Statistics.

The Information Executive will play a highly visible role in Capitol's continued 40% growth rate. Responsibilities will include:

- ● Preparing management information reports that will enhance productivity and efficiencies.
- ● Initiating statistical studies so as to interpret and forecast trends in the Operational sub-divisions.
- ● Track key, quantifiable variables measuring operations performance.

Capitol offers an excellent career environment and an aggressive compensation package, consistent with your exceptional performance. Qualified MIS Consultants and Managers please forward a confidential resume to:

Sr. Vice President, Operations/MIS
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Cleveland, OH 44114

Senior Computer Systems Analyst wanted to analyze, design and develop various commercial applications such as Management Information Systems, Quality Analysis, Financial Accounting, Sales Purchase Order Processing, Inventory Control, General Ledger, Accounts Payables, Accounts Receivables and Payroll Accounting for Manufacturing, Hospital Services, Advertising and Retailers Industry, transfer MS-COBOL source code to RM-COBOL and MF-COBOL using COBOL, BASIC and C languages, MVS/XA, MVS/SP, TSO/ISPF, OS/VS1, VM/CMS, UNIX, MS-DOS, CP/M, CICS/VS, BMS, SPF, EDF interest, IMS/VS, dBase III, Quickcode, Clipper, Lotus-123 software for use on IBM-4381, IBM-370, FORMATION-4000, UNIVERSE 48, IBM-PC's and CP/M hardware. Requires Bachelor's degree in Statistics, Management and Computers or Computer Science and two years experience in job offered or two years related experience as a Computer Systems Analyst. $36,000.00 per year. 40 hours per week.

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Salary from $31,781-$46,970

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A. Pike
Fairfax County Public Schools
Department of Personnel Services
6815 Edsall Rd.
Springfield, VA 22151
EOE, M/F/H/V

COMMERCIAL SYSTEMS ANALYST. Responsibilities include development of Computer Systems for client contracts. Will be involved in analysis, design & coding of various computer programs. Responsible for enhancement & modification of existing systems. Responsible as called upon, for preparation of technical reports, special studies & manuals. Will, when necessary, supervise programmers & work closely with end users to propose modifications to existing systems. Must have 2 yrs on job offered or 3 yrs exp as Programmer/Analyst. Exp must include work on large IBM type mainframes. Programming langs should include at least one of the following: COBOL, PL/1, Assembly. Exp w/on-line systems using large scale data bases. 40 hrs/wk, 9-5. Salary $38,000-$40,000/yr. DOT Code 012 167 066. Mail resume to: NY State Job Service, JO#NY8012730, 97-45 Queens Blvd. Rego Park, NY 11374.

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Mystic Color Lab
PO Box 144
Masons Island Road
Mystic, CT 06355

Mystic Color Lab

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Bachelor's degree plus 5-7 years full-time paid professional data communications related employment required. Additional related employment may substitute for the required degree. Citizenship or legal authorization to work in the U.S. required. Submit application or resume and transcripts to the Division of Personnel Management, 2229 State Office Building, SLC, Utah 84114. Contact Bradley Brown (801) 533-7986 for additional information.

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The successful candidate will have a Bachelor's or Master's Degree in Computer Science, Engineering, or a related technical field with a minimum of 7 years experience, 2 years directly related to position requirements. Background must include Fortran development experience. Knowledge of oil and gas industry, seismic data processing, exploration applications (mapping, etc.) or refining applications would be a plus.

Union Pacific offers a challenging work environment in an attractive location, excellent benefits and a competitive starting salary. Please submit a complete resume and salary history for confidential consideration to:

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Employee Relations Department
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Systems Analysts Systems Programmers

Are you at a point in your career where you feel stifled and not challenged by the day-to-day tasks expected of you?

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Unisys Corporation
Federal Information Systems
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8008 Westpark Drive
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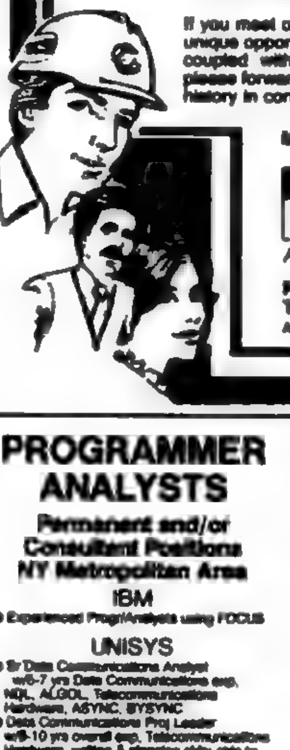
UNISYS

SECURITY SOFTWARE ANALYST

Tampa Electric Company, the major operating subsidiary of TECO Energy, Inc. located in Tampa, Florida, is currently seeking an experienced Security Software Analyst to work in our Information Asset Protection Group.

This position will be responsible for technical support of security software and security features in operating systems software, provide technical assistance in security and control related process techniques, and conduct research and analysis of the technical security environment.

Qualified candidates should have at least 7 years experience in a large-scale IBM installation with at least 3 years experience as a senior level analyst in technical aspects of RACF (1.7), MVS/XA operating system. Knowledge of VM security would be helpful.



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Computer Operations Shift Supervisor

Assistant to Computer Operations Supervisor. Plans, organizes and schedules operations. Performs coding, testing, modification and maintenance of systems and programs. Assists in evaluation, selection, implementation and modification of software, hardware and related data services. Establishes procedures and controls production. Provides technical assistance to various units and departments. Requires education/experience in OS/3, Univac System 80 or Univac 1100, COBOL. Considerable working knowledge of computer operation; system analysis and programming; supervisory principles and practices. Ability to communicate effectively verbally and in writing; establish and maintain effective working relationships with user departments, other staff, management, and public. Master's of Library Science desired. Starting salary: [illegible], excellent benefits.

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NEW ENGLAND

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John P. Bertsch is President of Bertsch & Company Advertising, Inc., a full service recruitment advertising agency headquartered in New York, with offices in Boston, MA and Irvine, CA. John is often asked by his clients to recruit data processing professionals and where to run their ads.

"Our clients are from varied interests — financial, food, high tech to mention a few," John explains. *"And most of them have at one time or another been looking for qualified data processing people. Our recommendation as to where to look? Not just in the local and national newspapers, but in Computerworld as well."*

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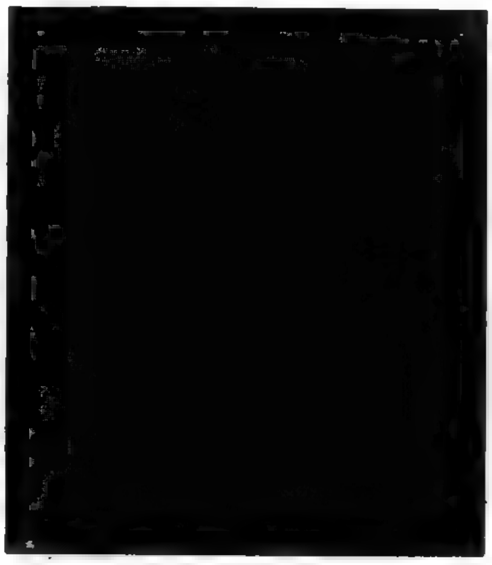

Dave Grinnell
Vice President & Ad Director
Source Services Corporation
Mountain View, CA

Dave Grinnell is Vice President and Advertising Director of Source Services Corporation, the parent company of Source Edp, the world's largest recruiting firm that specializes in the computer profession. Source Edp has been an advertiser in Computerworld — almost from inception of the publication. Here's why:

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"Not only does Computerworld reach our market, but it reaches a market that's actively interested in computing and fostering their career growth. Conservatively, over the years, we have helped many thousands of Computerworld readers find new positions within the computer profession; many times more than those readers of other technology or trade publications. How do we know? We have an elaborate tracking system that helps us verify from which media respondents see our ads. Typically, Computerworld generates over four times more respondents who eventually are placed in new positions by Source than the next nearest computer industry publication."

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Computerworld. We're helping employers, top professionals and people who help them get ahead get together. Every week. Just ask Dave.

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Saudi Arabia

The **King Faisal Specialist Hospital and Research Centre** in Riyadh, Saudi Arabia offers exceptional opportunities for experienced and qualified Data Processing Specialists. The Hospital, a 500-bed specialty referral complex with a large outpatient clinic, is the Kingdom's premier hospital dedicated to providing high quality health care to the citizens of Saudi Arabia.

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computer/net

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•9375-40	0.5	8 to 16
4331 2	0.5	1 to 4
S/38-300	0.58	8 to 8
S/38-400	0.75	8 to 8
4341 1	0.88	2 to 4
S/38-600	0.98	8 to 16
S/38-700	1.1	16 to 32
•9375-60	1.2	8 to 16
4381 11	1.4	4 to 16
4361-5	1.45	2 to 12
4341 2	1.5	2 to 16
4341-12	1.65	2 to 16
†4381-21	1.9	8 to 16
4381-1	2.1	4 to 16
•9377-90	2.5	8 to 16
4381 2	2.7	4 to 32
4381 12	2.7	8 to 32
†4381-22	3.2	16 to 32
4381 13	3.6	[illegible]
3083EX	4.4	[illegible]
4381-3	4.5	[illegible]
†4381-23	4.7	[illegible]

SYSTEMS	MIPS (Millions of Instructions Processed Per Second)	MEGABYTES
3033-UP	[illegible]	4 to 24
4381-14	[illegible]	16 to 32
3083BX	[illegible]	[illegible] to 32
•3090-120E	[illegible]	[illegible] to 128
†4381-24	[illegible]	16 to 64
[illegible]	[illegible]	8 to 32
[illegible]	[illegible]	32 to 64
3081D	[illegible]	16 to 32
[illegible]	[illegible]	32 to 64
[illegible]	[illegible]	16 to 64
[illegible]	[illegible]	32 to 64
[illegible]	[illegible]	16 to 64
[illegible]	[illegible]	32 to 64
[illegible]	27.7	64 to 128
[illegible]	28.7	32 to 128
[illegible]	31.8	64 to 128
[illegible]	44.3	64 to 128
[illegible]	50.0	128 to 256
[illegible]	58.0	128 to 256
[illegible]	76.0	128 to 256

• First Installation 1987
† First Installation 1st Qtr 1988

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SYSTEMS	MIPS	MEGABYTES
5840	[illegible]	16 to 128
5850	[illegible]	16 to 128
5860	[illegible]	16 to 128
5867	[illegible]	24 to 128
5868	[illegible]	32 to 256
5870	[illegible]	32 to 128
5880	[illegible]	32 to 256
•5890-190E	22	64 to 256
•5890-200E	31	64 to 256
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The above information is intended as a guideline for computer users on relative computer systems instruction cycle times. All data have been derived from published documentation and represent reasonable estimates of average MIPS ratings. However, Randolph is not responsible for the accuracy of the MIPS data. Cycle times will vary based on hardware software configurations and system manufacturers continually modify computer models as design improvements in hardware and software arise.

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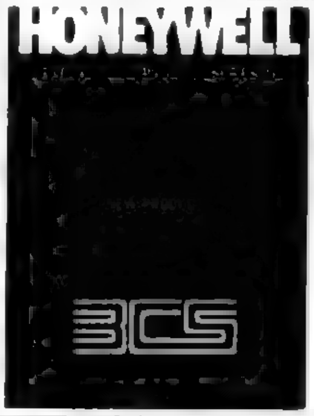

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COMPUTERWORLD

IBM revs up 3090s — with a hitch

INSIDE

In Depth: Price Waterhouse expects more from microcomputers. 53

Lack of advance notice riles users

COMPUTERWORLD

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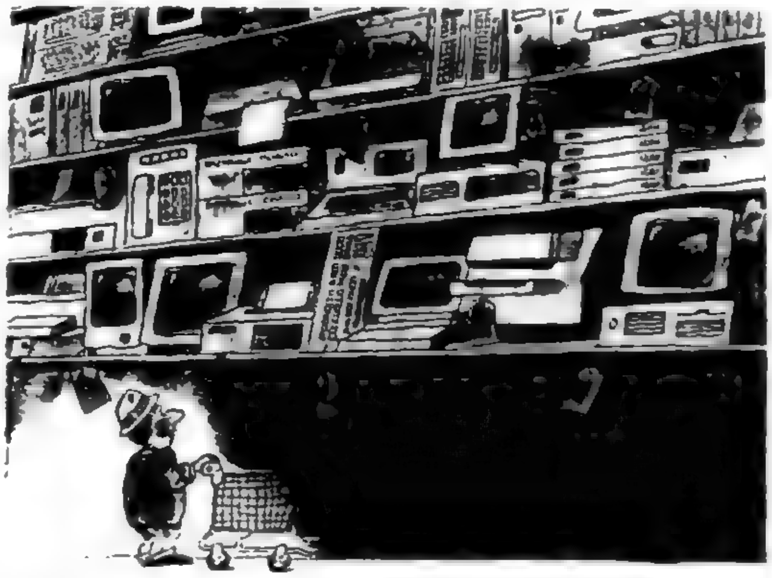

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Sept. 28	Hardware Roundup: Small Scale Systems	Sept. 11
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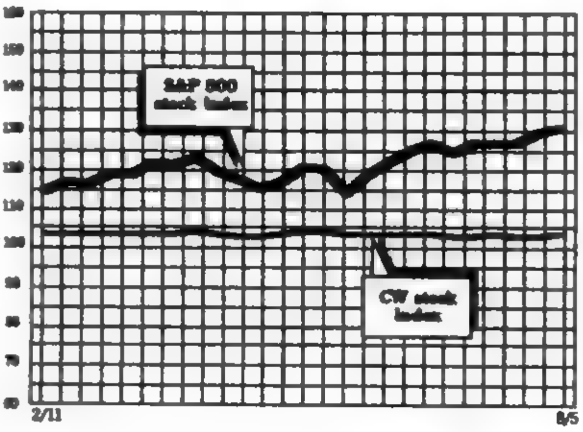

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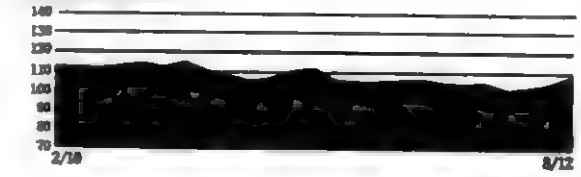
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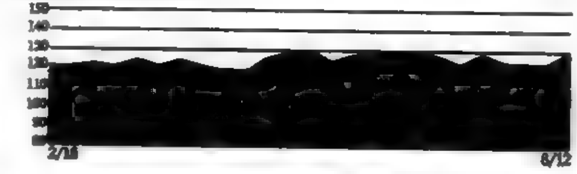
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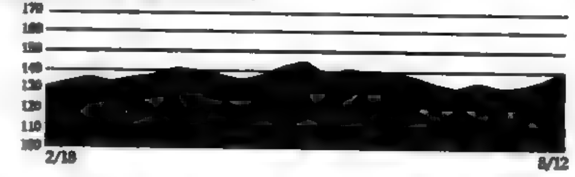
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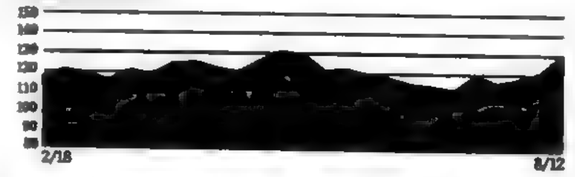
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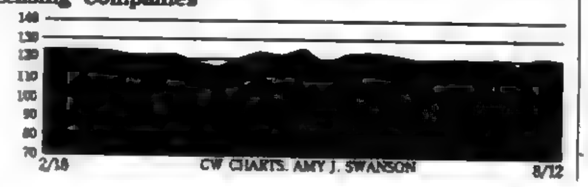
Leasing Companies

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Computerworld Stock Trading Summary

CLOSING PRICES WEDNESDAY, AUG. 12, 1987

Communications and Network Services

EXCH		52-WEEK RANGE (1)		PRICE CLOSE AUG. 12 1987	WEEK NET CHNGE	WEEK PCT CHNGE
N	AMERICAN INFO TECHS CORP	101	77	92.88	+4.1	+4.6
Q	ANDREW CORP	19	14	16.75	+0.5	+3.1
Q	ARTEL COMM CORP	5	2	2.88	+0.0	+0.0
N	AT&T	36	22	34.63	+1.8	+5.3
Q	AVANT GARDE COMP INC	7	3	4.25	+0.6	+17.2
Q	AVANTEK INC	19	13	15.00	+0.1	+0.8
N	AYDIN CORP	38	18	31.63	+1.0	+3.3
N	BELL ATLANTIC CORP	77	62	74.13	+5.1	+7.4
N	BELLSOUTH CORP	46	35	41.50	+2.3	+5.7
Q	BRIDGE COMMUNICATION	27	11	23.25	+1.3	+5.7
Q	COMPRESSION LABS INC	13	4	4.63	+0.3	+5.7
Q	COMPUTER NETWORK TECH	7	4	3.75	-0.3	-7.7
Q	CONTEL CORP	40	27	37.75	+1.3	+3.4
Q	DATA SWITCH CORP	9	5	6.38	+0.0	+0.0
Q	DIGITAL COMM ASSOC	40	18	37.50	+1.0	+2.7
Q	DYNATECH CORP	44	27	29.25	+0.8	+2.6
Q	EQUATORIAL COMM CO	6	2	3.25	+0.3	+8.3
Q	GANDALF TECHNOLOGIES	11	5	7.31	+0.1	+0.9
Q	GENERAL DATACOMM INDS	14	8	9.13	+0.5	+5.8
N	GTE CORP	44	34	44.00	+2.4	+5.7
Q	INFOTRON SYS CORP	13	7	9.25	+0.3	+2.8
N	ITT CORP	65	47	65.00	+1.3	+2.0
N	M A COM INC	16	12	15.50	-0.4	-2.4
Q	MCI COMMUNICATIONS CORP	9	5	8.63	+0.8	+9.5
Q	MICOM SYS INC	18	10	12.88	+1.1	+9.6
Q	NETWORK SYS CORP	19	9	11.38	+1.1	+11.0
N	NORTHERN TELECOM LTD	24	14	23.38	+1.9	+8.7
Q	NOVELL INC	27	9	21.88	+2.9	+15.1
N	NYNEX CORP	75	58	73.88	+3.4	+4.8
N	PACIFIC TELESIS GROUP	31	23	28.88	+1.8	+6.5
N	PARADYNE CORP	8	4	7.63	+1.0	+15.1
A	PENRIL CORP	6	4	4.50	-0.4	-7.7
N	PLESSEY PLC	41	24	31.38	-0.8	-2.3
N	SCIENTIFIC ATLANTA INC	20	9	19.25	+1.4	+7.7
N	SOUTHWESTERN BELL CORP	42	33	41.00	+2.0	+5.1
Q	3 COM CORP	24	9	17.00	+1.3	+7.9
N	TIMEPLEX INC	41	15	33.75	+0.6	+1.9
Q	UNGERMANN BASS INC	16	7	9.75	-0.8	-7.1
N	US WEST INC	62	45	56.13	+2.5	+4.8

Computer Systems

EXCH		52-WEEK RANGE (1)		PRICE CLOSE AUG. 12 1987	WEEK NET CHNGE	WEEK PCT CHNGE
Q	ALLIANT COMPUTER SYS	37	16	16.00	-2.8	-14.7
Q	ALPHA MICROSYSTEMS	7	3	5.13	+0.0	+0.0
Q	ALTOS COMPUTER SYS	17	10	13.50	+1.0	+8.0
A	AMDAHL CORP	44	17	42.00	+5.3	+14.3
Q	APOLLO COMPUTER INC	25	11	20.38	+1.1	+5.8
Q	APPLE COMPUTER INC	50	16	48.75	+5.5	+12.7
N	BOLT BERANEK & NEWMAN	30	19	21.63	+1.6	+8.1
Q	BRITTON LEE INC	5	3	3.50	+0.3	+7.7
N	COMPAQ COMPUTER CORP	55	14	53.25	+6.3	+13.3
Q	COMPUTER AUTOMATION INC	17	2	12.50	+0.8	+6.4
A	COMPUTER CONSOLES INC	12	7	7.50	-0.6	-7.7
Q	CONCURRENT COMP CORP	20	13	19.00	-0.5	-2.6
N	CONTROL DATA CORP DEL	35	21	33.50	+0.3	+0.8
Q	CONVERGENT TECH	12	4	7.63	+0.4	+5.2
Q	CONVEX COMPUTER CORP	22	8	15.75	-0.1	-0.8
N	CRAY RESH INC	136	88	111.38	+6.5	+6.2
Q	DAISY SYS CORP	13	7	7.75	+0.0	+0.0
N	DATA GEN CORP	38	25	34.50	+2.3	+7.0
N	DATAPOINT CORP	9	4	7.00	+0.1	+1.8
N	DIGITAL EQUIP CORP	184	88	182.13	+16.9	+10.2
N	FLOATING POINT SYS INC	17	8	10.38	+0.4	+3.8
N	GOULD INC	23	16	21.63	-0.1	-0.6
N	HARRIS CORP	43	27	39.00	+2.9	+8.0
N	HEWLETT PACKARD CO	69	37	67.63	+5.4	+8.6
N	HONEYWELL INC	91	58	89.75	+5.0	+5.9
N	IBM	172	116	170.38	+10.1	+6.3
Q	INFORMATION INTL INC	17	13	13.75	-0.3	-1.8
Q	IPL SYS INC	3	2	3.13	+0.3	+8.7
Q	MASS COMPUTER CORP	10	5	9.63	+0.9	+10.0
N	MATSUSHITA ELEC INDL LTD	176	81	175.63	+9.1	+5.5
Q	MEGADATA CORP	7	2	4.75	-0.3	-5.0
Q	MENTOR GRAPHICS CORP	34	13	33.25	+5.0	+17.7
N	MAI INC	14	8	11.88	-0.3	-2.1
N	NCR CORP	85	42	82.38	+5.6	+7.7
N	PRIME COMPUTER INC	30	16	26.13	+0.0	+0.0
Q	PYRAMID TECHNOLOGY	12	4	8.00	+0.3	+3.2
Q	STRATUS COMPUTER	41	18	29.75	+2.3	+8.2
Q	SUN MICROSYSTEM INC	46	13	36.50	+2.4	+7.0
Q	SYMBOLICS INC	8	4	4.38	-0.1	-2.8
N	TANDEM COMPUTERS INC	38	16	31.88	+4.0	+14.3
N	TANDY CORP	56	31	47.38	+1.1	+2.4
N	ULTIMATE CORP	31	13	30.63	+1.8	+6.1
N	UNISYS CORP	48	22	47.38	+3.0	+6.8
A	WANG LABS INC	19	11	18.38	+1.9	+11.4

Software & DP Services

EXCH		52-WEEK RANGE (1)		PRICE CLOSE AUG. 12 1987	WEEK NET CHNGE	WEEK PCT CHNGE
Q	ADVANCED COMP TECH	6	3	3.63	-0.3	-6.5
N	ADVANCED SYS INC	26	12	25.50	+1.6	+6.8
N	AGS COMPUTERS INC	22	8	19.88	+0.0	+0.0
Q	AMERICAN MGMT SYS INC	19	7	17.63	+1.0	+6.0
Q	AMERICAN SOFTWARE INC	22	8	17.50	+2.0	+12.9
N	ANACOMP INC	11	3	10.00	-0.5	-4.8
Q	ANALYSTS INTL CORP	9	3	8.50	+0.5	+6.3
Q	ASHTON TATE	30	12	25.25	+2.1	+9.2
Q	ASK COMPUTER SYS INC	17	10	14.88	+1.0	+7.2
Q	AUTODESK INC	285	10	27.63	+2.6	+10.5
N	AUTO DATA PROCESSING	52	30	50.63	+3.5	+7.4
Q	BOOLE & BABBAGE INC	12	4	11.00	+0.0	+0.0
N	COMPUTER ASSOC INTL INC	31	10	29.50	+3.3	+12.4
Q	COMPUTER HORIZONS CORP	18	10	13.38	+0.8	+5.9
N	COMPUTER SCIENCES CORP	61	30	58.38	+4.4	+8.1
N	COMPUTER TASK GROUP INC	18	11	12.38	+0.1	+1.0
Q	COMSHARE INC	28	11	26.25	+2.0	+8.2
N	CULLINET SOFTWARE INC	13	6	12.88	+1.0	+8.4
Q	CYCARE SYS INC	12	7	9.75	+0.5	+5.4
Q	DUQUESNE SYS INC	33	12	19.00	-1.3	-6.2
Q	ENDATA INC	12	5	9.50	-0.4	-3.8
N	GENERAL MTRS (CLS E)	48	24	47.75	+4.8	+11.0
Q	HOGAN SYS INC	17	9	11.88	-1.5	-11.2
Q	INFORMIX CORP	23	7	21.00	+2.5	+13.5
Q	INTELLICORP INC	11	4	7.13	+0.1	+1.8
Q	KEANE INC	10	5	6.75	-0.5	-6.9
Q	LOTUS DEV CORP	37	11	32.75	+2.8	+9.2
Q	MANAGEMENT SCI AMER	21	11	12.13	+0.1	+1.0
Q	MICRO PRO INTL CORP	8	2	5.88	+0.4	+8.0
Q	MICROSOFT CORP	128	26	100.00	+2.8	+2.8
Q	NATIONAL DATA CORP	34	17	32.75	+1.0	+3.1
Q	ON LINE SOFTWARE INTL INC	22	6	20.00	+1.1	+6.0
Q	ORACLE SYS CORP	30	7	25.88	+2.4	+10.1
N	PANSOPHIC SYS INC	29	12	19.00	+0.9	+4.8
Q	POLICY MGMT SYS CORP	30	15	24.25	+0.8	+3.2
Q	PROGRAMMING & SYS INC	13	8	12.50	+1.3	+11.1
Q	REYNOLDS & REYNOLDS CO	42	27	36.25	+1.5	+4.3
Q	SEI CORP	18	8	17.00	+1.3	+7.9
Q	SHARED MED SYS CORP	53	23	25.75	+0.0	+0.0
Q	SOFTWARE AG SYSTEMS INC	20	10	12.75	-0.3	-1.9
Q	SOFTWARE PUBG CORP	17	5	9.25	+0.5	+5.7
A	STERLING SOFTWARE INC	19	9	9.38	-0.9	-8.5
Q	SUNGARD DATA SYS INC	21	10	18.25	+1.3	+7.4
Q	SYSTEMATICS INC	30	14	28.75	+0.0	+0.0
N	UCCEL CORP	52	20	49.00	+5.1	+11.7
N	URS CORP	21	13	17.75	-0.1	-0.7
Q	VM SOFTWARE INC	46	15	18.50	+0.3	+1.4

Semiconductors

EXCH		52-WEEK RANGE (1)		PRICE CLOSE AUG. 12 1987	WEEK NET CHNGE	WEEK PCT CHNGE
N	ADV MICRO DEVICES INC	25	13	20.50	+2.4	+13.1
N	ANALOG DEVICES INC	24	14	22.38	+0.5	+2.3
Q	ANALOGIC CORP	13	10	12.50	+0.3	+2.0
Q	INTEL CORP	52	18	50.00	+3.1	+6.7
Q	LSI LOGIC CORP	17	8	11.88	+1.1	+10.5
Q	MONOLITHIC MEMORIES INC	19	10	17.63	+2.0	+12.8
N	MOTOROLA INC	66	34	64.63	+6.0	+10.2
N	NATL SEMICONDUCTOR	17	8	15.00	+1.4	+10.1
N	TEXAS INSTRS INC	70	35	68.88	+6.0	+9.5
A	WESTERN DIGITAL CORP	33	13	27.75	+0.0	+0.0

Peripherals

EXCH		52-WEEK RANGE (1)		PRICE CLOSE AUG. 12 1987	WEEK NET CHNGE	WEEK PCT CHNGE
N	AM INTL INC	9	5	7.88	+0.0	+0.0
Q	AST RESH INC	23	11	18.13	+1.1	+6.6
Q	AUTO TROL TECH CORP	9	3	6.63	+0.1	+1.9
Q	BANCTEC INC	16	6	12.75	+0.1	+1.0
Q	CIPHER DATA PRODS INC	18	9	10.25	+0.6	+6.5
A	COGNITRONICS CORP	5	2	3.88	+0.0	+0.0
N	COMPUGRAPHIC CORP	25	16	24.75	+1.5	+6.5
N	COMPUTERVISION CORP	28	12	15.88	+1.4	+9.5
N	CONRAC CORP	30	12	0.00	+0.0	+0.0
A	DATAPRODUCTS CORP	16	10	11.75	+0.4	+3.3
A	DATARAM CORP	10	7	7.38	+0.3	+3.5
N	DECISION INDS CORP	13	7	11.13	-0.1	-1.1
N	EASTMAN KODAK CO	101	52	98.75	+3.5	+3.7
Q	E M C CORP MASS	37	11	36.25	+1.5	+4.3
Q	EMULEX CORP	10	6	7.75	+0.3	+3.3
Q	EVANS & SUTHERLAND	40	20	34.00	+3.3	+10.8
Q	ICOT CORP	13	5	6.25	+0.4	+6.4
Q	INTERLEAF INC	20	8	16.88	+1.3	+8.0
Q	IOMEGA CORP	12	2	3.25	-0.1	-3.7
Q	LEE DATA CORP	10	5	5.13	-0.1	-2.4
Q	MASSTOR SYS CORP	6	2	4.88	-0.1	-1.3
Q	MAXTOR CORP	34	12	14.00	+0.3	+1.8
Q	MICROPOLIS CORP	44	14	37.25	+1.6	+4.6
Q	MINISCRIBE CORP	18	5	15.25	+1.3	+8.9
N	MINNESOTA MNG & MFG CO	80	50	79.50	+5.6	+7.6
A	MSI DATA CORP	19	10	18.38	-0.6	-3.3
Q	PRIAM CORP	6	2	4.00	+0.6	+18.5
Q	PRINTRONIX INC	14	10	12.00	+1.5	+14.3
N	QMS INC	22	11	21.13	+2.9	+15.8
Q	QUANTUM CORP	35	15	17.50	+0.5	+2.9
Q	RAMTEK CORP	6	4	5.50	-0.1	-1.1
N	RECOGNITION EQUIP INC	27	11	19.38	+0.4	+2.0
Q	REXON INC	14	5	10.25	+0.9	+9.3
Q	SCAN TRON CORP	17	11	12.50	-0.3	-2.0
Q	SEAGATE TECHNOLOGY	46	12	31.13	+1.0	+3.3
N	STORAGE TECH CORP	5	2	3.38	+0.0	+0.0
Q	TANDON CORP	7	2	4.00	-0.5	-11.1
A	TEC INC	7	3	4.81	-0.2	-3.7
N	TEKTRONIX INC	43	28	39.50	+0.8	+1.9
Q	TELEVIDEO SYS INC	3	2	3.06	+0.5	+19.5
N	TELEX CORP	102	55	63.38	-1.3	-1.9
Q	WYSE TECH	35	13	31.38	+0.5	+1.6
N	XEROX CORP	81	51	79.38	+6.1	+8.4
Q	XIDEX CORP	20	11	13.88	+0.6	+4.7

Leasing Companies

EXCH		52-WEEK RANGE (1)		PRICE CLOSE AUG. 12 1987	WEEK NET CHNGE	WEEK PCT CHNGE
N	COMDISCO INC	33	16	30.88	+2.6	+9.3
N	CONTINENTAL INFO SYS	14	7	11.50	-0.6	-5.2
Q	PHOENIX AMERN INC	8	3	4.25	-0.3	-5.6
Q	SELECTERM INC	7	5	5.25	-0.4	-6.7
N	US LEASING INTL	55	40	54.25	+1.3	+2.4

EXCH: N—NEW YORK; A—AMERICAN; Q—NATIONAL;
O—OVER-THE-COUNTER; S—SPLIT

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Raging bulls

DEC, IBM charge to new highs; many others also reach year's peak

The bulls were everywhere last week as the Dow Jones industrial average careened up 99 points in four days, and computer industry stocks reaped the benefits.

Setting a torrid pace was Digital Equipment Corp., which blasted through its previous high for the year (174½) to close Thursday at 183½, up 12⅝ points for the week. IBM held its own, rising 9 points to a new high of 173¾.

Thirteen computer-related stocks reached new highs for the year in Thursday's trading on the New York Stock Exchange. They included Cullinet Software, Inc., which closed at 13; Unisys Corp., 47¾; Automatic Data Processing, Inc., 52⅛; Hewlett-Packard Co., 69; MAI Basic Four, Inc., 21; and The Ultimate Corp., 31⅛. Apple Computer, Inc., which introduced several Macintosh products, rose to a new high of 49.

Data General Corp., despite its announcement that it will take a $26 million charge in the current quarter, was up 2¼ points to 35¼. Among other minicomputer vendors, Prime Computer, Inc. gained just one-eighth of a point to 27⅛, while Wang Laboratories, Inc. rose three-quarters of a point to 18½.

CLINTON WILDER

Firms enhance peer-to-peer SNA

Third-party vendors in the IBM community are gearing up for peer-to-peer Systems Network Architecture (SNA).

The following is a rundown of some of their activities.

- **Netlink, Inc.** has started working on its own PU2.1 implementation, which will fit its network concentrator for two roles, according to spokesman Richard Buckle.

First, the box can reportedly be a low-cost network node that performs routing among PU2.1 devices. Second, it can perform mapping between PU2 and PU2.1 protocols so that IBM 3274 controllers can communicate over a PU2.1 backbone network, Buckle said.

- **NCR Comten** is committed to duplicating IBM's expected new Network Control Program within approximately a year after it is shipped, according to Eric Birkeland, the company's director of product marketing.
- **Communications Solutions, Inc.**, which already offers both LU6.2 and PU2.1 software, has been waiting for IBM to extend support of those protocols further into its mainframe environment, according to John Pickens, senior communications architect.

He said Communications Solutions expects that its existing products will communicate with IBM's LU6.2 VTAM implementation, but the company is ready to do any necessary reprogramming.

- **Systems Center, Inc.**, which sells VTAM-based bulk data transfer software, said it will also provide an LU6.2 version of its VTAM-based bulk file-transfer product shortly after IBM's VTAM-based LU6.2 ships — which should be sometime in the third quarter of 1988.
- **Cincom Systems, Inc.** said it plans to bring out an LU6.2 version of Netmaster, which is a direct competitor with IBM's Netview network management system, around the same time.

Cincom has been making its own slew of announcements to ensure that Netmaster is at least a match for Netview in a distributed SNA environment. The company introduced an IBM 9370 VM version of the network management system several months ago, anticipating IBM's June 16 announcement of a 9370 version of Netview.

The 9370 version of Netmaster also can perform the same basic roles as the 9370-based Netview, acting either as a local network management system or passing alerts from the local network onto a central host, Cincom said.

Another Netmaster enhancement under development is a background-mode capability that will allow the operator to respond to a problem on the network while continuing to simultaneously record incoming alarms and alerts, according to Vicky Duckworth, Cincom senior product manager.

ELISABETH HORWITT

IBM prepping NCP for the future

Program will support added SNA capabilities; 9370 links enhanced

BY ELISABETH HORWITT
CW STAFF

IBM plans to bring out a new version of the Network Control Program (NCP) that will support several important Systems Network Architecture (SNA) networking capabilities that were announced in June but cannot be used with the current NCP, IBM recently told *Computerworld*.

Two of the major features that are dependent on a new or significantly modified NCP are front-end processor support of PU2.1-based peer-to-peer communications and the ability to reconfigure SNA nodes without bringing the entire network down, according to IBM.

IBM also plans further enhancements to its 9370's communications architecture that will be designed to deal with current limitations on the number of 9370s that can be installed on the same SNA network, an IBM spokesman said.

Need modified version

"ACF/VTAM Version 3 Release 2 supports many of the announced June 16 features," the spokesman said. "But you do need a new NCP — or a modified version of a current NCP — to support PU2.1 and for dynamic network reconfiguration."

The updated NCP will be available in time for IBM to meet its announced third-quarter 1988 shipment deadline for these features, the spokesman added.

The yet-to-be-announced NCP, which IBM referred to as the "then current NCP" in its June announcement, will interact with IBM's Advanced Communications Function/VTAM Version 3 to allow PU2.1 devices to communicate through a front-end processor without the need for host intervention.

The IBM spokesman offered one caveat, which he said was not made clear during the initial announcement: "You do need to have an initial, one-time, 'it's going on' communication to the host, to let it know that contact through the front-end processor is happening." After that, the host stays out of the picture, he added.

Another rollout expected

Users can expect another round of IBM announcements aimed at making the 9370 better able to communicate as a departmental processor node rather than as a full-fledged mainframe taking up a full subarea of an SNA network, the spokesman indicated.

Currently, SNA protocols only allow up to 255 subarea addresses on any network system. This is a drawback for companies that want to set up communications between a thousand or more 9370s, as several of the largest 9370 buyers intend to do, the spokesman admitted.

"IBM recognizes the requirement of having multiple 9370 nodes beyond the current limit, and we have our best people working on it," he said.

The current upper limit imposed on the number of 9370s per SNA network is a concern for the state of New York's Department of Education, which is currently evaluating the 9370 as a departmental processor that would be installed in hundreds of school districts and library buildings.

The department is thinking of taking a "layered approach," according to Michael Radlick, director of planning and development. Multiple 9370s would report to any of nine data processing centers linked by a high-speed network backbone.

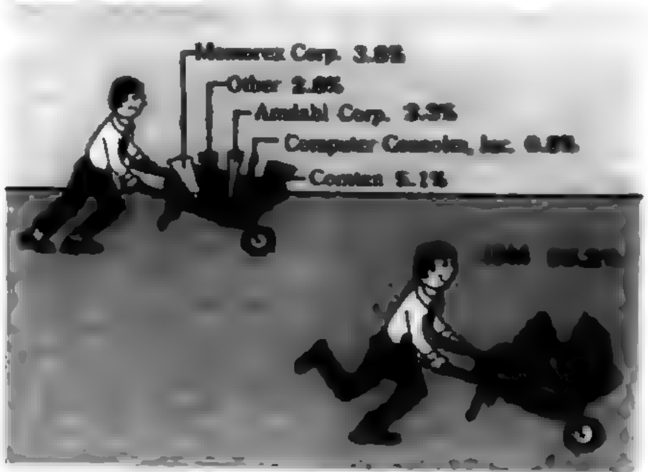
The problem is that some regions may have more than 255 9370s on their networks, he explained.

The department is eager for IBM to clarify the 9370's future role in light of "various pieces that are still floating around, like Enhanced Connectivity Facility, LU6.2, PU2.1 and Netview," Radlick said.

IBM still has not said whether it will implement PU2.1 support on the 9370.

Out in front

IBM dominates in June market share measurement of installed front-end processors of U.S. sites



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CW CHART: AMY J. SWANSON

IBM

FROM PAGE 1

keeping up with IBM's latest NCP features, according to Passmore. However, IBM has made it difficult for Amdahl to copy its high-end front-end processor, the 3725, by changing the microcode three times, he added. Communications processor vendors like Minneapolis-based NCR Comten and Netlink, Inc. in Raleigh, N.C., can offer greater networking flexibility and multivendor support than IBM because they are less firmly tied to the vendor's host environment, Passmore said. However, IBM's recent introductions threaten to eliminate some of those advantages.

Netlink spokesman Richard Buckle said, "What really affects us is the PU2.1 support on IBM's front-end processor, which will allow multiple [IBM] System/36s and their resources to talk to each other across an SNA network." This capability, which Netlink now offers, will not be available from IBM until a new NCP version arrives sometime late in 1988, Buckle said.

NCR Comten feels "hobbled by our need to conform to IBM's current NCP," said Eric Birkeland, the firm's director of product marketing. "Users have demanded dynamic reconfiguration from us, just as they have from IBM," but NCR Comten, like IBM, will not be able to offer this capability until the new NCP comes along. "Changing to a new NCP will be difficult for us and IBM," Birkeland noted.

At least one NCR Comten user has faith that the vendor will come through. "IBM is playing rough, but whatever they're doing, we're confident that Comten will make similar strides. They're very aggressive," said a data center manager at a major NCR Comten user site, who preferred not to be named. "We got Comten for the price breaks and because they were a forerunner in managing networks between front ends, independent of the host."

On the other hand, managers at two major IBM sites, Travelers Insurance Co. and Shearson Lehman Commercial Paper, Inc., said they would never consider bringing a third-party communications processor into their SNA networks. "We want to run the highest version of VTAM and NCP that we can get," said Trav Waltrip, Travelers' vice-president of data processing.

"Our network is very complex, and we need IBM's support," agreed Mervin Adrian, a manager for end-user computing at Shearson Lehman Commercial Paper. However, the company is keeping a close eye on SNA software vendors such as Communications Solutions, Cincom and micro-to-mainframe vendor Tangram Systems Corp. Adrian said he expects these companies to come out with connectivity tools and applications that could greatly ease his own burden when it comes time for his company to implement peer-to-peer SNA networking.

> "IBM IS playing rough, but whatever they're doing, we're confident that Comten will make similar strides. They're very aggressive."
>
> DATA CENTER MANAGER

Adrian said he expects those software vendors to be quick off the mark with applications and enhancements that will help companies like Shearson migrate to IBM's emerging peer-to-peer SNA architecture. "We are fairly Blue, but we have no problem with buying from a vendor that offers a significant price/performance differential or some important feature that IBM doesn't offer," he said.

Lotus/Intel/Microsoft EMS revision ready for display

BY ED SCANNELL
CW STAFF

PALO ALTO, Calif. — The first major revision of the Lotus/Intel/Microsoft Expanded Memory Specification (EMS) is set to be unveiled here this week, allowing users to access up to 32M bytes of expanded memory and providing several multitasking capabilities.

EMS Version 4.0 allows families of applications to use shared data in expanded memory, permits multiple spreadsheets to be linked and provides users with larger random-access memory (RAM) disks, print buffers and disk caches, an Intel Corp. spokesman said.

The previous EMS version, introduced in April 1985, was originally developed to allow use of memory beyond 640K bytes of RAM, which is the practical limit of Microsoft Corp.'s MS-DOS operating system.

In addition to Lotus Development Corp. and Microsoft, Ashton-Tate, Symantec Corp., Ansa Software and Quarterdeck Office Systems are expected to endorse the specification at its introduction this week.

Add-in memory boards that support Version 4.0 could be available before the end of the year, the spokesman said. Add-in boards designed to work with IBM's Personal Computer AT and compatibles will work with the revised specification but will require new device drivers.

Applications written for Version 3.2 are upwardly compatible with Version 4.0. However, software emulation packages supporting Version 3.2, such as Limulator, will not be supported by the upgrade. Version 4.0 also has several features for corporate and third-party developers that allow them to increase or shrink the amount of allocated expanded memory, do multiple page mapping, copy or exchange regions of conventional and expanded memory and map into memory more than 64K bytes at a time.

Version 4.0 is optimized to take advantage of some of the capabilities of the Intel 80386 processor. "The 386 machines have the ability to swap memory in the entire address space, so the spec [Version 4.0] now accommodates some of the things the 386 Lotus/Intel/Microsoft packages can do," a Lotus vice-president said. "So now, we can do some things in our applications that we couldn't do before."

While Version 4.0 offers users various multitasking capabilities, it does not allow multiple programs to be run concurrently without the presence of a multitasking operating system such as IBM and Microsoft's OS/2, as was speculated in recent published reports. However, some developers said they see it as an effective and more acceptable interim solution until OS/2 is delivered next year.

Desktop writer gets publishing slant

BY STEPHEN JONES
CW STAFF

MOUNTAIN VIEW, Calif. — With its sights set on an emerging market of occasional desktop publishing users, Software Publishing Corp. is scheduled to announce today a $249 package that merges word processing with low-end desktop publishing.

Software Publishing claimed its PFS:Professional Write Plus is the first product to combine word processing and desktop publishing programs that both feature what-you-see-is-what-you-get capabilities.

Unlike other desktop publishing packages that have to import word processor files, Software Publishing's package integrates both programs under a common main menu.

The merged product automates file handling and movement from the word processor to the publishing program. PFS:Professional Write Plus is scheduled to hit dealers' shelves by the first week of September.

The package combines the features of Software Publishing's $99 PFS:First Publisher with the vendor's $199 PFS:Professional Write and includes some file conversion utilities. Those products will continue to be sold individually. The new package requires 512K bytes of random-access memory and can output on Hewlett-Packard Co.'s Laserjet and Apple Computer, Inc.'s Laserwriter as well as 60 other dot matrix printers.

PFS:Professional Write Plus includes a print-smoothing feature that rounds off the jagged edges of dot matrix output. It also has a built-in dictionary, a thesaurus and an address book.

Software Publishing officials said PFS:Professional Write Plus was designed to tap into what many consider a huge market of business users who want slick-looking documents without taking the time to master such sophisticated high-end products as Aldus Corp.'s Pagemaker.

A goggle of offerings

And Software Publishing is not alone. A gaggle of companies, including the following, are moving to seize a piece of the low-end desktop publishing pie:

- Ashton-Tate, which recently announced Byline, a $295 desktop publishing program for occasional users that is compatible with the company's Dbase III program.
- Digital Research, Inc., with its $395 Gem Desk Publisher, which is also aimed at professionals with no expertise in desktop publishing.
- International Microcomputer Software, Inc., a San Rafael, Calif., company that is expected next month to announce Page Perfect, a package that integrates desktop publishing with word processing in one file for occasional users.

INSIDE LINES

RISC-y business? Sources close to HP speculated last week that the announcement expected this week from the company would include some reduced instruction set computer-based, DOS-compatible computers. Reportedly on the way is a new Intel 80386-based machine and a transportable. According to sources close to the company, the 386 machine will be targeted at the NCR Tower line. It will be DOS compatible and will run Xenix with HP's compiler on it. Microsoft's Windows, or an HP version compatible with Version 2.0, will be included. The new unit will have 3½-in. disk drives built in, with an optional 5¼-in. external drive. The announcement is also intended to hit IBM and Compaq on the issue of price/performance, sources said.

When's the honeymoon? Bridge Communications is not letting upcoming nuptial plans with 3Com interfere with its September product introduction schedule. At the Federal Computer Conference next month, Bridge will unveil encryption products that conform to the Data Encryption Standard. Also next month, the company expects to unveil its first commercial implementation of the Open Systems Interconnect (OSI) standard. The product will be fully compatible with Technical Office Protocol, a subset of OSI, and incorporate the Virtual Terminal Protocol for workstation-to-host communications. A third Bridge introduction this fall will be a new version of Transmission Control Protocol/Internet Protocol with a number of added features, including a "much more user-friendly interface," Bridge said.

My word. Microsoft will announce this week a new version of its best-selling Word word processing program for IBM PCs and compatibles. Word 4.0 reportedly is significantly faster than Word 3.1 and contains a powerful macro system, sophisticated support for forms, a document conversion facility and the ability to switch back and forth between text and graphics from within the package. Sources said they expect the price to be the same as that for Version 3.1, $450.

Chipping away at Intel. Advanced Micro Devices (AMD) will begin production of its 32-bit microprocessor, the Am29000, in early 1988. Based on CMOS technology, the chip is promising speeds of 17 to 25 MIPS and represents what the company calls its "most ambitious effort to become a major player in high-performance microprocessing," a market that is currently dominated by Intel and Motorola. AMD also finalized its acquisition of Monolithic Memories, Inc. and named Monolithic President Anthony Holbrook to the AMD board.

ULSI you again . . . Now that everyone knows that LSI means large-scale integration and VLSI stands for very large-scale integration, it is natural that someone invented ULSI. No, ULSI isn't a cow. It stands for ultra large-scale integration, says IBM, which claimed last week to have developed silicon transistors that are 1,000 times thinner than a human hair. The circuits, measuring one-tenth of a micron wide, switch at 10 picoseconds, which is 10 times faster than those used today. Cooled to -321 degrees Fahrenheit, the circuits may have a future in PC-sized computers running complex applications like weather forecasting and continuous speech recognition.

Speak now, or forever hold your header field. The Copyright Office of the Library of Congress will hold a public hearing Sept. 9 in Washington, D.C., on the topic of computer screen displays. Specific areas to be addressed are whether the office should register any computer screen displays separately from the underlying computer programs that generate them and what the office should require for the deposit if any registration is made for the screen displays either separately or as part of a computer program.

Top gun or pop gun? DEC went one step further last week in its battle with the U.S. Air Force, lodging a formal complaint with the General Services Administration (GSA) on specifications for a pending $3.5-billion Air Force computer contract. The Air Force recently rejected DEC's request to drop the contract requirement for a specific version of Unix, AT&T's System V interface definition. The GSA appeals board will consider the DEC protest this week.

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Sept. 14	DB2 Market	Aug. 28
Sept. 21	Hardware Roundup: Large & Medium Scale Systems	Sept. 4
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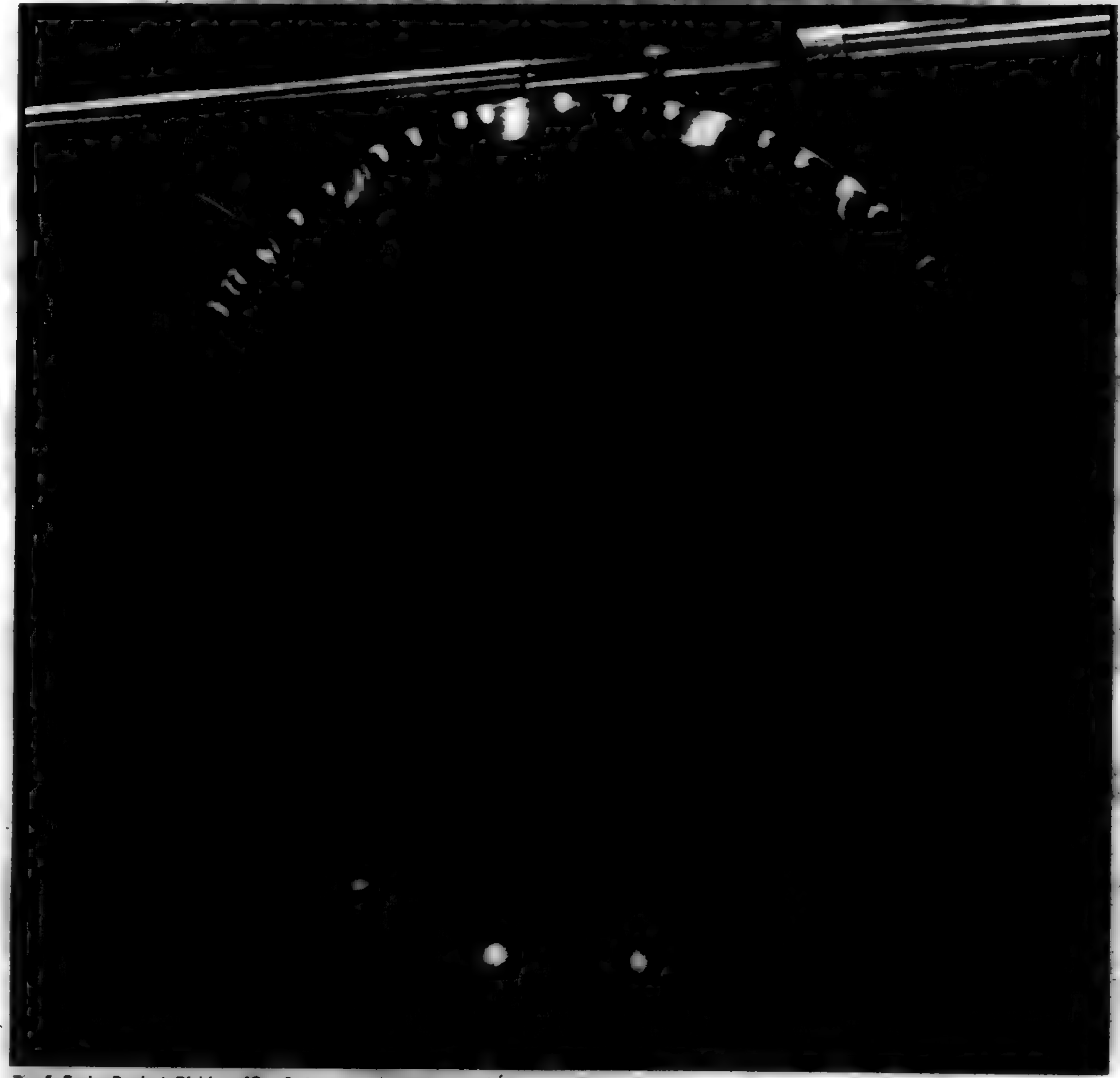

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UMI

SHOULD READ VOLUME 21, ISSUE 34, AUGUST 24, 1987.

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UMI

COMPUTERWORLD

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Zenith loses executive who guided company into top tier of PC-compatible vendors. Page 15.

DP sites drip-dry in Chicago

BY JEAN S. BOZMAN
CW STAFF

Heavy rains that deluged the Chicago area 11 days ago disrupted dozens of MIS departments and left five still operating in disaster recovery hot sites last week.

The rains dumped nine inches of water on the Chicago area in an eight-hour period beginning the evening of Aug. 13. By the next morning, the worst fears were realized at A. M. Castle & Co. headquarters, where a ground floor computer room housing an IBM 4381 Group 2 and an IBM 4341 Group 12 machine were covered by several inches of water.

The water was contaminated with sewer effluent, and all power to the building went out. But data processing managers waited before declaring a state of emergency, gauging whether the water would recede.

During the record-breaking rainstorm, many other MIS operations faced power failures and water damage but managed to get back on-line without leaving their home sites — sometimes by replacing ruined computers.

'Underwater for days'

A number of large IBM shops were flooded during the storm, which was estimated to have caused at least $77 million in damage to area businesses. "Some of our clients had computer rooms that were underwater for several days," said Ray Hipp, president of Comdisco Disaster Recovery Services, Inc. in Chicago.

As MIS operations lost power and telephone service, at least 10 shops chose to issue an alert and notify disaster recovery services that they might need help.

Continued on page 4

Price shift rocks software arena

BY ROSEMARY HAMILTON
CW STAFF

Major independent mainframe software vendors are moving rapidly to adopt graduated pricing structures that reflect the tiered pricing policy IBM announced late last year.

The revisions could bring sweeping changes to IBM mainframe shops, most of which have purchased software that was priced according to the operating system under which it ran.

Four software companies — Cullinet Software, Inc., Applied Data Research, Inc., On-Line Software International, Inc. and Software AG of North America, Inc. — plan to adopt graduated pricing schedules next month. In addition, Cincom Systems, Inc. has a similar move scheduled for October.

The new policies will have users paying a fraction of the current cost of mainframe software for products that run on IBM's 9370 minicomputers, which began shipping last month. For example, ADR last week said 9370 users will pay between 15% and 35% of the current software price under its tiered scheme.

The pricing structures will also bring price hikes to high-end users, particularly for IBM MVS systems utilities and applications.

"You have got to be flexible now," said Jeffrey P. Papows, vice-president of marketing at Cullinet. "The trend is evident. It presents an illogical comparison to charge more for a software license than what the hardware costs in some cases."

Paul Fusco, director of MIS at General Cinema Theaters, Inc. in Chestnut Hill, Mass., said he will not put purchasing plans on hold while the software companies sort out pricing details. One of Fusco's major vendors is ADR.

"If we were looking for something from ADR, and we were ready for it, I wouldn't wait," Fusco said. "But if they came out

Continued on page 6

CASE made for DB2 tool

Host-based software integrates data dictionary

BY ALAN ALPER
CW STAFF

NEW YORK — Eyeing two of the year's hottest software markets — computer-aided software engineering and IBM DB2 development — On-Line Software International, Inc. last week introduced a mainframe-based CASE system wrapped around a data dictionary that the company said can support production-level DB2 applications.

Officials claimed that the IBM MVS-based Casepac, which was developed by Tata Consultancy Services in Bombay, India, can handle more than 90% of all application development life cycle functions. It will eventually be tied to a Cobol code generator to create applications directly from entity models, which mirror an organization's structure.

However, some observers last week questioned Casepac's richness as a software engineering environment and said it ap-

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CHAPTER TWO

Play it again, MIS

BY KATHY CHIN LEONG
CW STAFF

When Charles Oldenburg addresses Decworld attendees next month on the issue of technology management, he will draw on his 35 years of experience in MIS at Chevron Corp. But Oldenburg will not go to Decworld representing Chevron.

Retired since last year, 58-year-old Oldenburg is one of a growing number of MIS professionals who are finding second careers after retiring from their full-time jobs. For Oldenburg, retirement has meant a full schedule of lectures and consulting.

But for others, adjusting to a new life-style after retirement has been difficult. Fearing stagnation, many continue in consulting or education roles, but some find it as easy to be overworked in "semiretirement" as in a full-time career. The number of MIS professionals reaching retirement age will swell in coming years as the

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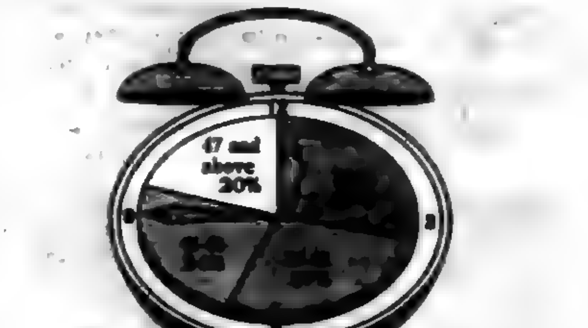
Second time around

One in five MIS professionals is nearing retirement age, and many in this group are pursuing second careers



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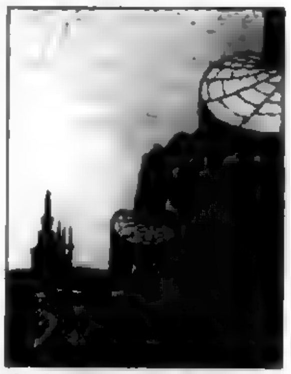

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> *"While it would seem some — including, perhaps, our competitors — might like to see us sell McCormack & Dodge, I'm afraid I must disappoint them."*
>
> CHARLES W. MORITZ
> DUN & BRADSTREET CORP.
>
> *See story page 21*

Pan Am slices Sabre

Says American could not solve software woes

BY DAVID A. LUDLUM
CW STAFF

Software problems undercut the effort to blend Pan American World Airways' reservation system into American Airlines' Sabre, a Pan Am executive said last week.

American and Pan Am recently said they were breaking off the 14-month-old agreement. The abrogation ended disputes that led Pan Am to withhold payments and American to respond by filing a lawsuit.

The chief problem arose in modifications for calculating international fares, according to Robert Mann, Pan Am's vice-president of marketing information systems.

Test runs produced excessively high fares, which could scare off customers, and inaccurately low ones, which could eat up profits, he said.

"The accuracy was not at all evident to us," Mann said. "It was not even close to what our existing software could provide. We could not function with the level of functionality American was going to provide."

American officials could not be reached for comment.

With international flights accounting for about 70% of its business, Pan Am must calculate international fares much more frequently than American, whose business involves at least 70% domestic flights.

While Sabre is the most widely used airline reservation system, in "a large degree of cases" it cannot calculate international fares, which involve complex conditional routines, according to Mann.

When Sabre cannot calculate an international fare, operators contact the principal airline involved by telephone or a Sabre data link, and employees of that carrier price the flight.

Pan Am and most other international carriers have adapted a system for pricing international flights developed by British Airways, Mann said. Panamac, Pan Am's reservation system, contains a Panafare component that can calculate 90% to 95% of Pan Am fares, he added.

Problems with adaptation

Mann said he believes American had difficulty developing software for pricing international flights because it tried to do so by adapting the current Sabre pricing program, which is based on the Automated Tariff and Fare Determination System (ATFDS) developed by Eastern Airlines and is geared to domestic fares.

"Pretty much around the world, people are doing [international fares] the way British Airways does. Pretty much no one is using ATFDS," Mann said.

Testing of the Sabre modifications for accommodating Pan Am continued through July. While the pricing problem was "the deciding issue" in ending the agreement, American's slow development of a link between the airlines' systems for controlling flight departures was also a factor, Mann said.

Illegal copying charged; 30,000 copies of DOS seized

BY ALAN J. RYAN
CW STAFF

SAN FRANCISCO — A U.S. marshal here seized 30,000 allegedly unauthorized copies of IBM's PC-DOS and evidence of the alleged illegal manufacture of Microsoft Corp.'s MS-DOS 3.3 after conducting raids on a printing shop and a computer dealer earlier this month.

Microsoft filed a copyright infringement action in the Federal District Court for the Northern District of California July 29, after it discovered illegal copies of its product were entering the stream of commerce, according to Microsoft senior corporate attorney William Pope. The seizure order was authorized by Judge Samuel Conti, and the raids took place Aug. 3-6.

The U.S. marshal and two investigators hired by Microsoft seized the software, alleged illegal copies of documentation and printing materials from KK Graphics Printing, located here, and its owner, Richard K. H. Lin. When contacted at home last week, Lin declined comment.

KK Graphics Printing was "manufacturing MS-DOS 3.3 and, according to their business records, they manufactured at least 10,000 copies," Pope said. He said 30,000 allegedly unauthorized copies of PC-DOS in various stages of manufacture were confiscated in the raid.

An IBM spokesman said the company was assessing the reported seizures.

According to Microsoft, Lin testified that the operating systems software had been sold to Julius Liu and Kathy Liu, the proprietors of Beltron Berkeley, a computer storefront in El Cerrito, Calif.

“Our departments had written hundreds of PC applications. Some of them actually worked.”
—Richard Roskelly, Director
Financial Computer Support
Brigham Young University

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In the process of untangling departmental computing a lot of MIS Departments get caught. While they're busy figuring out and cleaning up each department's applications, requests for new ones keep coming in. Suddenly there's a backlog. And it's MIS's fault.

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Avanti to boost net management

Seeks to expand T1 sales with graphics, windows, multivendor connections

BY ELISABETH HORWITT
CW STAFF

Avanti Communications Corp. is expected next month to add two key missing ingredients to its network management offering: a centralized, graphics workstation-based system geared to the nontechnical end user and a connection to other vendors' network management environments.

Computerworld has learned Avanti plans to announce the Open Network Management System (ONMS) at the 1987 Tele-Communications Association conference. The system was designed to centralize reporting and diagnostic features that are currently distributed among Avanti T1 switches.

Based on a Sun Microsystems, Inc. Sun-3/110, the ONMS will provide color graphics, windowing, icons, network topology maps and other features designed to guide the inexperienced user through identifying and solving network problems, according to Avanti director of marketing Charles Halquist.

Once the user identifies a trouble spot, which appears color-coded on the screen, he can zoom down first to the specific box and then to the component board that is causing the trouble, Avanti said.

Could've clinched contract

If Avanti had been able to offer ONMS last year, it would have had a better chance to win a T1 networking equipment contract from the state of New Jersey, according to Michel Guite, a Salomon Brothers, Inc. vice-president who follows the T1 industry.

The state organization expressed its preference for Network Equipment Technologies Corp. and Digital Communications Associates, Inc. (DCA) equipment, Guite said, "because a blue collar worker could manage their networks, and that was the kind of operator they could get to run their systems at 3 a.m." The contract ultimately went to DCA.

According to estimates by Boston-based research firm The Yankee Group, Avanti held 8% of the T1 equipment market last year.

Avanti's introduction is expected to include a version of a multivendor network management system — another area in which Avanti's competitors have been active lately.

Initially, Avanti said, the company plans to announce its intentions to provide a terminal-to-host connection between ONMS and selected vendors' network management systems. With the connection, an alarm condition on a Paradyne Corp. system, for example, will show up automatically in a window on Avanti's ONMS. "The real issue is that users like to have one terminal, not 10, to monitor network problems," Halquist said.

Once the alarm condition is identified, the user will be able to run diagnostics and other applications, which will appear as one window on ONMS, as a terminal session on the other vendor's system.

Everybody's doing it

In the last few months, several T1 vendors have announced strategies for interfacing their network management systems with other companies' products. Most major T1 vendors, including Avanti, now support IBM's Netview/PC as a common format for sending network alerts to a data base.

In May, DCA promised multivendor support through the Open Systems Interconnect (OSI) standard. In June, Timeplex, Inc. announced it would provide low-level links between its Time/View system and other vendors' offerings and that it also planned to support some form of OSI.

Next month, Motorola, Inc. subsidiary Codex Corp. is expected to announce a network management system with an open, integrated architecture, the details of which have not been disclosed.

Avanti will officially announce its intentions to provide terminal connections to other vendors' network management systems but not which products it will initially support, Halquist said.

Other ONMS features to be introduced next month include trouble ticketing and collection of network traffic statistics, such as bandwidth usage and individual port activity. Users will be able to generate usage analysis reports using standard IBM Personal Computer programming language formats and mainframe-based programming languages, Avanti said.

ONMS will reportedly be priced at approximately $70,000.

Drip-dry

FROM PAGE 1

Comdisco customer Castle was one of those shops. "We had to run out and buy a pump," said Arthur Cybul, manager of DP operations at Castle, which is located in the western suburb of Franklin Park, Ill. "Our uninterruptible power supply system was flooded, and it didn't work, but, fortunately, the only hardware that was damaged were some communications controllers for terminals."

In any case, Cybul said, the company was fully insured for all hardware losses. Castle is a company that services metal parts, generating about $300 million in annual sales.

Cleaning up

Meanwhile, Castle's DP staff of 30 began to clean up, aided by dozens of other Castle employees. Pumps were started Friday, Aug. 14, and a team of six workers prepared to resume operations in a Comdisco hot site.

But when Castle management declared a disaster Saturday, Aug. 15, Comdisco's Chicago-area hot sites were filled by other customers from flooded data centers.

Comdisco was able to accommodate only two of its clients, both large IBM customers, at its three Chicago-area hot sites. Since one of the clients had prepaid for the rights to use two hot sites in the event of a disaster, the third Chicago client, Castle, was forced to fly to Comdisco's Carlstadt, N.J., hot site.

"Comdisco made it clear to us that the hot sites filled up on a first-come first-served basis," Cybul said, "so we weren't surprised. We knew they could accommodate us elsewhere.

"At first, we flew two people out to New Jersey with our backup files, which were kept in an off-site location in Illinois," Cybul explained. "By Saturday night, when we flew the rest of the team to Newark, N.J., the hot-site personnel were waiting for us."

At the hot site, Castle's applications, which had been running separately on the two IBM 4300s, were brought back up on a single-image IBM 3081. The 3081 also regenerated the company's data base, written under Applied Data Research, Inc.'s Datacom/DB. The data base, which tracks all inventory and the movement of company trucks, is essential to company operations.

It took eight hours to restore Castle's files to their predisaster condition. A full-blown IBM Systems Network Architecture network was regenerated from New Jersey Sunday morning, reaching 27 sites across the country that distribute Castle's metals products.

As of Friday, the network was still being run from the hot site, but Castle executives reportedly planned to resume operations at corporate headquarters this week. Last weekend was reserved for testing, which began Wednesday when the Franklin Park computers were powered up again.

WORLDWIDE PHOTO

Road to ruin: *Record rainfall that closed off Kennedy Expressway in Chicago also disrupted MIS operations.*

Also providing disaster recovery services to Chicago-area businesses was Sungard Recovery Services, Inc., which is headquartered in Wayne, Pa. Sungard's clients did not face water damage, as Comdisco's had, but they did lack sufficient power and telephone service. One of them, a downtown financial services firm, only stayed at the hot site from Friday afternoon until 7 p.m. Saturday, Aug. 15.

After several hours without power, the financial firm flew its data, backup tapes and staff to a northern suburban airport. "They couldn't drive from downtown Chicago to our place," said John Ratliff, Sungard's vice-president of marketing.

Comdisco's clients were not as lucky. All three had flooded computer centers and will have to replace damaged equipment.

"It will take some amount of time, probably several weeks, before some of these users can get back into their flooded computer centers," Comdisco's Hipp said. "But they don't want to move to our cold sites and set up shop there. They want to get back home, because that's where their network is based."

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M&D builds on PC platform

First in application series works with mainframe accounting packages

BY CHARLES BABCOCK
CW STAFF

CHICAGO — McCormack & Dodge Corp. unveiled last week the first of what it said will be a series of personal computer products that work with its mainframe accounting packages to provide distributed processing.

In addition, the Natick, Mass.-based firm used its 10th annual users conference here to announce a new report writer, Viewprint, that can combine information from multiple applications into one report.

The first two PC applications, labeled the Satellite series, will be General Ledger, or GL:Satellite, and Accounts Payable, or AP:Satellite. M&D said both are currently in beta-site testing and will be available Oct. 1. They will be priced on a graduated basis, depending on the number of PCs that use the software at a site. Prices will range from $12,500 to $35,000 for GL:Satellite and $17,500 to $60,000 for AP:Satellite, M&D officials said.

A beta-test user of AP:Satellite, Bill Musser, accounts payable manager at Weyerhaeuser Co. in Tacoma, Wash., said his firm is using the software to write checks at the plant level that need to be issued the same day, a procedure that was formerly executed manually. Weyerhaeuser's accounts payable departments issue about 50 manually executed checks a day, he said.

Account update

In addition, the 100 plants maintain open lines to the headquarters mainframe during most of the day in order to be able to update vendor accounts with which Weyerhaeuser does business. Musser's department incurs $10,000 to $12,000 in CICS chargebacks per week because of its need for constant communication with the host, a task that will be off-loaded to plant-level PCs through Satellite software.

"Now we will be able to upload to the host in batch mode at night," saving 70% to 75% of the department's CICS costs, Musser said.

"We will probably purchase the Satellite series. We have to close our accounts every single day and do it under strict time constraints. The general ledger software would take the burden off the mainframe and let us utilize our PCs," said Karen Bogosian, a technical analyst with Putnam Co. who viewed a demonstration of GL:Satellite at the users conference. Putnam is a Boston-based mutual fund investment company.

The series sparked the interest of other conference attendees, including Gary McDaniel, vice-president and controller of Commercial Bankers Life Insurance, a medium-size insurance company in Irvine, Calif. He said Commercial Bankers and other subsidiaries of Fremont General Corp. use M&D's mainframe accounting products, and those companies will be able to process data in common ways through the complementary PC-based products.

M&D officials emphasized that the Satellite series will not consist of stand-alone packages. Instead, the series represents functions in comparable mainframe and minicomputer packages that can be off-loaded to a PC, such as data entry and local data manipulation. When the tasks are completed at the PC, the data is intended to be uploaded into the larger system by M&D's PC Link.

Formatting function

In a similar vein, Kenneth Sawyer, an M&D marketing manager, said, data can be downloaded from the mainframe on PC Link into the PC packages. While it would be possible to transfer data without the link, it performs a formatting function between the two packages that would be difficult for an individual customer to duplicate, Sawyer said.

With the PC software, users can run reports and do calculations, journal entries and other accounting functions while disconnected from the mainframe. When the local tasks are completed, the uploading is then subject to the checks and controls of a batch process, Sawyer said. While on-line features may become part of the series in the future, Sawyer claimed M&D customers wanted batch processing capabilities first.

The Viewprint report writer, also introduced at the conference, is said to allow a user to assemble data from multiple applications and combine it in one report provided the applications are part of the Millennium family. M&D said programmers can use also facilities in Viewprint to create hooks into non-Millennium applications.

Viewprint is a detailed report writer for comparing budget or actual actual expense statements and listing high-volume transactions rather than a management information analysis tool, M&D's Michael Levinger said.

Scott Thomasson, a programmer/analyst with Briggs & Stratton Corp. in Milwaukee, the only U.S. beta-test site of Viewprint, said the product "has an extract, sort and print methodology that allows you to do a report in one pass of the data base. Calculations can be performed at the extract or print stage."

Levinger said Viewprint will eventually replace application-specific report writers in M&D products. He acknowledged that speed of execution might be a concern in the beta-test version. "The logic to do cross-application extracts is quite complex," he noted.

Price shift

FROM PAGE 1

with lower prices afterward, I'd renegotiate, jumping up and down. I'd do what I could to recoup my dollars."

"If vendors are going to use this pricing to reduce the cost of entry-level systems, there's some benefit," said John Owens, executive vice-president and director of electronic data processing services at Shearson Lehman Brothers, Inc. But, he added, "If it increases prices for large shops, well, there's no benefit there."

Pricing policies

Other vendors report that a tiered pricing policy is under review. Pansophic Systems, Inc., for example, will probably institute new pricing within four to six months, according to David Eskra, chairman and chief executive officer.

Of nine software companies contacted by *Computerworld* last week, only one, Management Science America, Inc. (MSA), said it had no plans to revise its pricing strategy.

"Most of the ones that are doing it are systems software vendors," said John Imlay, chairman of MSA. "They have to do it because they compete directly with IBM. We don't, with application software."

However, Cullinet has moved to reprice in the applications area as well, establishing its tiered pricing policy "across the board," according to Papows. The Westwood, Mass.-based company will use a four-tiered structure for its data base products that corresponds with the IBM method.

IBM designated four groups for its 370 series processors last year and now bases software pricing on processor group. The four segments begin with Group 10, made up of IBM's low-end mainframes, including small 9370s. The tier tops off with Group 40, which includes IBM's 3090 series mainframes. For its financial and manufacturing applications, Cullinet said it will use a three-tiered system that is similar to the IBM model but combines Groups 30 and 40 into one unit.

Applications software vendor McCormack & Dodge Corp. is on the fence regarding graduated pricing. "I wouldn't say we're planning to, but we're studying the hell out of it," said Robert Kelley, corporate vice-president of strategic marketing. "Obviously, if Cullinet and MSA do it, we will have to do it."

At least two vendors are implementing graduated pricing in phases. ADR announced last week that it will provide 9370 pricing in September that is based on IBM's Group 10 and 20 pricing. ADR will follow next year with additional tiers for larger 370 series processors, according to William Clifford, ADR's executive vice-president.

On-Line Software said it will also introduce 9370 pricing next month. It has set up three 9370 price levels for its software products that run under IBM's VM operating system. In addition to low- and high-end 9370 prices, it has a separate price for IBM VM/XA users.

The changes will probably mean confusion to customers in the upcoming months, as vendors decide what will happen to existing policies such as site licensing and discounting in regard to the graduated structure.

Cincom, for example, has been selling software based on the number of users a system will support. It said it will retain this structure and add the IBM four-tiered hardware structure when it rolls out its price list in October.

The result will be that within the four groups there will be four different categories: unlimited users, up to 64 users, up to 32 users and up to 16 users.

Problem policies

Other vendors have used site licensing policies, which became a problem with the 9370.

ADR has traditionally sold software without regard to processor size, basing price on the operating system under which the software would run. With the old method, the company has a site licensing policy that allows customers to pay once for a software program that would run on multiple CPUs.

With its revised 9370 pricing, ADR will charge on a per-CPU basis for new customers or for current customers who will use a different operating system on the 9370 than the one they used on their other IBM mainframes.

A VM shop that installs 9370s also running VM would be able to run ADR software on the departmental systems at no extra cost, Clifford said. He said ADR has not yet decided how it will handle users who are currently under site licenses with larger processors.

Tipping the scales

Independent vendors are adopting IBM's graduated pricing scheme

	ADR Datacom/DB	Software AG Adabas	Cullinet IDMS/R
Previous	$145,900 (MVS) $114,500 (VM or VSE)	$178,000 (MVS) $142,000 (VM)	$90,000 (4300 series) $180,000 (3080,3090 series)
*Group 10**	$17,175 (VM or VSE)	$30,000 (VM)	*
Group 20	$51,065 (MVS) $40,075 (VM or VSE)	$150,000 (MVS) $53,000 (VM)	$125,000
Group 30	Not announced	$170,000 (MVS) $113,000 (VM)	$135,000
Group 40	Not announced	$190,000 (MVS) $113,000 (VM)	$180,000

*MVS not available on Group 10 9370 models

CW CHART

Cullinet loses general ledger rights

BY CHARLES BABCOCK
CW STAFF

WESTWOOD, Mass. — After losing a three-year court battle with McCormack & Dodge Corp., Cullinet Software, Inc. said last week it will internationally market a general ledger product that is different from the one it markets in the U.S.

The Massachusetts Supreme Court ruled last week that Cullinet did not obtain the right to market internationally a product it licensed from M&D six years ago.

Cullinet announced a year ago that it had acquired an additional general ledger product, which it calls the Cullinet International General Ledger System, from a European source.

Not disclosing the name of the source was included in the terms of the acquisition, Cullinet spokesman John Moriarity said.

Not unique

Jeffrey P. Papows, Cullinet's vice-president of marketing, said the ability to consolidate data from different general ledger systems is common in the industry rather than unique to the two Cullinet products.

"You could take Software International, Inc.'s [now part of Computer Associates International, Inc.'s application division] or Management Science America's [packages] and do the same thing," Papows said.

General Electric Co., the former owner of Software International and a user of its Masterpiece accounting software, uses several other general ledger products throughout the company, Papows said. Papows is a former executive at Software International.

According to Papows, the Supreme Court decision will not prompt any major change at Cullinet because the company refrained from marketing the M&D product overseas until the dispute between the two companies was decided.

Offering differing packages in the domestic and international markets will not lead to incompatible accounting entries for multinational customers, according to Cullinet representatives.

A multinational company can use both products and still consolidate worldwide accounts, Papows said.

Cullinet's interpretation of the $1 million-plus licensing agreement with M&D was that Cullinet was restricted to marketing the product in the U.S. and Canada for five years, after which it could market the product internationally.

M&D disputed that interpretation, and the two companies went to the Massachusetts Superior Court in 1984.

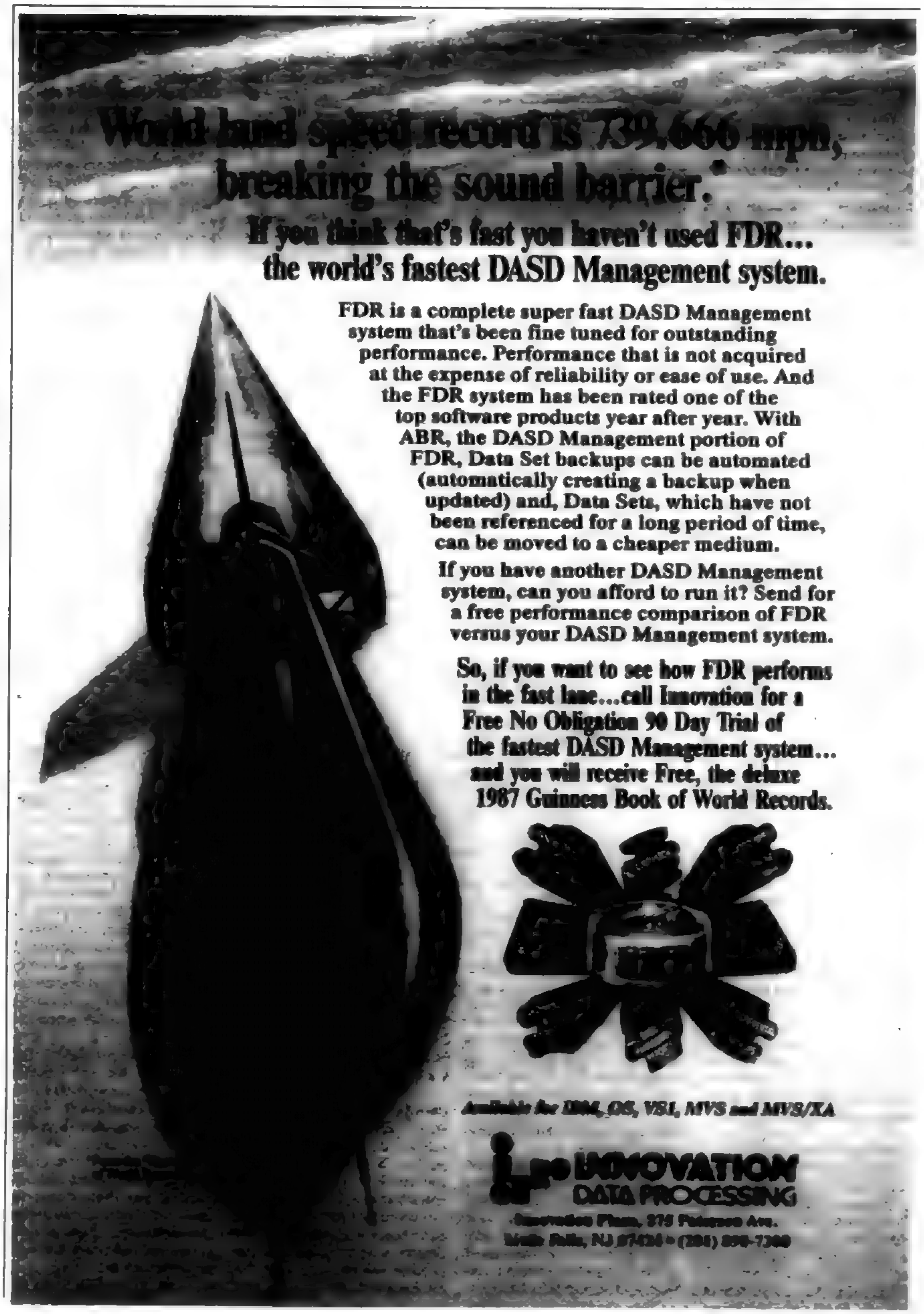
CORRECTIONS

Forecross Corp. was not acquired by On-Line Software International, Inc., although On-Line acquired rights to several of that company's products. Forecross's name was misspelled in an article referring to some new On-Line products [CW, Aug. 3].

Digital Equipment Corp. cut the price of a 32M-byte VAX 8530 system from $347,000 to $342,000 [CW, Aug. 17].

Data General Corp.'s MV/7800 XP and MV/7800 DCX [CW, Aug. 17] use 256K-bit memory chips.

Omitted from the July 27 Spotlight on graphics workstations were five products from Autodesk, Inc.: Autocad, a general-purpose open-architecture design and drafting package featuring an integrated high-level programming language; Autocad AEC Architectural for architecture and construction applications; Autocad AEC Mechanical for mechanical engineering; Autosketch, an entry-level architectural design program; and The Engineer Works, an Autocad interface that supports three-dimensional solid modeling for mechanical and architectural applications.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Low-end PS/2 gets stepladder

Pair of hard disk drive intros from third parties add muscle to Model 25

BY JAMES A. MARTIN
CW STAFF

Hoping that corporate MIS managers will take some interest in the IBM Personal System/2 Model 25, two add-on product vendors are offering hard disk drives for IBM's low-end microcomputer to expand that system's role beyond home and education applications.

Western Digital Corp. is expected to announce early next month the PS2520I, a 20M-byte hard disk drive kit that fits into the 3½-in. form factor slot underneath the PS/2 Model 25's microfloppy disk drive. The kit reportedly includes an internal controller board that absorbs one of the Model 25's two expansion slots.

Western Digital, based in Irvine, Calif., already announced the Filecard PS-30, an add-in card with a 30M-byte hard disk drive and controller for the PS/2 Model 30. The Filecard uses 1½ Model 30 expansion slots and was physically too cumbersome to fit into the tightly packaged Model 25, according to Linda Robinson, program manager for the Filecard.

In addition, Plus Development Corp. said last week that its Hardcard 40, a 40M-byte hard disk drive and controller on one expansion board, is compatible with the Model 25 as well as the Model 30.

Hardcard 20, a 20M-byte hard disk drive and controller board released in 1985, can be used in both models with the help of an upgrade kit.

Viable workstation

Although the Model 25 is strongly positioned for the home and education markets, a spokesman for Plus said that with a hard disk, the Model 25 becomes a viable low-end workstation for stand-alone processing or network terminal applications within a corporate environment.

Plus's 20M-byte hard-disk board "brings performance to the Model 25 that exceeds [the performance of] the Model 30 configured with a 20M-byte drive," said Hank Chesebrough, manager of product marketing.

However, analysts and users said they are not convinced that the Model 25, with or without a hard disk, could compete against the Model 30 or IBM Personal Computers and compatibles.

'Too many disadvantages'

"The Model 25 might be appropriate for a tiny business that doesn't need to communicate with a mainframe, but otherwise, there are too many disadvantages in speed, upgrading options and memory size," said Joe Cross, an analyst with Future Computing/Datapro in Dallas.

Although the Model 25's $1,350 retail price is considerably less than the Model 30's $2,295 tag, the Model 30 has been subject to deep discounting almost since its introduction. It can be purchased in some markets for slightly more than $1,000 and is, therefore, the better buy, according to Richard Shaffer, editor and publisher of "Computer Letter," an industry newsletter based in New York.

"As a dumb terminal of sorts or as a computer for PC training, when you don't need the expandability, the Model 25 should do OK in a business environment," said Richard Murphy, manager of Suntrust Banks, Inc.'s microcomputer division in Orlando, Fla. "Otherwise, even with a hard disk, I don't think it would really serve a strong purpose."

The Western Digital hard disk drive kit is set to begin shipping Sept. 4. Pricing has not been announced.

The Hardcard 20 upgrade kit costs $50 to users who purchased the board before Aug. 1 and is free to those who purchased it after that date, the company said.

Lockheed puts factory under Ethernet umbrella

BY KATHY CHIN LEONG
CW STAFF

SUNNYVALE, Calif. — Lockheed Missiles & Space Co. last week unveiled its Automated Center for Electronics (ACE), a $41 million manufacturing site that integrates more than 200 computerized devices under one baseband Ethernet network.

The company chose not to use the much-touted Manufacturing Automation Protocol (MAP) for its networking standard. Bob Fitzpatrick, chief systems engineer for ACE, said the company preferred to remain with Ethernet since Lockheed was already using Decnet, Digital Equipment Corp.'s version of Ethernet, in the engineering group. "By the time we started working out the details for the facility, MAP was not fully mature. We already had an installed Ethernet, and it wouldn't make sense to change," Fitzpatrick said.

That practical approach may also be the most prosperous for Lockheed. Anthony Friscia, president of Advanced Manufacturing Research, a Salem, Mass.-based consulting firm, noted that too many companies are concerned with using the latest and most popular technologies before planning exactly what they want to accomplish. He said successfully managing the automation process is the key to manufacturing success.

Locking horns

The issue of MAP vs. Decnet has been a topic of contention for the past several months, with DEC President Ken Olsen publicly deriding users groups' efforts to set standards and the decision by MAP proponents not to consider Decnet's medium as an alternative to MAP-endorsed broadband. MAP enthusiasts, led by DEC customer General Motors Corp., have long argued that Ethernet is prone to signal interference; that the contention-based access scheme will bog down the network as traffic increases since data collisions will increase; and that baseband networks are less flexible for long distances and cannot support a mixture of voice, data and video, for example.

But Lockheed's Fitzpatrick maintained that his team of specialists has already tackled those issues. Heavy, shielded baseband cable has been installed in the noisiest areas of the site. To lessen the volume of data collision on the network, engineers have worked with DEC to partition the network into "subnetworks," he said.

And, while broadband can support single network lengths of up to 25 miles and baseband cannot, Fitzpatrick said that does not matter. Lockheed's Ethernet network will be limited to the ACE and an adjacent Lockheed micro electronics facility.

The company has no intention of using video or voice on the factory floor network. "We looked at all the options and completed many feasibility studies," Fitzpatrick said. "Decnet is sufficient to meet all our needs for now and the future."

Under development for years, the 231,000-sq-ft facility will be the first to offer end-to-end production of printed-circuit boards for military defense systems, Lockheed officials said. According to Howard Wolnowsky, director of Lockheed's data exploitation programs, these boards will be made in a "nearly paperless environment" from design to the final assembly.

Quicker and cheaper

When fully operational in September, the site will be able to produce boards faster, cheaper and with higher reliability, Wolnowsky said. A 15- by 15-in. circuit board that would have taken eight hours to produce will now take seven minutes, he said. The same board will also cost the company 40% less to assemble. And that advantage has already given Lockheed the green light to bid for contracts at lower prices. In fact, Lockheed already has a space customer lined up for the ACE site.

Experts monitoring the manufacturing communications market are lauding Lockheed's plan. "I would put them in the upper 1% among American manufacturers," Friscia said. "Others have tried to do this and failed. What is important is to show that this works. It doesn't matter if they are the first or second or third. There are just not too many success stories out there."

The creation of the new site stemmed from the company's realization that state-of-the-art aircraft and missiles were increasingly reliant on computerized and electronic controls. In addition, the company said it expects sales of electronic components and related software to make up half of its revenue in 1991.

With those reasons in mind, Wolnowsky said the strategic need for a networked facility with a full complement of hardware and internally developed software was critical. Prior to this, engineers in various groups were using computers with a variety of protocols, Wolnowsky explained. "Specifications were passed manually from group to group, and redundant key entry was everywhere."

Although the ACE site is producing boards at a faster rate, Minouru Araki, president of Lockheed's Space Systems Division, stressed that the focus will be on quality production. "The goal is not high-volume production," he said. "We want to ensure [that] each customer gets custom electronic components from our division."

By February 1988, the adjacent facility, called the Micro Electronic Center, is scheduled to be completed for the development of very large-scale integration circuits, Wolnowsky said.

From start to finish

Leading a tour of the facility, ACE officials outlined the manufacturing process from start to finish.

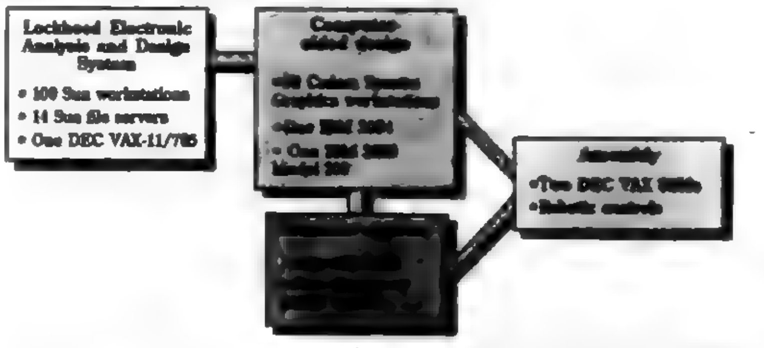
In the Lockheed Electronics Analysis and Design System area, engineers are creating the initial specifications on 100 Sun Microsystems, Inc. workstations linked to one DEC VAX-11/785. From there, specifications are sent to Cadam, Inc. Spectra Graphics workstations in the computer-aided design area for another set of engineers to create board layouts.

A business systems network of IBM mainframes is interfaced to the Ethernet network, giving the assembly line shop orders and production duties. Finally, the boards go from the computer to actual production in the assembly area, where rows of robotic arms stuff the boards with the components.

According to Wolnowsky, reliability is improved since users at any point on the network can check the original board design to make sure the product has not strayed too far from its intended specifications. At every turn of the process, the system software makes a series of quality checks. So exacting is the process that the company intends to bypass building prototype boards and go directly into final manufacturing.

ACE on the floor

Lockheed's ACE network links a variety of devices in a factory environment over DEC's version of Ethernet



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Speeded up Word adds macro ability

BY ALAN J. RYAN
CW STAFF

REDMOND, Wash. — Microsoft Corp. is scheduled to announce today an upgraded Microsoft Word software program and said last week it expects the changes to increase the company's penetration into large and small businesses.

Word 4.0 is targeted mainly at secretaries, managers and attorneys, according to Lewis Levin, Microsoft's product manager for applications marketing.

This latest version features increased speed, the ability to use macro commands and document management and retrieval. "Document retrieval is a total drop-dead secretarial requirement," Levin said. Other changes have been made as well — many at the request of users.

To reach the target audience, Levin said, "we needed to make some improvements for people who wanted to do word processing."

So Microsoft went to its users to see what features they wanted and needed most. Included in the improvements is a streamlined user interface to make the product more intuitive. "That was in response to some criticism we'd gotten," especially about cursor commands, Levin said.

Today's lesson

Other changes are an integrated on-line Help tutorial that presents a lesson on the topic in use without leaving the document and a "red-lining" feature for highlighting changes to copy or adding comments while leaving the original intact if the author chooses not to incorporate those changes, Levin said.

The cursor in Microsoft Word 4.0 reportedly moves 90% faster than in previous versions, but it can be slowed down if the user does not desire the speed.

Word 4.0 is scheduled to ship next month and to retail for $450 for new users. Those who purchased Version 3.1 after July 1 will get the upgrade free of charge; versions purchased prior to July 1 can be upgraded for $75.

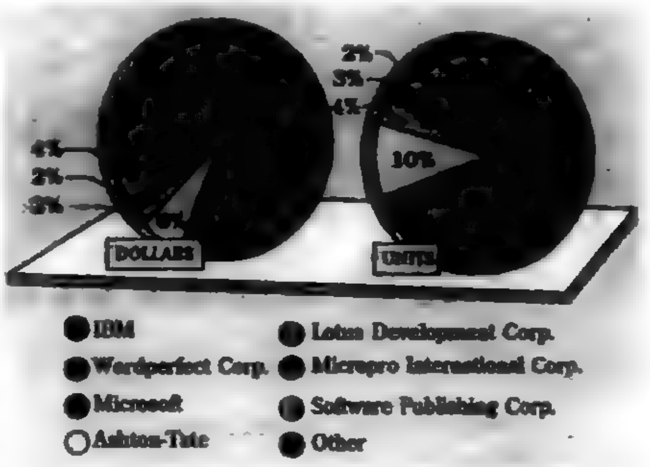
The networked version is expected out about six weeks after the first shipments of Word 4.0, Levin said.

For $750, the user will get Master Pack, which supports IBM's Token-Ring network and PC Network; AT&T's Starlan; Ungermann-Bass, Inc.'s Net/One; Novell, Inc.'s Advanced Netware and 3Com Corp.'s 3+ and Ether series as well as any other networking package compatible with Microsoft's MS-Net.

For each additional user, the fee is $150, which includes the workstation user manual, documentation and a license to get into the server copy.

Word power

Microsoft already holds a substantial share of the $42 million PC word processing market



INFORMATION PROVIDED BY IMS AMERICA LTD.'S NATIONAL COMPUTER RETAIL REPORT
CW CHART

Enmasse resurrected, to buy Point 4 Data

BY STANLEY GIBSON
CW STAFF

TUSTIN, Calif. — Point 4 Data Corp. recently announced that it has received an offer to be acquired by Enmasse Computer Corp. for $18.7 million.

Enmasse, formerly located in Acton, Mass., ceased operations early this year. However, its investors are now seeking to marry Point 4 with the remaining Enmasse technology in the belief that Point 4 will attain the marketing success that eluded Enmasse.

According to former Enmasse President Robert Gardner, Enmasse's investors denied the company $5 million in February, causing the young firm to shut down. Enmasse's investors include Oak Investment Partners in Westport, Conn., which is also an investor in Point 4.

Enmasse produced a Unix-based transaction processing system that it was unsuccessful in selling to large corporations or to value-added resellers (VAR). The company claimed its system could be expanded by adding tightly and loosely coupled units to a maximum size that could handle 2,500 users and provide 200 million instructions per second.

One-man gang

The current president and sole employee of Enmasse is Robert Baker, who is also president of Technology Service Group, Inc. in Melbourne, Fla. Enmasse has sold all of its hardware, Baker said, and retains only its software and hardware specifications. Baker said he was retained as a consultant by Oak Investment to explore how to best turn a profit from Enmasse's technology.

Oak Investment is also an investor in Technology Service. Baker said Technology Service is being paid a fee by Enmasse investors for his services.

Enmasse has neither declared bankruptcy nor paid off all its creditors, Baker said. The company hopes to gain revenue from its relationship with Point 4 in order to pay off its debts, although Enmasse's creditors have not yet been informed of the proposed merger, Baker said.

After the proposed transaction, William Rigby, Point 4 president and chief executive officer, will become president of Enmasse, which will act as a holding company.

Rigby will remain president and CEO of Point 4.

Under the plan, Point 4 said it will become a wholly owned subsidiary of Enmasse and will retain its name, management, products and policies. Point 4 management and its board of directors are recommending acceptance of the Enmasse offer to Point 4 shareholders, according to a prepared statement issued by Point 4.

"We are going to look at the [Enmasse] technology and repackage it for a profitable market," Rigby said, although he declined to say in what form he would put the technology or to which market he would try to sell it. "We won't market the Enmasse product right away," he added. Point 4 licenses the Iris operating system and sells transaction processing systems to VARs of small and medium-size businesses.

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[illegible]

HP, Tandy, Ashton-Tate pick up steam

BY CLINTON WILDER
and STEPHEN JONES
CW STAFF

The computer industry continued to show strength in several sectors last week as solid quarterly earnings growth was reported by Hewlett-Packard Co., Tandy Corp. and Ashton-Tate. But Cullinet Software, Inc., still in a transitional phase, reported its fifth straight quarterly loss.

Ashton-Tate posted strong revenue and earnings growth despite speculation that competition from IBM, which will reportedly include a data base in its OS/2 Extended Edition, would leave Ashton-Tate's popular Dbase III out in the cold.

Users apparently were not scared off by the pending IBM announcement. Dbase III sales accounted for about $41 million of Ashton-Tate's $63.6 million in revenue for the second quarter ended July 31.

Mixed reaction

Net income rose 55% from the corresponding quarter last year, from $6.5 million to $10 million, or 40 cents per share. Revenue was up 30% from the $49 million posted in the second quarter of 1986. But Wall Street was less impressed with the vendor's sequential quarterly revenue growth, which rose by just more than $3 million.

Bruce Johnston, an analyst with First Boston Corp. in New York, said Ashton-Tate came in at about $3 million less than his prediction of $67 million for second-quarter revenue.

He attributed the lower number to flat sales for Ashton-Tate's Multimate upgrades. Instead of taking off, Johnston said, sales from word processing packages grew by only about $400,000, from $11 million for the quarter ended April 30 to $11.4 million last quarter.

HP reported one of its better growth quarters in recent years. The Palo Alto, Calif.-based minicomputer and scientific instruments maker said third-quarter profits increased 20% from year-earlier levels to $148 million, or 57 cents per share. Revenue was up 14% to $2 billion.

HP President and Chief Executive Officer John Young said in a prepared statement that the firm's order backlog rose by $200 million during the quarter. He said the company's fourth-quarter goal is to convert that backlog into shipments.

Ups and downs

Westwood, Mass.-based Cullinet reported a loss of $8 million, or 25 cents per share, nearly double its $4.4 million operating loss in the year-earlier quarter. But sales jumped 48% to $49 million, compared with $33.2 million in the first fiscal quarter a year ago.

Cullinet lost a total of $11.4 million, or 36 cents per share, in the comparable quarter of 1986, but that figure included a $7 million charge.

Although Cullinet's sales reached a record high for the first quarter, Scott Smith, an analyst with Donaldson, Lufkin & Jenrette, attributed them to revenue from software maintenance rather than product licenses. He said maintenance revenue grew by 65% to surpass revenue from licenses, a highly unusual situation for Cullinet.

"It's a difficult time for Cullinet, as they try to introduce many new products and cut expenses," Smith said. "They will have difficulty stimulating any growth in the mainframe data base market." He estimated that Cullinet will remain in the red for at least two more quarters.

Like other leading microcomputer suppliers such as Compaq Computer Corp. and Apple, Tandy reported strong quarterly and year-end financial results. In the quarter ended June 30, profits rose 66% to $44.4 million, or 49 cents per share, on a modest revenue gain of 7% to $736.6 million.

For the year, the Fort Worth, Texas-based firm said its profits increased by 23% to $242.3 million and that sales grew 14% to $3.45 billion.

PS/2 to get 3½-in. HAL

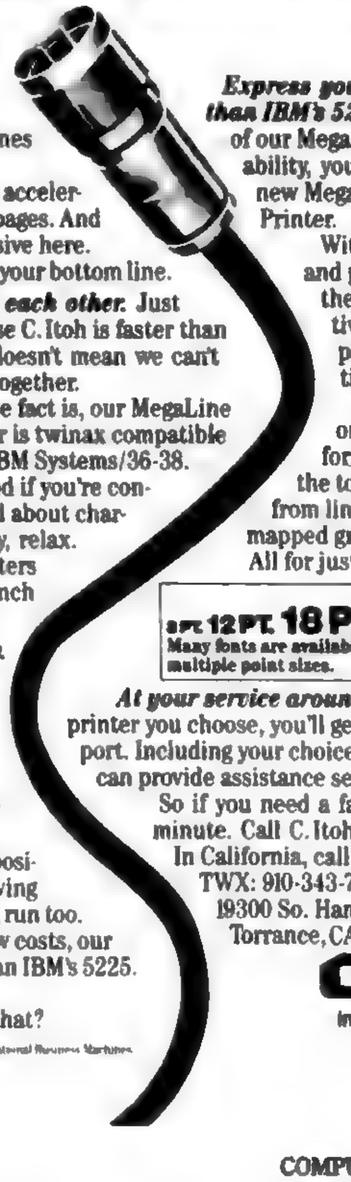
CAMBRIDGE, Mass. — Lotus Development Corp. last week announced it will immediately begin shipping a 3½-in. version of its Human Access Language (HAL) for the IBM Personal System/2.

HAL is a collection of shortcuts from Lotus's 1-2-3 program that makes it easier to perform tasks such as entering formulas, formatting worksheets, moving and copying data, extracting data, creating graphs and sorting data bases, according to Lotus.

The product takes advantage of the features of Microsoft Corp.'s MS- and IBM's PC-DOS 3.3, new data storage devices and the video displays of the IBM PS/2, Lotus claimed.

Registered users of the 5¼-in. disk version of HAL will be allowed to migrate to the 3½-in. version. That program reportedly will begin in the fourth quarter and carry a $30 fee.

HAL sells for $150.



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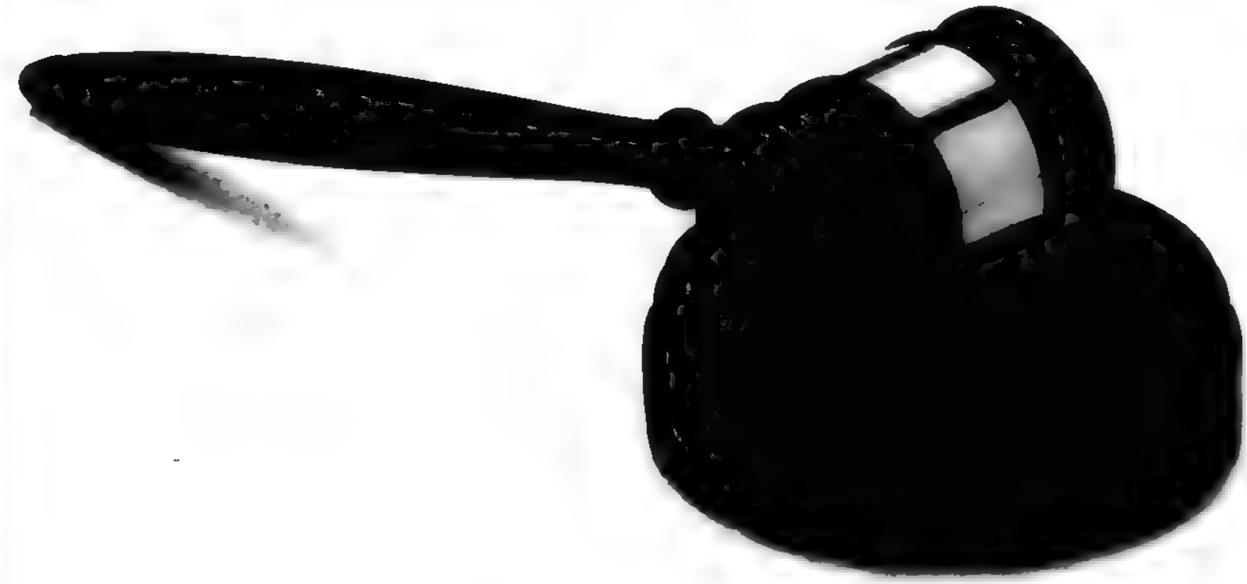

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Zenith Data president leaves for start-up

Dilworth leaves for Metricom; Senior VP Frank named replacement

BY CLINTON WILDER
CW STAFF

GLENVIEW, Ill. — Zenith Data Systems President Robert Dilworth, who guided the firm to its status as one of the top three IBM Personal Computer-compatible vendors, resigned last week to head a Silicon Valley start-up.

Dilworth will become president of Metricom, Inc., a Cupertino, Calif.-based firm that is developing remote meter-reading and control systems technology for the electric utility industry. His new position will take effect Sept. 1.

Named to replace Dilworth at Zenith was John Frank, 48, Zenith's senior vice-president of sales and marketing. Frank joined Zenith in 1981 from a sales position at Management Assistance, Inc.

Frank said Dilworth's departure was not a surprise and that its timing was not related to Zenith's recent winning of a $104.5 million contract to supply laptop computers to the Pentagon [CW, Aug. 17].

Free spirit

"Bob has always been an entrepreneurial spirit and never made any bones about it," Frank said. "This was the kind of opportunity he has been looking for. We expect a real smooth transition."

A keynote speaker at Comdex/Spring '87, Dilworth is a California native who maintained a residence in Scotts Valley during his two years at Zenith, according to Metricom Chairman Paul Barron. Metricom, incorporated in December 1985, is a venture capital-backed company employing 22 people.

The move will mean a drastic organizational change for Dilworth, who joined Zenith from Morrow Designs, Inc., the firm that licensed its portable microcomputer technology to Zenith.

A wholly owned subsidiary of Zenith Electronics, Inc., Zenith Data Systems reported revenue of $550 million last year and is growing at a 100% rate this year, a Zenith spokesman said.

Zenith made its name selling IBM PC compatibles to the federal government and education markets.

It won several high-priced government contracts during Dilworth's tenure, including the 1986 Internal Revenue Service laptop bid and the recent $104.5 million pact for 90,000 laptops for the armed forces.

Because Metricom is not in the computer business directly, Dilworth will be available as a Zenith consultant until the end of the year.

Art Lambert, formerly vice-president of sales, was named to replace Frank, and national sales director Jack Cullen replaced Lambert.

First Financial to pay $65M for Endata

ATLANTA — First Financial Management Corp., a leading data processing service bureau for banks and thrift institutions, last week announced its intention to acquire Endata, Inc. for approximately $65 million in cash and stock.

First Financial Management is a major customer of Endata, a Nashville-based firm that transfers data stored on computer disks and tapes onto microfiche. Endata has an annual revenue of approximately $40 million, and First Financial Management does about $110 million in business annually.

The buy-out closely mirrors one made earlier this year by a major First Financial Management competitor, MTech Corp., according to Cato Carpenter, an analyst with Baltimore-based Alex Brown & Sons, Inc.

Dallas-based MTech purchased Kalvar, Inc., which supplied microfiche services in two of MTech's 20 data centers. After finalizing the acquisition, MTech plans to expand the Kalvar service to all of its centers.

"My hunch is that First Financial saw that deal and saw that it made sense," Carpenter said.

Banks and financial institutions are required to keep customer account records and other data on microfiche for varying periods of time. First Financial operates 36 DP centers accessing 87 mainframes for approximately 1,000 customers.

After completion of the merger, Endata Chairman and Chief Executive Officer Douglas C. Altenbern, a former chairman of ADAPSO, will become vice-chairman of First Financial Management.

The final price of the acquisition will be between $60.6 million and $73.6 million, depending on the average First Financial Management stock price in a specified period. First Financial will fund 20% of the buy-out in cash and 80% in newly issued shares. The transaction is expected to be completed in October.

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Pageperfect sets final October delivery goal

BY STEPHEN JONES
CW STAFF

SAN RAFAEL, Calif. — After almost one year of delays, International Microcomputer Software, Inc. last week said it will start shipping a $495 desktop publishing package with a fully integrated word processor by early October.

The company claimed Pageperfect will be the first product to merge desktop publishing, full-function word processing and file management into one program. Unlike the spate of economy-minded packages released recently for the low end of the desktop publishing market, Pageperfect requires expensive hardware and a large amount of memory.

Jill Lifschiz, manager of marketing for the software publishing house, said the hybrid product will be released no later than the second week in October.

The package was designed to run on machines based on Intel Corp.'s 80286 and 80386 microprocessors and needs 640K bytes of random-access memory. It also uses IBM's Enhanced Graphics Adapter.

Those requirements put Pageperfect in the middle of today's desktop publishing spectrum — between Software Publishing Corp.'s $249 PFS:Professional Write Plus and Xerox Corp.'s $895 Ventura Publisher.

Evading desktop publishing fray

But International Microcomputer President Richard Borenstein said the product will not be positioned as a traditional desktop publishing product. Instead, he said, the firm will promote the product as an easy-to-use word processing package that can dress up standard business communications such as letters, memos, news releases and reports.

Pageperfect features a file management operating shell that is said to enable the user to move through document creation, graphics integration, layout and printing without exiting the program.

The package allows users to enter and edit text within a composed page at nine different view levels with what-you-see-is-what-you-get capabilities. It is bundled with a high-performance graphics editor called Desktop Publisher's Graphics.

"It's not the ultimate desktop publishing program, but it has good typesetting functionality, nice built-in graphics, and it's very easy to use," said Peter Dyson, editor of "The Seybold Report on Desktop Publishing," who saw a demonstration of Pageperfect last spring.

The package automatically accepts files from other word processing packages, such as Micropro International Corp.'s Wordstar and Ashton-Tate's Multimate, and it features a spell checker and a thesaurus.

First scheduled for release in November 1986, Pageperfect has hit a number of development obstacles, and early runs of the product might still contain some bugs, sources said.

Borenstein said the initial version of Pageperfect will not be compatible with Adobe Systems, Inc.'s Postscript and that its output capabilities will thus be limited to laser printers from Hewlett-Packard Co. and Canon U.S.A., Inc. Borenstein, however, emphasized that Postscript compatibility will be available by January.

But that concerns industry watchers like Dyson, who said lack of integration with standard products could make Pageperfect little more than a niche offering.

"If Pageperfect is going to be perceived as a desktop publishing solution, then [International Microcomputer] is going to have to come out with a Postscript driver at some point," Dyson said.

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Amdahl makes first super sale

Three-year wait ends as oil-search firm buys vector processor

BY JEFFRY BEELER
CW STAFF

HOUSTON — For Amdahl Corp., the long wait has ended at last. Nearly three years after the company entered the supercomputer field with considerable fanfare, a domestic user has finally agreed to buy one of Amdahl's four models of IBM-compatible vector processors.

The first U.S. customer of an Amdahl supercomputer is GECO Geophysical Co., the U.S. affiliate of Geophysical Co. in Norway. GECO said it plans to use its Model 1100 number cruncher, which it installed Aug. 8-9, to aid its clients in the search for untapped deposits of crude oil.

Installation of the Model 1100 at the contractor's U.S. processing center here came more than 34 months after the machine and a companion system, the Model 1200, were introduced at Amdahl's Sunnyvale, Calif., headquarters in September 1984. Since then, the IBM-compatible mainframe vendor has announced two additions to its supercomputer family, which now ranges in performance from 143 million to 1.14 billion floating-point operations per second (FLOPS).

Importing success

At the same time, Amdahl and its West Germany-based business partner, Siemens AG, together installed a total of 10 of Amdahl's vector processors at various customer sites in Europe. But it was not until the 267-MFLOPS Model 1100 — which corresponds with Fujitsu Ltd.'s VP 100 supercomputer — replaced GECO's existing Amdahl 5860 that Amdahl began to duplicate its European sales success in the U.S. The vendor attributed the delay in domestic sales to a fundamental difference between the American and European supercomputer markets.

"The U.S. vector processing arena was extremely hard for us to crack, because it's Cray's home turf, the place where they're most deeply entrenched," said Wayne McIntyre, Amdahl's director of scientific systems. "In Europe, where loyalty to one dominant vendor is somewhat weaker, the market is a bit more of a free-for-all."

Another reason the company's supercomputer line remained unpopular in the U.S. for so long has to do with an admitted lack of clarity in its initial marketing efforts. "When we started, we adopted a bit of a shotgun approach, and it took us a while to figure out which applications our vector processors are best suited to," an Amdahl spokesman said.

The firm identified the petroleum and seismic services industry as a business opportunity that "fits our supercomputers to a tee," McIntyre said. "What almost every player in that sector has in common is a lot of experience in scientific computing and a nearly complete dedication to IBM 370-style mainframes."

"As a geophysical contractor, we acquire and process seismic data for oil companies, both large and small," said Randall Odom, GECO's vice-president of data processing. "Through an air gun or some other device, we shoot energy into the ground, then listen to the signals the underlying layers of rock send back to us."

By sampling the returning energy waves every 2 msec for 8 to 15 seconds, geophysicists can record a series of "wiggle traces" that indicate precisely how the earth is structured at a particular point beneath its surface. They can then interpret the highly technical data to derive whether the section of rock in question looks promising enough to warrant exploratory drilling for oil.

Although the procedure sounds simple, it demands far more computation power to eliminate extraneous noises and otherwise process the incoming seismic data than GECO's existing combination of an Amdahl 5860 and three 470V/8s can deliver, Odom said.

So about two years ago, the contractor's parent company in Stavanger, Norway, benchmarked three systems as potential substitutes for the 5860 scalar mainframe. The test subjects included the Model 1100, a Cray Research, Inc. supercomputer and an IBM 3090 with a vector processor attachment.

Cray didn't do it for GECO

Although the Cray machine took top honors from the standpoint of sheer speed, it proved unsuitable for GECO's application. "It lacked a sufficient amount of main memory to handle and manipulate the long records we have to deal with when we process our seismic data," Odom said.

Moreover, the IBM candidate proved more expensive than the Model 1100 when the price of the 3090's vector processor attachment was figured into the overall cost equation, he added. So by a process of elimination, GECO's parent organization opted eventually for the Amdahl alternative, which holds up to 256M bytes of internal storage and is currently configured with 128M bytes.

Like GECO, most large oil companies and geophysical contractors run lots of Fortran code which, if vectorized and recompiled, can be readily transported from the scalar mainframes where they currently reside to IBM-compatible supercomputers such as Amdahl's.

But no sooner had Amdahl targeted the petroleum industry as a prime market than the price of crude oil plunged to nearly $10 per barrel. The decline put oil companies in a severe financial bind and forced most of them to slash their spending for research and development, including supercomputers, McIntyre said.

DEC flak grounds Air Force contract

MAYNARD, Mass. — The U.S. Air Force last week said it will suspend bidding on a $3.5 billion computer contract protested by Digital Equipment Corp.

According to Frank Donovan, DEC government systems group spokesman, his firm contends that the contract unfairly restricts competition because the Air Force contract requirements for 20,000 computer systems "requires operating systems that conform to AT&T's proprietary System V Interface Definition as measured by AT&T's proprietary System V Verification Suite."

Joining DEC's protest last week was Wang Laboratories, Inc., Donovan said.

The formal complaint was filed by DEC Aug. 12; hearings were held last week on DEC's request to suspend the procurement until after the formal complaint has been heard, which will likely take up to 45 working days.

"We have no reason to believe the judge will not rule in our favor because the Air Force acquiesced" and suspended the bidding, Donovan said.

He added that while DEC is pleased with the suspension of the procurement because it gives the company more time to prove its case, "It's not by any means conclusive of anything. The protest has yet to be heard." A hearing is slated for Sept. 16 in Washington.

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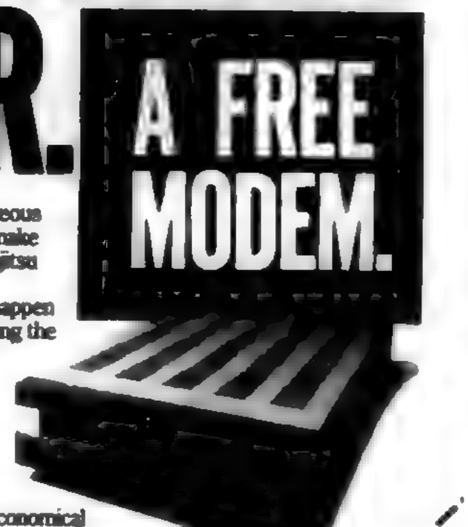

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EDITORIAL

See the light

A couple of years ago, a consultant rather irreverently said we'll see the paperless office of the future at about the same time we see the paperless bathroom.

Clearly, that individual did not foresee the real future of data storage, and that future belongs to optical disks.

As our Executive Report, beginning on page 55, demonstrates, optical storage, recently just a gleam in the eyes of visionaries, is inching closer to reality, driven inexorably by two forces. One is the explosive growth in storage needs. The other is the tremendous market potential in optical storage for the vendor community.

Optical storage represents a quantum technological leap compared with conventional magnetic storage. As the report notes, existing compact disk/read-only memory technology allows the distribution of the equivalent of 175,000 pages of ASCII text, plus indices, to a user with a microcomputer and a $700 drive. Along with recent developments in superconductors, optical storage is one of the few authentic gee-whiz technologies today.

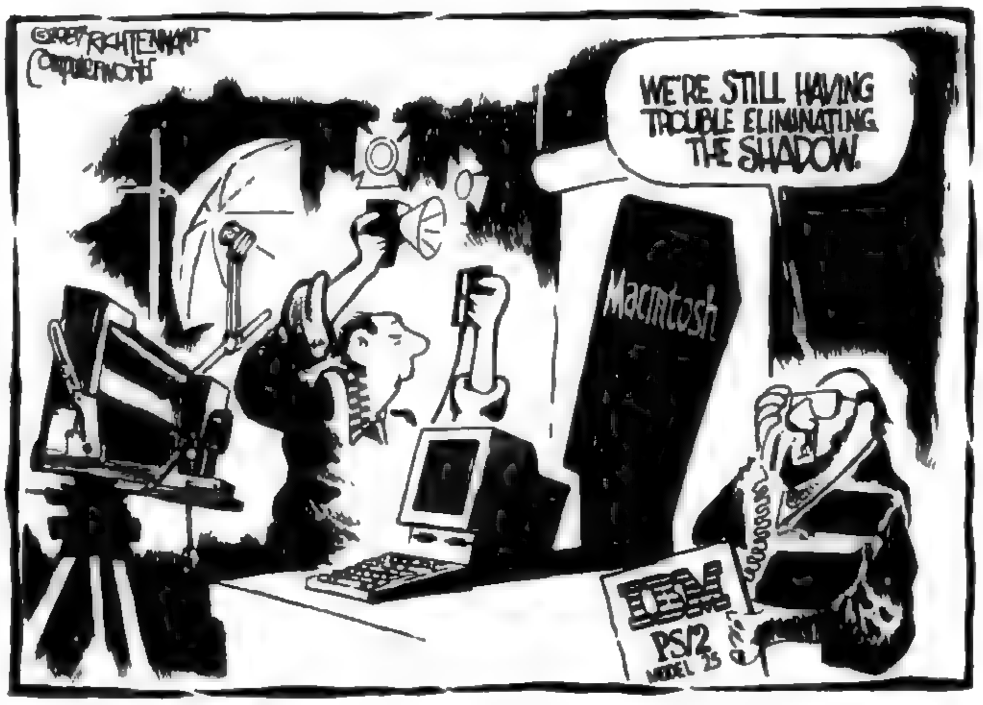
Personal computer managers are not the only ones excited about this technology. Conventional MIS pros are licking their chops over the potential resident in erasable optical disks, which are still in developmental stages. In compute-intensive industries, the amount of valuable office space occupied by large-scale direct-access storage devices can be literally measured in acres. A single erasable optical drive will replace dozens of today's large-scale DASDs. Skeptics say that erasable optical media is nearly a decade away. But these skeptics overlook the mighty efforts being made both abroad, by Matsushita Electric Industrial Co. in Japan and Philips N.V. in the Netherlands, and in the U.S., by Eastman Kodak Co., IBM and others, that will bring such products to market within five years — perhaps sooner — at affordable prices.

As optical disk technology blossoms, several critical issues will need to be addressed. What will be, and what *should* be, the role of MIS in implementing optical systems?

As one pioneering optical user notes in the report, this is a sizable political problem. The technology is so new that people don't readily have a handle on whether it is a data processing, department or end-user system and whether it can manipulate or just store data. Users are reluctant to let procurement get bogged down in the MIS acquisition process.

There are also critical standards issues with which the vendor community is wrestling. Any unnecessary delays in setting standards will certainly delay acceptance of the technology, because users have been burned by nonstandard technologies more than once in the past.

Pending the resolution of industry standards issues, optical technology will dominate storage in the next decade. As optical consultant Ed Rothchild says in the report, all the pieces are in place to turn optical technology into an essential tool.



LETTERS TO THE EDITOR

Not in our lifetime

I enjoyed Charles P. Lecht's column on the Japanese data entry predicament [CW, June 22], but I strongly disagree with his initial premise and conclusions.

He said that voice input will be successful first in Japan, passing lightly over the problems of dialect and inflection. He did not tell us that each *Kanji* ideogram has three or four pronunciations and may be written or printed in five styles. And he did not remind us of the importance of formality in the Japanese social structure.

Throughout the article, Lecht implied that voice input in Japanese is on the verge of success. He then closed by inferring that voice input for English must therefore soon follow.

But the problem is entirely different. In Japan, the challenge is to get an ideogram into the computer by any means, from weird 3,000-key keyboards to expert systems screening ***Kanji*** options from phonetic-symbol manual entry.

In the West, we already have great keyboarding. We can produce a handsome business letter. We can enter computer data fairly cheaply. Verification and error correction are straightforward. The problem is to do better with voice input.

Even if the Japanese succeed in eliminating keyboarding, which I do not believe will happen in any CW reader's lifetime, and even if here in the West we use voice recognition techniques to help paraplegics and to benefit senior executives, it emphatically does not follow that typing and key data entry will be superseded.

Herb Grosch
Mies, Switzerland

Still preliminary

I read "FBI info system expansion assailed" [CW, July 6] and believe that incorrect conclusions will be drawn by the otherwise uninformed reader.

The major premise of the article was that the National Crime Information Center (NCIC) Advisory Policy Board has made recommendations on a plan to expand its criminal information system, and the Federal Bureau of Investigation was mulling it over.

That is not the case. The board, composed of criminal justice administrators, is an advisory to the FBI on NCIC management. The purpose of their recent meeting was to review concepts developed by extensive interviews of the criminal justice community on what interstate information requirements, if provided by NCIC, would substantially enhance the effectiveness of the criminal justice community.

The significance of the recommendations is that sufficient need has been demonstrated by the NCIC user community for certain proposals, and they should be studied further.

No final board recommendations will be made until extensive review is made of societal impacts, civil liberty concerns, architectural design considerations, fiscal considerations and other related issues. No planned growth for the NCIC 2000 system exists nor is the FBI considering such a plan at this time.

It is important to point out that the NCIC 2000 study was funded by Congress after oversight hearings addressed the scope of the study. The FBI has and continues to manage NCIC responsibly with primary sensitivity to civil liberty interests.

All current NCIC files have extensive security and privacy protection, including restrictive criteria on when information can be entered and limitations on agencies and individuals authorized to access the information.

Milt Ahlerich
Acting Assistant Director
Office of Congressional and Public Affairs
U.S. Department of Justice
Washington, D.C.

This week in history

Aug. 22, 1977
A U.S. Department of Commerce report urges President Jimmy Carter to create a national information policy because 46% of the U.S. gross national product is derived from producing, processing and distributing information, and half the labor force is engaged in information "activity."

Aug. 23, 1982
The Internal Revenue Service begins using its computer system to help enforce military draft registration despite feelings from congressmen, privacy advocates and the agency itself that the plan may be illegal.

Computerworld *welcomes comments from its readers. Letters may be edited for brevity and clarity and should be addressed to Bill Laberis, Editor,* Computerworld, *P.O. Box 9171, 375 Cochituate Road, Framingham, Mass. 01701.*

It's the man, not the machine

High-tech software development falls flat using low-tech management

RUSSELL LIPTON

You've heard, of course, about the revolutionary new technologies and methodologies that will transform tomorrow's software development shops — computer-aided software engineering (CASE), intelligent workstations, fourth- and fifth-generation languages and, ultimately, automated programming.

But these technologies, even if implemented, will at best only marginally affect the productivity of software development. If you disagree, consider the sorry history of every so-called software breakthrough in the past two decades.

BILL RUSSELL

Actually, the key factors driving substantive productivity improvements have been available for a decade. These factors have little to do with advanced technology and everything to do with the integrated technical management process required to produce the highly integrated product we call software.

Software begins with someone's request for the computer to do a useful task and ends with the user employing the result. In between, someone must decide what the software is to do, how it is to be designed, implemented and tested and, ultimately, maintained and enhanced over the required number of years. These activities interweave, loop back and forth and combine in a very difficult-to-predict fashion. Even the employment of the software life-cycle methodology — a true step forward — quickly runs up against the subtler tangled web of any software project.

In the real world, most development shops proceed in an ad hoc fashion. Design, if it takes place, bears little measurable relation to the initial requirements on the one hand and the ensuing code on the other. Testing is largely random, and a product's release is not infrequently driven by its announcement date rather than its quality.

No one really knows how much effort is expended by various product teams across the differing development phases. The financial people don't have a clue as to whether the delivered product represents a profitable use of the company's development resources.

The technology solutions cited rarely address the systematic, interwoven nature of the software development process. This fact should not be a surprise. It is still not clear whether we understand the development process well enough to develop software tools and environments with the requisite power and flexibility to drive and coordinate the multitude of separate development events. But even this observation hides the key problem, which is that we cannot look to our software to drive and coordinate something that is fundamentally a management, not a technology or machine, issue.

For example, during the past 10 years, a wide number of sophisticated data base management systems and fourth-generation language products have appeared, most making the claim that software development will be revolutionized and productivity increased by up to a 10-1 ratio. But which aspect of development and which piece of the productivity equation is being addressed? Typically, it is the coding phase that reaps improvements. The many other phases of software development (with the possible connected exception of maintenance) are left untouched. Total productivity gains for the entire project may only be 20% to 30% rather than the claimed 1,000%.

The fact that most of these products are aimed at the programmer makes my point. Software development is not viewed as a highly integrated and interdependent series of activities. To be sure, CASE products, in their still primitive efforts to bring control to the design phase of development, illustrate a more sophisticated realization of the larger problem. Obviously, if we have a choice between using a productivity-enhancing tool, however limited, and no tool, we will choose to use a tool. But we would be better advised to use productivity-enhancing people.

Balancing act

The challenge is, on the one hand, to bring the many varied human disciplines of software development into play and, on the other, to measure the players and make them accountable to one another, to the corporation and, remarkably enough, to the customer.

It means, for example, bringing people from such disciplines as education, finance, technical communications, human resources and technology processes into intimate relationships with architects, coders, testers and maintenance programmers. When software development personnel are educated, they are able to move flexibly between project teams with maximum retention of skill. When the costs of project management are tracked and quantifiably related to final product and revenue, intelligent decisions can be made for the first time about the utilization of resources.

A good story from my own experience runs as follows: A super programmer once said to me of a very capable senior software manager, "What does that guy know about software? He hasn't programmed in 30 years. All he's done is manage." We all know that management has nothing to do with software, right?

Technology is always a temptation wherever we try to substitute it for the need for human management. Software development — and the use of software by customers — is all about man and machine, not machine without man.

The real litmus test of tomorrow's software productivity revolution will be this: When you pick up *Computerworld* on Jan. 1, 2000 and read a reprint of this article, will you know it is a reprint? Or will the simple management processes we describe here still sound fresh, radical and modern? Ironically, we have been able to develop tomorrow's software using yesterday's techniques for quite some time now.

Lipton consults on software productivity in the U.S. and France with New York-based James Frame Enterprises, Inc. He is currently writing books on expert systems and SQL-based products.

Thirsty for the truth in the factual desert

READER'S PLATFORM

ROBERT KENDALL

Picture two businessmen on the golf course. One says, "You should get yourself a computer so you have the facts instead of using guesswork and intuition." The other responds, "We've certainly thought about it, but does it pan out economically?" The first businessman answers, "We don't know for sure, but our information systems manager has a hunch that it will."

One could argue that businessmen today who are not fully up on computers probably wouldn't take time off for golf. Neither is the inherent value of computing so much in question.

Yet, for a function that supplies so much data to others, it is surprising how little data processing generates for its own use.

Nowhere is the lack of data so evident as in making trade-offs between program development and computer operations. A recent Viewpoint article by Efrem G. Mallach [CW, May 4] centered on the observation that "the computing capacity of the U.S. would be doubled overnight if people knew how to program." While the author went on to weigh whether machine efficiency was the appropriate goal, there was no challenge to the statement itself.

Doubling possibility?

The statement is subject to question, however. Could we cut the average program runtime in half by better techniques — not just a few notorious examples, but enough to truly double the computing capacity of the U.S.?

And if all application programs were twice as efficient, how much difference would it make? We can ignore the obviously impossible task of improving all existing programs overnight — increasing emphasis on maintenance attests to the immensity of that task.

Ignoring that, however, puts us no closer to answering the question unless we assume that computers run only application programs.

Of course, that is not true. In large mainframes, more than half the CPU cycles are consumed by the operating system. (In some cases, the figure is more than 70%.)

In studying one large interactive and networked order-entry system to see how its capacity might be stretched, the discovery was made that only 2% of the cycles were used by application code. The rest were used by system code and the control program, leading one to observe that if all application functions were removed and the time reduced to zero, there would be no detectable improvement in throughput.

In studies conducted years ago, it was discovered that in more than half the cases, the CPU cycles taken to schedule a task exceeded that task's running time.

A large portion of the remaining capacity goes to running sort programs and utilities that support DP applications. Direct-access storage device dumps and file reorganizations take huge bites out of computer capacity, as do other utilities, catalog updates and system maintenance time.

How much time is taken in such system service functions? An educated guess suggests at least half. That leaves us with a surprising 25% of the system available for running application code.

Well, not quite. We shouldn't forget compiling, testing and other application development services. Indeed, as computer-aided software engineering tools take hold, this use of computers is one of the most rapidly expanding.

Even before that, though, a substantial number of programs spent more of their lifetimes in the computer as source code being compiled than as object code being run.

Now we are down to 25% or less of the computer cycles being devoted to application code — clearly not enough to contribute to the goal of doubling the capacity of computing in the U.S.

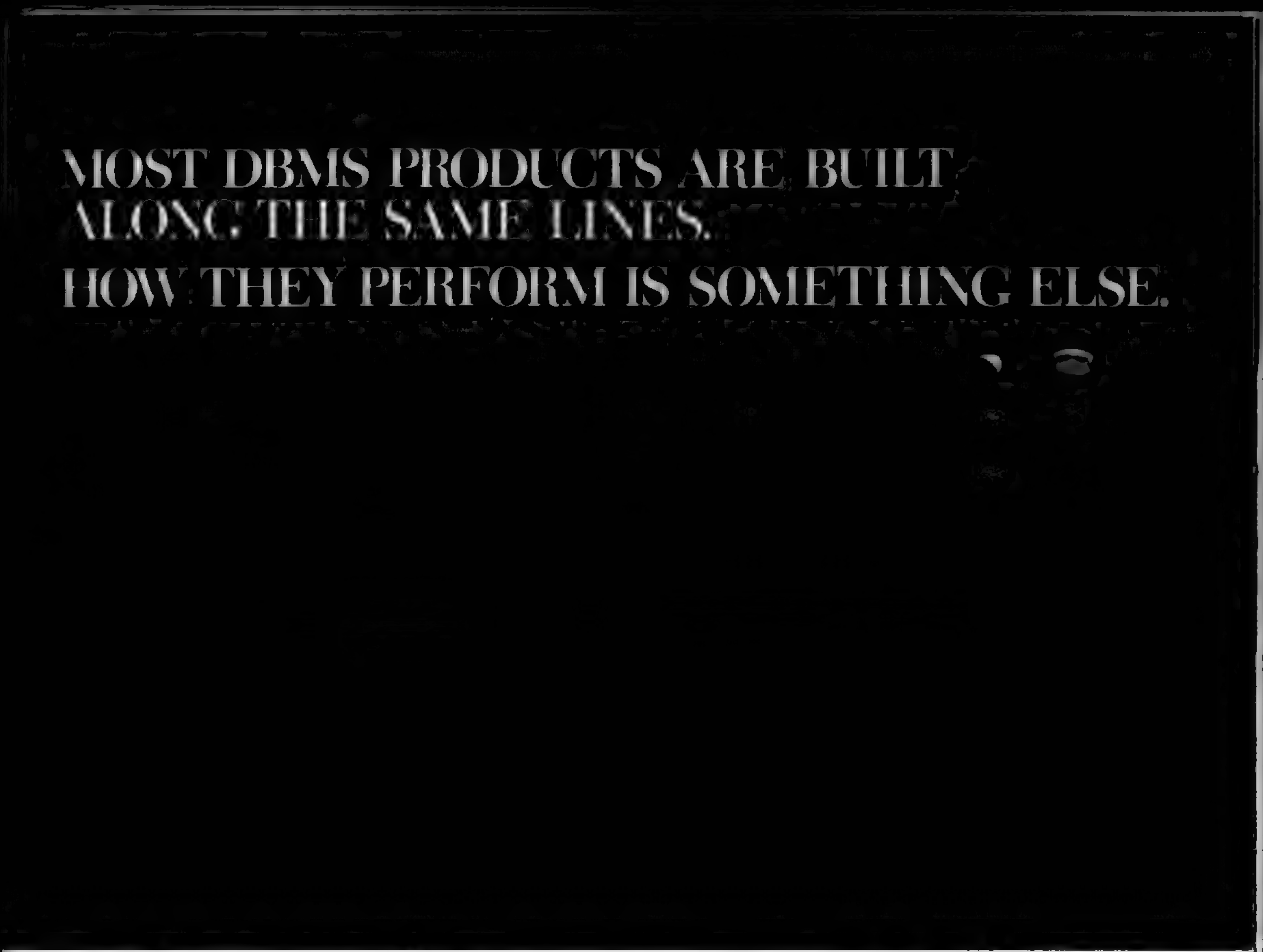
Just the facts

The fact is there are no facts — no data about this vital DP activity. Until such facts exist, we will be confronted with a pseudoscience of supposition based on the intuitively obvious and frequently erroneous.

We cannot understand computer usage and its relationship to programming productivity until we substitute investigation and learning for those baseless things that "everybody knows."

Until then, vendors won't truly know what to build, customers won't know what to demand of them and users won't know why or how to make the right trade-offs.

Kendall is a research fellow for Software Productivity Research, Inc. in Cambridge, Mass., and a consultant in programming productivity and measurement.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SOFTWARE & SERVICES

SOFT TALK

Rosemary Hamilton

Reinvent info center

Many information centers are in the midst of an identity crisis, and one of the first things they should do is find a new name.

The term information center is dying out. Even executives within IBM, the founding father of information centers, acknowledge that the moniker is an antiquated term.

In an effort to redefine themselves within a corporation, information centers should more clearly identify themselves for what they are.

Within today's information centers, the responsibilities vary greatly. Some centers are devoted to microcomputing; others support both mainframe computing and personal workstations. Some are involved with departmental computing issues. Some tackle expert system technology.

Yet they all have one thing in common: end-user support. A new name defining them as the end-user support organization would bring them more meaningful recognition within their company.

Continued on page 22

M&D moves tool package to DEC

Will move Millennium to VAX by mid-'88, CEO Dodge vows at meeting

BY CHARLES BABCOCK
CW STAFF

Frank H. Dodge

CHICAGO — McCormack & Dodge Corp. will move its popular Millennium application environment to the Digital Equipment Corp. VAX by the middle of next year, said Frank H. Dodge, chairman of the Natick, Mass.-based software house, at M&D's 10th annual user conference here last week.

A prototype DEC version is being developed by M&D's Bristol, England, research group, which two years ago produced the version of Millennium that runs on hardware from British manufacturer ICL PLC. The prototype is expected to be ready by the end of the year, Dodge said in an interview.

The initial Millennium environment provided the data sharing capability of the original Millennium accounting series and grew into an application development environment with its own tool set. What is known as Millennium: SDT, a customization and development system using the Millennium platform, can be expected to compete in the future with DEC's extensive tool set for the VMS operating system, Dodge said. He added, however, that M&D is undertaking the move with DEC's assistance.

Moving Millennium into the DEC world will enable M&D to move applications to the VAX much more quickly, Dodge said. DEC is helping M&D make the move because DEC believes the software firm's accounting and human resource applications will help VAXs move into mainstream data processing, he said.

M&D, which has sold software for the VAX for eight years, currently offers much of its accounting and manufacturing lines for use under DEC's VMS. Mainframe software still accounts for 78% of M&D's revenue, but Dodge said he anticipates VAX software will represent 30% to 35% of revenue by 1992. Non-mainframe revenue — currently 22% of the $122 million M&D garnered in 1986 — is derived from sales to customers of Hewlett-Packard Co. machines, IBM System/38s and Honeywell, Inc. computers as well as VAXs.

Dodge attributed the growth to steady demand for M&D's product line and said his firm's revenue is expected to be close to $150 million in 1987.

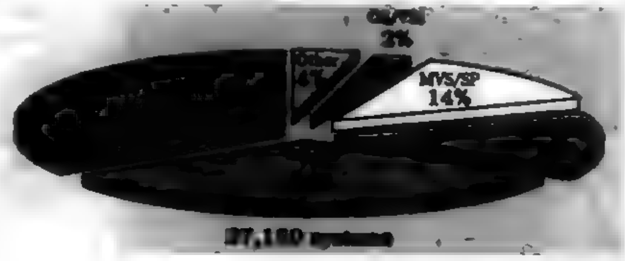
The revenue figures were cited, some M&D observers suggested, to scotch rumors that M&D's owner, Dun & Bradstreet Corp., wants to sell M&D after unloading D&B Computing Services, another subsidiary and maker of the Nomad II fourth-generation language.

In the opening address to the 2,000 assembled users, Dun & Bradstreet Chairman Charles Moritz said, "While it would seem that some — including, perhaps, our competitors — might like to see us sell M&D, I'm afraid I must disappoint them."

Data View

VM and DOS/VSE operating systems still dominate IBM mainframe sites

Although MVS/XA represents nearly half of all MVS sites, VM and DOS/VSE make up two-thirds of the installed base of mainframe operating systems



INFORMATION PROVIDED BY INTERNATIONAL DATA CORP.
CW CHART

IBM's latest Unix offering has built-in 9370 support

RYE BROOK, N.Y. — IBM has rolled 9370 support into its latest Unix offering, the company announced recently.

"This is to satisfy the demand they know they'll get from some quarters," said Kate Cominskey, an analyst at International Data Corp. in Framingham, Mass. "There is potential for Unix on the 9370, but I don't think they'll aggressively push it."

In addition to 9370 support, the Interactive Executive for the 370 (IX/370) Version 1.1.4 will

Continued on page 24

Inside

- Carnegie Group to sell Knowledge Craft components individually. Page 22.
- DEC rolls out upgrade packages for PDP-11, MicroPDP-11. Page 28.

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Tool manages licensed PC packages

NORTH PALM BEACH, Fla. — Applied Software, Inc. recently introduced a mainframe-based system designed to manage the use of microcomputer software.

Designed to run under the IBM MVS and VM operating systems, Host Storage & Retrieval (HSR) acts as a clearinghouse for personal computer software, according to Walter Josephson, president of Applied Software.

HSR is intended to work with software programs under site-license agreements, he added. It includes a microcomputer component called the Dialog Facility that lets users request copies of microcomputer programs from the HSR mainframe component. The component automatically distributes software to workstations based on the software's availability and the user's security clearance.

HSR includes a backup facility for the PC software, and microcomputer users can identify which files are included in the backup. The system generates reports for given time periods so that an administrator can track and analyze microcomputer software usage.

HSR carries an $8,000 license fee for either MVS or VM operating environments. Each microcomputer HSR component costs $90.

System tracks VM problems

SACRAMENTO, Calif. — RD Labs, Inc. recently said it plans to release next month a problem-and-change management system for the IBM VM operating system.

RD/Change was designed to help users keep track of problems and make changes in a more controlled manner. It does so by providing a problem-and-change life cycle methodology that users can follow from the onset of a problem until it has been fixed.

The system is based on a generic life cycle that the company has built into RD/Change. For instance, when a problem is entered into the system, it is given a "new" status. It then becomes an "assigned" problem once it has been given to a staff member who analyzes the problem.

If a request for a programming change is made, it is given an "open" status, which it maintains until the work on it has been completed. It then moves to a "review" status during which the changes will be examined and either approved or rejected. It finally moved to a "closed" status.

Users may customise the system to include additional steps in the life cycle, the company said. RD/Change can generate status reports of ongoing problems.

RD/Change runs under VM/SP Release 4.0 or higher. The company uses a graduated pricing structure, and the software license ranges from $3,675 for low-end systems to $11,675 for high-end processors.

Info center

CONTINUED FROM PAGE 21

Today, the phrase "information center" doesn't mean much. Actually, it never really did, so perhaps they should have been called end-user support centers in the first place.

Strip away whatever knowledge you might have of what its function is and isolate the words "information center." What is that? A center of information. Whose information? What in those words associates this department with end users? Such a vague title could belong to the accounting or legal department. After all, they are centers of information, too.

IBM set the style

Despite its ambiguity, the term information center really took off because of IBM's backing. In the early 1980s, IBM was heralding information centers as the new way to manage end users. It had a "fly-in" program in which it would fly executives from customer sites to see its own information centers.

Such centers sprouted like weeds as users took their cue from IBM. At that time, information centers were primarily set up around a mainframe system to accommodate end-user requests and lessen the burden on MIS.

That information center, however, is long gone, and IBM plays a much more low-key role in the information centers of today. "I think the way IBM is looking at things is that the office is all-encompassing," IBM's Edward Baas said recently.

Baas, a senior marketing support representative for office software marketing, said, "It's not just information centers or specialty tools that we're looking at but a broad range of areas for productivity gains."

With IBM no longer playing the central role in information center activity, now is the time for users to come up with their own identity.

"End-user computing center" is not quite as catchy a phrase as information center. But at least it says something that will more clearly distinguish this group to a company's computing community.

Hamilton is a *Computerworld* senior writer.

"We changed over 8,000 programs last year alone. Who in the world could keep track of all that?"

It must have been a programmer who said the only thing that remains constant is change. No sooner is a program completed than changes get made. And so many get made so often that staying in control of it all can be more than humanly possible.

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Unix

CONTINUED FROM PAGE 21

include full-screen editing for IBM 3270 display stations and on-line documentation, IBM said.

Version 1.1.4 should be available by the end of September, the company added.

Early 9370 users were able to run IX/370 Version 1.1.3, which was introduced in January, if they requested a service update. In such cases, IBM service representatives would have to modify the IX/370 code on-site.

Version 1.1.4 will enable 9370 users to run this Unix operating system without modification, according to IBM.

'A program product'

"This is now considered a program product. It's much easier to install," an IBM spokeswoman said.

IX/370 can operate only as a guest under the VM operating system on IBM's 9370. It will require VM/SP Release 3.0 or higher, the company said.

Depending on the type of processor, the one-time charge for Version 1.1.4 will reportedly range from $10,000 to $75,000.

SOFTWARE NOTES

Rise wins printing patents; Focus link forged

Rise Technology, Inc. in Cambridge, Mass., has been assigned two 17-year U.S. **patents** that protect its technology to print photographs on a printed page using a computer-aided publishing system. Rise brought a publishing system to market in 1986 that included a Masscomp computer, an enhanced Canon U.S.A., Inc. scanner and a video camera.

Information Builders, Inc. has interfaced its **Focus** fourth-generation language and data base management system to the Britton Lee, Inc. relational data base computer.

The **Knowledge Engineering Environment** (KEE) has been demonstrated on an **Intel Corp.** 80386-based microcomputer, according to officials of Mountain View, Calif.-based producer **Intellicorp Inc.** KEE, used in developing expert systems, was previously limited to workstations from Sun Microsystems, Inc., Symbolics, Inc., Texas Instruments, Inc. and Digital Equipment Corp. Intellicorp also recently received a U.S. patent covering KEE's frame-based representation facility for applying general knowledge to specific applications.

DEC has signed a distribution agreement with **Relational Technology, Inc.** that allows DEC to sell the **Ingres** relational data base management system to its customers using **Ultrix**, DEC's version of Unix. Relational Technology will continue to sell Ingres to Ultrix and VMS users and will provide support for the product.

Spokesmen for **Relational Technology** said **Ingres** is now available on the operating systems provided by California-based supermini manufacturer **Elxsi**. The operating systems include Unix 4.2, AT&T's Unix System V and Embos.

Arthur D. Little, Inc. and systems integrator **ITP Boston, Inc.** in Cambridge, Mass., have agreed to team up to offer a one-stop source of consulting on manufacturing processes and systems.

Oracle Corp. spokesmen said that firm's relational data base management system will be jointly marketed by **Convex Computer Corp.** for use on Convex's **C1 series** of minisupercomputers. In addition, the **Oracle DBMS** will be jointly marketed by Elxsi for use on the Elxsi System 6400 minisupercomputer.

Pansophic Systems, Inc. will sell **35mm Express**, personal computer-based presentation software from Business and Professional Software, Inc. in Cambridge, Mass., for use with Pansophic's **Starburst**, a turnkey IBM Personal Computer AT-based presentation-graphics system.

The **Software Maintenance Association** named **Imperial Oil Ltd.** in Toronto as the recipient of its **Distinguished Performance in Software Maintenance award.** The association cited Imperial's "systematic methodology for managing systems" and its "active synergism of users and data-processing professionals."

Fujitsu Ltd. in Tokyo will market **Cullinet Software, Inc.'s IDMS/R** on Fujitsu's **Facom M** series of computers under a three-year agreement between the two companies.

Telesoft said it has signed a three-year contract with **Cray Research, Inc.** to port its Ada compiler and productivity tools to the Cray-2 and Cray X-MP supercomputers, which run under Unicos, Cray's version of Unix. Cray will have a license to market the Ada software, Telesoft said. In addition to the Ada compiler, Telesoft will be porting its source-level debugger, global optimizer and other language tools to the Cray environment.

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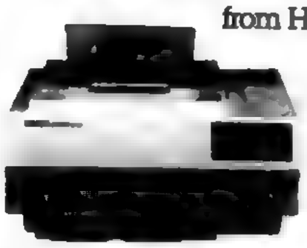
What can you expect from the new LaserJet Series II Printer?



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Or you can create a sophisticated combination of text and graphics. With additional plug-in memory, you can also produce full-page 300 dpi graphics, like our Nuts form shown below. To do this, we used HP's new ScanJet desktop scanner, Microsoft Windows and Pagemaker® from Aldus.

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Business Computing Systems

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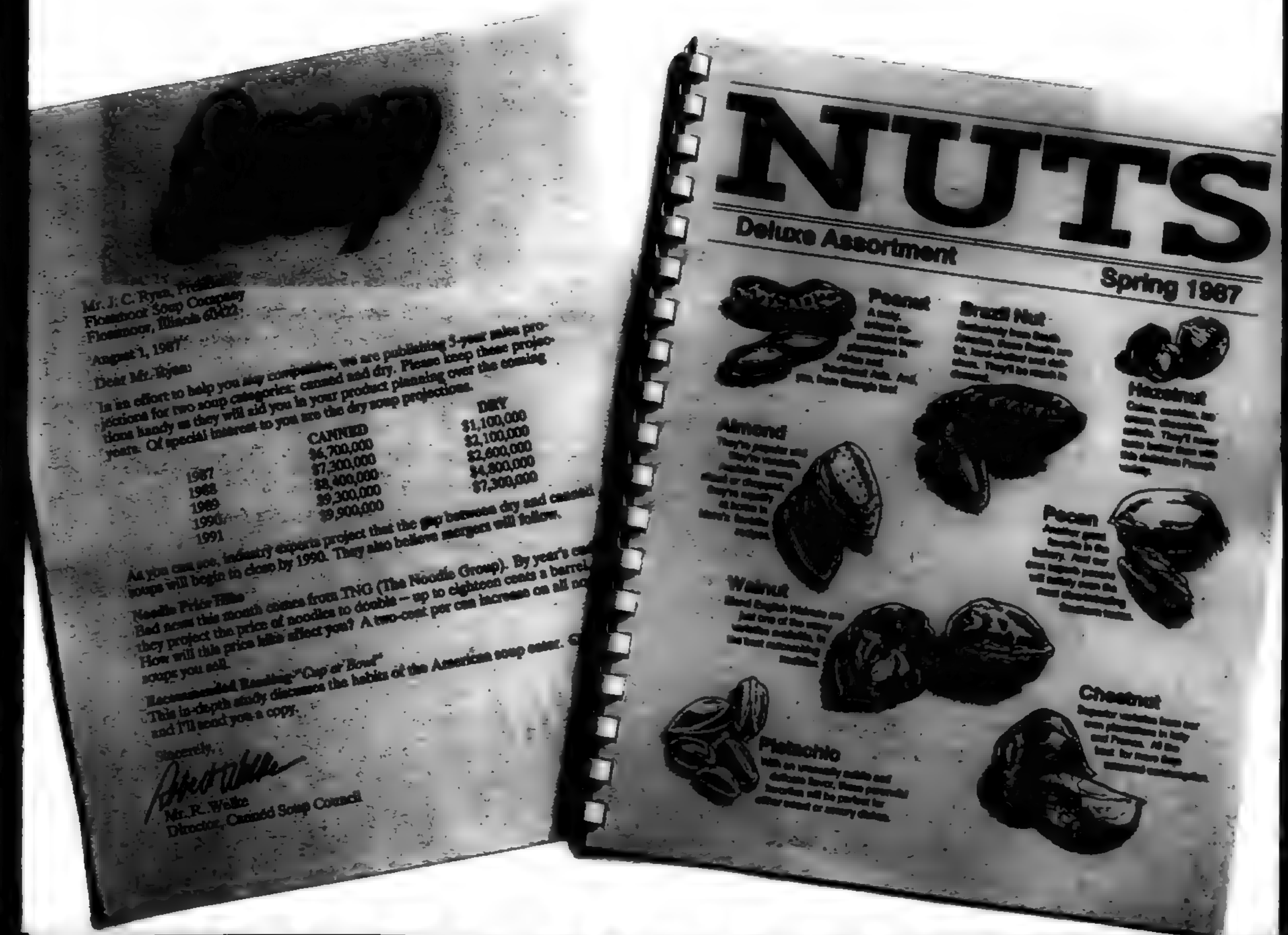


Mr. J. C. Ryan, President
Flossmoor Soup Company
Flossmoor, Illinois 60422

August 1, 1987

Dear Mr. Ryan:

In an effort to help you stay competitive, we are publishing 5-year sales projections for two soup categories: canned and dry. Please keep these projections handy as they will aid you in your product planning over the coming years. Of special interest to you are the dry soup projections.

	CANNED	DRY
1987	$6,700,000	$1,100,000
1988	$7,300,000	$2,100,000
1989	$8,400,000	$2,600,000
1990	$9,300,000	$4,800,000
1991	$9,900,000	$7,300,000

As you can see, industry experts project that the gap between dry and canned soups will begin to close by 1990. They also believe mergers will follow.

Noodle Price Hike
Bad news this month comes from TNG (The Noodle Group). By year's
they project the price of noodles to double – up to eighteen cents a barrel.
How will this price hike affect you? A two-cent per can increase on all
soups you sell.

Recommended Reading: "Cup or Bowl"
This in-depth study discusses the habits of the American soup eater.
and I'll send you a copy.

Sincerely,

Mr. R. Welke
Director, Canned Soup Council

NUTS

Deluxe Assortment

Spring 1987

Peanut

Brazil Nut

Hazelnut

Almond

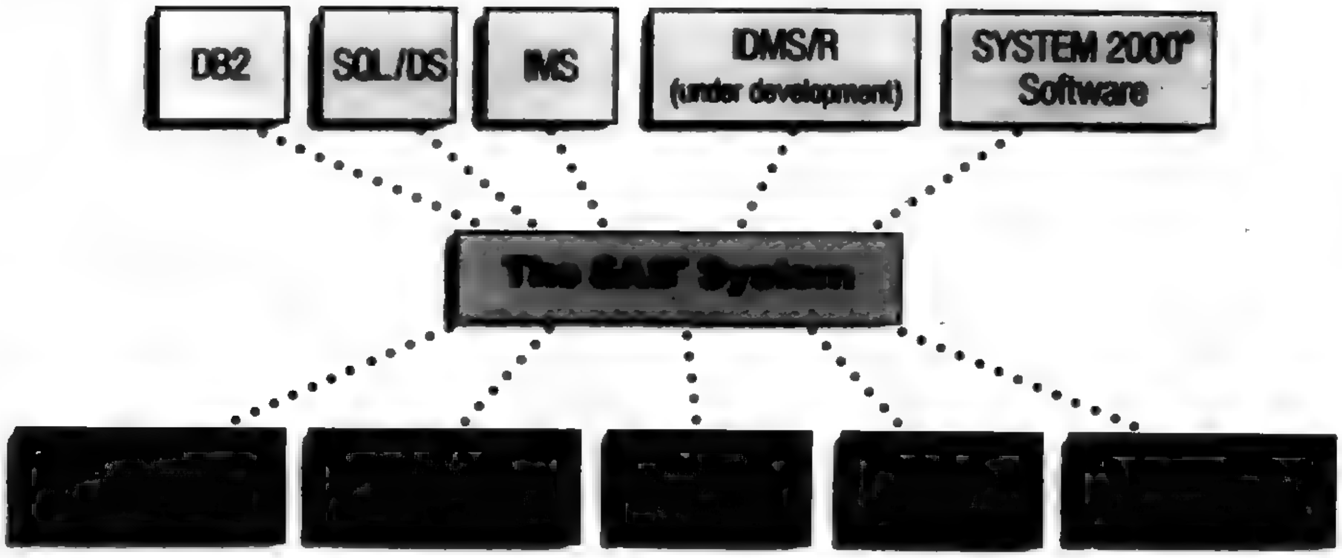
Pecan

Walnut

Chestnut

Pistachio

Get the Facts from Your DBMS.



The most powerful applications software has joined forces with the most popular data base management systems. To turn raw data into meaningful facts. To analyze, estimate, optimize, simulate. To produce custom reports and color graphs. Whatever your information need, the SAS System delivers more from the data you store.

**Don't Just Store Your Data.
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And Get 30 Days FREE.**

Bring the SAS System together with your data base. You'll receive high-quality software—plus training, documentation, and support—all from SAS Institute Inc. We'll even provide a free software trial to get acquainted. For details, call or write today.

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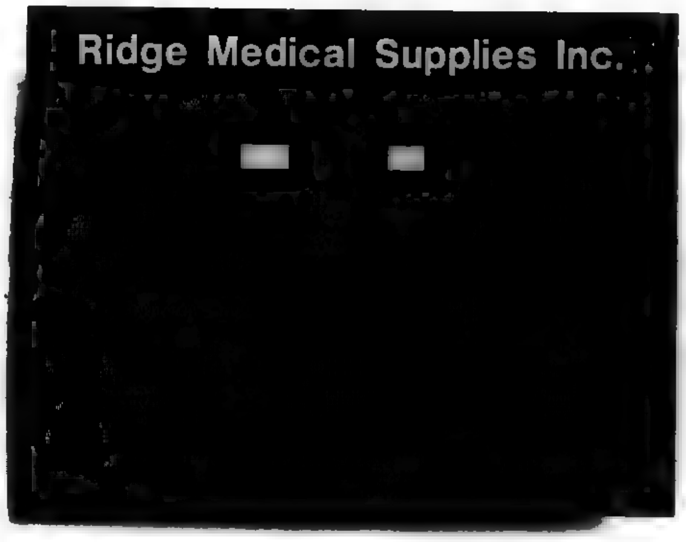

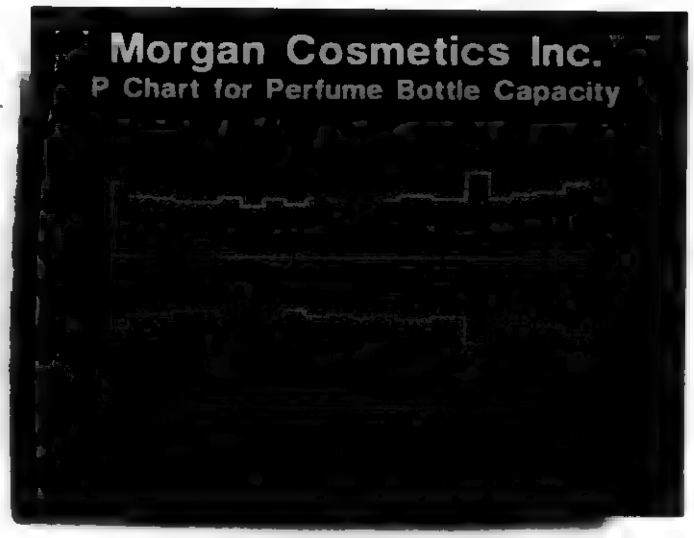

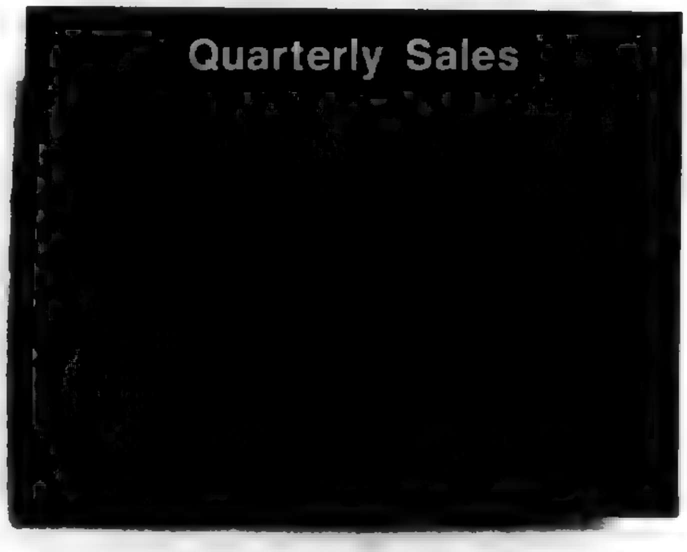

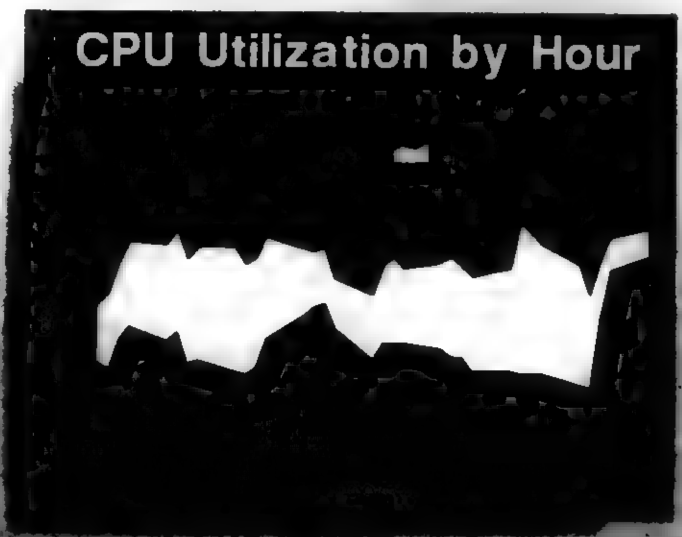

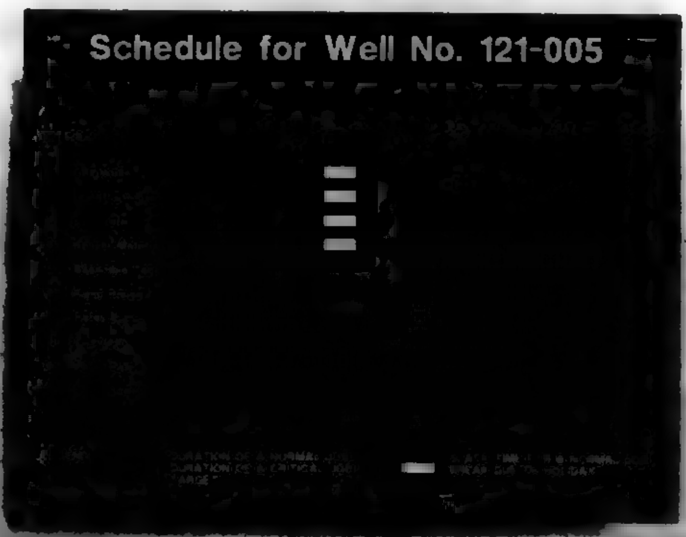

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NEW PRODUCTS

Systems software

RGL Business Systems, Inc. has announced the **Logistics Module** component for its On-Line Material Management System, which runs on Digital Equipment Corp. VAX computers and IBM mainframes.

The software allows users to manage and control material through the purchasing, traffic and transportation, warehouse and job-site receiving and inventory-management processes. The software allows multiple currency handling.

The pricing for the Logistics Module starts at $70,000.

RGL Business Systems, P.O. Box 1006, Bloomfield, N.J. 07003.

Digital Equipment Corp. has introduced four **upgrade packages** for **PDP-11** and **MicroPDP-11** computers said to provide such features as complete software compatibility, improved packaging and peripheral selection and enhanced system performance.

The PDP-11 system upgrade kits include all hardware, operating system software, documentation, field-service hardware installation and a software license upgrade. Prices for the products range from $10,200 to $11,750.

A Microvax system upgrade package, said to allow users to move from the Microvax I system to the Microvax II while retaining their software and hardware enclosures, was also announced. It costs between $13,400 and $22,400.

DEC, 146 Main St., Maynard, Mass. 01754.

Computer Consoles, Inc. has introduced software said to allow Wang Laboratories, Inc. 2200 users an upward migration path from the 2200 systems to Computer Consoles' Unix-based Power 5 and Power 6 computer systems.

The **Basic-K** compiler allows Wang 2200 applications to be moved onto Computer Consoles processors, which can support more than 80 users.

The compiler under Unix reportedly offers such language extensions and operating system enhancements as Unix utilities for performing previously programmed functions, open file systems with nonrestrictive sizing, expanded memory capabilities and the ability to migrate to data bases.

Prices for the Basic-K compiler range from $1,500 to $4,500.

Computer Consoles, Suite 1700, 950 Winter St., Waltham, Mass. 02154.

Languages

A version of the Fortran programming language designed to ease the movement of applications running on Digital Equipment Corp. VAX/VMS workstations to Sun workstations has been announced by **Sun Microsystems, Inc.**

Sun Fortran 1.0 includes VMS extensions said to give Sun workstation users access to the application code written with VMS Fortran.

Other enhancements include improved error messages and recovery and the Pointer data type, which provides partial compatibility with Cray Research, Inc. Fortran.

Sun Fortran 1.0 costs $400 and reportedly will be available in September. It runs on the Sun-3 and Sun-2 families of workstations with Sun OS operating system Release 3.2 or later.

Sun Microsystems, 2550 Garcia Ave., Moutain View, Calif. 94043.

Utilities

WPmonitor, a utility for the capture and reporting of Wang Laboratories, Inc. VS IIS word processing statistics, has been announced by **BEI Corp.**

The core monitor program runs in the background and automatically captures, for each on-line document edit session as it occurs, the operator user identification, document number, library, volume, time, date, workstation number and revision number. It also calculates the exact individual edit-session statistics for time, number of keystrokes, number of lines and number of pages. A report generator allows creation of custom reports.

Software pricing is tiered and follows Wang's A, B and C CPU classifications. A single class-B license is $5,000.

BEI, 2921 Eastlake Ave. E., Seattle, Wash. 98102.

Hewlett-Packard Co. has announced a software tool called **HP Visor/V**, which allows users to generate reports and ad hoc inquiries from relational data bases on the vendor's HP 3000 computers.

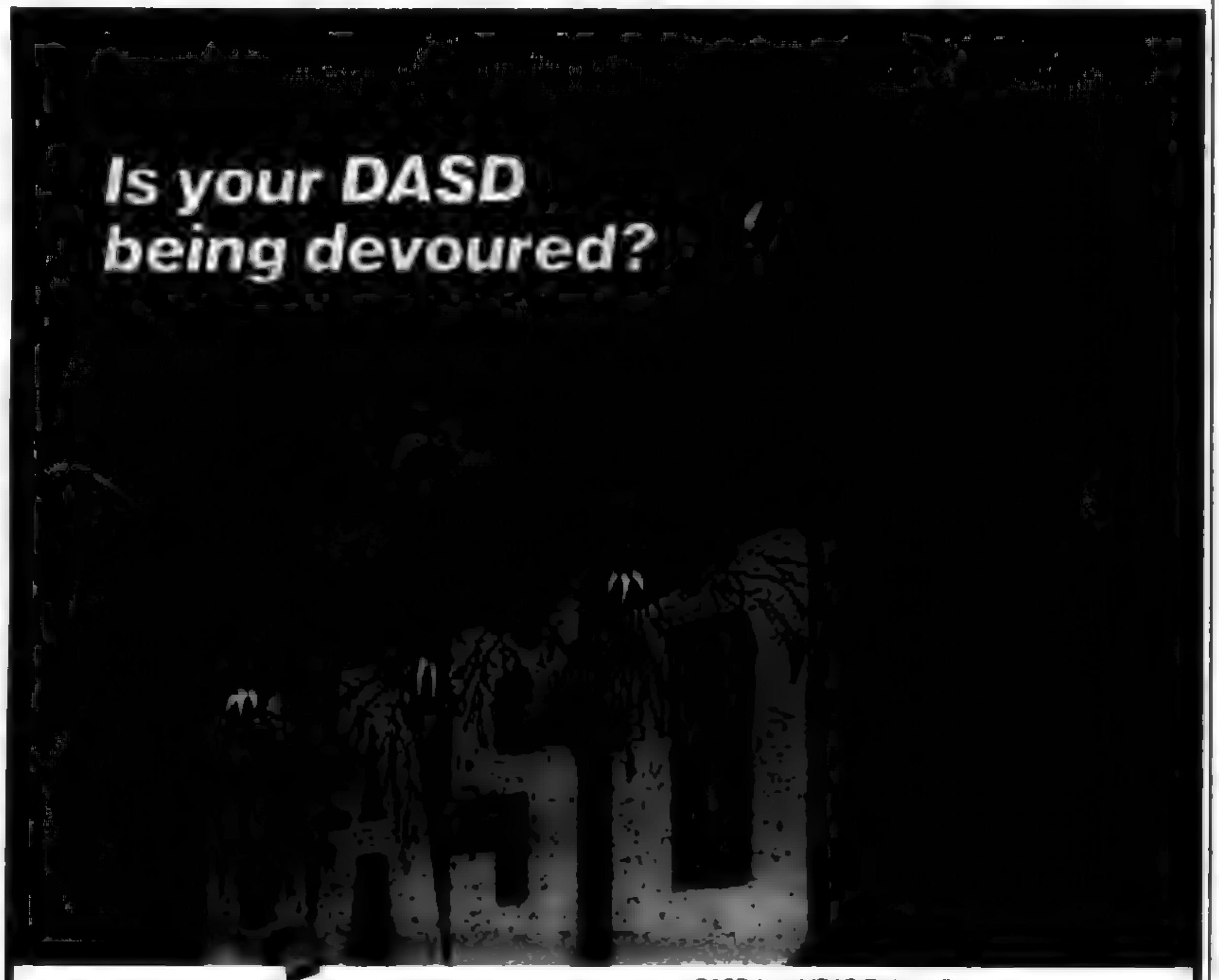
HP Visor/V works with HPSQL/V, HP's relational data base that conforms to SQL. Names of data bases, tables and columns are supplied as menu options so users can produce custom reports, according to the vendor.

In addition, SQL commands can be entered to initiate queries, create new data base items, change rows of data and maintain the data base.

Other features include on-line Help, the ability to view and modify a report before printing and the ability to save queries, reports and sequences of commands for future use.

HP Visor/V costs $10,000 for the first copy and $7,000 for each additional copy.

HP, 1820 Embarcadero Road, Palo Alto, Calif. 94303.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MICROCOMPUTING

SMALL TALK

William Zachmann

Antsy over Hypercard

With a graphical interface like that of Apple Computer, Inc.'s Macintosh inexorably working its way onto IBM and compatible systems, I've been wondering lately how the Mac will retain its innovative edge. Working with Hypercard, a new extension to the Macintosh system software developed by Apple Fellow William Atkinson, goes a long way toward answering that question.

Hypercard is undoubtedly one of the most exciting, innovative software products I have ever seen. It will permit development of new types of applications that haven't appeared on personal computers before. It also offers a much easier way of doing many more traditional applications.

The greatest initial challenge with Hypercard is simply to characterize it. A highly innovative product, it just doesn't fit into the conventional categories of software for personal computers. Nevertheless, we humans have no other way to understand something new than to compare it with things we know and to

Continued on page 33

Sun mulls 386 PC

Could shine by beating foes to multitasking

BY ALAN ALPER
CW STAFF

NEW YORK — Sun Microsystems, Inc. is considering testing the high-end personal computer waters with a Unix-compatible, Intel Corp. 80386-based machine offering true multitasking capabilities.

A source inside Sun confirmed that a 386-based micro is under development but stressed that the Mountain View, Calif., firm has not yet committed to launching such a system. The source said a 386-based machine is among a number of options the firm is evaluating as its response to the convergence of high-end personal computers and low-end technical workstations.

"We're looking at four or five options," the source said. "Things such as software emulation or an add-in coprocessor board for our traditonal [Motorola, Inc.] 68000-based platform are also under discussion."

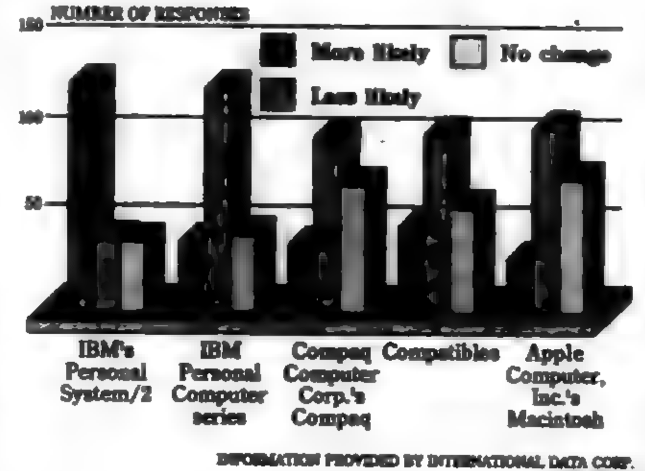
The advantage of a full-fledged 386-based machine is that it would allow Sun to better compete in the price-sensitive Microsoft Corp. MS-DOS-compatible portion of the microcomputer business, the source noted. Sun would unveil the 386-

Continued on page 32

Data View

PS/2 impact

System purchase plans



INFORMATION PROVIDED BY INTERNATIONAL DATA CORP.
CW CHART

Wang exec: Integration keys micro strategy

Wang Laboratories, Inc. introduced its Wang Professional Computer in May 1982, nine months after the debut of the IBM Personal Computer. In 1985, Wang announced the Advanced Professional Computer, its first machine based on Intel Corp.'s 80286 microprocessor.

Although both systems were well-received, one drawback was that they were not fully compatible with the IBM PC. But in May of this year, Wang announced its first fully IBM PC-compatible systems: the 80286-based Professional Computer 280 and the Intel 80386-based Professional Computer 380.

Win Burke, Wang's director of desktop systems, recently discussed the company's microcomputer strategy with *Computerworld* senior writer David Bright.

Seeing as Wang may still be best known for its word processing systems and, financially, the company has been on a roller-coaster ride for the past couple of years, why should corporations buy personal computers from Wang?

It is true that Wang was well-known as a word processing company, but over the past several years, Wang has expanded its product line and its product capabilities significantly to include not only office automation but also a number of data processing capabilities. Wang is in the systems business, playing as a systems vendor, not a PC vendor. Our primary business is to provide integrated departmental productivity systems based on our VS superminicomputer.

Win Burke

What is the level of integration between Wang's Professional Computers and VS systems? Do the Professional Computers basically function as terminals for the systems, or are they more closely linked with virtual disk and other capabilities?

They are already more closely integrated than that. And our

Continued on page 33

Inside

- Laser Digital adds 386-based micro. Page 36.
- The Software Link rolls out multiuser, multitasking PC operating system. Page 36.

Afraid to modify your old mainframe applications? Unlock their potential with VS COBOL Workbench.

The unique testing tools of VS COBOL Workbench help you to understand programs you have never seen before or that have grown complicated.

In one product: ANIMATOR for source code debugging, STRUCTURE ANIMATOR for displaying the structure of your programs and debugging at the structure level, ANALYZER for path and performance analysis, SESSION RECORDER for regression testing. These tools make maintenance not only easy, but fun.

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The most complete syntax support of IBM OS/VS COBOL, IBM VS COBOL II, ANSI'74, ANSI'85 and others.

Fully Integrated Development Environment
Find out what productivity really can be with the superb integration of our development tools

Compile and Run Huge Programs
If your programs are large, you can handle them with VS COBOL Workbench's unique 32 bit architecture and the new XM memory extender. Programs with Data and Procedure Divisions of up to 16 MB may be handled on an AT

XM Memory Extender
Combined with our 32 bit architecture, XM allows you to break the 640K barrier imposed by DOS. Run your VS COBOL Workbench programs in protected mode and switch to real mode for DOS services.

Get started for OS/2 Now
Purchasers will be upgraded to the next release of VS COBOL Workbench which will be a superset of IBM COBOL/2. Both will support OS/2 and SAA.

Networks Now
COBOL is all about serious applications. On PC's this means networking. Shared file access with record locking across networked PC's is built right into the product.

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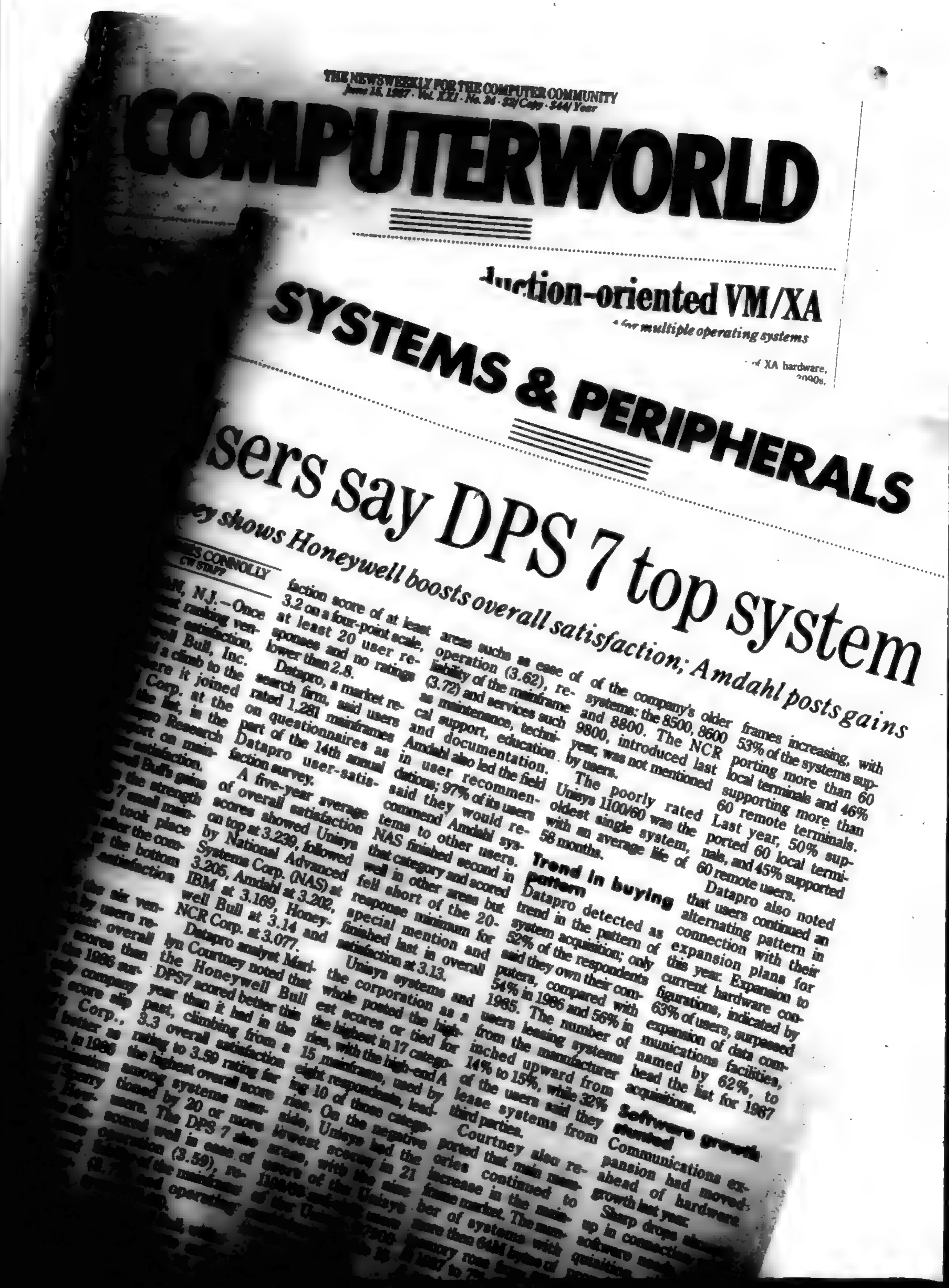

THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY
June 15, 1987 · Vol. XXI · No. 24 · $2/Copy · $44/Year

COMPUTERWORLD

uction-oriented VM/XA

for multiple operating systems

of XA hardware,
2090s.

SYSTEMS & PERIPHERALS

sers say DPS 7 top system

ey shows Honeywell boosts overall satisfaction; Amdahl posts gains

ES CONNOLLY
CW STAFF

N, N.J.—Once ranking ven- er satisfaction, ell Bull, Inc. a climb to the ere it joined Corp. at the the list, in the pro Research port on main- satisfaction.

faction score of at least 3.2 on a four-point scale, at least 20 user responses and no ratings lower than 2.8.

Datapro, a market research firm, said users rated 1,281 mainframes on questionnaires as part of the 14th annual Datapro user-satisfaction survey.

A five-year average of overall satisfaction scores showed Unisys on top at 3.239, followed by National Advanced Systems Corp. (NAS) at 3.205, Amdahl at 3.202, IBM at 3.169, Honeywell Bull at 3.14 and NCR Corp. at 3.077.

Datapro analyst Marilyn Courtney noted that the Honeywell Bull DPS7 scored better this year than it had in the past, climbing from a 3.3 overall satisfaction rating to 3.59 rating for the highest overall score among systems mentioned by 20 or more users. The DPS 7 also scored well in ease of operation (3.59), reliability of the mainframe

areas suchs as ease of operation (3.62), reliability of the mainframe (3.72) and services such as maintenance, technical support, education and documentation.

Amdahl also led the field in user recommendations; 97% of its users said they would recommend Amdahl systems to other users. NAS finished second in that category and scored well in other areas but fell short of the 20-response minimum for special mention and finished last in overall satisfaction at 3.13.

Unisys systems and the corporation as a whole posted the highest scores or tied for the highest in 17 categories, with the high-end A 15 mainframe, used by eight respondents, leading 10 of those categories. On the negative side, Unisys had the lowest scores in 21 areas, with the nine users of the Unisys 1100/60

of of the company's older systems: the 8500, 8600 and 8800. The NCR 9800, introduced last year, was not mentioned by users.

The poorly rated Unisys 1100/60 was the oldest single system, with an average life of 58 months.

Trend in buying pattern

Datapro detected as trend in the pattern of system acquisition; only 52% of the respondents said they own their computers, compared with 54% in 1986 and 56% in 1985. The number of users leasing systems from the manufacturer inched upward from 14% to 15%, while 32% of the users said they lease systems from third parties.

Courtney also reported that main memories continued to increase in the mainframe market. The number of systems with more than 64M bytes of memory rose from

frames increasing, with 53% of the systems supporting more than 60 local terminals and 46% supporting more than 60 remote terminals. Last year, 50% supported 60 local terminals, and 45% supported 60 remote users.

Datapro also noted that users continued an alternating pattern in connection with their expansion plans for this year. Expansion to current hardware configurations, indicated by 63% of users, surpassed expansion of data communications facilities, named by 62%, to head the list for 1987 acquisitions.

Software growth slowed

Communications expansion had moved ahead of hardware growth last year.

Sharp drops showed up in connection

You said it, not us.

Nothing beats word of mouth advertising. And the word being spoken by users of Honeywell Bull systems is "satisfaction."

In a recent Datapro Research Corp. report, Honeywell Bull scored highest in overall user satisfaction.

Not second highest, or third highest.

Highest.

Period.

And users gave our DPS 7 mid-range computer high marks for its ease of operation and reliability. They also praised its operating system, GCOS 7, that allows it to perform a wide range of functions, such as high-volume transaction processing, office applications, sophisticated networking and communications, and program development. In short, they rated the DPS 7 the best system available.

Again, not second best or third best.

The best.

For months now, we've been telling you that, to Honeywell Bull, customers are more important than computers. That means we don't develop technology for technology's sake. We develop reliable systems that solve problems. And we don't give lip service from 9 to 5. We give prompt service 24 hours a day, anywhere in the world.

Apparently, that philosophy has paid off. Because the same customers that we put first, have now put us *in* first.

Honeywell Bull

Customers are more important than computers.

Sun PC

FROM PAGE 29

based PC as a proactive response to IBM and Compaq Computer Corp., the source said, noting that the firm is worried about being put on the defensive in the low end of its market.

Bob Herwig, an analyst at Hambrecht & Quist, Inc., said debate between Sun's East Coast and West Coast operations on the virtues of adding a 386-based machine to its lineup has only recently been resolved in favor of releasing the product.

The final decision, Herwig said, was delayed as Sun management examined the necessity of having a bridge product for desktop commercial users and whether diluting the firm's Unix purity with a product that features an operating system running Microsoft Corp. MS-DOS applications made any sense. Sun was also deciding how to position the product during the ongoing controversy over Microsoft's MS OS/2 vs. MS-DOS.

"The mindset of the technical people in Sunnyvale is that they tend to sneer at anything but Unix. It does appear that the marketing mentality has won out," Herwig said.

The 386-based micro would be Sun's first machine powered by an Intel microprocessor and would place the firm in direct competition with high-end microcomputers offered by IBM, Compaq Computer Corp. and other PC vendors.

The machine, expected to be priced at less than $7,500 with a 40M-byte hard drive and a high-resolution monitor, would be pitted against IBM's Personal System/2 Model 80 and Compaq's Deskpro 386 in many upcoming competitive bids placed by power users.

The Sun system is being developed under the code name Roadrunner at Sun's Billerica operation, analysts and users familiar with the firm's plans said.

Roadrunner, sources said, would leverage the firm's traditional strengths in the Unix operating system, emphasizing Unix's inherent multitasking capabilities and networking via its open systems architecture Network File System.

Sun's timing in the 80386 market could be fortuitous, analysts said, since Roadrunner would provide true multitasking before both IBM and Compaq. Multitasking for the PS/2 line and Compaq micros is tied to the availability of MS OS/2, which is scheduled to be available in bare-bones form by the end of the first quarter of 1988.

IBM's OS/2 Extended Edition, which is intended to provide data base management and built-in micro-to-mainframe communications capability, is not expected until mid- to late 1989. IBM has said it would not disclose Extended Edition's availability until later this year.

Any slippage in the availability of MS OS/2 and extensions from IBM or third-party vendors could prove to be a boon for Sun, analysts said.

"They would be offering a microcomputer with multitasking that is here today," said one West Coast analyst who requested anonymity. The ever-increasing portfolio of applications for Unix could also boost Sun's fortunes in the 386 arena.

Roadrunner would strengthen Sun's growing following within the financial services business, observers said. Sun workstations have caught on in the last year in the financial community because of their multitasking operations, open systems networking and expert systems development capabilities.

Sun's family of technical workstations have primarily been designed around the 68000 microprocessors, although its most recent product line, the Sun 4, uses a proprietary reduced instruction set microprocessor.

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Main storage upgrades are the most reliable and cost-effective way to improve the performance of your 4381 computer. But only EMC main storage upgrades let you *maximize* the power of your 4381 computer system.

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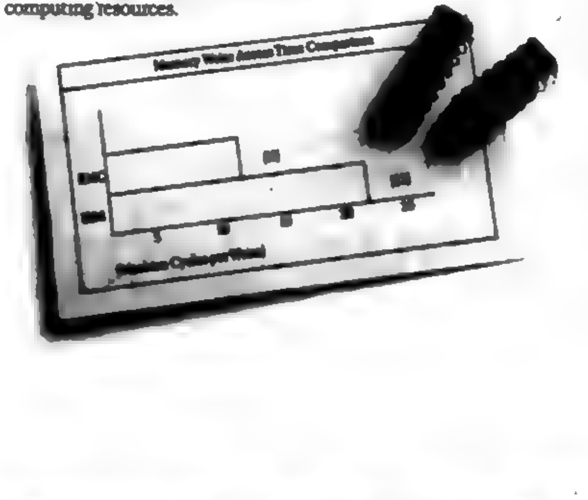
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Processor Cycles per Write

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Wang

CONTINUED FROM PAGE 29

strategy is, over a period of time, to enhance that integration to the point where, eventually, we will have a totally transparent systems environment in which personal productivity would be so well integrated they would appear to be part of the same systems environment.

I can assure you that over the next few months and [the next] year, we're going to be significantly enhancing the level of integration. There will be software and hardware enhancements.

So your typical customers already have VS minicomputers?

First of all, I'd say that almost every corporation has VS superminicomputers. It's a safe bet to say that our existing customer base is our most attractive prospect for our PC product line.

Why did it take Wang so long to provide full IBM PC compatibility in its systems?

First of all, when we introduced our product, the Professional Computer, there was no de facto standard. IBM had just introduced its product; our design was done in parallel to the IBM PC design. We had a number of advanced design features in the initial design of the PC, including things like channel I/O architecture, which IBM, of course, has endorsed with its recent Personal System/2 announcement. Over a period of time, our customer base found our existing PC product line quite attractive for the application environments in which our products were being sold.

It did become clear that there was some polarization within the market and in our own customer base. We received increasing numbers of requests to provide 100%-compatible products. So about 18 months ago, we kicked off a major project to address that set of customer needs.

Will Wang offer systems that are compatible with the IBM PS/2?

The PS/2 is not a single product line or a single set of features. First of all, the PS/2 has two separate bus architectures. The Model 25 and Model 30 are really IBM PC XT-based bus systems, whereas the Model 50 and above are Micro Channel-based systems. They really aren't the same system at all, or part of the same product line at all from a technical point of view.

We feel that the IBM PC AT bus is already the de facto standard in that segment of the market, and there's no reason for us to regress to a lower performance bus.

We believe that it will be some period of time before the Micro Channel architecture reaches the same de facto standard status as the AT bus. So there will be increased demand for AT bus-based systems. We are committed to providing industry-standard platforms as VS workstations, and hence, if that is the industry standard, we'll certainly address that need.

Hypercard

CONTINUED FROM PAGE 29

things that are in some way similar to it. By looking at how it is both similar to — yet different from — known objects, we come to understand the new object.

Hypercard is constructed to resemble known objects, the metaphor being stacks of cards that the user may browse through. In the simplest sense, this means going through a collection of cards in sequence.

Card tricks

Individual cards displayed on the screen can include both multifont text and graphics. In the simplest form, the user might go through a stack of cards on some subject like reading sequentially through the pages of a book. Typically, the user will use the mouse with forward and backward pointing arrows on the card currently displayed to move forward and backward through the stack.

Buttons can be defined to do almost anything. Moving a card in the stack forward or backward is one of the simplest things buttons can do. A button may be defined to move to a table of contents or an index. Buttons defined in an index may move to a topic. In fact, buttons can move to any card in any stack, initiate processes, generate sounds, do calculations and a lot more.

For hard-core digital macho types, Hypercard may be viewed from a completely different perspective because underlying Hypercard is a very powerful command language: Hypertalk. Hypertalk is nothing less than a powerful procedural command language for the Macintosh. What Hypercard buttons actually do when pushed is to initiate sequences of Hypertalk commands.

Every button has a Hypertalk script associated with it. This is a sequence of Hypertalk commands. Hypertalk includes, for example, control structures such as "if . . . then . . . else," "repeat for" and "repeat while."

Hypercard convincingly demonstrates that Apple hasn't lost the innovative edge that characterized the Macintosh from the start. The Mac may never become the standard of corporate personal computing, but Hypercard certainly offers yet another convincing reason to take the Macintosh seriously as an alternative to the more widely used IBM and compatible systems in business.

Zachmann is vice-president of research at International Data Corp.

Grow Power.

The New WYSEpc 386 and New 286 models are designed for speed, power and upgradability.

WYSE's Modular Systems Architecture gives the new WYSE PCs power to grow. In addition to being able to add a number of storage peripherals, a variety of board products can be plugged into the bus.

All the new systems include a 1.2 MB diskette and hard drive controller, MS.DOS 3.2 operating system with enhanced features and GW Basic 3.2. They also feature the WYSE Window system status display which indicates important system messages, disk activity, system performance, date, time, and processor speed.

The WYSEpc 386 Model 3216 utilizes the 32-bit 80386 CPU chip operating at 16 MHz with zero wait-states. A dedicated 32-bit memory bus provides fast access to up to three memory cards expandable up to 6MB RAM. Other features include: six PC AT-compatible accessory slots; four 16-bit slots, two 8-bit slots (one half-size).

The WYSEpc 286 Model 2108 has a 16-bit 80286 processor running at 8 MHz with 512K of memory. It features seven PC AT-compatible accessory slots; five 16-bit slots, and two 8-bit slots.

The WYSEpc 286 Model 2112 has a 12.5 MHz CPU with one wait-state, 1MB memory, and seven PC AT-compatible accessory slots. Model 2214 features 1MB of fast, true-zero wait-state memory, and expanded memory addressing through software emulation. It also has nine PC AT-compatible accessory slots.

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feature is lots

Option one is a new pull-down menu interface. Now even beginners can easily access all the word processing power of MultiMate Advantage II.™

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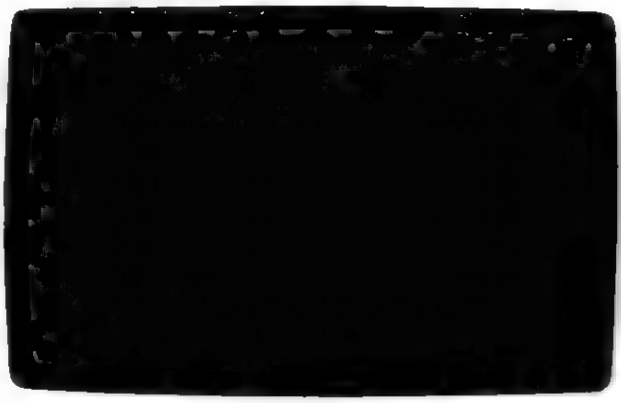

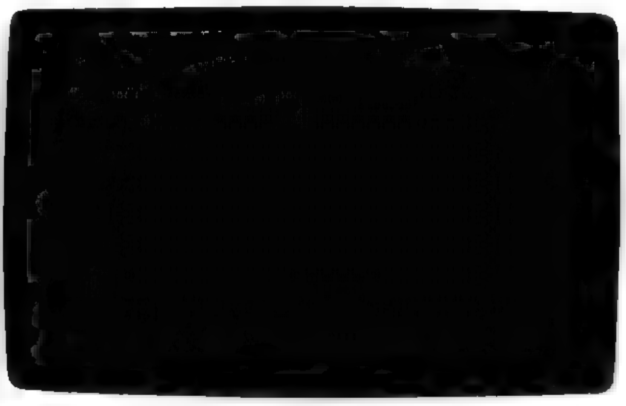

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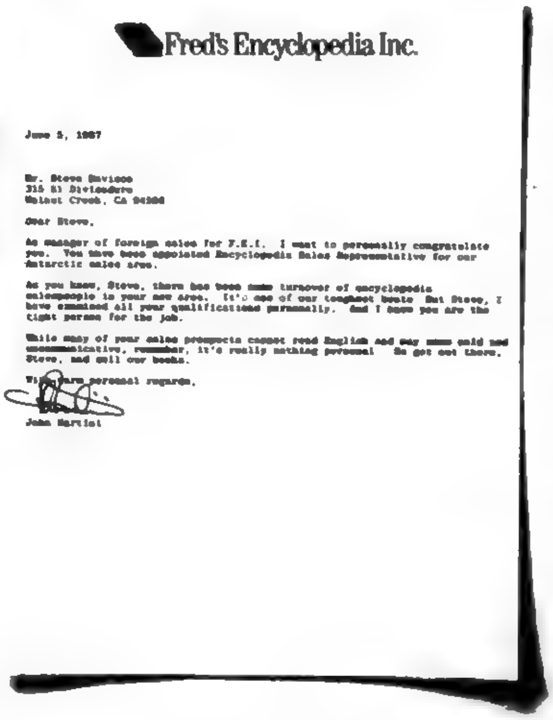

Fred's Encyclopedia Inc.

June 5, 1987

Mr. Steve [illegible]
315 El [illegible]
Walnut Creek, CA [illegible]

Dear Steve,

As manager of foreign sales for F.E.I. I want to personally congratulate you. You have been appointed Encyclopedia Sales Representative for our Antarctic sales area.

As you know, Steve, there has been some turnover of encyclopedia salespeople in your new area. It's one of our toughest beats. But Steve, I have examined all your qualifications personally. And I know you are the right person for the job.

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With warm personal regards,

John [illegible]

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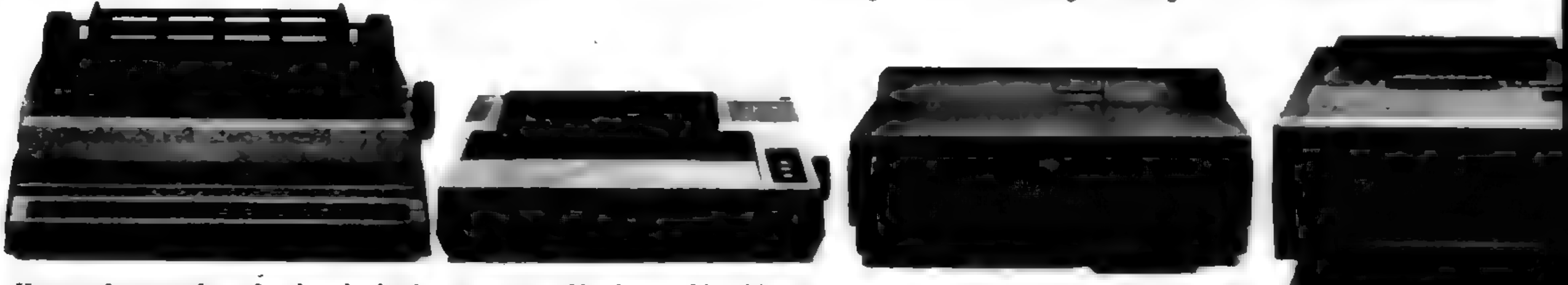

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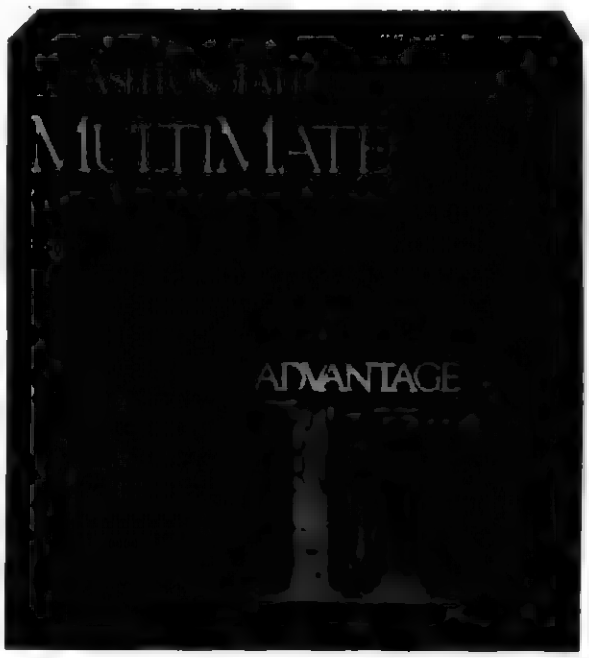

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After that, you may conclude there's only one option left.

To buy it.

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NEW PRODUCTS

Systems

Laser Digital, Inc. has announced the **Pacer 386**, an Intel Corp. 80386-based microcomputer.

The Pacer is said to have a clock speed of 16 MHz. It incorporates 512K bytes of random-access memory on the main board, which can be expanded to 8M bytes via 32-bit expansion boards. Features include eight full-length expansion slots, a 200W power supply, a real-time clock/calendar on the motherboard, an enhanced IBM Personal Computer AT-style keyboard and Microsoft Corp. MS-DOS. Options include a 1.2M-byte floppy drive and a choice of hard disk drives with capacities of up to 100M bytes.

A Pacer 386 with a 40M-byte hard disk, a 1.2M-byte floppy drive, a monochrome monitor and a graphics card costs $4,695.

Laser Digital, 1024 Morse Ave., Sunnyvale, Calif. 94086.

Software utilities

A multiuser, multitasking operating system for Intel Corp. 80386-based personal computers has been introduced by **The Software Link, Inc.**

PC-MOS/386 is said to be able to manage memory-intensive applications even though its kernel occupies only 128K bytes of memory.

The product supports 32-bit native mode and the virtual Intel 8086 mode that allows support and control of multiple 8086-compatible applications or tasks, the vendor said.

All versions support record and file locking, print spooling, remote modem access and multilayer security, according to The Software Link.

PC-MOS/386 is available in a single-user version for $195, a five-user version for $595 and a 25-user version for $995.

The Software Link, Suite 632, 8601 Dunwoody Place N.E., Atlanta, Ga. 30338.

Development tools

Multitasking development software that combines Basic and Ladder Logic and runs both languages concurrently on the same Bitbus board has been announced by **Robanks, Inc.**

Basic and Ladder Development Software was written to execute on any Bitbus 8044-based core. Features include a token interpreter that forms the execution vehicle for Basic; screen-oriented menus; on-line editing of both Basic and Ladder programs developed on the host personal computers; and an interactive compiler and debugger.

Each remote Bitbus card executes its own Basic/Ladder program. Up to 10 slave remote boards may be cascaded.

The software costs $1,995.

Robanks, P.O. Box 493, Banks, Ore. 97106.

Software enhancements

Target Software, Inc. has upgraded its Maclighting spell-checker for the Apple Computer, Inc. Macintosh and changed the product's name to **Mentor**.

Mentor comes with an abridged version of the Merriam-Webster, Inc. 100,000-word Ninth New Collegiate Dictionary. A second version, called Mentor Plus, includes the Merriam-Webster 75,000-word Pocket Dictionary, complete with definitions.

Features include automatic and manual hyphenation, no limit to characters that may be added to the dictionary, a checking speed of 140 word/sec. and network compatibility.

Mentor costs $99.95. Mentor Plus costs $199.95.

Target Software, 14206 S.W. 136th St., Miami, Fla. 33186.

Data storage

CSSL, Inc. has introduced the **Awesome I/O Card**, a hard-disk subsystem designed to eliminate I/O logjams in IBM Personal Computer ATs and compatibles.

The card is said to double disk capacity and decrease average access time. According to the vendor, the proprietary design intercepts and stores commonly used data from the disk. The card contains a solid-state disk accelerator and is socketed to allow an additional 256K or 512K bytes of nonvolatile CMOS random-access memory for disk acceleration.

The Awesome I/O Card costs $595.

CSSL, 909 Electric Ave., Seal Beach, Calif. 90740.

Board-level devices

The **Smartpanel/368**, a single personal computer board designed to provide users of Texas Instruments, Inc. S600 and S800 computers with a time-of-day clock, has been announced by **Houston Computer Services, Inc.**

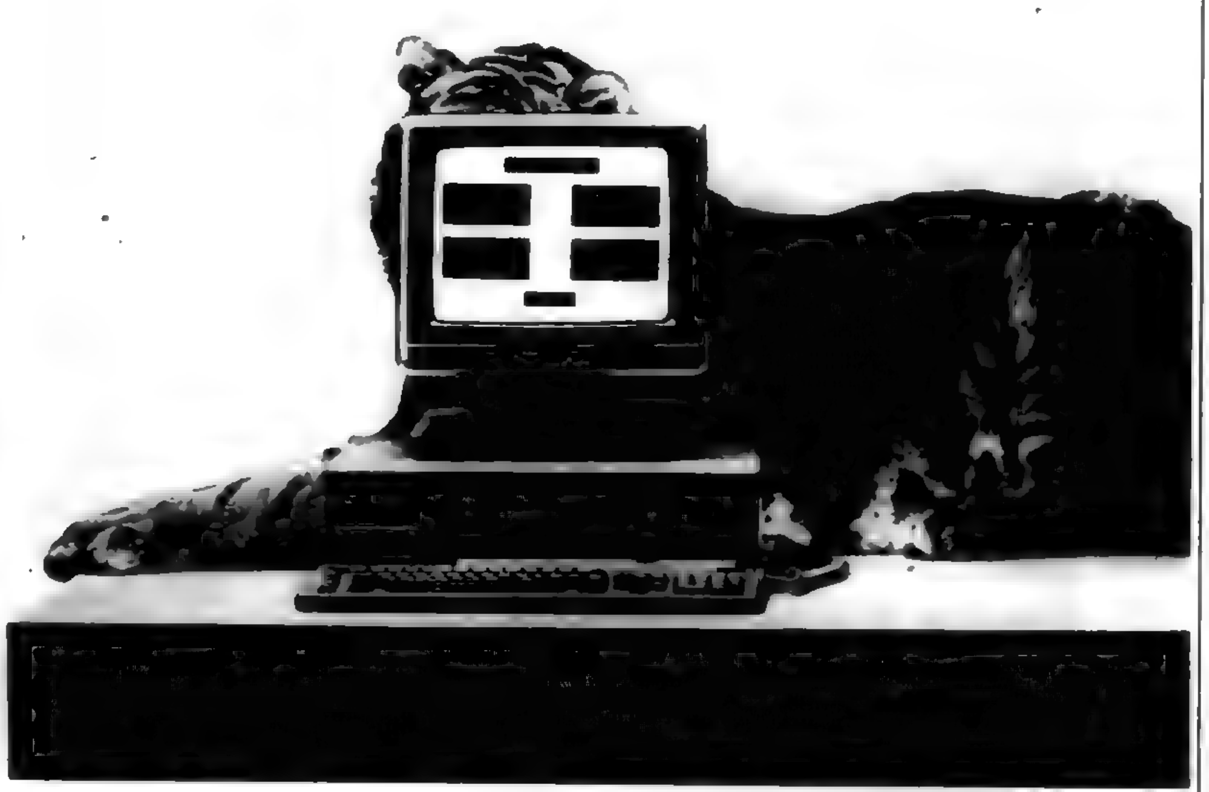
The board automatically sets the operating system's date and time every time the system is booted.

According to the vendor, the correct date and time are stored in the Smartpanel module itself, backed up by an integrated battery.

The Smartpanel/368 is priced at $399.

Houston Computer Services, Suite 200, 11001 S. Wilcrest Drive, Houston, Texas 77099.

Nixdorf tames the data entry tiger.



There was a time when it was enough just to be able to capture data. Now, the premium is on speed, flexibility and easy maintainability.

The faster and more accurately you can capture data, the faster it can be put to use by corporate management.

But capturing data exclusively from a huge centralized host system has become an expensive and unacceptably slow process. And it's getting harder and harder to find new ways to skin the cat. Especially if the cat's a big one, and it decides to resist.

Nixdorf's answer to the problem is to reduce the size of the tiger: we can help you complement your host systems with one or more subsidiary distributed systems. By breaking the problem down into manageable parts, Nixdorf's system permits departmental data capture, which makes you faster and more valuable to management.

Our distributed systems come in all sizes, from a tabletop version to a supermini, and drastically reduce the cost of providing high–level information, saving more than enough to justify the expense of installation.

Nixdorf is used to taming big problems. We are a $2 billion–plus corporation with nearly 26,000 employees in over 600 offices in 44 countries worldwide. We have more than 100 sales and service locations throughout the U.S. and Canada alone.

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Mark Freund

Top-down LAN planning

Recently, an MIS director was asked by the manager of his company's local-area network (LAN) pilot project, "Where should we begin?" His answer was typical of high-level MIS departments in large corporations: "You must begin with a plan. Initially, I would suggest a needs analysis of the end-user department, an inventory list of their existing personal computers and a facilities evaluation for cabling requirements."

Corporate MIS departments are increasingly promoting investigation and pilot implementation of new networking technologies.

However, all too often there lies a gap between management's high-level directives and the resulting research and recommendations that result from investigations conducted by their employees.

Disoriented?

Part of the problem stems directly from orientation. Upper management is often looking at the big picture — and rightly so. Their subordinates' perspective, however, is often much narrower and tends to be highly product-oriented — to everyone's misfortune.

The first and most essential

Continued on page 41

Shielding nets from disaster

Vowing self-sufficiency, McKesson switches to satellite-based system

BY JEFFRY BEELER
CW STAFF

RANCHO CORDOVA, Calif. — Bud Turner and his colleagues at McKesson Corp.'s Information Services organization have never forgotten the violent winter storm that thrashed much of Northern California 2½ years ago. The storm brought prolonged downpours and triggered extensive flooding that washed away the terrestrial communications links between the company's main data center here and its nationwide network of 100 distribution centers.

McKesson, which distributes drugs, chemicals and other products, eventually replaced the lost private lines and restored the disrupted electronic services to its in-house users. But the experience taught the company a valuable lesson about the dangers of being dependent on resources that are beyond its control and stiffened its resolve to achieve systems self-sufficiency.

In order to prevent a repetition of the flood-related disaster, the $7 billion corporation says it plans to replace its private transmission lines with a satellite communications link. McKesson is already experimenting with the idea through a pilot project that has resulted in the installation of an earth station outside its Drohan Data Center here and involves nine of the company's remote locations.

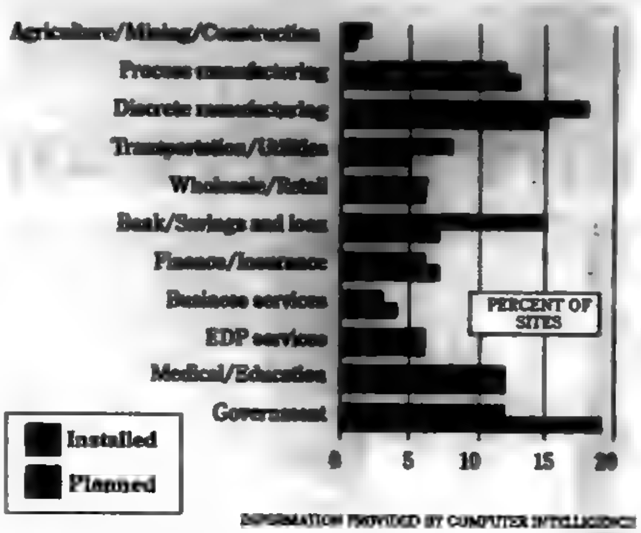
When the test is complete and the satellite network is fully implemented in early 1989, it will make the firm's internal communications significantly less susceptible to natural and man-made calamities than terrestrial

Continued on page 41

Data View

Security systems profile: breakdown by industry

Survey tracks industry sector use of call-back and encryption systems



INFORMATION PROVIDED BY COMPUTER INTELLIGENCE
CW CHART

Mac users get TCP/IP link

BY PATRICIA KEEFE
CW STAFF

BERKELEY, Calif. — Centram Systems West, Inc. recently introduced communications software said to link users of Apple Computer, Inc.'s Appletalk network to Transmission Control Protocol/Internet Protocol (TCP/IP)-based systems.

Fourth-quarter availability is planned. Pricing has not been determined.

Unveiled at the recent Macworld Expo in Boston, TOPS Terminal for the Mac reportedly enables users of the Apple Macintosh to communicate with machines ranging from worksta-

Continued on page 39

Price cuts should up modem use

BY ELISABETH HORWITT
CW STAFF

During the last few months, vendors have quietly made $2,495 the standard price for full-duplex 9.6K bit/sec. dial-up modems. Late last month Codex Corp., one of the last holdouts, cut prices on its own 9.6K bit/sec. dial-up modems to $2,495 for the standard model and $2,745 for the same model with error correction.

"Obviously, we have to be competitive with other companies who have already cut their prices," said Peter Edelstein, manager of dial-up product marketing for the Mansfield, Mass., firm. Within the last few months, Concord Data Systems and NEC America, Inc. have also lopped $1,000 off the original $3,500 price they put on their 9.6K bit/sec. modem introductions more than a year ago.

According to a recent report by Salomon Brothers, Inc., the

Continued on page 39

Inside

- IBM enters telephone network equipment market. Page 39.
- Datanex software lets VAX, Microvax users use Hasp+. Page 42.
- Trans-M designs LAN for IBM PCs. Page 42.

MAINFRAME

printf("Hello, ^ world\n");

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The mainframe compiler uses standard IBM linkage conventions. Assembler programs, MAIN routines in other high-level languages, and packages such as IBM's ISPF and GDDM can be invoked directly from C. And you can use C, instead of assembler, to develop small and fast subroutines called from other languages.

We designed the compiler listing and cross-reference to make programs easy to follow and errors easy to find. An extensive library offers functions from Kernighan and Ritchie and the Lattice PC C compiler. The run-time library produces explicit numbered error messages and a traceback of active function calls if an error occurs.

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Mac users

CONTINUED FROM PAGE 37

tions to supercomputers on the TCP/IP-based networks proliferating throughout many Fortune 1,000 companies, government agencies and academic institutions.

TOPS Terminal not only gives Apple users access to corporate host systems but does so within the context of the familiar Macintosh environment, said Nathan Goldhaber, president of Centram.

Centram, an independent subsidiary of Sun Microsystems, Inc., is the developer of TOPS, network software enabling distributed file service between Mac-, Microsoft Corp. MS-DOS-, IBM PC-DOS- and AT&T Unix-based computers.

Using TOPS Terminal, Mac users can tap the applications and file storage of any number of networked hosts simultaneously through multiple terminal-emulation windows, the vendor said. A concurrent modem connection to a remote host may also be established.

Users can run host-based applications while concurrently using a modem-based connection to commercial data bases, Unix utilities, bulletin boards and electronic mail services, the vendor said. They can also cut and paste between different terminal emulation windows.

A Mac possessing 512K bytes of random-access memory can reportedly support more than a dozen concurrent sessions.

The software supports a broad range of terminal types, including Digital Equipment Corp. VT100, VT52 and VT102 terminals. It is said to support effective terminal-to-host transmission speeds of between 7.2K and 9.6K bit/sec. The package's integrated text editor allows users to edit Unix, IBM Personal Computer and Mac text files without conversion.

Price cuts

CONTINUED FROM PAGE 37

fastest growing segment of the modem market is made up of asynchronous/synchronous modems that can support transmission rates of up to 9.6K bit/sec. over either leased or dial-up lines. Modems of this type accounted for less than $40 million, or 4% of the modem market's revenues in 1986, the report said. However, sales for such products are projected to grow to more than $300 million, or almost 20% of total modem revenues, by 1989, according to the investment consulting firm.

Codex has seen "an immediate and strong response" in sales since July 2, when it allowed its sales force to let potential customers know about the reduction, Edelstein said. However, further reductions will be necessary before the products become cost-effective for the majority of IBM Personal Computer users, he said. "Today there are far more synchronous than asynchronous applications for high-speed dial-up modems, but the PC market should emerge as a major niche for these products."

Other vendors who now offer 9.6K bit/sec. dial-up modems for $2,495 are Cermetek Microelectronics, Inc. in Sunnyvale, Calif; NEC America, Inc. in San Jose, Calif.; and Universal Data Systems, Inc. in Huntsville, Ala. Universal Data will not be shipping its modems until October, the company said.

IBM launches 9370 in central office market

IBM has become a serious contender in the intelligent telephone networking equipment market. The company recently announced a major contract to supply United Telecommunications, Inc.'s telephone companies with a combination host/local-area network configuration that will support intelligent services like enhanced call screening and call processing, a United Telecom spokesman said.

IBM 9370 mid-range processors will act as service-control points for the operating companies, housing data bases of service-related information such as call-originator profiles and routing data. The 9370s, along with the IBM System/88 fault-tolerant processors (which will act as communications front ends), will be linked over IBM Token-Ring networks.

IBM won the United Telecom contract from several vendors already firmly established in the central office equipment market: AT&T, Northern Telecom, Inc. and Digital Equipment Corp. Getting the contract not only establishes IBM in the rapidly growing central-office processing node market but also positions the vendor to influence telephone companies as to their future service offerings, according to John Walsh, managing director for Integrated Strategies Group, Inc. Part of that direction may be toward interfacing central-office 9370-based services with on-premise 9370 applications, Walsh said.

One potential area of integration is between IBM's 9370-based network-service management system and the 9370 running IBM's private network management system, Netview, Walsh suggested. This would provide users with a way to centrally manage hybrid networks that combine private lines with carrier services. The integration could take place through Signaling System 7, a telecommunications protocol that IBM has agreed to implement on the systems it develops for United Telecom.

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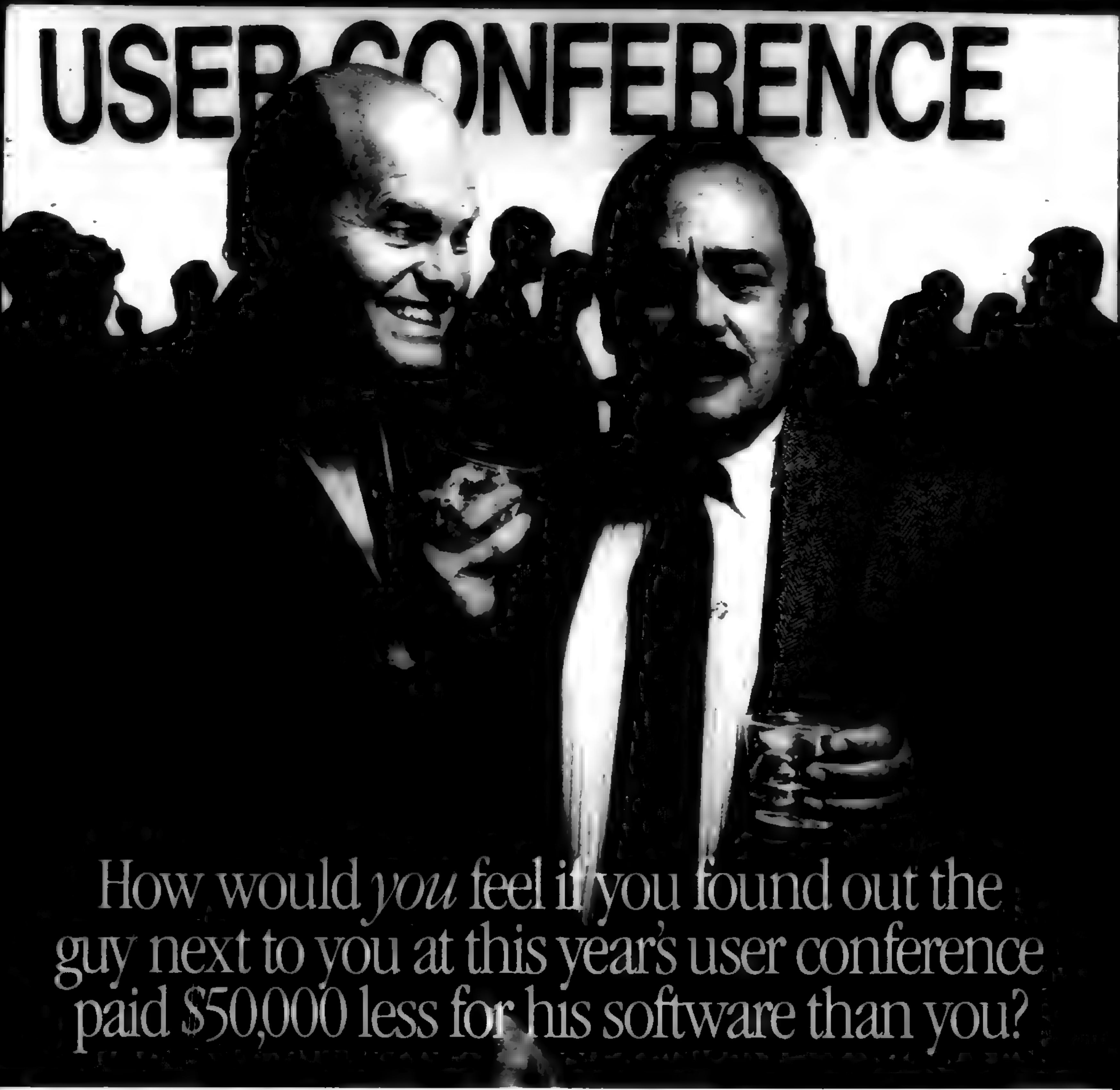

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LAN planning

CONTINUED FROM PAGE 37

step to the planning process for a LAN is for upper management to guide the project leader several steps backward, to help that person see a bigger picture. For instance, which other departments frequently interact with the one selected to receive the pilot LAN? And what existing computing resources does the pilot department currently employ? Answering questions like these will help the project leader recognize the potential magnitude of his recommendations and discourage a quick, product-oriented solution.

The next step is to become focused. Encourage the project leader to define what it is that the end-user department does functionally. An understanding of the business function is one of the most frequently ignored aspects of any system design and/or implementation, yet it is the most important. Once the business function is defined, assess how elements of automation are being utilized today and determine what some of the end users' explicit needs or desires are for automation in the future.

Now it becomes important to define and document the current automation inventory (if any) and its corresponding investment value. Remember, utilization of current investment is important.

The next step involves guiding the end user into the future. Ask "Where would you like to be in 12, 24 or 36 months?" With the results from responses and some parallel research into the LAN industry, several distinct approaches may be developed. Define two or three paths that may take the user from his current state of automation to his desired goal one to three years from now.

Plan B

User motivations may vary from complete connectivity to peripheral sharing to phasing out of existing centralized processing systems. Regardless, the development of alternative paths to migrate from today to tomorrow is important. If nothing else, they provide management with a basis on which to build, a point of reference to react to. Of equal importance, rough order-of-magnitude cost estimates can be created.

Another common question concerns how to go from a "conceptual plan" to a working, reliable system; in particular, how to deliver a LAN installation to users in a timely fashion without getting locked into poorly standardized technologies. The intermediate step is to examine the alternative paths, and select the one whose basic philosophy and approach, as well as cost/benefit ratio, best suits the organization it is serving. Then develop a phase-by-phase approach to implementing the LAN and other related automation technology.

Management wants to see good planning and physical proof that what is put on paper can also be put into their organization in a somewhat recognizable manner.

The goal here is to plan, design and then implement highly integrated, modular systems that allow flexible adaptation to dynamic corporate environments. This may be accomplished today, while maintaining 75% to 95% utilization of the initial capital investment a year or two further into the project.

Powerful LANs can provide MIS with that capability today, but only when properly planned.

Freund is a co-founder of Interconnect Consulting Group, a Pasadena, Calif., company that designs, engineers and installs networks primarily at Fortune 500 companies.

Shielding

CONTINUED FROM PAGE 37

lines, according to Turner, the data center's director.

With a satellite-based network, McKesson can maintain a network control backup facility. "We could rebuild our network simply by moving an earth station from here to our other data center in Oakland, Calif.," and reestablishing network operations from there, Turner explains. In contrast, switching to a backup data center under the company's current terrestrial configuration would involve rerouting all of the communications lines. The satellite link could also provide redundancy for the dial-up public lines that the company uses to exchange customer information between drug stores and its order-entry system.

Adoption of the satellite communications capability is only the latest and most prominent in a long series of steps McKesson has taken to duplicate its critical systems and minimize its data center's reliance on external utilities.

Some of those safeguards are somewhat unconventional. For example, McKesson is the only major corporation in the Sacramento, Calif., area with a direct fiber-optic feed from the local Pacific Bell telephone company central office.

"Usually, fiber-optic cables go from the telephone company to some central location, probably a manhole somewhere, where they then branch out to the various data centers," says John Fitzgerald, McKesson's vice-president of information services.

McKesson's penchant for systems autonomy and backup is a direct outgrowth of the nature of its business. "Ours is an inherently low profit margin industry," Turner explains, adding that the trick is to keep costs down while providing customers with top-notch, reliable service.

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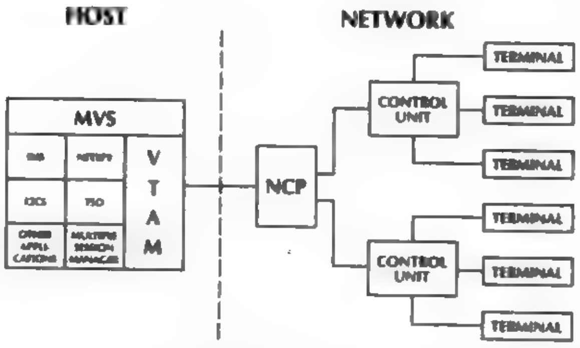

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NEW PRODUCTS

Local-area network hardware

A local-area network designed for IBM Personal Computers, PC XTs, ATs and compatibles has been announced by **Trans-M Corp.**

The **Net-127 PC** network features peer-to-peer architecture. It supports up to 127 users, linked by telephone or twisted-pair wiring. The network has device locking security features and two extra sockets on the network card that allow proprietary programming of read-only memories and the use of diskless stations.

The Net-127 can handle data transmission for user stations up to 1,000 ft apart. It supports Microsoft Corp.'s MS-DOS.

The Net-127 PC network costs $249.95 per node.

Trans-M, 28 Blacksmith Drive, Medfield, Mass. 02052.

Local-area network software

Software that allows Digital Equipment Corp. VAX and Microvax users on Decnet nodes and Vaxclusters to use **Datanex, Inc.'s** Hasp+ and EZSNA/Remote Job Entry (RJE) software has been announced by Datanex.

RJEnet uses store-and-forware techniques for file processing. Console commands can be issued through RJEnet to any host mainframe connected to the VAX. The product can reportedly support up to 50 nodes for each Hasp+ or EZnet/RJE copy.

Hasp+ allows VAX users to perform RJE and file transfers into most mainframes and minicomputers. EZSNA/RJE performs the same functions into IBM Systems Network Architecture networks.

Prices start at $1,000, including a host module for the Hasp+ or EZSNA/RJE node and support for one remote node. Expansion costs $250 per node.

Datanex, P.O. Box 1728, Eugene, Ore. 97440.

Customer-premise equipment

Dover Communications has introduced its **B-1 PAD** for users of IBM 3270 systems.

The single port B-1 packet assembler/disassembler (PAD) is compatible with X.25 networks, host PADs and front-end PAD software. It allows a single IBM 3270 access line with up to 32 devices to connect to a packet-switched network via a single X.25 line.

The B-1 PAD is priced at $2,795.

Dover Communications, Suite 966, 1412 Broadway, New York, N.Y. 10018.

Links

Epic Data, Inc. has introduced four data collection system controllers said to provide host links and party-line speeds up to 19.2K bit/sec. as well as control up to 96 terminals per party line.

The **Network Control Unit** controls up to 16 party lines of 96 terminals each at speeds up to 19.2K bit/sec. The **IVAX Controller** controls up to eight party lines of 96 terminals each.

Based on the IBM Personal Computer AT, the **Personal Computer Controller** is said to handle up to four party lines with 24 terminals each, running at up to 19.2K bit/sec. The **Host Programmable Control Unit-MC** can control up to two party lines of 24 terminals each.

Base prices range from $6,000 to $28,900.

Epic Data, 7280 River Road, Richmond, B.C., Canada V6X 1X5.

Diagnostic equipment

A personal computer-based line monitor that provides time-stamping, mnemonic display, data emulation and data recording has been announced by **Atronix, Inc.**

The **Atronix LM-1** is a software controller instrument that time-stamps every character, modem change and error. It is capable of configuring each line differently so users can receive asynchronous ASCII and transmit IBM Synchronous Data Link Control EBCDIC. They can test protocol converters and then save the data as DOS files.

The monitor provides data communications equipment and data terminal equipment simulation. It displays 1,600 readable data characters and records data directly to disk in full-duplex mode at 9.6K bit/sec.

The Atronix LM-1 line monitor costs $1,595.

Atronix, 780 Boston Road, Billerica, Mass. 01821.

Cabling

The Model 61 RS-232-to-coaxial converter, introduced by **Telebyte Technology, Inc.**, is said to alter standard data signals to provide full-duplex communication on a single coaxial line.

The Model 61 is said to sample the various control signals in the RS-232 interface and derive its power from them. Full-duplex operation is provided for transmit data and receive data at rates up to 9.6K bit/sec. over distances of 2,500 ft. A data terminal equipment/data communications equipment switch is provided to allow reversing of pins two and three of the RS-232 interface.

The Model 61 can be ordered with either a male or female DB-25 RS-232 connector. It costs $75.

Telebyte, 270 E. Pulaski Road, Greenlawn, N.Y. 11740.

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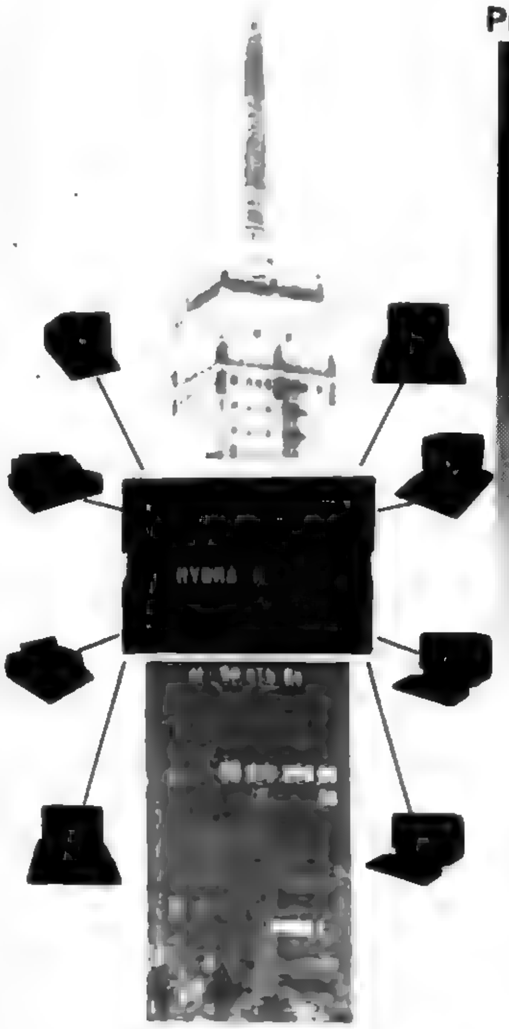

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"HYDRA has exceeded our expectations. We are amazed with the flexibility and simplicity that HYDRA offers. We use HYDRA to drive laser printers as 3211 system printers, support several types of ASCII terminals, and for PC to mainframe file transfer. For both local and remote applications HYDRA has been a tremendous help. We didn't even need a system programmer to set everything up." Buddy Allee, Data Processing Operations Manager for Tower Life Insurance Company.

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HYDRA supports virtually any ASCII asynchronous RS-232 device including terminals, PCs, printers, bar code readers, document scanners, etc. You can direct connect or communicate from your office, home, or any remote location over voice-grade phone lines.

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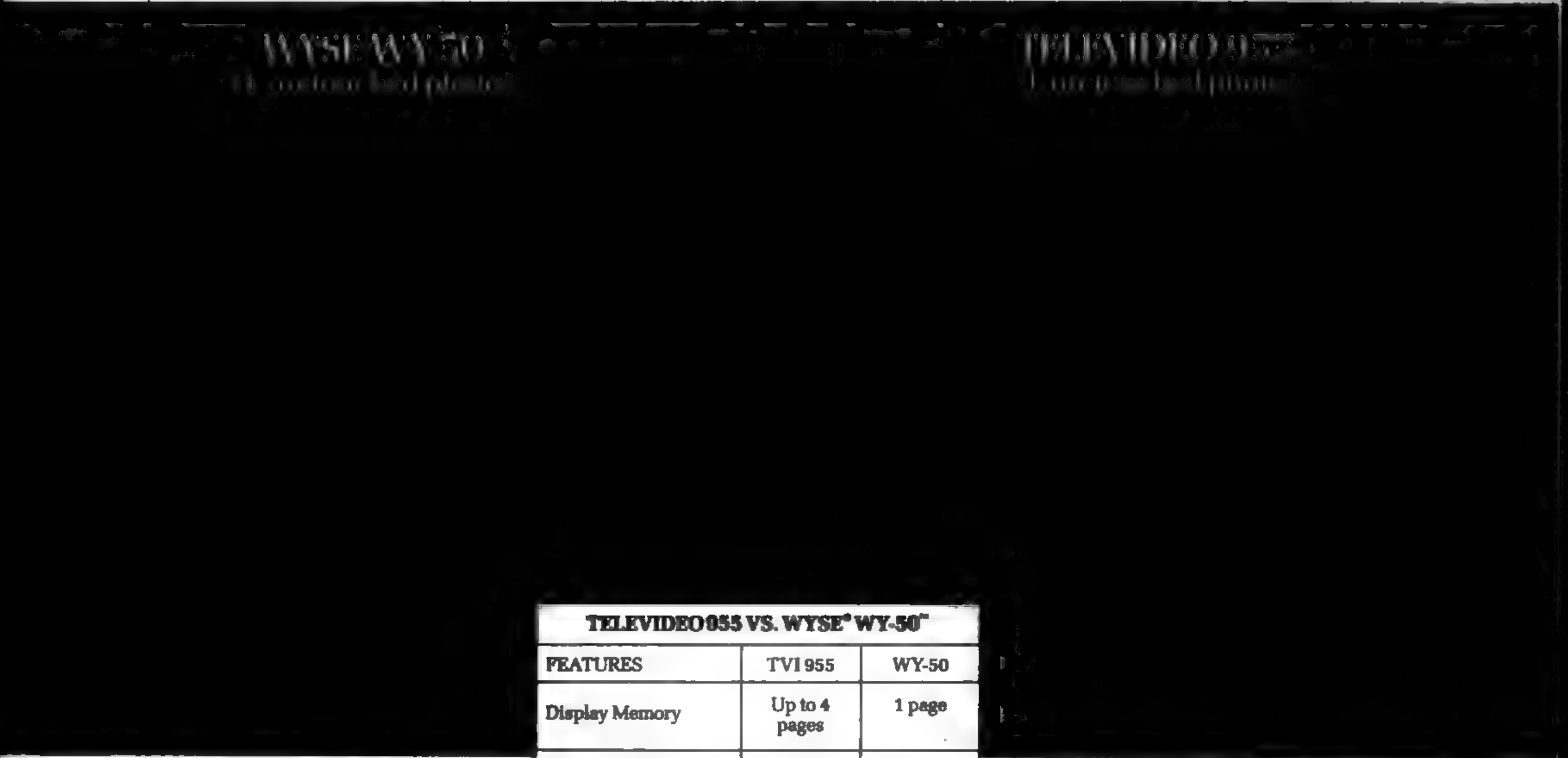

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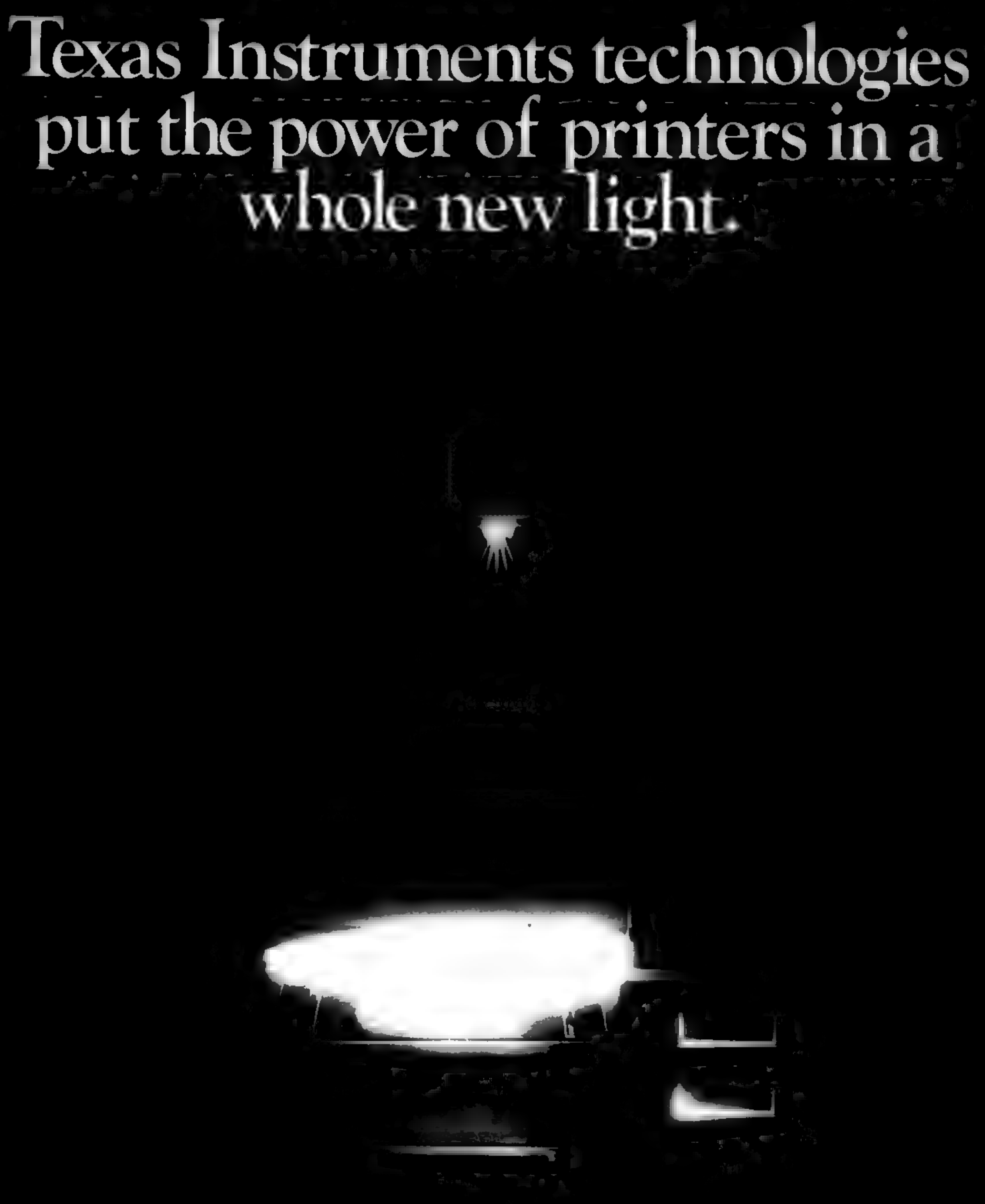
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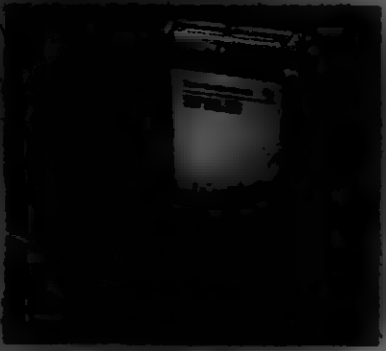

These convenient plug-in cartridges provide for easy font selection, either manually or under software control.

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See back page for more information.

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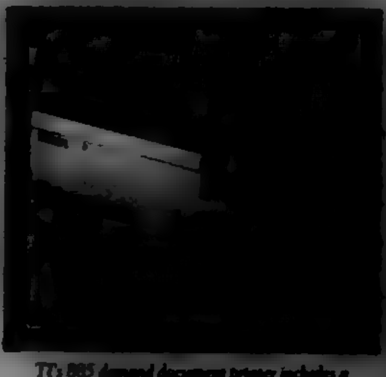
Our Model 810, for example, has become the standard for heavy-duty system printers. Over the years, they've proved themselves to be so durable, most of the world's largest airlines depend on them for ticket printing.

Then there's our Model 880s, which feature high-throughput, near-letter-quality printing and high-resolution raster graphics for data processing environments. And just about the only maintenance they require is the occasional ribbon change.

Increase operator productivity and eliminate forms waste.

The latest addition to our printer family is the Model 885 demand document printer. Just like the other family members, it's designed to be rugged and offer superior paper handling. But its differences make it ideal for applications where space is limited and paper waste is a consideration.

We've added a zero tear-off capability that eliminates forms waste. Simply put, it uses just one form where most printers would also use a second. It's front-loading, handles up to five-part forms with ease, and thanks to its small footprint, fits on a desk or countertop.



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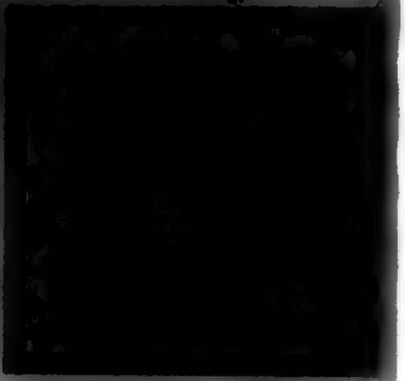

Optional interface boards make TI printers compatible with IBM's 3270 protocol, or with System 34, 36 or 38 minicomputers.

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HARD TALK

David Bright

DEC juggles, confuses

Earlier this month, Digital Equipment Corp. juggled its prices around a bit. It cut prices on some of its low-end systems and jacked up high-end prices to better reflect value. A similar juggling took place in March.

One end result of all this is that a high-end VAX 8000 series CPU now costs at least $100,000 more than it did just 5½ months ago. But DEC officials stress that customers should look at the whole picture. They point out, for example, that it has introduced denser and less expensive memory, added software to its list of discountable products and placed a one-year warranty on all its products. According to Marc Roberts, corporate product operations manager, the total cost of ownership for the high-end VAX 8000 series systems is now less than it was before, despite the basic price increase.

Roberts suggests that customers bothered by the notion of paying more for the same systems, and therefore messing up their carefully planned budgets, simply haven't figured everything in.

That may very well be true, but perhaps it might have been better, marketingwise, if DEC had left system prices alone and instead looked for other ways of reducing the total cost of ownership. Let's face it, it can sometimes be difficult to make people think they are getting a good deal when prices go up but performance doesn't.

In the past, surely DEC and other computer vendors have raised system prices like this, but no particular instance comes readily to mind. "I'm sure we've made price increases in the past, although I can't remember when," Roberts says.

Overall, Roberts says, DEC customers are quite happy with the changes. "The general response has been very positive," he notes. In a DEC survey of the company's 100 largest accounts, "People were generally

Continued on page 46

Beacon brightens Boston stocks

Single system installation ups trade processing, volume, contains costs

BY STANLEY GIBSON
CW STAFF

BOSTON — For more than 150 years a quiet regional exchange in the shadows of the trading world, the Boston Stock Exchange is gaining its share of the spotlight by installing the Beacon computerized trading system.

The $2 million Beacon system is a stock trading and communications application designed to run on three Stratus Computer, Inc. fault-tolerant minicomputers working in conjunction with about 100 Zenith Data Systems personal computers. Although the exchange switched to the new system in July, some fine tuning is still being done.

"Beacon is the first attempt to put all the capabilities on one system at one time," says Robert L. Andrews, data processing manager of the exchange. In addition to providing traders with current stock prices, the system automatically executes trades at the lowest possible price for buyers and at a low cost per transaction to the exchange.

Single system unique

Andrews says other regional exchanges have systems that perform the same tasks Boston's does, but those systems are collections of separate hardware and software applications, not a single system installed at one time. Although Andrews stops short of claiming that Beacon puts Boston far ahead of other regional systems, he says it is a safe bet that Boston will no longer be technologically behind.

Robert L. Andrews

Andrews, who came to the Boston Stock Exchange in February to take over implementation of the Beacon system, brought with him 15 years of experience in the securities industry, having helped develop the National Association of Securities Dealers' Automated Quotation system.

The Boston exchange is one of five regional exchanges; the others are located in Chicago, Los Angeles, Philadelphia and Cincinnati. Founded in 1834, the Boston Stock Exchange has operated almost continuously ever since, the exception being several months at the beginning of World War I.

With 200 members, the exchange trades only equity securities, including stock, preferred stock, warrants and bonds. It does not deal in over-the-counter stocks, commodities futures or options.

Technology has played a key role in turning the tide of the exchange's fortunes since 1981, when it lost more than $1 million. Inadequate systems meant Boston could not process trades fast enough to achieve economies of scale. The exchange had to recover overhead expenses by charging more per trade than other trading centers. In 1982, the exchange asked its members for a financial commitment to upgrade its computer system.

Members responded to the appeal by putting up $750,000 in working capital, which has since been paid back, according to James Crofwell, senior vice-president and treasurer of the exchange. "It was time to put up or shut up, and we got help, not just from regional members but from the Boston offices of national firms," Crofwell recounts.

Cutting costs

Some of the money was spent on an IBM 4381, which has helped the exchange cut costs and contributed to three rate cuts since 1985. These rate cuts have dropped the price of a trade by 50%. The Beacon system is aimed at further accelerating trading, boosting trade volumes and keeping costs down.

The system executes trades automatically by scanning all U.S. exchanges and locking in the best bid available, using the the Intermarket Trading System, a computer securities trading network of which the Boston exchange is a member. The system is operated by the Securities Industry Automation Corp.

After an order is entered by a broker, it goes to a trader on the floor who may execute the order or delay in hope of a better price.

Continued on page 46

Raster adds to graphics capability

Announces collaboration with Sun to ensure hardware portability

WESTFORD, Mass. — Raster Technologies, Inc. recently introduced a graphics processor designed for high-performance two- and three-dimensional applications.

In announcing the Model One/385, the company also introduced the first two members of its family of GX4000 3-D graphics accelerators, which were designed for use with Sun Microsystems, Inc. workstations.

The Model One/385 reportedly features a proprietary IEEE floating-point processor architecture that is optimized for 2-D and 3-D graphics algorithms.

The company claimed that the system processes up to 140,000 3-D vector/sec. It was designed to provide a resolution of 1,280 by 1,024 pixels, support for eight local light sources and up to 16.7 million colors. It also features a built-in direct-memory access interface for connections to a range of processors, Raster said.

The system was designed to allow flexibility and upgradability with configurable features, including up to 12M bytes of local display list memory, 8 to 24 bits of image memory, double buffering, support for multiple independent displays and 8-bit image overlays. Prices start at $33,000; shipments are scheduled for the fourth quarter.

Raster also announced a collaborative agreement with Sun, under which the companies will work to ensure graphics software portability between the Sun-3 and Sun-4 workstation families and Raster's GX4000 series.

The GX4000 series was designed to speed execution of proposed ANSI Programmer's Hierarchical Interactive Graphics Standard (PHIGS) and PHIGS+. A configuration that includes 8M bytes of display list memory costs $38,995.

Surge seen for optical disk drives

BY DAVID BRIGHT
CW STAFF

MOUNTAIN VIEW, Calif. — Optical disk drives will see much greater acceptance within the next three years as their use expands to broad business applications, a recently released report predicts. In addition, a significant portion of those drives will be erasable units.

By 1990, worldwide revenue from optical disk drives will exceed $1.4 billion, up sharply from $203 million in 1986, according to the report from Disk/Trend, Inc., a market research firm based here.

Optical disk drives are currently broken down into two categories: read-only types (mostly in a compact disk/read-only memory format) and those that can be written on once.

So far, the major applications for the write-once drives have been in image storage, for which the drives' performance limitations are not a serious drawback. Those applications include law enforcement, military systems and medical information storage. As various system development programs now under way reach completion, the drives will also be used for broader based business applications, the report says.

Shipments of optical disk drives reached only 31,700 units in 1986, according to Disk/Trend. But the research firm says shipments should triple this year and nearly triple again in 1988, finally topping one million in 1990. In 1990, shipments of read/write drives of less than 1G-byte capacity will reach some 619,800 units, surpassing read-only devices as the most popular type of optical drive, the report predicts.

Erasable optical disk drives should soon be making a big impact, Disk/Trend reports. The

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Inside

- Strobe Data development allows DG software to run on IBM PCs. Page 46.
- Vicom Systems designs peripheral processor for Sun-3 workstations. Page 50.
- Printer Systems converters communicate with IBM machines. Page 51.

Falcon executes DG software on PCs

BELLEVUE, Wash. — Strobe Data, Inc. recently introduced a coprocessor card and software package for the IBM Personal Computer XT and PC AT that reportedly enables those machines to execute software written for Data General Corp. Nova minicomputers.

The Falcon coprocessor can execute DG's RDOS and other software written for the Nova computers without any reprogramming or special software, according to Strobe.

The Falcon coprocessor becomes the main processor, while the PC processor serves as a peripherals controller in such a system, according to Ellen Oliver, Strobe's director of marketing.

Sold to developers

Oliver said Strobe is selling the system primarily to developers, who will resell it in a package with their Nova applications software and an XT, AT or a clone.

The Falcon can also emulate 16-bit DG Eclipse instructions, she said.

However, she added that some customers have been using the Falcon card primarily to make an XT or AT into a multiuser system. This can be done by using the PC's serial ports or by attaching a multiplexer, she explained.

Currently available, the Falcon coprocessor carries a suggested retail price of $3,975.

Quantity discounts for the product are available, Strobe said.

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Beacon

FROM PAGE 45

If the trader does not act to delay within 15 seconds, the trade is automatically completed. Such instant execution keeps traders from having to perform many trades for relatively small orders and frees them to spend more time personally handling large orders. The overall effect is to speed up traders, enabling the exchange to handle more trades. As time goes on, that will mean more fees and the greater prestige that goes with handling large trade volumes.

Although it is a total system, Beacon is composed of two parts. One Stratus XA600 processor handles communications with exchanges to gain current stock quotations — the so-called ticker plant function — while the XA2000s process the trades and perform workstation functions for the PCs used by the members on the floor.

In turn, each user has two screens, one containing stock price information and the other carrying on the intelligent functions of the PC, including historical information on the stock.

Members needed some training to work with the PC, having worked before only with Quotron Systems, Inc. terminals, which have different keyboards than PCs. "You have to be comfortable before you can do any trading," Andrews explains.

Beacon does not displace the exchange's 4381, however, which is used at night to store information taken from the on-line Stratus machines. Data stored in the 4381 is sent to the National Securities Clearing Corp. and is also used in monthly statements. And in a stage following Beacon's development, member firms will be able to connect their remote systems to the 4381.

Beacon's software was designed by Femcon Associates, Inc., a Westford, Mass.-based firm that specializes in financial services applications written for Stratus computers. "We see Stratus as being a good on-line transaction processor, and it has good networking," says Craig Conti, a Femcon cofounder and executive vice-president.

Conti says Femcon is hoping for wide marketing of Beacon on the advent of 24-hour trading. "Other exchanges believe they have to tie in and become part of the global, 24-hour trading network in order to survive," he says. European exchanges similar in size to Boston's have expressed interest in a Beacon-type system, he adds.

Founded in 1980, Femcon's major creation is Continuous On-Line Trading System (Colt). Colt tracks user trading positions in given securities and tracks their profits and losses. The Beacon package includes Colt features.

The ticker plant component of the system is based on a software package called Market Access, created by Market Systems Technology, Inc. in Boston, which is partially owned by CMQ Communications, Inc. in Toronto.

"Market Access has custom-written interfaces for a variety of securities exchanges. Some exchanges may have different protocols. For example, some use bisynchronous protocols; others use asynchronous," Market Systems' Stan Jackson says. After receiving the data from the different sources, Market Access puts the information on a single data stream, Jackson explains.

Now handling the some two million shares per day that change hands at the Boston Stock Exchange, Beacon is just beginning to show its value. "The floor really likes it," Andrews says.

Optical

FROM PAGE 45

first significant shipments of erasable drives will begin in 1988, and by 1990 the drives will account for 68% of all read/write optical disk drives sold worldwide with less then 1G-byte capacity, Disk/Trend said. Image-storage applications will generally use 5¼-in. erasable optical drives, and personal computers will begin using 3½-in. versions of the drives, the report notes. Both sizes are expected to replace tape drives as the preferred backup device.

The number of vendors making optical disk drives is also expected to grow from 21 in 1986 to 28 by the end of this year. Although nearly half of the 1986 sales took place in the U.S., non-U.S. manufacturers accounted for 92% of those sales, according to the report.

DEC

FROM PAGE 45

pleased with the much better memory and the ability to expand the machines. No other issues really came up."

Meanwhile, the Microvax III, said to use a CMOS-based microprocessor to at least double the Microvax II's 0.9 million instructions per second (MIPS) performance, is expected to be a main attraction at Decworld. "It's the worst-kept secret in the world," laughs one DEC user.

Many performance-hungry DEC customers would like to see DEC introduce a new high-end system. "Our problems have outgrown VAXs," one scientist says. "If I want 40 MIPS, I'll have to buy from someone else."

Bright is a *Computerworld* senior writer.

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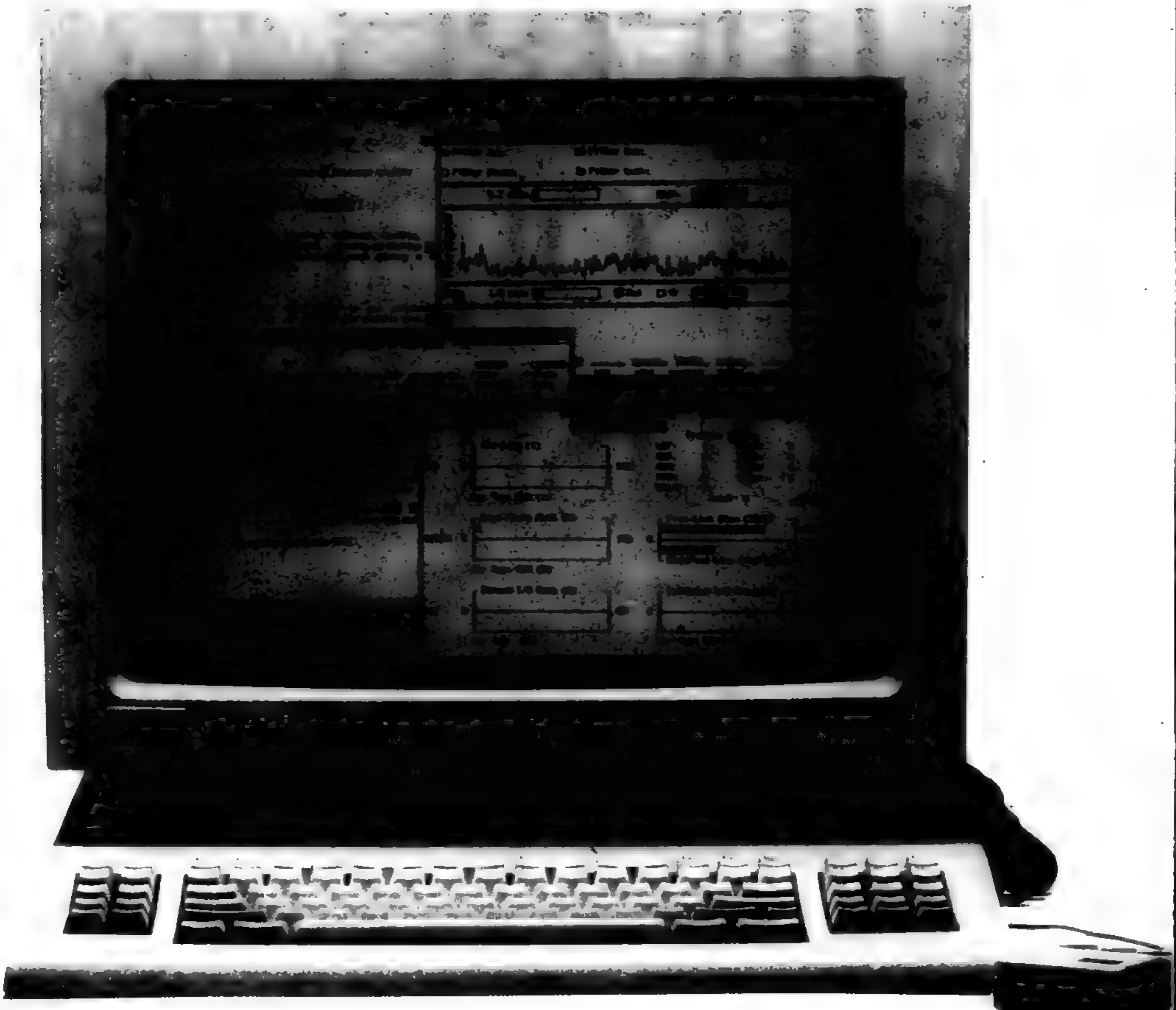

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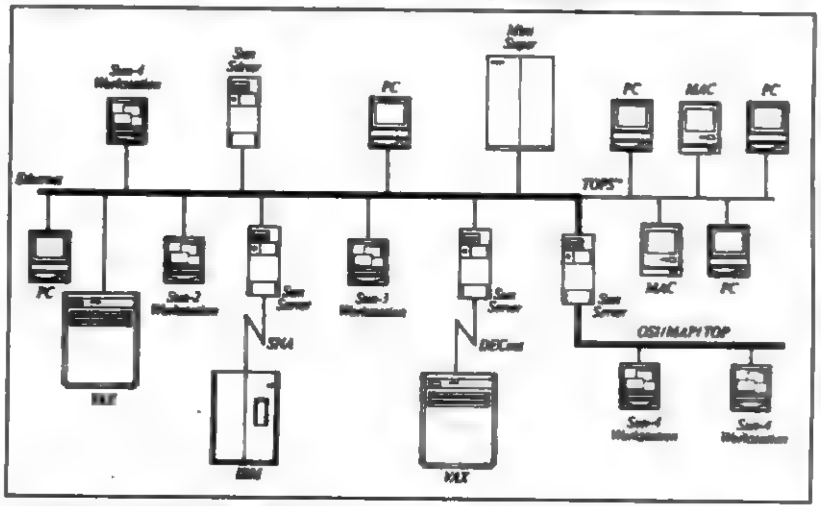

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NEW PRODUCTS

Processors

A modular deskside image processing workstation designed as a peripheral processor to a Sun Microsystems, Inc. Sun-3 workstation has been announced by **Vicom Systems, Inc.**

The **Vicom-VME** utilizes a 32-bit parallel data bus, a 32-bit address bus and a control bus. The bus structure allows image memories, dedicated processors and the Sun-3 to be interconnected. Separate modules for image acquisition, processing and display are offered.

Image processing algorithms are executed by sequence of point, ensemble and spatial operations. The implementation of Unix 4.2 Sun-OS as the operating system provides the user with high-level languages for algorithm development and customized processor control.

The Vicom-VME costs $48,000.

Vicom Systems, 2520 Junction Ave., San Jose, Calif. 95134.

A universal small computer systems interface (SCSI) host adapter board called the **VME-SCSI/U** has been introduced by **Integrated Solutions, Inc.**

The board is said to support any SCSI target device that conforms to ANSI X3.121 and complies with the Common Command Set. It occupies one slot on the VME backplane and provides a maximum data transfer rate of 1.5M byte/sec.

The Universal SCSI includes a 16-bit processor, an on-board 16K-byte data buffer memory and power-on self-test diagnostics.

The VME-SCSI/U costs $1,795.

Integrated Solutions, 1140 Ringwood Court, San Jose, Calif. 95131.

A 2M- to 16M-byte add-in memory board for use in Data General Corp.'s MV4000, MV10000 and Eclipse 5280 processors has been introduced by **System Controllers & Interface Products.**

Described as a plug-and-play emulator of DG's Universal Memory, the **MV410** is availble in 2M-, 4M-, 8M- and 16M-byte sizes with the starting memory address-selectable in 1M-byte boundaries via a five-position board-edge switch.

Other features include a board-deselect switch that removes the memory from the system and two LEDs on the board edge that indicate memory power on and memory selected.

The MV410 is priced from $3,000 for 2M bytes to $15,900 for the 16M-byte board.

System Controllers & Interface Products, 449 S. Beverly Drive, Beverly Hills, Calif. 90212.

Data storage

A magnetic tape subsystem designed to interface to Data General Corp.'s Nova, Eclipse and MV processors, has been introduced by **Zetaco, Inc.**

The **Model Zip-12** subsystem employs a cartridge tape drive that holds 630M bytes of data when formatted under DG 4307 software parameters. It is said to back up about 10M bytes of data per minute using standard DG backup utilities, and it can be preset to do backup without operator intervention.

The Model Zip-12 runs under DG's AOS/VS operating system, emulating a 4307 tape subsystem. It interfaces to the computer via DG's Burst Multiplexer Channel and uses a 24-track serpentine recording format with a recording density of 16,000 bit/in. The average data transfer rate is 250K byte/sec.

The Zip-12 costs $15,395.

Zetaco, 6850 Shady Oak Road, Eden Prairie, Minn. 55344.

Two bubble-memory cassette systems with 0.5M-byte Bubbl-Pac cartidges, said to be direct replacements for standard 5¼-in. floppy disk drives, have been announced by the **Bubbl-Tec** division of PC/M, Inc.

The **BDJ-1 Bubbl-Dek** system fits the same mounting holes as a standard full-height 5¼-in. floppy disk drive, the vendor said. It provides two front-panel slots for Bubbl-Pac plug-in cartridges. The **BDJ-2** is a half-height unit that accommodates a single Bubbl-Pac.

All controllers for the Bubbl-Deks provide automatic error detection and correction and automatic retries for software errors. They also provide built-in self-test capabilities.

The BDJ-2 costs $787. The BDJ-1 costs $1,291.

Bubbl-Tec, 6805 Sierra Court, Dublin, Calif. 94568.

Two disk drive controllers designed for Digital Equipment Corp. Microvax, MicroPDP-11 and LSI-11 computers have been introduced by **Distributed Logic Corp.**

The **DQ246** controller can interface up to four storage module drive-type disk drives. The companion **DQ256** can interface up to four SMD enhanced-class drives.

Both products can reportedly optimally fragment a record across multiple platters and offer multipattern formatting capabilities. Each has a command-queue buffer capable of storing up to 21 seek commands.

The DQ246 costs $2,250. The DQ256 costs $2,850.

Distributed Logic, P.O. Box 6270, 1555 S. Sinclair St., Anaheim, Calif. 92806.

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Terminals

A Digital Equipment Corp.-compatible terminal that can be connected to two hosts for simultaneous operation has been announced by **CIE Terminals, Inc.** a subsidiary of C. Itoh Electronics, Inc.

The **CIT310** provides instant on-line switching between hosts. In dual-session mode, the screen can be split horizontally. Each host can have an independent screen display of 24 rows.

Other features include 1K byte of nonvolatile function memory per session, allowing 180 programmable functions accessible through 45 function keys, and separate set-up menus for each session.

The CIT310 costs $749.

CIE Terminals, 2505 McCabe Way, Irvine, Calif. 92714.

A point-of-sale (POS) terminal called **Datalink II** has been announced by **MSD Systems, Inc.**

The terminal was desined to interface with computer systems running POS applications software. The terminal contains a standard electronic cash register keyboard, a receipt printer, a CRT and support for up to four cash drawers.

The Datalink II can also function as a simple stand-alone cash register if the host computer becomes inoperable. In stand-alone mode taxes are automatically calculated, 10 departments are supported, there are five tenders and report-printing data is captured.

Datalink II features four RS-232 serial ports that operate at 150 to 19.2K bit/sec. The terminal costs $2,695.

MSD Systems, Suite 206, 10031 Monroe Drive, Dallas, Texas 75229.

Printers/Plotters

A printer said to combine bar code, labeling and demand document printing capabilities has been announced by **Facit, Inc.**

Called the **Documate 3000**, the 200 char./sec., 80-col. matrix printer can print 11 bar code combinations, any type of label and forms consisting of up to six parts.

Fonts are contained on a plug-in font card and can also be down-line loaded.

The Documate 3000 is priced at $1,495.

Facit, 9 Executive Drive, Merrimack, N.H. 03054.

A printing system designed for use with the IBM System/34, 36 and 38 and featuring a 20 page/min. laser printer with duplex capability has been announced by **General Business Technoloy, Inc.**

The **6637PM** printing station offers a print resolution of 300 by 300 dot/in. It features dual 250-sheet input trays that accept 8½- by 11-in. paper.

The user can select from 34 resident fonts.

The display station, called Model 7710DS, features a 14-in. display in green or amber and a 122-key keyboard with 24 command keys, according to the vendor.

The 6637PM is priced at $27,670.

General Business Technoloy, 1891 McGraw Ave., Irvine, Calif. 92714.

Printer Systems Corp. has introduced the **Printmate Coax** and **Printmate Twinax**, protocol converters designed to provide communication with IBM computers.

The converters feature cartridges that contain upgradable emulation software specific to individual printers.

The Printmate Coax emulates the IBM 3287-2 and 4214-1 dot matrix printers and the IBM 3262-3/13 line printer.

The Printmate Twinax enables communication with IBM minicomputers.

The Printmates cost $1,495 each.

Printer Systems, Suite 100, 1485 Chain Bridge Road, McLean, Va. 22101.

Input devices

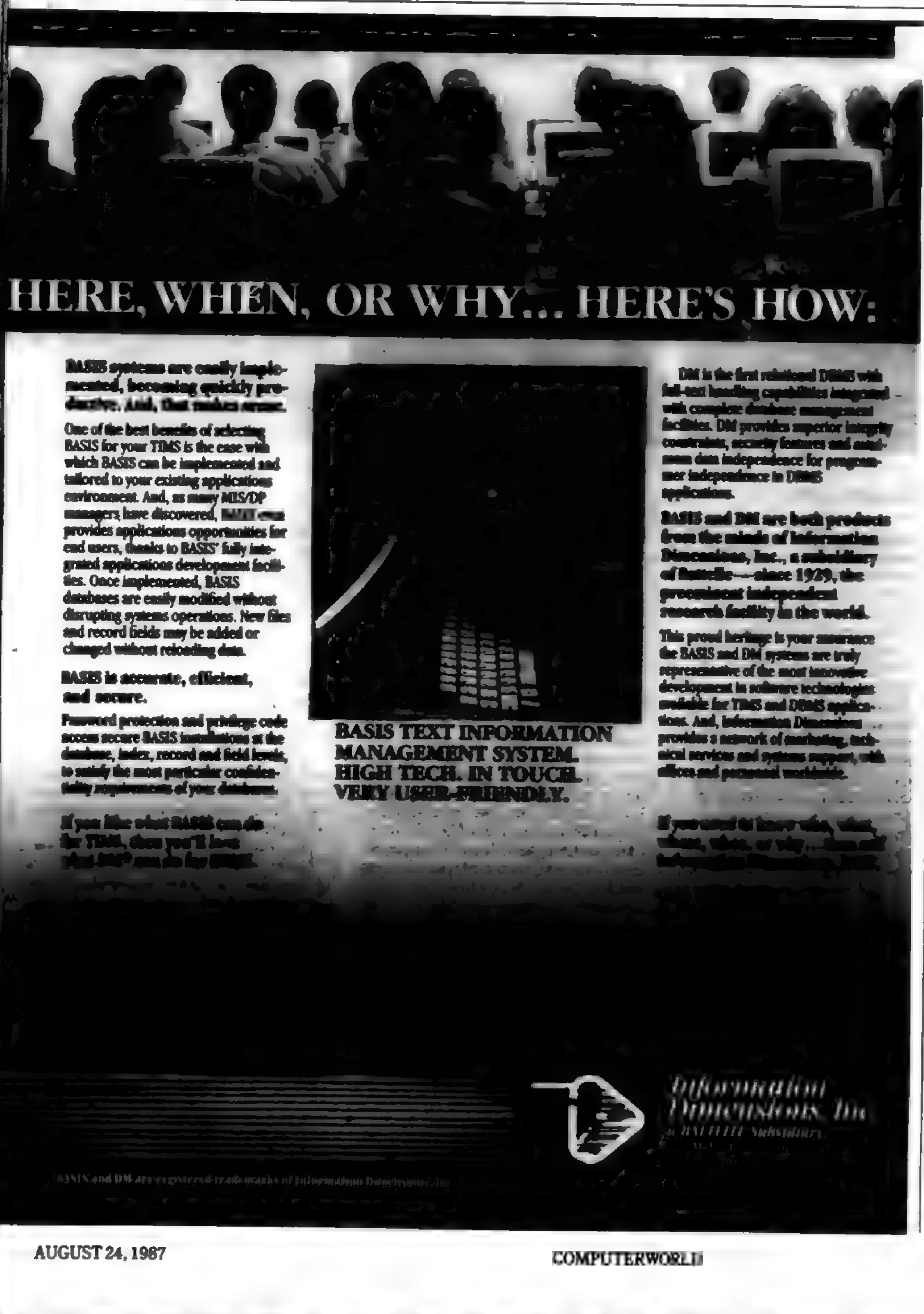
An optical character-recognition page scanner designed to process various page formats, including documents with both text and graphics, has been announced by **Recognition Equipment, Inc.**

The **Tartan XP90** system, which includes a Tartan XP90 scanner and an REI IBM Personal Computer AT-type system, processes print or type in most font sizes, styles and formats. It captures a bit-mapped image of the document at a rate of 100 char./sec. and converts text to ASCII characters at a resolution of 300 dot/in.

Users can define up to 256 data-capture zones per form, alpha and/or numeric zones, English or structural context and fixed or variable pitch. Also included is a 70,000-word dictionary. Density can be selected, and a document can be rotated.

The Tartan XP90 system is priced from $80,000.

Recognition Equipment, P.O. Box 660204, Dallas, Texas 75266.



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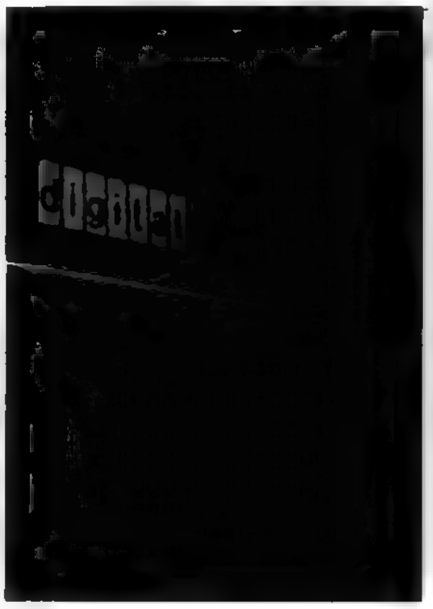
MAX FACTOR DID.

Max Factor's international operation has that vibrant glow about it. And Cullinet's Manufacturing System (CMS) software helped make it that way. The largest producer of its kind in Europe, Max Factor currently offers over 1,300 different cosmetics and fragrance items. Unit totals exceed 55 million annually. The key to success in the industry? Max Factor people believe it is keeping inventories low while at the same time maintaining a high service level on customer orders. CMS does just that. It's an advanced MRPII system that gives the 800 manufacturing and distribution personnel at the huge U.K. plant the capability to plan, control and react to real-world changes in a variety of manufacturing environments. Inventory and service objectives have become easy to attain. And the software has paid for itself in very defined terms over a short time. In the next five years, they plan to save five times their original investment. Obviously, CMS allows the best possible use of resources so that Max Factor, Ltd. just keeps looking better every day.

KAYSER-ROTH DID.

As America's second largest manufacturer of hosiery for men and women, Kayser-Roth understands that support is a key component of any software solution. That's why they selected the Cullinet Manufacturing System (CMS) featuring the Implementation Workbench for Manufacturing. This package of expert-based application and sophisticated implementation tools will enable Kayser-Roth to achieve an overall integration of information among departments. Their data exchange plans extend from PC to mainframe to user tools – between headquarters, multi-site plants and warehouses. Kayser-Roth's corporate managers use the Implementation Workbench for Manufacturing to enhance their implementation efficiencies, project planning and scheduling. Access to project status data helps meet target projections. CMS also provides superior on-line user documentation, interactive training and data conversion instruments, giving Kayser-Roth a most valuable tool for achieving its goals.



DIGITAL DID.

Digital Equipment uses Cullinet software to distribute Digital products. That's one of the highest compliments they could pay. Cullinet's Distribution Management System has allowed Digital to achieve real warehousing flexibility, because the same software can be utilized at multiple sites and still be tailored to the needs of each individual one. The ability of the system to be networked nationwide has provided Digital with the interconnectivity they were looking for. It has resulted in an optimum level of performance – one that has dramatically increased inventory turnaround. And Digital feels that Cullinet's vendor performance has been equally impressive. The distribution personnel say their success is shared with Cullinet – people who have become more like colleagues than vendors. Five Distribution Management products are available to companies like Digital: Order Management, Warehouse Management, Distribution Resource Planning, Distribution Center Management and Sales Forecasting. Digital knows how important these products are. Their clients believe that "Digital has it now," and Cullinet helps keep it that way.

RLD CLASS AND DISTRIBUTION.

CULLINET.

LHTEC DID.

The Light Helicopter Turbine Engine Company (LHTEC) did not exist as an entity until the U.S. Army instituted its T800 Full-Scale Engineering Development Program. T800 is the designated propulsion system for the LHX program to ultimately upgrade the Army's entire fleet of light helicopters. To accomplish that task within the Army's production competition strategy, the Garrett Turbine Engine Company of Allied Signal and the Allison Gas Turbine Division of General Motors joined resources for the Full-Scale Development (FSD) portion of the program. Even though these companies will become competitors during the production phase, FSD required they function as one, with a management process featuring fully integrated software and a state-of-the-art performance measurement control system. Cullinet's Manufacturing System (CMS) with EASYTRAK enabled easy linkage of files from cost, scheduling and technology standpoints. This project was accomplished across an 1,800-mile distance, with both partners having equal access to vital information simultaneously. And Cullinet managed to deliver up to 70% more savings in day-to-day operational costs than any competitive vendor LHTEC considered.

TECH FORM DID.

Tech Form Industries makes tubular exhaust components for automotive production. And when they needed a repetitive manufacturing system coupled with an automated release package, an exhaustive search led them to Cullinet's Repetitive Manufacturing System. This on-line, closed-loop, MRPII System software runs on VAX as well as other departmental platforms. Because of its exceptional automation of workflow and documentation, it is helping TFI meet the growing needs of original equipment automotive manufacturers around the world. Timely information turnaround has given Tech Form better tracking of investment balances. They can interface financial reporting with shop-floor data reporting systems. And because it's a stand-alone, in-house system – not a tie-in with an outside mainframe – it lets TFI realize the tremendous savings inherent in departmental, one-site computing. TFI products contribute to the performance of scores of domestic and foreign cars and trucks. And Cullinet's Repetitive Manufacturing System is helping to keep the company on the road to greater profitability.

3X3 ARCHITECTURE.

An investment in a truly integrated information management system is one of the best investments a company can make. And the investment in Cullinet is easier to justify than ever, because only Cullinet's 3x3 architecture offers an "industrial strength" database, comprehensive tools and more than a dozen fourth-generation business applications. Those include Project Management, Distribution Management and Manufacturing for both IBM and DEC VAX systems. Finance and Human Resource applications provide additional breadth. All of them are engineered to work together for total corporate computing solutions. System portability and referential integrity are assured – with connectibility between PCs and departmental computers, and SQL compatibility across a three-tiered platform. Get the complete Cullinet technology story in our new IDMS/87 brochure. Call toll-free 1-800-551-4555. Or write to Cullinet Software, Inc., 400 Blue Hill Drive, Westwood, MA 02090-2198.

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For The 80s, 90s And Beyond.

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Our lowest-cost system integrates UNIX™ into the Tandem OLTP network.

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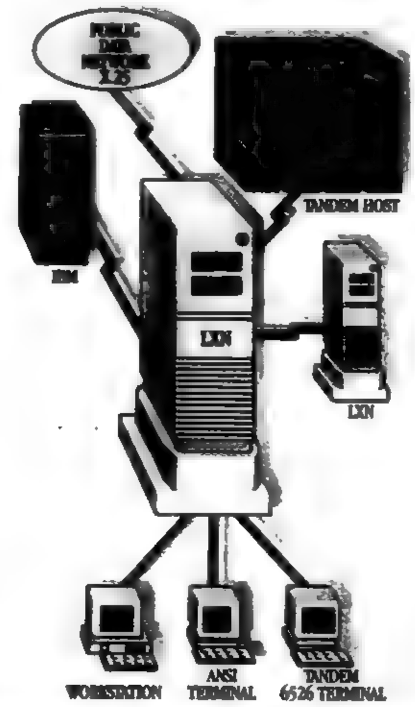
The LXN system integrates easily into the Tandem transaction processing network. You can access both Tandem host applications and UNIX applications, as well as other hosts through SNA or X.25. You can connect PCs to LXN through Ethernet LANs, then LXN to other systems. A MS-DOS file server provides availability benefits of LXN to PC users.



HIGH AVAILABILITY.

Tandem is the first to bring OLTP features to UNIX in this price range. The system can support two mirrored disks. If one fails, the other takes over. In case of power failure, an uninterruptible power supply will run the entire system for up to five minutes. It will also send everything in memory to disk. When power is restored, auto restart resumes where you left off, maintaining data integrity.

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Now you can run your UNIX applications and access the Tandem OLTP network— all from any workstation. The power comes from a 32-bit microprocessor. It's backed by a 1.6 megabyte floppy disk drive, 80 or 170-megabyte hard disk storage and a 60-megabyte streaming cartridge tape drive.

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EXECUTIVE REPORT

OPTICAL DISKS

Optical products inching their way to market reality

BY BARBARA SEHR

Gary Hill's superiors at Dun & Bradstreet Corp. were not impressed in 1983 when he showed them what a fledging new technology called compact disk/read-only memory (CD-ROM) could do for the company's numerous financial and consumer data bases. But this rejection did no more to dampen Hill's enthusiasm for the technology than the Boland Amendment did to temper Ollie North's zeal for aiding the Contra resistance in Nicaragua.

Hill, a vice-president and general manager of the corporate financial giant's Donnelley Marketing Information Services arm, launched an internal project to publish a consumer market research data base on CD-ROM disks. The project, it turned out, was quite successful. "Once [top-management officials] saw what we had, they fell in love," Hill recalls.

Indeed, Donnelley's revenue figures already indicate that the CD-ROM data base is having its effect on the company's distribution plans. Where on-line charges once represented 75% of the revenue in Hill's department, that figure is now down to about 2% of revenue. "I have no plans to go back to time-sharing," Hill says.

Hill is a pioneer in the new world of optical technology. But are he and other pioneers on a collision course with market reality, or are they the forefathers of still another technological revolution? The answer is that while its beginning has been slow, optical technology seems ready to make its move — standards, software and user security permitting.

In fact, there is no shortage of MIS interest in optical storage. Because of an explosion in graphics-intensive applications, magnetic media is stretched to its limits. One user facing this crisis is Gary L. Porter, systems analyst at Jeppesen Sanderson Corp. in Englewood, Colo. Jeppesen Sanderson, responsible for 90% of the graphics-generated navigational maps used by commercial airlines, is choking on 1.2G bytes of magnetic disks. For Porter, optical storage promises gigabytes, even terabytes, of on-line storage within a single system. But it also leads to confusion and other drawbacks.

The navigational maps published by Jeppesen Sanderson must be stored and revised every 28 to 56 days, some with major, some with minor changes. Today's optical storage is not erasable: Once a laser image is burned onto a disk, it is permanent. Should the company wait for an erasable optical disk? Porter says his application can't.

But, he says, an even larger roadblock bars the technology's progress. There is a decided lack of standards in the industry, something Porter says must be corrected before his company decides to take the optical plunge. "We've gotten ourselves into trouble before because of nonstandard storage systems," he says.

Porter's skepticism is understandable — from the beginning, the optical storage industry has been plagued by unfulfilled promises and unmet delivery dates. If the technology finally seems ready to make real strides in the marketplace, it may be because the industry's biggest names are joining the fray. IBM and Digital Equipment Corp. are both set to enter the field.

According to published reports, DEC will step into the optical arena at the high end, with a jukebox product slated to be introduced at Decworld next month. The product will be sold as a document-imaging system, combining features developed in-house with hardware acquired from outside of DEC. IBM, on the other hand, has already entered the market at the low end, offering an optical-disk peripheral with its Personal System/2, which was introduced last April.

Optical storage of all kinds comprises a technology that has battled user resistance but is now starting to discover its application potential. Indeed, up until recently, optical technology vendors have sold more shiny forecasts than shiny disks. "This is not a technological revolution in the same sense of word processing systems replacing typewriters," says Richard Fisher, an independent consultant with Kalthoff-Fisher Associates, Inc. in Santa Clara, Calif. "This is an additional option that won't replace anything."

Optical technology can be divided into three categories. Most attention in the last year has focused on CD-ROM, which has thrived primarily at the personal computer level as a multimedia storage device that complements, rather than replaces,

JAMES ENDICOTT

INSIDE

Documents on disk: Are they legal?
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CD-ROM standards under control
Page 67

Sehr is a free-lance writer based in Seattle.

Inching

FROM PREVIOUS PAGE

existing PC storage peripherals.

Write-once read-many (WORM) disks, on the other hand, are emerging as alternatives both to the image-storage capabilities of microfiche and microfilm and the archival storage of magnetic tape drives. A greater threat to magnetic storage, however, is erasable optical disks, which are still in the development stage. Most observers do not expect this technology to be available in production quantities before 1990.

CD-ROM off the ground

CD-ROM technology, boosted by the explosive popularity of its audio parent, appears finally off the ground floor and ready to lead users down the optical path.

CD-ROM disks are made of reflective metal, which records information in digital form, creating a series of microscopic pits and adjoining spaces arranged in spiraling tracks. Each disk contains 16,000 tracks per inch, and each disk is approximately 4½ inches in diameter.

Despite its large storage capabilities and the joint marketing and development efforts of two of the world's largest electronics manufacturers that developed CD-ROM — Sony Corp. and Philips N.V. — the technology did not win instant acceptance by users. In its early years, from around 1983 until 1985, CD-ROM was like the high school cheerleader everyone was afraid to ask out for a date.

However, once users discovered that this attractive phenomenon had a personality, its dance card began to fill up with applications and new ideas. For instance, MIS and PC managers are finding that CD-ROM provides a means of distributing 600 million characters of data — equivalent to 175,000 pages of ASCII text, plus indices — to any end user with a microcomputer and a $700 drive.

Whereas today's average PC random-access memory is about one megabyte or less, CD-ROM can expand ROM available on PCs to more than half a gigabyte. With the ROM supplement, applications once unheard of become a strong possibility.

Already, Microsoft Corp. has introduced Bookshelf, an on-line reference source that, on a single disk, includes the contents of major reference works, including a national ZIP code directory, *Bartlett's Familiar Quotations*, a thesaurus and a manual of style. Other on-line reference facilities in the works from other vendors include a medical reference guide for physicians and a legal precedence guide for attorneys.

CD-ROM's focus has turned away in the past year from the more ambitious applications of on-line multimedia encyclopedias and graphically enhanced video games. In the corporate world, the technology has set its sights on converting on-line data bases to CD-ROM. Currently, most of the data bases converted have been volumes that are less frequently updated, such as biannual catalogs, quarterly financial information and the like.

But even with these maturing applications, growing up hasn't been easy for CD-ROM technology. According to Ed Rothchild, chairman of San Francisco consulting and market research firm Rothchild Consultants, CD-ROM shipments dropped to 8,000 units in 1986, compared with 12,000 shipments in 1985, probably due to confusion about the technology. However, Rothchild says the tide has been stemmed by standards developments (see story page 67). His organization recently increased this year's forecasts of 25,000 units shipped to 38,000 units.

And as shipments have gone up, prices have come down. CD-ROM has already experienced the beginning of a price decline as the technology begins to mature (see chart page 58).

Lower prices notwithstanding, the lack of standards has been a major hurdle on CD-ROM's acceptance track. More than any other optical technology, interchangeability is critical to CD-ROM. Fortunately, the largest manufacturers of CD-ROM players, media and software — as well as some influential observers — convened at Lake Tahoe, Calif., to develop what has become known as the High Sierra standard. The result is a disk format that can be played on any CD-ROM player, just as a compact disk can be played on any compact-disk player.

This means that people like Hill will eventually be able to publish a Dun & Bradstreet data base that records the spending habits of consumers in a particular demographic area and that the manager of the local K Mart or the national advertising manager of Proctor & Gamble can access the data at his own convenience and at his own rate of speed — without worrying about running up on-line costs. The disks can be distributed through the mail — like a floppy disk — and at far less cost than the weighty printed manuals that once held the data base.

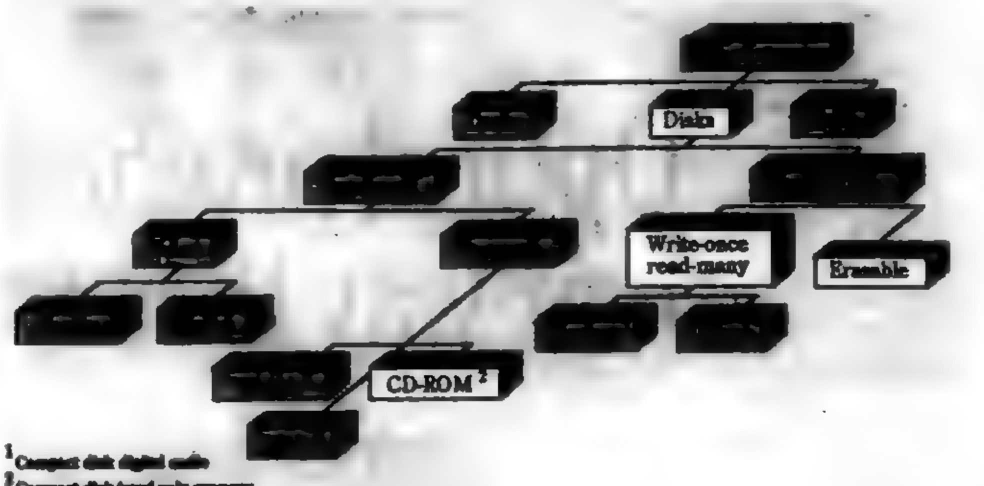
WORMs

In theory, WORM disks feature removability, ruggedness and massive data storage capacity

Continued on next page

Optical storage technology tree

Optical disks are the most mature of the three types of optical storage; CD-ROM, write-once read-many and erasable disks are the most viable technologies for MIS/DP applications



[1] Compact disk digital audio
[2] Compact disk/read-only memory
[3] Compact disk interactive

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CW CHART

Selected optical product implementation forecast

Optical products will see widespread use in the next three years

Product type	1982	'83	'84	'85	'86	'87	'88	'89	'90	'91
Digital videodisk		★	★		★					
CD-ROM¹			★	★	★		★			
CD-I²					★	★	★		★	
Optical ROM					★	★	★	★		
Write-once optical disk	★			★	★		★			
Erasable optical disk			★			★		★	★	
Hard-disk cartridge	★		★	★		★				

¹ Compact disk/read-only memory
² Compact disk interactive

[illegible]

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The IRS is asking the question: Is seeing believing in courts of law?

Are optical images acceptable as evidence in a court of law? It may not seem a critical question today, but interest in the legality of optical storage of images is likely to accelerate in the next few years.

According to a recent survey done by Richard Fisher, an independent consultant who performed the survey for The Yankee Group in Boston, between 100 and 150 document-imaging installations exist today. Fisher projects that number will increase about 75% per year, which he says "may not sound like much compared with the 100% and 200% growth once experienced in the personal computer market, but it is still quite healthy."

And according to Frank Moore, chief of the Laser Technology Center at the Information Systems Development section of the Internal Revenue Service in Fresno, Calif., the legal issue is one of the more important ones to be considered before the IRS's optical disk program is expanded.

To date, there has been no court ruling on the legality of images stored on optical disks. However, Moore says, the IRS has received general assurance from its own legal counsel and the U.S. Department of Justice that images stored on optical disks fall under the provisions of the Uniform Paperwork Act. Accordingly, the National Archives, responsible for paper management within the federal government, has authorized the IRS to destroy original returns when images have been stored on optical disks. Moore emphasizes, however, that no original returns have been destroyed in the pilot program.

The opinion of the IRS legal counsel conforms to the belief of Robert S. Williams, president of Cohasset Associates, a Chicago management consulting firm that deals with record management. Williams is about to publish *Legality of Optical Storage*, a book that explores the legal considerations of optically stored images.

Williams says a "very good case" can be made for the admission into evidence of images stored on optical disks, just as evidence submitted on microfilm and computer printouts have been admitted in previous cases. Williams adds that it is too early for a court test.

Only one state, New Jersey, has so far considered any legislation specifically outlining guidelines for the admissibility of optical disk images. The bill, introduced in the 1986 session of the New Jersey legislature, has not been adopted into law to date, Williams says.

BARBARA SEHR

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Typical turnkey optical filing systems

The characteristics of optical disk-based filing systems vary widely

	Tab Products Co.'s Laser Optic 2500	*Tab Products' Laser Optic 1000*	*3M Co.'s Docutron 2000*	*Filenet Corp.'s System*	*Laserdata, Inc.'s Laserview*	*CIE Systems, Inc.'s Optical Filing System*	*Canon U.S.A., Inc.'s Canofile 5500*	*Fuji Photo Film U.S.A., Inc.'s OD System*	*Minolta Corp.'s MIIIMS*	*Philips N.V.'s Megadoc*
Disk size (diameter)	12 in.	5¼ in.	12 in.	12 in.	12 or 5¼ in.	12 in.	8 in.	8 in.	8 in.	12 in.
Disk capacity (page images)	60,000	5,000	60,000	45,000	Varies	60,000	33,000	15,000	15,000	45,000
Scanner resolution (pixel/in.)	200 or 400	200	200 or 400	200	300	200 or 400	200, 300 or 400	200 or 400	200 or 400	200
Maximum document input size	B4	Legal	A3	B4	A4	B4	A3	A3	A3	A3
Scanning time (A4 page)	5 sec.	12 sec.	3 sec.	4 sec.	5 sec.	5 sec.	5 sec.	6 sec.	3 sec.	5 sec.
Microfilm scanner	No	No	No	No	No	No	Yes	Yes	Yes	No
Video resolution (pixel/in.)	200	100	200	100 or 200	150 or 300	200	200	200	300	200
Video display size (diagonal)	15 in.	15 in.	17 in.	20 in.	15 in.	15 in.	15 in.	15 or 20 in.	15 in.	15 in.
Printer resolution (pixel/in.)	400	300	400	400	300	400	400	400	400	200
Printer output (maximum document size)	B4	Legal	A3	A4	A4	B4	A3	A3	A3	A4
Jukebox retrieval unit	Option	No	Future	Yes	No	Option	Option	Option	No	Yes
Availability in U.S.	Now	Now	Now	Now	Now	Now	This year	Uncertain	Uncertain	Withdrawn

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CW CHART

Inching

FROM PREVIOUS PAGE

capacity within a small form factor. Even the 12-in. optical cartridges require only a fraction of the archival storage space taken up by the standard 10-in. magnetic tape reels. They do not have to be threaded and can be maintained under less than ideal computer room conditions.

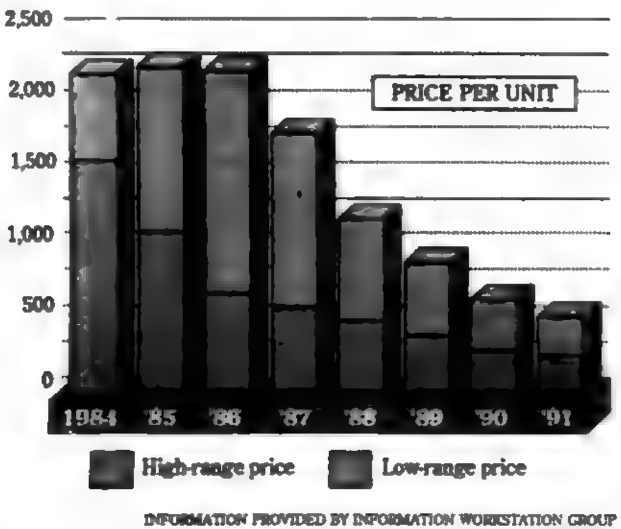
Recording on WORM disks does not require special mastering procedures, as CD-ROM does. There are several recording technologies, but most involve a laser burning pits into thermally sensitive recording material. Information from video scanners, keyboards, optical character recognition equipment and other devices can be recorded on WORMs.

While more sophisticated than their magnetic cousins, WORM disks do not enjoy the fast access time of magnetic media, and users are very much wedded to their tape libraries. Some users may balk at a 100- to 200-msec access time, having been accustomed to access times between 17 and 50 msec for magnetic media.

However, for someone like Charles Plesums, acting director of systems research at the United Service Automobile Association (USAA) in San Antonio, the access time of optical disks can be an advantage. The USAA is a national insurance company that underwrites the automobiles of military officers.

CD-ROM drive price forecast

By 1991, CD-ROM drive prices should plummet to $500 or less



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Until recently, correspondence between the insurance company and its clients was stored on microfilm. "There is quite a difference between searching 100 msec for something on an optical disk and several hours of searching through microfilm," Plesums says.

Legal requirements force insurance companies like USAA to keep all correspondence regarding a claim in storage for many years. The combined graphics images would take up far too much space on magnetic disk or tape. "There is no other alternative for us than optical storage," Plesums notes.

What is the price?

While optical disks represent a major savings to storage-intensive applications like Plesums', the initial cost of WORM systems and media also represents key considerations that determine whether the technology can meet its full potential. Today's WORM systems can cost anywhere from the $6,000 system integrated into the PS/2 to the multimillion-dollar levels of custom jukeboxes.

Price, however, may not be a barrier to a huge corporate institution seeking record management savings, such as the Internal Revenue Service. In fact, Rothchild Consultants has estimated that the cost per megabit for a 12-in. WORM disk is only a penny, half that of 6.25 bit/in. magnetic tape reels. It is, however, 10 times the cost per megabit of microfilm, according to a Rothchild survey.

It has been four years since the first WORM drive rolled off the production line at Storage Technology Corp. in Louisville, Colo. According to Rothchild Consultants, there were only 13,500 drives shipped worldwide between then and the end of 1986 — a figure that would hardly represent a day's shipment of magnetic drives today.

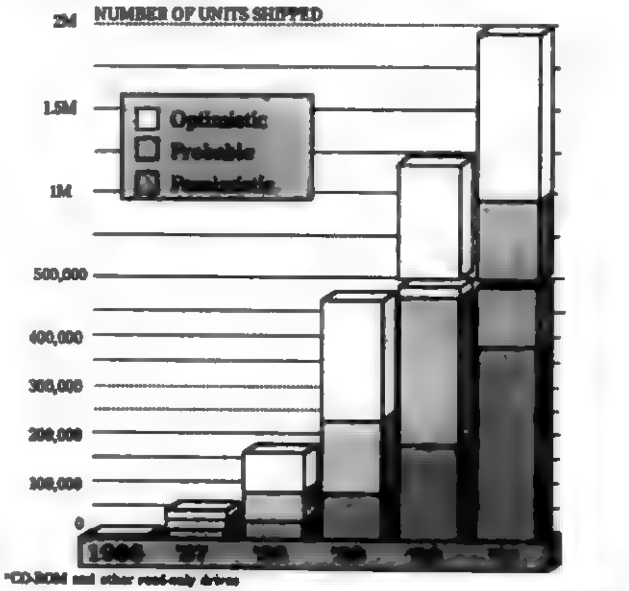
Shipments of 5¼-in. WORM disks alone are expected to exceed 25,000 units this year, while 12,000 12-in. disks are forecast by Rothchild. This reflects the sharpened interests in WORM disks as a result of document-imaging applications like the USAA's and one in test mode at the National Archives (see story page 63). Office automation specialists see great potential in the enormous capacities available within a single optical disk and the huge jukeboxes already in service. Fisher estimates that the document-imaging market will grow from about $100 million this year to $1.25 billion in 1990. "That's not explosive growth in PC terms," Fisher says, "but it's nothing to sneeze at."

Most of the document-imaging systems use jukeboxes with more than one optical platter. A jukebox is a rack system similar to the disk packs of another time that could allow several hundred

Continued on page 62

Optical drive* market forecast

The optical drive market should zoom to nearly one million units shipped by 1991



*CD-ROM and other read-only drives

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CW CHART

New toy: Even the military is training with videodisks

BY JANET FIDERIO

The med students gather around an IBM Personal Computer AT equipped with hard disk, touch-screen monitor and videodisk player. An image of a patient being wheeled into an emergency room appears on the screen.

It is up to the students to provide acute care for the patient and stabilize his condition. By touching the screen and choosing items from a menu, they gather information and direct treatment. Suddenly, however, the patient's condition worsens; the students watch as the patient slips into shock — a result of their misdiagnosis.

The Clinical Simulator System described above, created by Intelligent Images, Inc. in San Diego, is one of a new category of training products that combine optical technology — namely laser-imprinted videodisks — with sound, PCs, color monitors and a sampling of computer-assisted instruction techniques.

The products are designed to be interactive and to provide feedback. For example, the Clinical Simulation System not only recreates emergencies; it then records student actions as they respond to situations. At the end of each acute-care simulation, students are provided with printouts that track the treatment session's sequence and time of actions. The system will tell the students what the correct diagnosis and treatment plan should have been and, if requested, compare what the students spent on medication, laboratory tests, X-rays and so on with what experts would have spent caring for the same patient.

Not a flash in the pan

Intelligent Images, and vendors of similar systems that address the industrial, technical and MIS markets, is betting that these products are the answer to our technical training needs. And the market figures seem to agree. According to Rockley Miller, editor and publisher of "The Videodisc Monitor," more than 111,000 industrial videodisk players have been sold into the U.S. nonconsumer market. One-third of these systems are found in the industrial training arena, and about half of those are used solely in the auto industry. Another third are scattered across medical, government, military and other education markets. Nearly all of the remaining systems are used in entertainment arcades.

One major indication of this market's stability is IBM's recent arrival, with its Info Window hardware package. In typical IBM fashion, Miller notes, "[Info Window] has provided stabilization among software support tools — the vast majority of the authoring packages that are used to develop courseware have added support for IBM."

Yet another indication that the market is more than just a flash in the pan is the U.S. military's interest in the technology. In one of the largest videodisk contracts to date, the U.S. Army recently signed an agreement with Matrox Electronic Systems, Inc. in Montreal for 47,900 electronic information delivery systems.

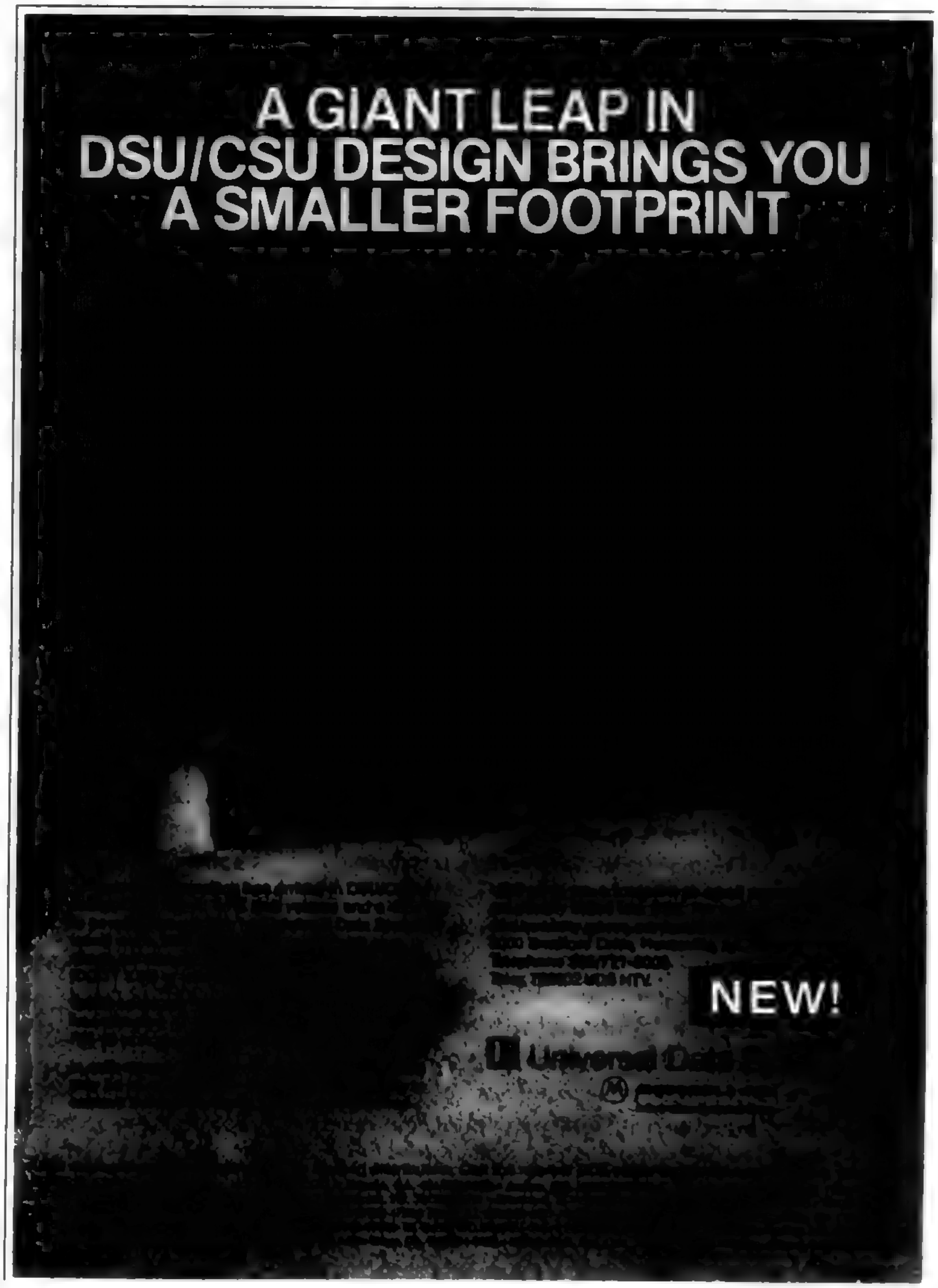
In the industrial and DP corner, videodisks are also making an impact. At 3M Corp., five interactive videodisk systems provide technical training in electronics, math, robotics and hydraulics — while in the learning center, one system provides training for MIS-related courses. According to Jim Gumbusky, human resources development manager for manufacturing at 3M's St. Paul, Minn., facility, interactive video systems can tailor training to the ability of the individual. While fast learners can whiz through the lessons, those having a bit more difficulty can take their time. "The important thing is that [employees] obtain the tools you want them to have," Gumbusky says.

Gumbusky says that he sees interactive video as a supplement, not a replacement, for stand-up training. "Adults are more comfortable with the self-paced [videodisk systems] than with the classroom, because they aren't in a situation where their peers are chiding them. Also, if they are having trouble understanding the material, they can go through it again."

Miller notes that MIS should not overlook the fact that some of the most extensive libraries of existing courseware for interactive video systems deal with fairly sophisticated computer topics. "The availability of this type of courseware — the kind that can bring people in and get them up to speed on new system configurations or software — could prove to be extremely valuable," Miller says.

"Videodisk is the newest toy for many MIS people," adds Margaret Sullivan, president of Practical Training Solutions, Inc., a Chicago-based consultancy. "There is an entertainment factor with video that you don't have with other forms of training. In terms of actual training effectiveness, most of it tends to come with the entertainment value — the more students enjoy what they're doing, the more they're going to retain." ●

Fiderio is a *Computerworld* senior editor, features.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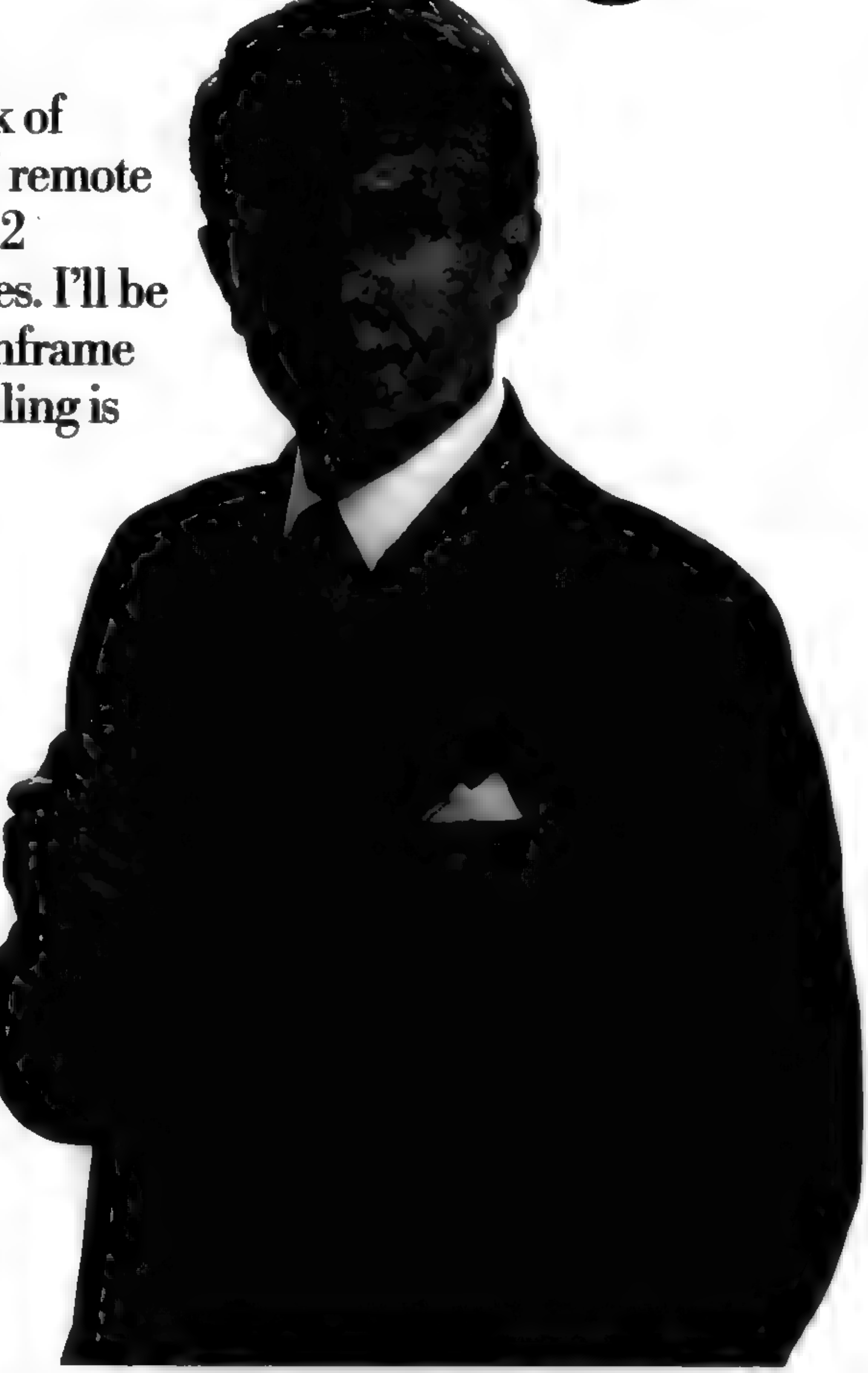

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Inching

FROM PAGE 58

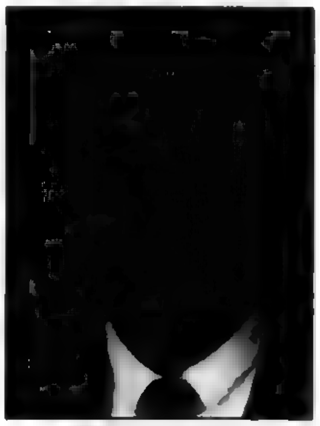
optical platters to be mounted into a rack that is hooked into a single controller. The result is the hundreds of gigabytes of storage capacity required for the storage of graphics images.

Document imaging is simply the preservation of complete documents in which graphics and text are digitized into machine-readable form that can be recalled on a high-resolution VDT. Until the entry of the WORM disk, microfilm and microfiche provided a state-of-the-art alternative to storing reams of paper documents. The primary drawback of microfilm, however, was its time-consuming sequential, rather than random, access. Even the relatively slow random access of WORM disks appears superior when compared with a search through reel after reel of microfilm.

Banking, insurance and government — all paper-intensive businesses — are the primary targets for document imaging on optical disks. According to Fisher, the most important development in these corporate environments has been the return of technologically sophisticated MIS personnel to the evaluation, testing and application decisions surrounding the use of document-imaging systems. He notes that the significant costs both of the optical storage systems and the high-resolution terminals necessary for document retrieval have revived the importance of MIS decision making.

USAA's Plesums, like Hill, had the time and responsibility to experiment with new ways of solving old problems. Unlike some users, he had the technical ability to enhance raw products still in their infancy and provide manufacturers with experienced user input.

In 1986, Plesums had a turnkey optical disk system from Filenet Corp. in Costa Mesa, Calif., installed at USAA headquarters. The system, which cost more than $500,000, features a jukebox with several hundred gigabytes of storage capacity. The system also features removable disks that can be stored until needed — for example, when a customer inquiry needs to be checked.



USAA's Plesums

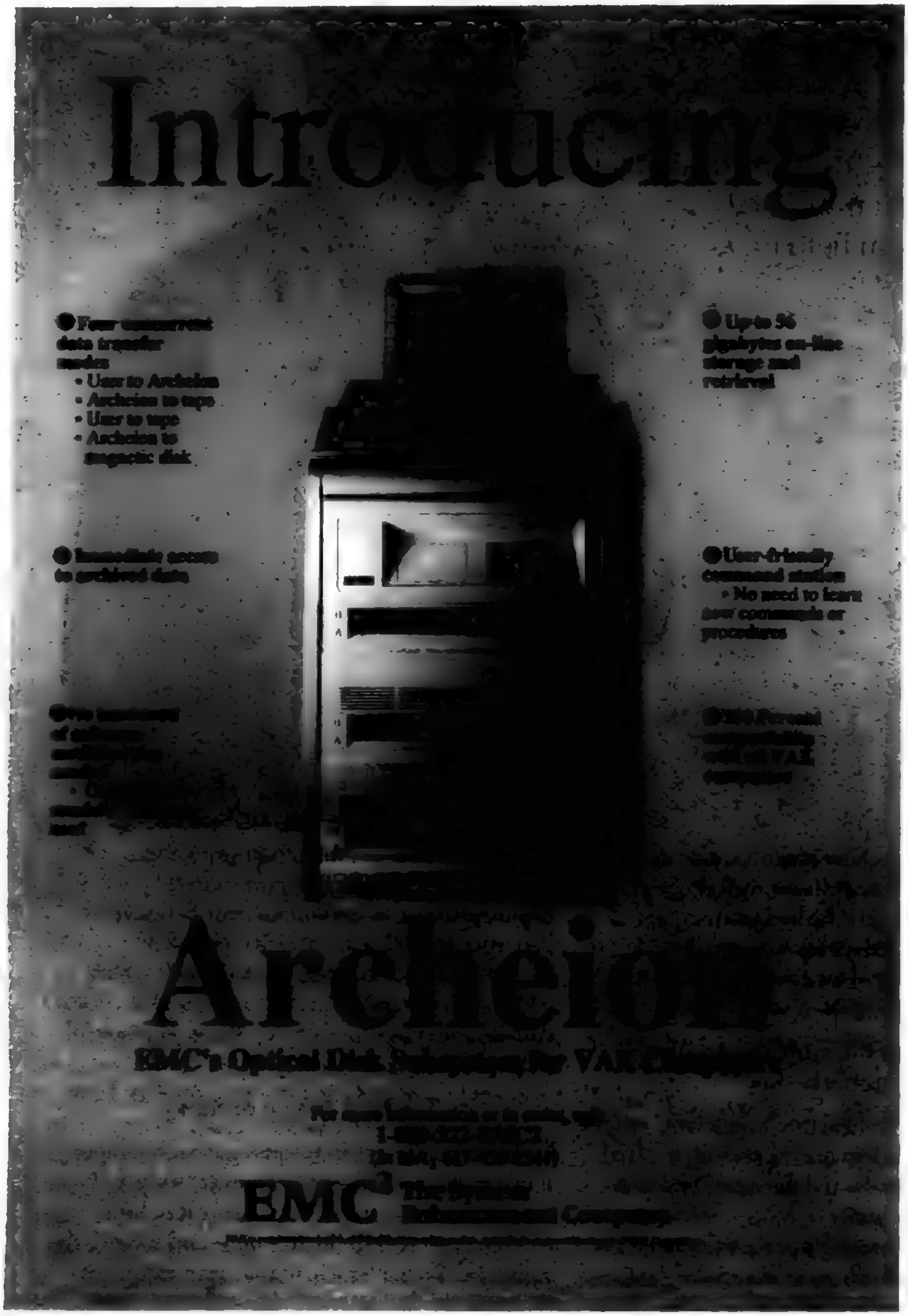
"Instead of having to get back to a customer perhaps the next day with requested information, the operator can access the information in seconds and give the answer right over the phone," Plesums adds.

No match for IRS

While Plesums' paper congestion problem would seem huge to most users, it is no match for Uncle Sam's own IRS. Frank Moore, chief of the Laser Technology Center at the Information Systems Development section of the IRS, says that more than 1.5 billion documents are currently stored in IRS files, at a total cost to the government of some $40 million so far. The congestion arises because federal law mandates that the IRS keep originals of forms such as the familiar 1040 for various lengths of time. For example, while personal income tax forms must be kept for a little less than seven years, corporate income tax returns must be stored for 75 years.

In a pilot program at the IRS service center in Fresno, Calif., a custom-designed set of three jukeboxes with WORM disks capable of storing up to 600G bytes of digitally scanned tax forms is now being tested. Taxpayers targeted for audits will be happy to know that when the system is up and the IRS picks out the lucky returns for a closer look, they can be accessed in as little as 30 seconds, where once

Continued on page 64



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INTERVIEW

Archiving the Archives

With space at a premium, the National Archives is installing a videodisk image storage and retrieval system "to store, maintain and make available to the public the records of the federal government."

According to Bill Hooton, director of the National Archives' optical digital image project, the archives' charter reads, "To store, maintain and make available to the public the records of the federal government." With hundreds of thousands of such records, that's a tall order to fill.

Hooton, 36, started in DP at the Internal Revenue Service in 1970, became interested in videodisk for image storage and retrieval and eventually designed a paperless IRS using optical disks. After that ambitious trial project was under way, he moved to the National Archives as part of its high-tech task force. Currently, he is installing the test system that will put the fragile 19th-century personnel documents of Tennessee's Confederate soldiers into an optical storage system put together by Unisys Corp.'s System Development Group. Hooton, who is also chairman of the Digital Image Application Users Group, spoke recently with Kelly Shea, a *Computerworld* assistant editor, about the nuances of the Archives' system.

What needs will an optical imaging system fill at the National Archives?

The biggest need is that we're completely out of space. So we either have to build a new building and/or we have to do something with the existing space.

Number two is a real preservation issue — we don't want to handle those original documents. It's also a real pain in the neck to try to get at the information — of course, any kind of manual filing system would be, especially in terms of the six or seven billion page images of permanent records that we have. And those are the ones we have to keep forever. We have about 15 billion, if you count everything.

So those are two issues, and of course, trying to automate the retrieval is another one.

When this system is up and running, will you put as many documents as possible on it?

Well, not necessarily on this system. This is really an isolated system, intended to be a research test bed. That's why it's so flexible. If we went with a much larger system, we would probably redesign it.

How many users will be able to access this system?

At one time, we'll have four pure retrieval terminals, with the possibility of about eight, because any of these high-resolution monitors — which are also used for quality control and indexing — can be used for anything else. They're strictly controlled by the user profile on the password.

Have you followed the traditional rules of DP acquisition with this system?

Oh yes. There's only one benefit to doing a research test as opposed to a pure production DP-type of an operation, and that is that you don't have to do a cost-benefit analysis before you buy it. Because by definition you are trying to get that information.

Have there been any major problems so far? When do you plan to have this test running?

The date right now for installation completion is Dec. 7. I expect it will be before that.

Everything is going extremely smoothly, much more smoothly than anything I've ever been involved with. This is a $1 million system — actually it's a $4 million system, but we paid $1 million for it because it's advertising for Unisys.

I think the reason things are going so smoothly is that Unisys realizes that they'll either get $30 million worth of advertising if it's a good system, or they'll have to close their doors if it's a bad one.

I'm in a position to tell the world, and I plan on telling the world. So they're working devilishly hard to try and make it a beautiful system. They have done that, and things have been on time, and it's really nice so far. I reserve the right to change my mind on that, though.

National Archives' Hooton

ALAN WITSCHONKE

How will MIS shops interface with such systems?

That's a big political problem these days. It was a big political issue originally at the IRS, because they've got a huge DP division nationwide — we're talking thousands of people. At the IRS, people didn't know where the system fell. Was it a file management system? Was it a DP system? It didn't really fall under a DP procurement, because it didn't manipulate data, it only stored it. Nobody really wanted it at first, but as soon as it caught on then everybody wanted it.

Users don't usually want to do this type of procurement through the normal, huge DP organization because it doesn't get done quickly. It gets put in with all the other thousands of projects and doesn't go anywhere. If it's kept on the user side, driven by the user side and looked at as more of a records management kind of thing, it usually gets done much faster. So that's where people are opting to try and put it. But more and more now I see that it's going as normal DP.

Do you think that that's better? Should it be under the guise of MIS?

Oh I don't know. It all depends on whether it's going to be integrated in with the existing mainframe; if so, then it really should be under DP. If it's a little stand-alone, office-size thing, it should not be under DP, I don't think.

Will the Archives' system eventually be integrated with DP?

Well, right now we don't have DP. We don't have anything like that. We've got a few people, we've got some small branches and things like that, but we don't really have a large organization. We are trying to reorganize, and eventually we will probably have one giant DP group like everybody else does. But right now it's not a problem. Everything's just being run by this small, high-tech staff that I'm on.

A lot of people say that this is a technology looking for a market. Is it?

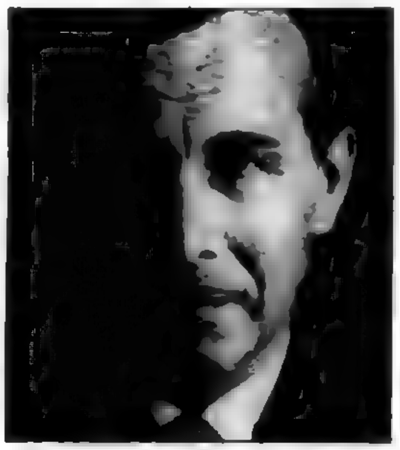
I think it was always a technology looking for an application. And I think that users now can look at those test pioneers who took the ball and ran with it at the beginning and say, "Look, it really did work. We don't have to go with some kind of test system for our application. We have a big application, and we can go with a production system." And that, I think, is what's going to turn it around. So it just took time. It always takes time. •

Inching

FROM PAGE 62

it took six weeks of rummaging through files. It also means, according to Moore, that taxpayers with a question about a return filed years ago can have their queries answered in a much faster time. Moore says the present system "can retrieve 30% of the 1.5 billion documents now in storage in Fresno."

The IRS's decision to go with an optical disk system was made in 1984, when the technology was still relatively new. Since then, Moore notes, there has been quite a bit of progress in optical disk technology. Data throughput times have increased, access time is improving, and the cost of the high-resolution terminals that retrieve the images is on the decline. The Fresno project remains a pilot program, however, and "there is no indication that this system will become part of a complete system in the future," Moore says.



Freeman Associates' Freeman

Systems such as those custom-made for the IRS and USAA were designed for highly sophisticated users. As a result, very little emphasis was placed on creating operating and applications software that is entirely user-friendly. Plesums, however, says even his custom system does not pose a major training problem for personnel assigned to its operation. "It's not hard; it's just different," he says.

But for most future users of optical systems, a user shell and refined applications that reflect the write-once limitations of today's WORM disks are key requirements. In fact, software is a barrier even more critical to WORM technology than standards. The software problem with optical disks comes into play in the relationship of the optical drive to the operating system.

Since operating systems were designed with magnetic disks in mind, the operating system has a tendency to want to reuse disk space, which is not possible on a WORM disk. This must be overcome with software that makes the WORM disk transparent to the operating system. A number of systems houses working with various CPUs have developed software to overcome operating systems, including Microsoft's MS-DOS, Unix and DEC's VMS. But more must be done to create transparent user shells.

Erasable disks

Most erasable disks are recorded using lasers to heat magnetized areas coated with various metals. The magnetism provides polarity in the sections, which can then be read with another laser. Data is

Continued on page 66

WORM standards debate breeds world of confusion

How important are standards?

If you own a Betamax or an eight-track tape player, you may have already discovered the importance of standards in a media that must be interchanged among many users. Unlike compact disk/read-only memory technology, however, in which interchange is a key to the success of a disk, the interchange of write-once read-many (WORM) disks is not always necessary.

'[The need for standards] simply depends on whether an application requires the interchange of media," says Richard Fisher, an independent consultant with Kalthoff-Fisher Associates, Inc. in Santa Clara, Calif. "In most of our applications, we have discovered that only a small minority of users requires interchange."

Before the stream of 5¼-in. WORM disk introductions began in 1985, there was little concern for standards in the 12-in. world. Optical disks were rare and expensive, and customers generally did not require interchangeability. "Standards are not as important to our application as a reliable second and third source of media," says Frank Moore, chief of laser technology for the document imaging pilot project within the Internal Revenue Service in Fresno, Calif.

A second source of media is usually required by any systems integrator putting together a jukebox or other optical subsystem. In this way, optical disks are no different from a new semiconductor chip or a new form factor for a magnetic disk drive.

While Charles Plesums, acting director of system research for the United Service Automobile Association in San Antonio,

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T-1 Introduction to CD-ROM Industry, Markets, Futures
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T-2 Preparing Databases for CD-ROM, including catalogs and lists
End users or vendors planning a CD-ROM application will find this session invaluable for exploring database formats, indexing, searching systems, display formats and other practical issues. Also included will be the role of consultants and turnkey package suppliers, and problems of maintaining quality and timeliness of information once released. **For:** Publishers and user information systems and records management executives.

T-3 CD-ROM Technology: Hardware
This session covers the equipment technology side of CD-ROM, in the context of information storage sub-systems including magnetic storage, optical discs, erasable discs, CD/I and WORM. Discussions will include laser reading/recording methods and reading and error checking/correction. Drive topics will include standalone, ganged, networked and cartridge operations, production of discs; and aspects of implementing multi-drive, multi-user applications, including interface and service questions. **For:** Technically and product-oriented professionals interested in a systems-level understanding of CD-ROM.

T-4 CD-ROM As An In-House Publishing Application
Attend this tutorial to examine the suitability of CD-ROM as a replacement for paper and microfilm/fiche methods of publishing catalogs, parts lists, service and software manuals, directories and databases of all sorts. Attendees will discuss questions of economics, frequency of updating, transmission costs, security and access, training and equipment/viewer implementation. The session will also compare in-house production versus outside consultants and implementors. **For:** MIS, records management, field support and training professionals.

1:30-4:30 p.m.

T-5 CD-ROM Technology: Software
This session will look in detail at each step of CD-ROM usage via software, beginning with the user interface, indexing techniques, interaction with applications software including MS-DOS Extensions, and implications of standards issues (i.e., file formats, High Sierra, and others). Discussions will include problems of off-CD-ROM use of data and unauthorized reproduction. **For:** Professionals interested in the effect of software on the flow of information from disc to application.

T-6 Authoring Systems Workshop
Register for this session for detailed exposure to the tools needed to create the CD-ROM database, starting with a mass of data and ending with a useable application. You will learn about premastering, mastering, and service/equipment/programming approaches, including alternatives such as in-house and out-of-house consultants and turnkey suppliers. **For:** Professionals with expected responsibilities for managing CD-ROM product development.

T-7 MIS Applications for CD-ROM and Optical Memory
This session examines where CD-ROM fits in the MIS chain. You will become familiar with CD-ROM's suitability for different types of databases, including financial and other numerical bases, with attention to record length, speed, frequency of access, update scheduling, security/integration and backup requirements. Discussions will also include networking of drives, personal computers and other workstations/mainframes. **For:** MIS-experienced and systems/database management professionals.

T-8 Using CD-ROM in Expert Systems
The massive storage potential in CD-ROM, along with its low cost and reliability, make possible advanced expert or artificial intelligence applications ranging from emergency medicine to point-of-sales retail. This session will introduce some of the applications and the problems providers face with CD-ROM equipment in public or severe environments. **For:** Professionals who work with intelligent, educational, or decision-support systems and who plan to use CD-ROM technologies.

shares the IRS's requirement for a second source, he says he feels standards in the industry can only help the future of the technology — and especially users. "Standards will give users confidence in the technology and, at the same time, force media prices down as more suppliers emerge," Plesums notes.

But confusion reigns supreme in the brave new world of 5¼-in. optical disks. At a meeting in Portland, Ore., in March, the ANSI X3B11 committee endorsed continuous and sample servo formats.

The sample servo format has become known as "the OSI standard" in honor of its most forceful proponent, the Optical Storage International division of Colorodo Springs-based Laser Magnetic Storage International — a joint venture company formed by Control Data Corp. and Philips N.V. The joint venture is joined in the format endorsement by three other major optical disk makers, Sony Corp. in Japan, Alcatel Thomson Gigadisc in France and the Philips & Du Pont Optical Co., a joint media venture.

"THE NEED for standards simply depends on whether an application requires the interchange of media."

RICHARD FISHER
KALTHOFF-FISHER ASSOCIATES, INC.

However, a large contingent of smaller 5¼-in. optical disk drive makers led by Optotech, Inc. in Colorado Springs and Maxtor Corp. in San Jose, Calif., are pushing for the continuous servo.

The continuous servo disk features a grooved media previously used in 12-in. disk drives. Proponents say the continuous format will allow far greater capacities in drives and media in the future. Opponents, however, say the sample servo is technically superior because it allows additional recording space occupied by the grooves of a continuous servo disk. Sample servo proponents say the only reason smaller companies are sticking with the continuous servo is because they made production commitments early on and are unable to afford the high cost of retooling.

The American National Standards Institute (ANSI) is not the only source of confusion on the 5¼-in. optical disk standard. Japanese standards agencies reportedly also will support a dual banner. Observers there say not enough evidence exists at this point to make either standard technically superior.

IBM makes matters worse

In addition, IBM's decision to advance its own format — with its optical disk drive introduced as part of the Personal System/2 — has not made the problem any easier. The IBM disk is closer to the continuous servo than the sample servo, but it does not come close to either.

IBM's optical disk, reportedly manufactured by Japan's Matsushita Ltd., has been both hailed as a long-awaited IBM endorsement of optical technology and condemned by one media manufacturer, who asked to remain anonymous, as IBM's bid to kill the technology forever.

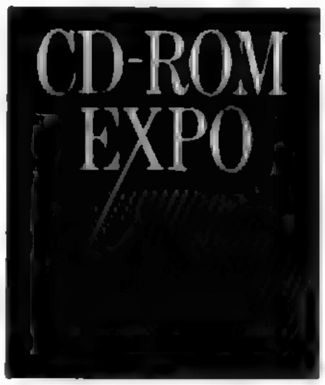
This type of criticism has come from competitors and experienced users of optical disks who say the IBM offering is too conservative. The IBM WORM disk holds only 200M bytes and has a very slow access time. It arrives at a time when magnetic disk technology is pushing past the 1G-byte level and dual-sided 5¼-in. optical cartridges hold nearly 2G bytes.

However, the loudest complaint about the IBM disk is that it fails to adhere to either of the two standards recently adopted by ANSI. Critics say standards are crucial to low-end products like IBM's, and some note that the company has not been as successful in determining low-end storage standards as it has at the high end.

The anxiety in all of this is that standards are far more important at the low end — in drives using the 5¼-in.-and-smaller form factor — than at the high end. The small form factor optical drives, like their magnetic cousins, will be entering applications that are more likely to need some sort of disk interchange. By definition, low-end disks are produced in greater volume and at lower cost and are likely to be distributed over a wider area. As a result, the question of interchange becomes more important, and, therefore, so does the question of standards.

Already there are signs of alarm within the industry. Frederick F. Geyer, program manager of the mass memory division at Eastman Kodak Co. in Rochester, N.Y., says his company has opted for a 3½-in. form factor for its one-of-a-kind erasable optical disk. He says Kodak does not even want to get involved in the 5¼-in. standards war. Instead, it will start from scratch and make its plans known to all, potential rivals included. "We will act responsibly," Geyer insists.

BARBARA SEHR



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erased by shooting an even more powerful laser at the disk, which reverses the established magnetism.

But where are erasable disks?

Ray Freeman, president of Freeman Associates, Inc., a Santa Barbara, Calif., market research firm, is from the school that contends production quantities will not emerge before mid-1990.

Rothchild disagrees. He says he believes that at least 1,000 erasable optical disk drives will be shipped by Japanese manufacturers later this year. However, he notes that production volumes from Japanese and U.S. suppliers probably will not be available before 1989.

When the age of optical storage began, the ultimate vision was erasable disks, which would combine the large storage capacity of optical media with the write-many-times versatility of magnetic media. Corporate records managers were salivating with anticipation of replacing huge tape-reel libraries with relatively tiny optical media cartridges.

Three possibilities

And the wait continues. A large stumbling block impeding the introduction of erasable disks is media production. Like manufacturers of semiconductors, thin-film heads and thin-film media before them, makers of optical media are experiencing the frustration of getting enough yields to make optical media cost-effective. There are three types of erasable optical media now in development. Magneto-optic is apparently the most advanced in production, according to Rothchild Consultants, but phase-change and ultimately erasable polymer media are likely to follow in quick succession.

Magneto-optic media features a tolerance for a high data rate and broad bandwidth. It has been the media of choice for the Japanese erasable disks now being introduced. Phase-change media allows an even higher data rate and broader bandwidth. It reportedly is preferred for optical video recording.

Erasable polymer is expected to be the lowest in cost of all three erasable media while, at the same time, offering the highest performance. However, this media is still in the experimental stages, and attractive yields have yet to be reached.

Meanwhile, amid the excitement, a funny thing has happened to erasable media on the road to reality. There is now some doubt that these disks are even necessary. "With magnetic disks getting larger in capacity at less cost than optical disks, the only advantage erasable disks will have is removability," Fisher notes. And erasable optical disk drives will naturally be far more expensive than their more mature magnetic rivals.

"The longer it takes erasable disks to get here, the less a market they will have," observes Jeffrey R. Dulude, director of marketing at Optotech, Inc., a manufacturer of 5¼-in. WORM disks in Colorado Springs.

According to analyst Freeman, erasable optical disks are likely to play their most dramatic role as a new form of backup. In this capacity, they will be a logical successor to the low-capacity floppy disks of an earlier era and to the high-capacity tape cartridges of today. "I believe there is room in the market both for WORM disks and erasable optical disks to live side by side," Freeman says.

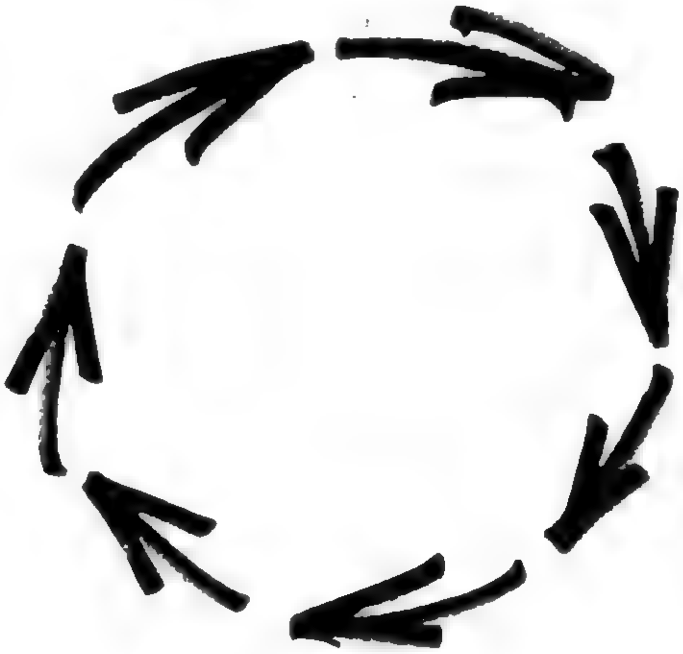
Ed Rothchild

Hope, not hype

While optical technology has undergone its challenges, it is making progress and cutting through the hype. Ironically, the most encouraging development in the past year has been a hesitance on the part of major drive makers to raise expectations too high. Optical Storage International, the nation's largest shipper of 12-in. disks, has been very sensitive to charges of hype in the industry. As a result, the company is holding back on its announcement of a forthcoming 5¼-in. optical drive until the product gets onto the loading dock.

Although acceptance has not appeared in the dimensions once expected, optical technology is still likely to become evident in everything from home CD-ROM players — which use a different file format — to the massive document-imaging applications of the IRS and the Library of Congress. Optical media may never reach the magnitude of success of magnetic media, however, which has seen floppy disks appearing in K Mart checkout lines.

But the pieces are beginning to come together. In the words of an enthusiastic analyst, Rothchild says, "All of the major technical problems have been solved. All of the pieces needed are in place to turn an interesting technology into a viable, essential and cost-effective tool upon which end users depend." •



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Organizations hash out CD-ROM standards, compatibility issues

BY JOHN GALE

In the compact disk/read-only memory (CD-ROM) arena, several standards and compatibility issues must be resolved before the technology can provide DP shops with the storage capabilities that MIS managers still only dream of. Most of these issues, while not completely settled, are under control through various agencies and vendor companies.

In 1985, the High Sierra Group created a standard to facilitate the use of CD-ROM with operating system file management in a variety of different operating environments. The group then worked with the National Information Standards Organization (NISO) and the European Computer Manufacturers Association (ECMA) until May 1986, when it proposed a file manager standard to the two organizations.

> IBM IS ONE of the few organizations that might be able to install a standard for higher resolution CRTs.

NISO and ECMA each approved the standard, which is currently undergoing final approval by the International Standards Organization (ISO).

This international standard provides for the following:

- A boot block, which enables a computer to boot or initiate processing from the optical disk.
- A volume table of contents. This specifies where files are on the disk and what their names are.
- Expandable logical volumes. An information product can be published as, for example, a two-disk set and then expanded as update disks are added.
- Support for the Philips N.V./Sony Corp. compact disk-interactive file structure.

The NISO/ECMA/ISO standard does not address those issues unique to write-once media, software interfaces for drives, hardware interfaces for drives, hardware standards, indexing of data or user retrieval commands.

It will require additional refinement in the file format arena when read-only disks are developed that are playable on write-once drives or when disks are developed that have read-only as well as write-once sectors.

In addition to standardization considerations, there are several significant compatibility issues that affect CD-ROM systems, including the following:

- In general, vendors support the High Sierra file manager standard. The systems integrator and/or software house dictates the data file and index layout on the disk. This layout has a significant effect on performance for some types of applications.
- There is no standardization of the interface type used by the hardware interface that connects the CD-ROM drive to the computer. The de facto industry standard is evolving toward small computer systems interfaces (SCSI), but not all drives use them at this time.

And unfortunately, not all SCSIs are compatible with each other, so the various hardware vendors have had to work together to resolve this problem. This will continue to be a problem area requiring drive-specific interfacing.

- There is also no standardization of the command set used by

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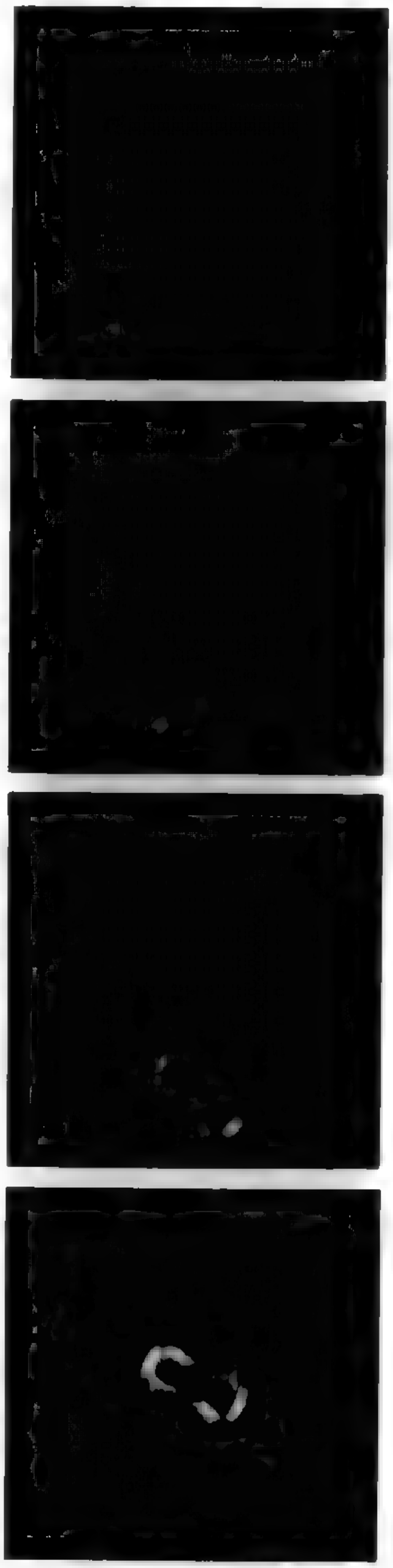
Gale is president of Information Workstation Group, a consulting firm located in Alexandria, Va.



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the hardware interface. The result is that each applications developer must provide support for the command sets — and thus the drives — of his choice in a software driver, which he must create.

Developers tend to select drives for support that are widely installed or perceived as providing better or more reliable performance or providing superior support. This means the retrieval software for a particular application may require a certain drive to be available to the end user.

This is being resolved as software houses support more hardware interfaces and, in the long term, as Microsoft Corp. releases its operating system extensions and relieves the software houses of the need to create drivers.

THE THROUGHPUT capabilities of the LAN are particularly significant for data-intensive applications such as image data bases. Thus, certain applications will perform more acceptably in some LANs than in others.

A few systems that require very high performance will remain and will, therefore, need unique hardware configurations.

• There is currently no standardization of user interfaces, retrieval commands or menus. Such standardization is actually not appropriate, however, as these functions are application-specific within a particular vertical market.

We must distinguish between data bases that support a particular professional task and those that appeal to a broad horizontal market, such as library reference departments.

For example, the needs of the brokerage community are very different from the needs of the owner of a hardware store. The respective end users will have different perceptions of what information is and varying experiences with computer interfaces.

• Index structures are not standardized. This means that a particular retrieval software package can access only data bases indexed using a predetermined subset of that specific package's indexing capabilities.

The retrieval software almost certainly cannot access a data base intended for a different software package.

Software houses regard their index structure as proprietary and as a key means by which they differentiate their product.

If index structures were standardized, the end user would experience a degradation in access capabilities and perceived response time.

The American Association of Publishers (AAP) and NISO are preparing an AAP Electronic Manuscript Standard. This standard might provide a basis for software houses to retain their proprietary indices and to enable a low level of common access to a data base via any retrieval software in which both the software and the data base support the AAP standard.

In addition, it is hoped that the AAP standard will provide low-level common access to data bases frequently found in the reference department of libraries.

Further standardization of index structures is not feasible in light of the need to optimize performance and access techniques at the application-specific level.

MOST CD-ROM systems use keyboards for entry devices. However, as systems are optimized for the layman end user, 10-key pads and mice creep in as nonstandard devices.

Many CD-ROM-based systems, such as those from Lotus Development Corp., The Library Corp. and Online Computer Systems, Inc., can be used in local-area networks (LAN). The throughput capabilities of the LAN are particularly significant for data-intensive applications such as image data bases. Thus, certain applications will perform more acceptably in some LANs than in others.

There are interesting points of commonality between the extensive imaging needs of optical disks, and more general work is being done in network data base protocols.

Some applications software packages require specific CRT graphics displays for CD-ROM, such as IBM's Enhanced Graphics Adapter. Others include software that is executed in a processor on the CRT interface board. IBM is one of the few organizations that might be able to install a standard for higher resolution CRTs.

Most CD-ROM systems use keyboards for entry devices. However, as systems are optimized for the layman end user, 10-key pads and mice creep in as nonstandard devices.

Some standards organizations have worked to resolve many of these critical issues. A common set of commands for use with write-once read-many drive interfaces has been proposed. This might be desirable for CD-ROM as well. •

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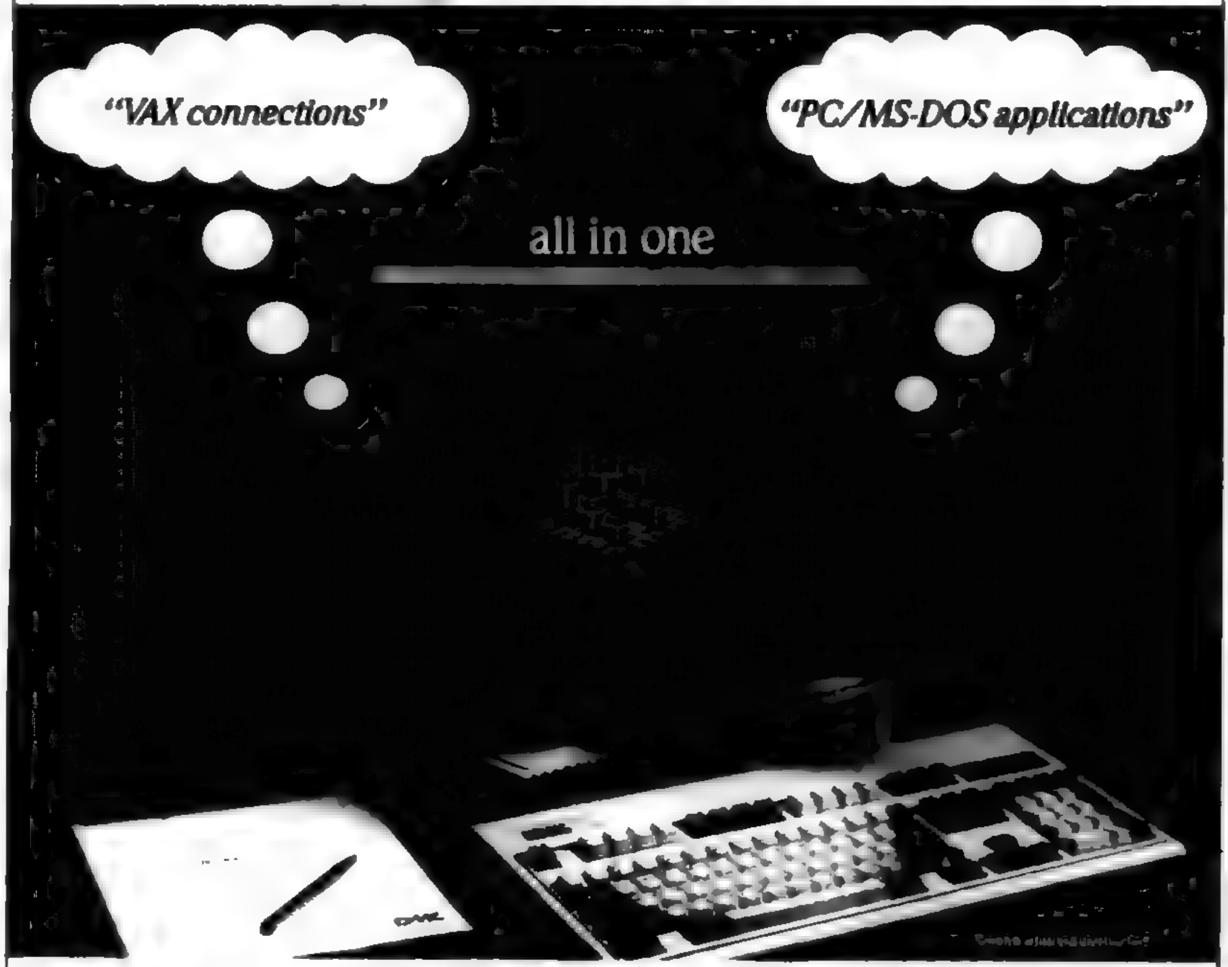

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Your personal computer isn't yours anymore

Scenarios for the next wave in end-user computing

BY DAVID FREELAND

Had we planned better, support for personal computers might well have been incorporated into the services provided by mainframe data processing centers, and information centers might never have come to be.

Now there is a second chance to plan more carefully, as recent major advances provide a fresh set of possibilities. Will information centers survive this time around, or will they become history?

Three technological milestones have changed some of the most significant premises on which information centers were originally established:

1) Flexibility provided by currently available local-area network (LAN) technology.
2) Increasing flexibility and portability of data base technology.
3) Imminent availability of distributed processing software.

These advances are altering the way information centers do business in the following ways:

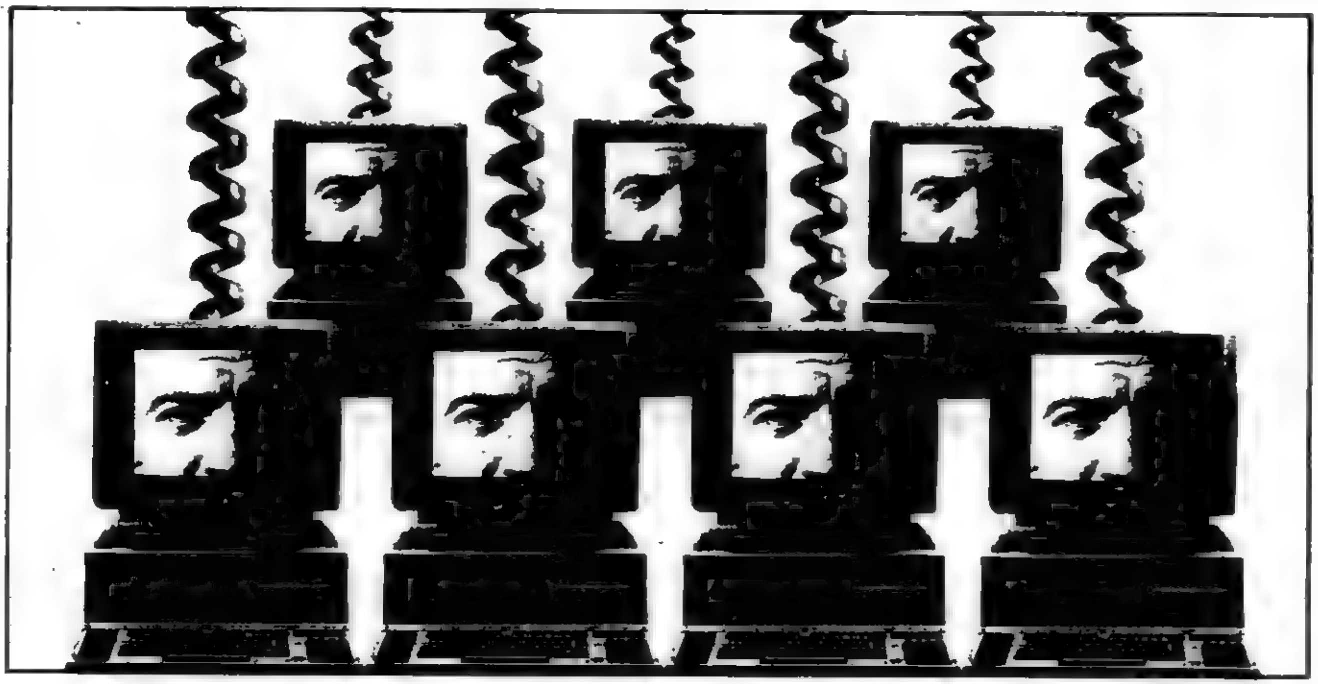
- PCs are no longer stand-alone devices but are becoming nodes of microcomputer networks or a more complex generation of host networks on which data bases and processing are (truly) distributed.
- In this new environment, PC operators are no longer "little" DP managers but are becoming "remote" workstation managers.
- PC data files are not owned by the workstation user but, because of the microcomputer or host network, are becoming a company resource that needs to be centrally managed.
- PC hardware must be compatible with the company networking technology and devices used within an organization, suggesting an increase in importance of a single, under-one-roof management of all computer equipment acquisitions.
- PC operating systems must be compatible with the selected networking technology and devices used, putting new importance on centralized management of operating systems, versions and defaults.
- PC hardware — and users of that hardware — will be held responsible if they cause the rest of the network to become unavailable, stimulating new urgency for centralized management of hardware maintenance.

Changing world

In short, just about the only thing not changing is that PC applications can still be individually selected without major significance as to the remainder of the networking scheme.

This is true as long as the applications used can produce and receive required files in the necessary format for other network users. Even this area, however, will require more centralised control in networked

Freeman is project leader for special projects in the information services division at the Home Federal Savings & Loan Association in San Diego and a former data center consultant with Price Waterhouse.



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applications and distributed processing.

The impact of these changes will vary, but the direction will certainly be toward more of an assembly-line approach to PC support. Central DP organizations will push into information center turf, and following this intrusion will be a change in the nature of personal computing. The following scenarios are not farfetched:

- Company policy states that all PCs have at least one host connect. All PC files are backed up to the host via host control between 10 p.m. and 6 a.m. daily. The host may control and record PC access as well as internal file access and use or else the PC will not be able to access any network devices such as file servers and printers. The host maintains statistics and the current status of all PCs so that host operators know before the user does when hardware problems develop.

PC OPERATORS are no longer "little" DP managers but are becoming "remote" workstation managers.

- Host and host operators use every PC on the system to achieve the cheapest and fastest processing and file storage. Users may not turn off their equipment at the end of the day, because they may not be aware of who in the system might (remotely) be using their device or devices.
- Most mundane communications are done among PC and host terminal users using the workstation, including electronic document file exchanges, simple messaging and distribution-list types of mailings.

In general, new workstation requests will be handled in a production-line manner, because those workstations will be part of an overall system. The organization will continually explain to users that it doesn't matter what is available on the market; the company information system works only with authorized equipment that offers compatibility with the big systems family of microcomputers, minicomputers and mainframes processing companywide data — and that one user needs only a small slice of this total systems pie.

Job modification

A different set of jobs is always required for a different set of needs. In this case, there will be fewer programmers because programming will be easier and will require less. There will be more analysts because, since a greater potential exists to give everyone what they need, there is a greater need to understand what everyone requires. Some of the job changes and new types of jobs that will be created are listed below.

Connect systems specialist. Field-service technicians, currently trained in nonintelligent terminal servicing, will need to gain a working knowledge of the corporate LAN technology, emulation scheme, networking scheme and other PC expansion activity.

These connected systems specialists will also need to possess an operational understanding of PC operating systems, operating system alterations for networking, operating systems alterations for emulations, networking software, emulation software and, possibly, architecture conventions used. A broad understanding of PC file formats may also be a prerequisite for this position, as required for file transfers.

These specialists will also need to understand things like BIOS, virtual storage (both on the PC and the host), PC data security and encryption as well as managing electronic mail and

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companywide services such as usage statistics maintenance and availability and downtime.

The scope of the critical knowledge base in hardware and operating software required of this person is vast. Therefore, extensive understanding of PC applications software will probably not be important, which creates a need for a separate position, a "PC product specialist."

PC product specialist. This person will be an operational expert in PC-level application software used by the firm. Depending on the size of the firm, whether there is a separate architecture group and the extent of departmental processing software used, this position may also evaluate new software for use by the firm and may also maintain application software on departmental processors.

It is unlikely that this position would become involved with programming, however, since enough of a market presence exists in usable packaged software. Also, a larger DP organization requiring PC programming would probably have a separate programming area for custom PC software that would include a PC-to-host capability.

Distributed processing analyst. In the connected and distributed environment, processing should be accomplished at the lowest level possible, consistent with the need for multiple users and interfaces with other processes. This saves money because the cheapest processing is available at lower levels, making more expensive high-CPU-level processing available for needs that are more widely distributed throughout the company.

It will become increasingly possible to move processing (or parts of processing) around, but someone needs to keep track of where processing for all of the users is needed. For example, if a wholesaling firm's central office only needs a roll-up of remote warehouses inventory, it would be better to process (if possible) the inventory programs at the warehouse and communicate totals rather than try to run inventory programs off a mainframe at the central office for simultaneous access by all warehouses.

THE IMPACT of these changes will vary, but the direction will certainly be toward more of an assembly-line approach to PC support.

The distributed processing analyst will review and monitor such needs, provide users with an understanding of what potential DP capabilities are available to them at the particular organization and may also perform traditional systems analysis work.

Distributed data base analyst. The distributed data base analyst may be the same person as the distributed processing analyst, or this may be a separate position. This person has the responsibility to identify the data needs of each user or group of users and to determine where the data would best reside. It would usually be desirable to have the data kept at as high a level as required in order to provide necessary access for others.

This person will also monitor data use to ensure that company data is kept secret and is backed up regularly and will inform users of available data so they will know of all possible opportunities for data manipulation.

Support by any name

The positions described above are different enough from mainstream DP jobs for some DP centers to maintain a separate workstation-, user- and distributed system-support unit — be it called an "information center" or not.

In other organizations, however, these duties will be accomplished by individuals in multiple organizational units, perhaps one type in the technical services group and others in production service areas.

In many ways, the deciding factor will be how the information center manager and staff position themselves during and prior to the transition stage. Careful planning during this time may save the information center. Lack of a strategy may make it history. ●

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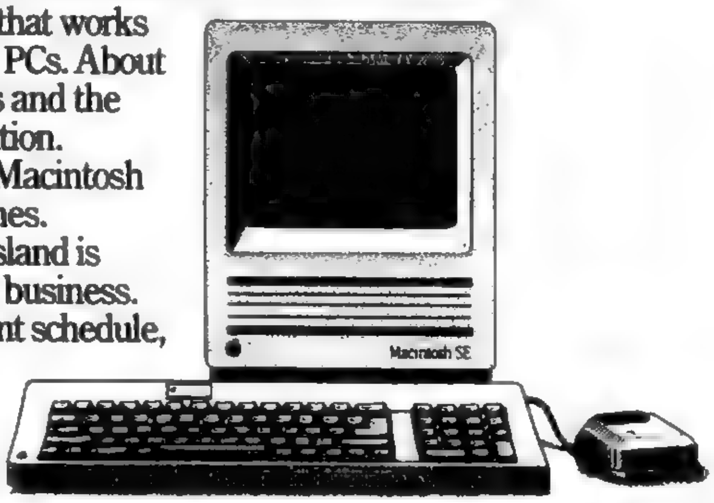

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MANAGEMENT

TAKING CHARGE

David Ludlum

No dog days for MIS

With the Eastern Seaboard sweltering and news on the MIS front largely slowing to a seasonal trickle, one current of that flow seems to be at least holding steady — American corporations' exploitation of information technology to buoy mature businesses and plunge into new [illegible]

While the movement to strategic use of information resources has been subject to some hyperbole, recent events suggest the trend continues unabated and may be gaining momentum, with companies already accomplished in the field pushing further ahead.

One case in point is McKesson Corp. in San Francisco, an acknowledged leader in the strategic application of computer and communications technology, chiefly for the Economost on-line order-entry system used by retailers who peddle the drug store merchandise the company distributes.

At McKesson's annual meeting last month, President and Chief Executive Officer Thomas W. Field Jr. said the company may more than double its investment in computer technology and new facilities during the next five years.

The $700 million plan focuses on construction in Arizona of

Continued on page 74

Fleet installs CIO

Exec has been honored for strategic MIS

BY DAVID A. LUDLUM
CW STAFF

PROVIDENCE, R.I. — Fleet Financial Group, Inc. recently created the position of executive vice-president and chief information officer and filled it by hiring Michael R. Zucchini, who was honored this year for developing a customer information system at General Re Corp.

Zucchini, 40, started work at Fleet Aug. 3, taking charge of all data processing for the group's operations, including credit card processing and overall supervision of two units that provide DP services.

He arrived at Fleet 11 months before the company expects to complete a $1.3 billion merger with Norstar Bancorp, Inc. in Albany, N.Y., which would be one of the largest U.S. bank mergers. Fleet said it expects to complete the deal July 1, 1988, when a new Rhode Island banking law takes effect.

In a research report on 64 bank holding companies covering the first quarter of this year, brokerage firm Smith Barney, Harris Upham & Co. named Fleet the best overall performer. Its merger with Norstar would unite two strong regional banks that offer an array of nonbanking financial and DP services.

Zucchini comes to Fleet from serving as president and chief executive officer of General Re Services Corp., an information services subsidiary of General Re Corp., a reinsurance firm based in Stamford, Conn.

In May, Zucchini was one of five MIS executives presented with an award for achievement in managing information technology by sponsors American

Continued on page 74

Data View

Data dogfight

Airline reservation systems' shares of 1986 U.S. travel agency locations and 1985 revenue

Airlines	*Locations*	*Revenue*
American Airlines (Sabre)	36%	44%
United Airlines (Apollo)	25%	29%
Eastern Airlines/Continental Airlines (System One)	14%	11%
TWA/Northwest Airlines (PARS)	12%	11%
Delta Air Lines (Datas II)	11%	4%

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CW CHART: MITCHELL J. HAYES

Touch screens can ease users' keyboard phobia

BY ROSEMARY HAMILTON
CW STAFF

Worker resistance to computers remains a major issue for factory managers, but some have recently found that touch-screen technology is effective in combating this problem.

"Touch screens have been around for a long time, but they are really only now emerging in factories," says William McSpadden, who follows computer-integrated manufacturing for the Gartner Group, Inc.

Many factory workers avoid using personal computers on the floor because they are intimidated by them, managers report. But touch-screen products provide an environment of which users are more accepting.

"We've run into several problems with people being afraid of PCs. The keyboard is intimidating, and they are afraid they'll mess something up," says Frank Caldwell, a systems project manager at Ranco Controls North America in Plain City, Ohio.

Earlier this year, Caldwell's facility installed Easel software from Interactive Images, Inc. in Woburn, Mass. As a front-end to mainframe data bases, it allows workers to access the data from a PC with a touch-screen format. Easel is icon-based, providing and inputing data such as inventory figures when users touch a graphic representation.

'Kind of unique'

"It's kind of unique," the Gartner Group's McSpadden says. "There really aren't any competitors doing this exact kind of thing."

Caldwell says the product has helped his facility give factory workers more responsibility. "We're trying to push authority and accountability as far down the chain of command as possible," he says.

JOE PASTOREK/GAMMA LIAISON

Interactive Images' *Easel software*

"People on the shop floor are the ones confronted by the dynamics of manufacturing. They have to make immediate decisions — often the wrong ones if they don't have the data on the floor."

John Allen, a supervisor at Ranco who uses Easel to track the production of power elements, says it is hard to make a mistake using the product. "It's very simple," he says. "You just reach up and push the screen."

Chrysler Corp.'s Sterling Heights, Mich., assembly plant is also installing Easel.

George Knapp, the plant's manufacturing systems manager, says workers find it almost self-explanatory. "There is so little training time," he says. "You can pick it up in a couple of seconds."

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Fleet CIO

FROM PAGE 73

Management Systems, Inc. and Carnegie-Mellon University's Graduate School of Industrial Administration [CW, June 1].

Zucchini was cited for developing the Communications Network for Electronic Reinsurance, which provides General Re's 300 underwriters and sales agents access to all company records on a customer or a prospective customer. The system tells users whether General Re has insured a prospect and generates documents and reports on coverage, quotations and documents for new policies and accounting entries.

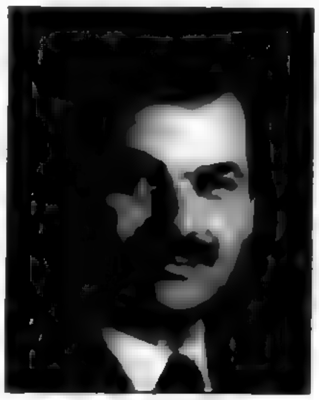
Describing his experience at General Re as "absolutely wonderful," Zucchini said the new position poses the challenge of addressing a variety of complex DP needs, from the mundane to the strategic.

Ordinary building blocks

"Mundane applications should in no way be considered inferior," he noted. "I don't believe you can build a strategic system without having the foundation of the basic systems. Most companies don't realize it's a building block process." Those basic systems "have to have a substantial amount of quality."

Zucchini identified his four major tasks, in order of importance, as the following:

- Making sure each Fleet operation has a viable DP system.
- Taking advantage of areas of synergy among them.
- Developing appropriate, long-term, technology-based strategic plans.
- Generating fees from marketing DP services.



Fleet's Zucchini

He said he would take advantage of the best applications available from Fleet and Norstar and from packages available on the market. "Both of these companies have grown through acquisition," he said. "The major challenge is to find the best approach and standardize as much as possible.

"It's also very important to establish a direction in technology," Zucchini said. "The technology decisions are very important. A mistake could be quite costly."

Zucchini oversees Fleet Information, Inc. in Providence, which provides DP services to Fleet companies and services such as payroll processing to outside clients. David Sheppard continues to serve as president of Fleet Information, reporting to Zucchini.

Zucchini also supervises FAS, Inc. in Madison, Conn., which provides processing for variable and universal life insurance to underwriters.

Fleet, with assets of $11.7 billion and 490 offices in 39 states, has banking operations in Rhode Island, Connecticut, Maine and Massachusetts. Norstar has assets of $11.1 billion and 375 offices, with banks in New York and Maine.

Combined as Fleet/Norstar Financial Group, the two firms would form one of the 25 largest banking companies in the U.S. and one of the major new "superregional" banks. Zucchini, one of six executive vice-presidents now at Fleet, said he would retain his present titles after the merger.

Zucchini was a member of President Reagan's Private Sector Survey on Cost Control, also known as the Grace Commission, which examined the operations of the federal government. He holds a patent for the invention last year of an outlet that can make mainframe computer terminals portable. He received an undergraduate degree in business and an MBA from Pace University.

No dog days

FROM PAGE 73

"the first of a new generation of hub distribution centers," which would serve seven states with computer technology and satellite communications. The strategy is to meet the needs of a customer base of high-volume but heterogeneous retailers.

Committed to the future

Field emphasized that the project would proceed only with the understanding that it would boost customer service, company growth, profits and return on investment.

If it succeeds, he said, "we will have leapfrogged our competitors just as we did a decade ago when we introduced Economost. Companies that are unwilling or unable to to make a similar commitment to the future will find it increasingly difficult to remain competitive."

Another company established in the competitive use of information techology that is expanding its efforts is Fleet Financial Group in Providence, R.I., an unusually profitable regional bank holding company with subsidiaries offering data processing services to insurers and other lenders.

Fleet has established the position of chief information officer at the level of executive vice-president and this month hired a highly regarded insurance executive to marshall its DP efforts (see story p. 73).

In another instance, Weyerhaeuser Corp., the Tacoma, Wash., forest products giant, is continuing its push into information products and services catalyzed last year with the creation of Weyerhaeuser Information Systems. In conjunction with offerings in software, computer services, training, disaster recovery and consulting, the unit's Manufacturing Systems Division said last month it will hold a June 1988 conference on linking incongruous computer systems.

The gathering will feature a computer model demonstrating how process industries can use the Manufacturing Automation Protocol/Technical and Office Protocol (MAP/TOP) data communications standards. A Weyerhaeuser spokesman notes that solutions to such technical problems free managers to address business issues.

Getting in on the act

Companies less frequently associated with information products and services are also stepping up efforts.

Last week, Bank of America National Trust & Savings Association in San Franciso, with Euromoney Publications PLC in London, announced a joint venture to capture and distribute the bank's extensive data on overseas economic trends. Bank of America-Euromoney World Information Services, which is scheduled to start up Oct. 1, will rely on a system designed by the partners that maintains a data base and generates products with personal computers and spreadsheets linked to a mainframe.

A chief selling point is the system's ease of use for the strategic planners the information is aimed at.

In another joint venture announced this month, Westinghouse Electric Corp. in Pittsburgh will provide training and consulting to users of Relational Technology, Inc.'s Ingres distributed SQL relational data base system. A Westinghouse spokesman says the joint venture will let the company apply to a broader market the skills it has developed in designing electrical generating plants over the years.

While investments in innovative uses of computer technology should be regarded with healthy skepticism, managers should be mindful of such moves being made by their competitors or future competitors — even in the dog days of summer.

Ludlum is *Computerworld*'s senior editor, management.

CALENDAR

AUG. 30-SEPT. 5

The National Conference on Network Publishing. Dallas, Aug. 31-Sept. 2 — Contact: Interactive Features, Inc., 28½ Cornelia St., New York, N.Y. 10014.

Show CASE Conference II. St. Louis, Sept. 1-2 — Contact: Donna Skaggs, Center for the Study of Data Processing, Campus Box 1141, Washington University, One Brookings Drive, St. Louis, Mo. 63130.

Computer Aided Publishing CAP'87 West. Los Angeles, Sept. 1-3 — Contact: Computer Aided Publishing CAP, Suite 200, 90 W. Montgomery Ave., Rockville, Md. 20850.

5th Anniversery PC Expo. New York, Sept. 1-3 — Contact: PC Expo, 333 Sylvan Ave., Englewood Cliffs, N.J. 07632.

Thirteenth International Conference on Very Large Data Bases. Brighton, England, Sept. 1-4 — Contact: VLDB 87, The Conference Department, British Computer Society, 13 Mansfield St., London, UK W1M 0BP.

SEPT. 6-12

Banque '87 — The 6th European Trade Fair for Techniques and Organisation in Banking. Copenhagen, Sept. 7-9 — Contact: Bella Center A/S, Center Blvd., 2300 Kobenhavn S, Denmark.

SIBOS: SWIFT's International Banking Operations Seminar. Montreal, Sept. 7-11 — Contact: Euan R. Sellar, Public Relations Department, Society for Worldwide Interbank Financial Telecommunication S.C., Ave. Ernest Solvay 81, B-1310 La Hulpe, Belgium.

12th Annual National FSI User Conference. Dallas, Sept. 8-11 — Contact: Forum '87, Elizabeth Joyce, Suite 700, 2777 Stemmons Freeway, Dallas, Texas 75207.

Decworld '87. Boston, Sept. 8-18 — Contact: Public Relations Department, Digital Equipment Corp., 200 Baker Ave., Concord, Mass. 01742.

OSI Meeting for Government Users. Gaithersburg, Md., Sept. 9-10 — Contact: Joan Wywra, Room B218, Building 325, National Bureau of Standards, Gaithersburg, Md. 20899.

Financial Investment Management Exposition and Conference. New York, Sept. 9-10 — Contact: FIM Conference, Flagg Management, Inc., P.O. Box 4440, New York, N.Y. 10163.

1987 Capital Microcomputer Users Forum. Washington, D.C., Sept. 9-10 — Contact: Jackie Voigt, National Trade Productions, Inc., Suite 400, 2111 Eisenhower Ave., Alexandria, Va. 22314.

The Desktop Publishing Conference. Santa Clara, Calif., Sept. 9-12 — Contact: Seybold Seminars, 6922 Wildlife Road, Malibu, Calif. 90265.

Distribution/Computer Fall Expo '87. New Brunswick, N.J., Sept. 10-11 — Contact: C. S. Report, Inc., P.O. Box 453, Exton, Pa. 19341.

SEPT. 13-19

Vaulting the Barriers to EFT Success. Washington, D.C., Sept. 13-15 — Contact: Electronic Funds Transfer Association, Suite 1000, 1726 M St. N.W., Washington, D.C. 20036.

13th National Conference of North American Honeywell Users. Cincinnati, Sept. 13-17 — Contact: Les Pacca, NAHU, P.O. Box 2037, Willingboro, N.J. 08046.

Software Contracts. Boston, Sept. 14-15 — Contact: Registrar, Batelle Seminars Program, P.O. Box C-5395, 4000 N.E. 41st St., Seattle, Wash. 98105. Also being held Oct. 5-6 in Chicago.

The First Annual Conference on Expert Sytems in Financial Institutions. New York, Sept. 14-15 — Contact: Institute for International Research, Inc., Suite 600, 9301 Wilshire Blvd., Beverly Hills, Calif. 90210

Atre Annual Forum on Data Base. New York, Sept. 14-16 — Contact: Atre International Consultants, Inc., P.O. Box 727, 16 Elm Place, Rye, N.Y. 10580.

Data Storage 87. Santa Clara, Calif., Sept. 14-16 — Contact: Forum Management, Cartlidge & Associates, Inc., Suite M-259, 1101 S. Winchester Blvd., San Jose, Calif. 95128.

7th Annual Conference on Control, Audit & Security of

IBM Systems. Chicago, Sept. 14-17 — Contact: MIS Training Institute, 4 Brewster Road, Framingham, Mass. 01701.

Integrated Manufacturing Solutions '87. Long Beach, Calif., Sept. 14-18 — Contact: Intertec Communications, Inc., Building 33-34, 2472 Eastman Ave., Ventura, Calif. 93003.

1987 Electronic Printer and Publishing Conference. Miami, Sept. 14-18 — Contact: Jean O'Toole, CAP International, Inc., One Snow Road, Marshfield, Mass. 02050.

ICCC-ISDN '87 . . . Evolving to ISDN in North America. Dallas, Sept. 15-17 — Contact: International Council for Computer Communication, c/o Bell Communications Research Corp., Room 1B349, 290 W. Mount Pleasant Ave., Livingston, N.J. 07039.

CAM-I Industrial Automation Standards Conference & Workshop. Chicago, Sept. 15-18 — Contact: Annette Van Hauen, Computer Aided Manufacturing-International, Inc., Suite 1107, 611 Ryan Plaza Drive, Arlington, Texas 76011.

The National Association of Bank Servicers' Annual Meeting. Seattle, Sept. 15-18 — Contact: NABS, Suite B, 5008 Pine Creek Drive, Westerville, Ohio 43081.

Workshop on Computer-Assisted Map Analysis. Corvallis, Ore., Sept. 16-17 — Contact: School of Forestry and Environmental Studies, Yale University, 205 Prospect St., New Haven, Conn. 06511.

Information Systems Consultants Association's Second Annual Conference and Consultants Market. Atlanta, Sept. 18-19 — Contact: ISCA, Inc., P.O. Box 467190, Atlanta, Ga. 30346.

SEPT. 20-26

Interex North American Conference of Hewlett-Packard Co. Business Computer Users. Las Vegas, Sept. 20-25 — Contact: Interex Conference Department, 680 Almanor Ave., Sunnyvale, Calif. 94086.

Management Information Systems for Strategic Advantage. Philadelphia, Sept. 20-25 — Contact: Registrar, Office of Executive Education, 200 Vance Hall, The Wharton School, University of Pennsylvania, Philadelphia, Pa. 19104.

Systems Integration in Multivendor Environments: Dataquest, Inc.'s Business and Office Systems Conference. Littleton, Mass., Sept. 21-22 — Contact: Marina Pettijohn, Dataquest, 1290 Ridder Park Drive, San Jose, Calif. 95131.

Integrated Services Digital Networks. San Francisco, Sept. 21-22 — Contact: Customer Service, Frost & Sullivan, Inc. 106 Fulton St., New York, N.Y. 10038.

Corpcon Corporate Microcomputer Exposition and Technical Conference. Los Angeles, Sept. 21-23 — Contact: Corporate Expositions, Inc., P.O. Box 3727, Santa Monica, Calif. 90403.

CSM '87: Conference on Software Maintenance. Austin, Texas, Sept. 21-24 — Contact: The Computer Society of the Institute of Electrical and Electronics Engineers, 1730 Massachusetts Ave. N.W., Washington, D.C. 20036.

Fifth Annual NCR Users Eastern America Conference. Fort Washington, Pa., Sept. 24-25 — Contact: Frank Whalon, c/o Tinius Olsen Testing Machine Co., P.O. Box 429, Willow Grove, Pa. 19090.

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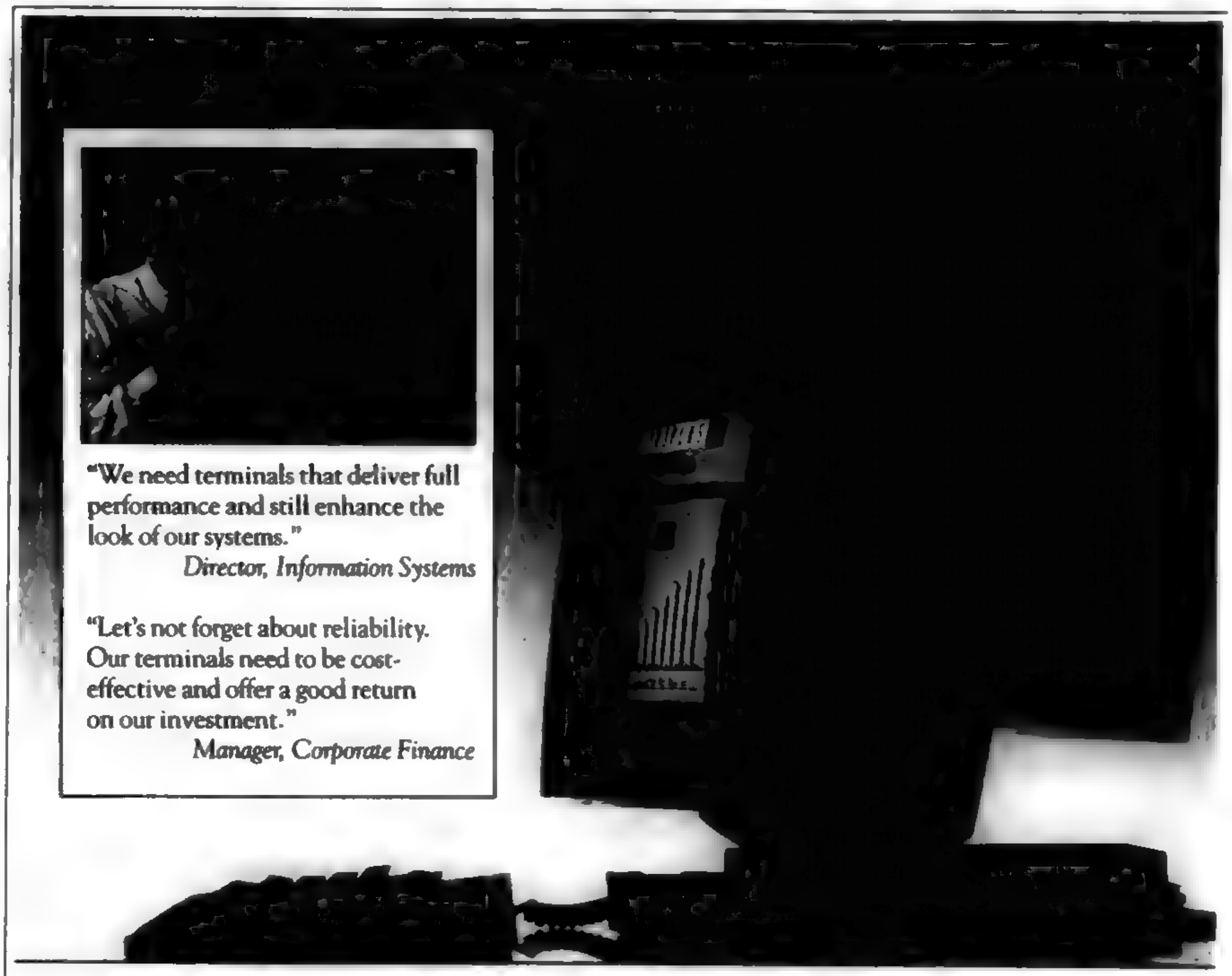

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COMPUTER INDUSTRY

INDUSTRY INSIGHT

Clinton Wilder

Talking a lot, saying little

About a year ago, we published in this column a list of what we considered the top 10 computer industry cliches of 1986. In the midst of this summer's dog days, it is time to roll out the second annual edition.

1. We offer solutions. Variation: We are a solutions-driven company. This was No. 1 last year and has only solidified its position in the last 12 months. It seems no one in this business sells hardware, software or communications gear anymore, just "solutions." If the phrase means better integration of islands of automation within an organization, fine. But in all but the leanest MIS operations installing complete turnkey systems, it is MIS that provides the solutions; the vendors supply tools to assist that task.

2. We are committed to standards. Unix, Manufacturing Automation Protocol (MAP), SQL, Open Systems Interconnect (OSI). . . . Everybody says they're committed. If they were all truly behind standards, we wouldn't need the Corporation for Open Systems to push OSI, and we wouldn't have the MAP controversy rearing its head every other week.

3. We provide departmental systems for today's distributed environment of networked work group computing. Doesn't anyone make minicomputers anymore? (By the way, is a work group larger or smaller than a department?)

4. Our industry is consolidating, and this represents a great opportunity for us. In other words, we can't wait to swallow up a cash-starved competitor and increase our market share.

5. We offer much more value-added service, or product, and we don't compete on price alone. This one is voiced by the third-party market when a major vendor unexpectedly slashes prices on systems, software or maintenance. Granted, third-party maintenance pro-

Continued on page 80

Workstations hit financial target

Price cuts, graphics spark Sun, Apollo growth in brokerage market

BY ALAN ALPER
CW STAFF

NEW YORK — Technical workstation vendors are making significant inroads into the financial services industry, a market that only recently has become a primary target for their high-performance wares.

In the past year, leading banks and brokerage firms have adopted Unix-based technical workstations manufactured by Apollo Computer, Inc., Sun Microsystems, Inc. and IBM for a variety of applications. Uses range from securities trading and real-time market analysis to portfolio management and expert systems development.

Fueling the trend is the gradual price reduction in entry-level workstations from more than $10,000 to less than $5,000. At this price point, Unix-based technical workstations designed around the Motorola, Inc. 68000 line of microprocessors are providing more bang for the buck than high-end microcomputers based on Intel Corp. 80286 and 80386 microprocessors.

From a software perspective, technical workstation vendors have seized the opportunity to crack the financial services business while Microsoft Corp. MS-DOS-based micros still lack true multitasking capability. OS/2, Microsoft and IBM's multitasking operating system for the personal computer industry, is not expected to be available until early next year.

"People do not want to wait for OS/2 to be available," says William O'Neil, vice-president of technical planning at Shearson Lehman Brothers, Inc. "Many firms are looking at Apollo, Sun and even IBM's RT Personal Computer for that reason."

Both Apollo and Sun are in the process of opening sales and support offices in the world financial centers of Chicago, Los Angeles, London, New York and Tokyo. Both see increased penetration of the financial services market as vital to sustaining their accustomed heady growth rates.

"We looked at the sales and trading area and found that there was a market of 100,000 seats [users], growing at 10% to 15% annually," notes Bruce Golden, Sun's financial services marketing manager. "With trading floor technology turning over every three or four years, we felt you can never saturate the market. You can resell those seats."

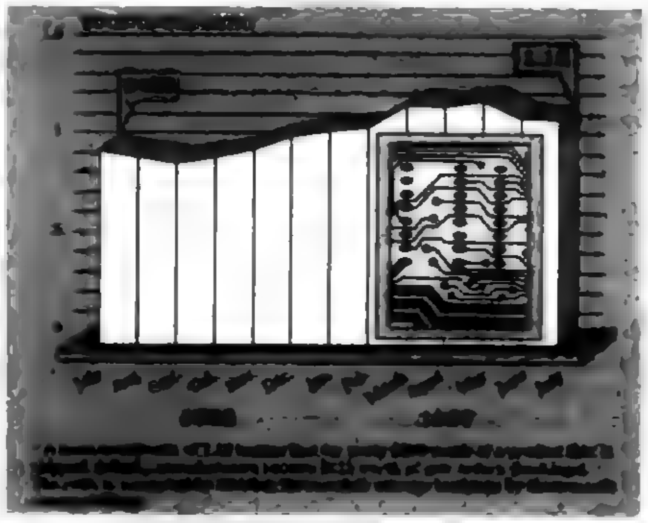
Golden says that traders like information displayed graphically because it better reflects financial relationships. Multitasking is important, he adds, because of the traders' need to monitor a variety of markets simultaneously. Traders used to need eight to 10 monitors to track vital market information, but with a Sun workstation displaying multiple windows, mar-

Continued on page 81

Data View

The chip industry rebound

*U.S. semiconductor industry's monthly book-to-bill ratio, 1986 to 1987**



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CW CHART

Cincom eyes first public offering

BY JEAN S. BOZMAN
CW STAFF

CHICAGO — Cincom Systems, Inc. President and Chief Executive Officer Thomas Nies last week projected that the Cincinnati-based data base company will make its initial public offering in the next nine to 24 months.

"The timing is very appropriate for us now to seriously consider going public," said Nies, who was in Chicago to address a Cincom executive seminar. "We would like to raise $30 million to $50 million by allowing public ownership of a minority share in the company. We would like to use outside capital to expand our infrastructure and our distribution system."

The aim of the public investment in Cincom would be to spur the company toward its goal of $200 million a year or more in annual sales. The firm currently projects revenue of $115 million this year.

Cincom is the only major mainframe data base supplier that is still privately held.

However, Applied Data Research, Inc. is now a unit of Ameritech.

As part of his investment strategy, Nies said he plans to retain the role of president for a year or more, in part to reassure investors of the company's direction and stability. On Aug. 10, Nies reassumed the company's presidency after Dennis Yab-

Continued on page 80

Network General: sniffing out network snafus

BY ELISABETH HORWITT
CW STAFF

SUNNYVALE, Calif. — When he formed network diagnostic company Network General Corp. in 1985, Harry Saal brought with him two valuable lessons that he had learned at his former company, Nestar Systems, Inc.

The first lesson: Thou shalt not sell a technology before its time. The second lesson: Thou shalt not tie a networking product to a single set of protocols.

Mountain View, Calif.-based Nestar, founded by Saal in 1978, sold local-area networks (LAN) several years before their time, according to Saal. "It was an uphill battle," he says. "We were convinced the technology was right and the idea was good, but, being small, we couldn't wait 10 years for the 'Year of the LAN' to arrive."

When Nestar was clearly floundering, Saal looked around for an area of the LAN market in which there was growing demand but few products available. Two years ago, he found such an area — network diagnostics tools.

"We found at Nestar that one of the great problems of the network vendor is solving problems . . . when one vendor supplies the software, another the personal computers, a third the server and so on," Saal says.

Network General's Saal

"When networks work, they work great, but when they don't, it's [difficult] to find the problem because it is often something small, like one bad card or cable segment," he adds.

Enter Network General and its aptly named diagnostic product, Sniffer. The Sniffer monitors packets going over a network between a given PC and server, searching for existing and potential bottlenecks.

"It works like a CAT scan or X-ray, looking at packets and protocols going over the net, allowing you to see healthy and unhealthy activity," Saal says. "Either things are already at a level where you can make a major improvement by tuning the network, or there is incipient rot, which will cause problems if left unchecked."

With a $20,000 price tag, the

Continued on page 81

Cincom

FROM PAGE 79

lonsky's sudden resignation after a three-year tenure. Yablonsky left to become president and CEO of the Carnegie Group, Inc., a Pittsburgh-based artificial intelligence software firm [CW, Aug. 17].

Majority control of Cincom would remain firmly in the hands of Cincom's 1,400 employees, who have been granted stock options since 1981. "We would not provide majority control outside the company because of the short-term goals of the investment community," Nies cautioned.

Nies blasted investors that have broken up companies for short-term gains in recent years.

"Giving those kinds of investors majority control would be letting events control your company's strategy, rather than letting you control events," he commented.

Nies said Cincom has spent $100 million on research and development costs since 1979, something that outside investors would never have allowed. Last year, R&D expenses topped out at 19% of Cincom's budget.

The firm first hinted at a public offering nearly three years ago but put the plans on hold when the mainframe software industry sagged.

Cincom, the first company to market a competitor to IBM's DB2 relational data base, has said it intends to capitalize on more than seven years of development in the Supra line.

Talking a lot

FROM PAGE 79

viders can offer customized services that users may find superior to IBM's. But their businesses never would have gotten off the ground without underpricing Big Blue, and cost savings are still their modi operandi.

6. It's a software-driven business now. Not untrue. If it weren't true, it wouldn't be a cliche, right?

7. We are focusing on vertical markets. Now *there's* a phrase that means many things to many people. To some vendors, "manufacturing" and "financial services" are vertical markets; to others, the buzzword refers to small companies making customized widgets for oil drilling rigs in the North Sea. There is nothing wrong with specialized marketing and product development, but "vertical" has degenerated into a word without a definition.

8. We are reorganizing to better serve and get closer to our customer. A blanket justification for layoffs, plant closings and reshuffling top executives to reward those who have done well and bury those who haven't. This one really means, "We know that what we've done so far hasn't worked, so we'll try something else."

9. Our departing chairman/president/chief executive officer will remain with the company on a consultant basis to identify new business opportunities. This one is for the top executive changes running rampant in the industry lately. It's usually an outright falsehood, unless the company considers it a new business opportunity to operate outplacement services for departing executives.

10. There is a pause in the market as users are assessing the impact of the IBM Personal System/2. Gee, a couple years ago, it was tax reform or the IBM 3090 or the strong dollar. Poor sales are never the vendor's fault; there is always an outside reason. But the proof is in the pudding of the competition. You don't see any "pause" at Compaq, Tandy, Apple or the micro software Big Three.

Wilder is *Computerworld's* senior editor, computer industry.

SCIENCE/SCOPE®

Larger power requirements of advanced satellites promise to be met by a new type of battery. Hughes Aircraft Company is developing nickel-hydrogen technology for the U.S. Air Force. The new batteries will be placed on larger spacecraft now being built for customers such as the Air Force, Japan Communications Satellite Company, and INTELSAT, the international telecommunications consortium. A nickel-hydrogen battery the same size and weight of a conventional nickel-cadmium battery will produce more watts for more years, take more abuse, and perform well even when nearly drained of power.

Hot spots, leaks, and other potential problems in jet engines show up more readily during testing with the use of a Probeye® thermal video system by the U.S. Air Force. Six units of an advanced, third-generation version of the system, developed by Hughes, have been delivered to Arnold Air Force Station in Tennessee for use in analyzing engines undergoing performance testing. Designed for both laboratory and field applications, the all-electric thermography system provides a real-time, multi-color television display of the temperature distribution of a scene being viewed by the Probeye infrared viewer. The new version features enhanced image processing capability, a four-fold improvement in resolution, easier portability and other operational improvements that provide the user with more information for quicker, more accurate testing.

An aircraft collision avoidance function is part of the new air traffic control system in the Republic of Korea. One of the world's most sophisticated civilian air traffic control (ATC) systems warns controllers when aircraft fly in converging paths, descend below a safe altitude, or approach restricted airspace. Radar data and flight processing functions are automated and combined in the system, enabling controllers to move traffic safely and expeditiously. The system monitors data simultaneously from multiple overlapping radar networks, creating a tracking picture significantly more reliable than current systems. When a potential conflict is identified, the system automatically provides an early visual and audio alert on the air traffic controller's console. Under development for three years, the ATC system and the aircraft collision avoidance function were both developed and built by Hughes. The system provides complete control of South Korean airspace, including en route and airport approach control throughout the nation and over ocean areas.

A ground-based sensor is being developed to reduce exposure to chemical weapons. The Hughes Remote Active Spectrometer (RAS), designed to detect chemical agents up to three miles away, will lessen the danger to forward observers and the larger community. Unlike conventional point detectors, the RAS is a standoff sensor, and does not require physical contact with contaminants to take readings. The unit beams carbon dioxide laser pulses at a specified target area. It then tells the RAS operator if contamination exists, and identifies the type, concentration, and location of the chemical. Studies are underway to adapt the RAS on U.S. Army reconnaissance vehicles and helicopters.

A broad spectrum of technologies, many of which grew up within the past five years, are represented in the products of Hughes' Industrial Electronics Group. Six divisions and two subsidiaries, each operated like a small high-tech company but backed by resources of its multibillion-dollar parent, offer career benefits to qualified engineers and scientists. Advancing technologies such as microwave and millimeter-wave communications, silicon and GaAs solid-state circuitry, fiber optics, and image processing equipment are pursued in facilities located in many of Southern California's most desirable coastal communities. Send your resume to A.T. Moyer, Hughes Industrial Electronics Group, Dept. S3, P.O. Box 2999, Torrance, CA 90509. EOE. U.S. citizenship may be required.

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AUGUST 24, 1987 • SPOTLIGHT NO. 19

Issues of the Information Age:

The way beyond Babel.

Imagine trying to build a railroad system if every locomotive manufacturer used a different track gauge. And each local stretch of railroad had a different load-carrying capacity and its own unique set of signals.

The business of moving and managing information is in a similar state today. Machines can't always talk to each other. Proprietary systems and networks abound. And the enormous potential of the Information Age is being dissipated by incompatibility.

The way beyond Babel lies in setting firm, far-reaching standards. In developing products and services that conform to those standards while establishing new standards for higher-level functions and applications.

The process must be continuous. Dynamic. And cooperative. We must share our visions, technical approaches and experiences. AT&T is committed to that course.

Our involvement in the evolution of ISDN (Integrated Services Digital Network) is a good example of this process at work.

AT&T works closely with national and international coordinating groups to establish standards through consensus and insure that they are consistently interpreted.

Where standards are firmly established, we've developed products and services that conform to them and address a broad range of customer needs. From voice/data work stations and ISDN PBXs for business to central office switches for Operating Telephone Companies.

Wherever possible, we've also shared the benefits of our experience, as we did in a recent Chicago test where, in partnership with Ameritech's Illinois Bell, AT&T began the nation's first customer application of a production ISDN system for McDonald's.

We must, as an industry, continue working together to provide our customers with maximum flexibility and utility. Then they can decide how and with whom to work.

Once we've taken those important steps, we foresee a time when the promise of the Information Age will be realized. A time when people will participate in a worldwide Telecommunity through a vast, global network of networks. A merging of communications and computers which will enable them to handle information in any form—conversation, data, images, text—as easily as they make a phone call today.

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Power is one reason to put business and management education into DP curriculum. Otherwise, generalists may grab control.

MASTERING MANAGEMENT

BY MICHAEL SULLIVAN-TRAINOR

PETER KUPER

To guarantee that the MIS department is more closely tied to business strategy, executives at Ralston Purina Co. in St. Louis are promoting nontechnical managers to senior DP positions. "The corporate executives don't have time to manage the department themselves, so the alternative is to get a person they trust — someone who will run information systems like the rest of the company. That person is usually a corporate non-DP staffer on a fast track who understands the business," says Curt McDermott, Ralston Purina's director of MIS operations and customer service, who himself gained his managerial experience through nontechnical positions.

Losing top management positions within their own departments to business-oriented peers is one of the key factors driving MIS managers to seek specialized management training and education. "There is definitely a trend to transfer proven managers into information systems groups," says J. Daniel Cougar, professor of computer and management science at the University of Colorado. "Obviously, the reason is we have not prepared our technical people well enough to do a good job in management. In those companies where this is happening, the executives are really saying that managerial ability is more important than technical ability."

Other trends stirring companies to establish MIS management training programs outside the human resources department include the following:

- **Business demands.** As corporate executives become aware of the competitive advantages provided by information resources, they are relying more heavily on MIS to apply systems to serve business strategy.
- **High turnover.** Companies are recognizing that high employee turnover within MIS is partly attributable to poorly trained managers.
- **Recognition.** While many managers try to establish dual career paths — providing unlimited growth on the technical as well as the management side — becoming a manager is often the only viable path to promotion for technical workers.

Though research in the late 1970s identified the need to provide MIS/DP professionals with unique management and business training, many companies are only now instituting independent programs to shepherd people through the transition from technician to manager.

For example, Allstate Insurance Co. in Hartford, Conn., is only now finding out the hard way that technical people find it difficult to act as managers without specialized training. More than 50 DP consultants at Allstate work as project leaders and liaisons between the information systems group and end users. Promoted for their technical prowess, they received no management training for their particular needs.

"Directors who have consultants reporting to them are receiving negative feedback," says Pat Lucas, Allstate's manager of technical training. "They've gone on walk-throughs and found that the consultants don't know how to talk to users."

Within a year, Lucas expects to implement a DP management training program to provide consultants with interpersonal and management

---

Sullivan-Trainor is a *Computerworld* senior writer.

Management

FROM PREVIOUS PAGE

skills. "Our corporate management development training does not address DP needs," she says. "DP professionals need more communications skills training because they are used to working with machines, not people."

Many companies currently concentrate their efforts on training technical people who are already struggling in management positions rather than teach new candidates management skills.

"Most often, the recipients of this training are guys who have been in management jobs for six months to a year," Cougar says. "There is a strong backlog of existing managers out there who get priority over the people being groomed for management. Many of the current managers are people with a lot of technical background but without the proper education. The backlog stems from the fact that we are still giving most of the budget priority to technical training."

Rapid changes in technology are causing companies to emphasize technical training, and many managers still view management training as "a nice extra," Cougar says.

"Managers can still manage without training," he adds. "So the training is often viewed as icing on the cake."

Ralston Purina's MIS managers — whether they possess a technical background or not — can take technical courses from outside vendors. But until recently, they were not exposed to management training within the MIS department. McDermott is trying to provide management training for his 200-person technical staff at the company's St. Louis data center.

"For the past two years, the emphasis has been on nontechnical training," McDermott says. "We've used American Management Association courses, computer-based training and video tapes of management consultant Tom Peters. We're trying every technique we can.

"I'm trying to expose people to management and business skills. There's a lack of management perspective among the DP people. I'm trying to change the mindset," he says.

Different cultures

Moving technical staff members into management positions requires providing them with the skills to work in a different culture. First, the technician must be convinced that it is worth his time to learn them.

> "THERE'S a lack of management perspective among the DP people. I'm trying to change the mindset."
>
> CURT MCDERMOTT
> RALSTON PURINA CO.

"Technical people tend to think of management skills as something you can learn when things quiet down, not as a way to handle yourself every day," says independent consultant Rosalind Gold. "They need to learn that when you are responsible for getting a lot of talented people to work toward a common goal, management skills are essential."

While first-line supervisors and project leaders need training in project management, delegation and communication skills, senior managers require more complex training.

"They need to learn a lot about company politics," Gold says. "As you get higher in the organization, political considerations are a key factor in your success. A lot of decisions are made that sound like technical compromises. Sometimes, of course, they are.

"For technical people who are well versed in their specialty, politics seems to contaminate the purity of the speciality. Technical people need to see the process as a way to make their work available to others rather than as harmful to the technical solution," she says.

Beyond adapting to cultural differences, technical people must switch their loyalties, says consultant DeAnne Rosenberg.

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a management trainer since 1971. "Often, a technical person's loyalty is targeted more at the excitement of solving technical problems than at meeting the company's needs," Rosenberg says. "Managers have to be loyal to the company."

Reaping new rewards

For most managers, transferring loyalty means finding different rewards in their work from when they were technicians. For example, Steve Folick, an information systems supervisor at Lockheed-California Co. in Burbank, Calif., found different ways to obtain satisfaction when he was promoted from the programming ranks to a management post.

"There are different things that motivate you as a manager," Folick says. "As a programmer, my immediate gratification came from writing a piece of code and seeing it work. If your reward system is on that level, then it is difficult to make a transition to a level where your rewards are from the good work that others do.

"A lot of times, as a manager, if you write a good business letter, you feel good about that. You gain feedback from different kinds of activities. Although every once in a while, I like to go back and write some code," he says.

Using a national data base of 8,000 DP professionals, Cougar and Robert Zawacki, professor of management and organizational behavior at the University of Colorado, compared survey results on motivation and management of technical professionals with those of 500 other occupations.

The research they conducted reveals that DPers have a greater need for growth than any other occupation surveyed.

The DP staffer's strong desire to take on ever greater challenges makes him an ideal candidate for fast-track management positions, Cougar says. But the technical bias of many DP professionals prevents them from seeing management as a viable growth path.

"They need a lot of challenge in their jobs," Cougar says. "But technicians feel they'll lose their technical capability if they become managers. They need external motivation that promises the management job can be just as challenging. This idea has to be made more explicit in management courses."

Social wallflowers

Cougar and Zawacki also found that DP professionals have the lowest need for social interaction of all the occupations surveyed. Based on this finding, Cougar contends that management courses for technical people should contain a strong dose of small-group dynamics.

Managers must, by the nature of their job, increase their level of interaction over that of independent technical roles. But there is some debate among MIS managers and consultants about whether an emphasis on technical skills is a hindrance or an asset to a manager of a technical staff.

On one side of the issue are those who say that nontechnical managers often find it difficult to gain respect from their technical staffs.

"A pure manager cannot manage a technical staff well," says Paul Bangert, assistant vice-president of data processing for Bank One, Indianapolis, NA. "You have to have some good basic background in what your people are doing. A nontechnical manager cannot appreciate the problems his staff faces, and that causes a real decay in morale among the technical people."

> "A NONTECHNICAL manager cannot appreciate the problems his staff faces, and that causes a real decay in morale among the technical people."
>
> PAUL BANGERT
> BANK ONE, INDIANAPOLIS, NA

On the other side is Jim Bigham, vice-president of operations for Prudential-Bache Securities, Inc. in New York.

"A good manager can manage a technical organization or a nontechnical one, regardless of his background, because he is using the skills of the people around him," he says. "Nontechnical managers can effectively manage technical departments because their objective is not to be technicians but to be providers of the business guidelines and controls."

Whether companies emphasize the technical or the managerial side often depends on their long-term strategy, says Curtis Plott, executive vice-president of the American Society for Training and Development in Alexandria, Va.

"The type of training the training department will provide has to do with how it aligns itself with the company's business objectives," Plott says. "If the company is trying to change the culture or the business strategy within the organization, training will focus on management development. On the other hand, if the company is cutting costs or has identified technology as the key to the future, there will be a lot more technical training."

For example, at Lockheed, technical skills are vital to the company's sophisticated military aircraft manufacturing business, and MIS professionals within

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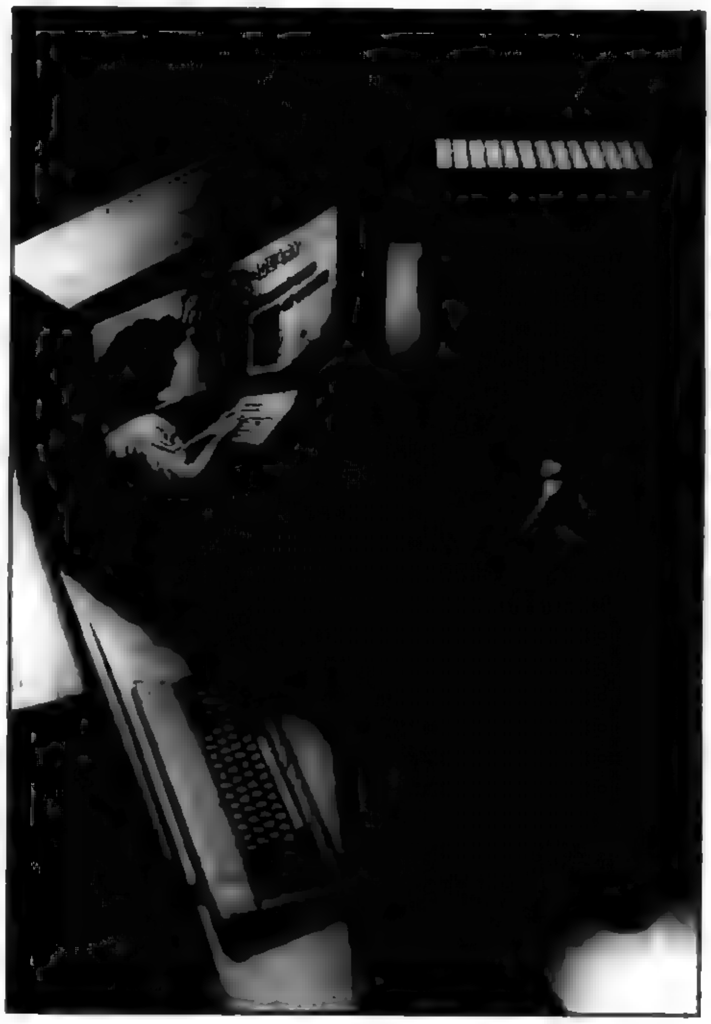

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the organization are currently more concerned with the technical knowledge and capabilities of their managers than with their managerial skills.

"Over the last couple of years, we have recognized that we need to help our management understand the technical aspects of the organization," says Merv Dirks, information management specialist.

Because a large portion of Lockheed's population includes engineers, the company's management training is geared to technical professionals, eliminating the need for a separate MIS management program. Companies with fewer technical employees, such as those in the finance and insurance industries, tend to offer more customized management training for MIS professionals.

> HOW RECEPTIVE are MIS managers to management training programs? Initially, they make the transition "kicking and screaming."
>
> BILL ANDERSON
> PRUDENTIAL-BACHE SECURITIES, INC.

"Everyone is trying to use technology smarter," says Sandra Ginnis, director of DP education and development at Travelers Insurance Co. in Hartford, Conn. "In a service industry like ours, technology gives you an edge, and it requires you to look at your personnel and figure out ways they can be more effective."

Until recently, Ginnis's department conducted only technical training. Now, because of new business objectives, the department will offer management training next year.

Courses cover only 20% of what DP professionals need to know to become managers, Ginnis says. The other 80% of their management knowledge should be provided by on-the-job experience, including formal job rotation, mentoring and succession planning programs.

The Travelers' version of job rotation would include identifying the skills a technical person needs to acquire and determining which on-the-job experiences provided exposure to those skills. The length of time in the different jobs would range from six to 18 months and could include exposure to both technical and management skills.

Ideally, the candidates for job rotation would take courses to prepare for rotation, move to jobs at their own levels and once they acquired the necessary on-the-job skills and coursework for the next level, be promoted.

Another possibility Ginnis is considering would be to send DP staff members to courses covering the areas of the business they support. For the program to work, Ginnis's department must coordinate its efforts with the DP supervisors.

"We don't have the staff to do all the evaluations for individual development plans," she says. "I envision a partnership with various line supervisors to identify the skills needed. The managers would functionally develop the individual plans, and we would become a delivery system."

Managers from Missouri

How receptive are MIS managers to management training programs such as the Travelers'?

Initially, managers make the transition "kicking and screaming," says Bill Anderson, director of Prudential-Bache's Information Systems Division. Two years ago, Anderson introduced a full management education curriculum to his division.

"I was facing managers with up to 15 years' experience, and their attitude was, 'Show me,'" he says. "They said they had too much to do, but once they became involved with the program, they were more positive. We had to prove it had value and was high quality."

Anderson's support of the program was key to its acceptance, says Cynthia Triolo, assistant vice-president for training and human resources within the division. "You need support from the top level. No matter how good the quality of the training, it wouldn't happen if it wasn't for that," she says.

When Anderson took over the division three years ago, there were less than 100 information systems employees. Now the staff consists of 550 people. This rapid rise in manpower caused an urgent need for technical people to become managers. Although it was a logical career step, most of the managers did not have access to management training beyond generic courses offered for other departments. So the information systems management curriculum was implemented.

"We're still playing catch-up to educate those managers," Triolo says. "Some of them came in with management experience, but we want to make sure everyone has that same basic set of skills."

The management program, which amounts to 35% to 40% of the Information Systems Division's training budget of about $100,000 a year, accounts for 2% of Prudential-Bache's information systems budget. At the heart of the curriculum are two core courses — "Leadership Education" and "Managing Work Relationships."

Leadership Education, a customized version of a course offered by Learning

Continued on page S6

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INTERVIEW

ON THE FAST TRACK

Terry Ebert is director of training and recruiting for Finance and Administration and Operations at Morgan Stanley & Co. in New York. He is responsible for information services and entry-level and advanced training. Ebert was interviewed by *Computerworld* senior writer Michael Sullivan-Trainor.

What are Morgan Stanley's business goals, and how do they relate to MIS training?

In the investment banking environment, we live or die with data processing. Our overall goals are to increase systems availability, control costs and increase user satisfaction.

Technically, we want to improve the efficiency of our coding, improve response time and improve systems stability.

On the management side, we want to make the information systems professional as aware of the business as the users so that he can have input in user meetings that deal with business objectives.

Our specific management goals are to increase the efficiency of our operation, maintain a positive environment and reduce turnover. We have about a 15% to 20% annual turnover, but it was higher than that before the training was introduced.

When you instituted your training program, did you have to convince the information systems people who were in place that the training was worthwhile?

I developed the program in 1982, when I came on board. We didn't have to convince people of the need for training because back in 1979, when the entry-level program was implemented, Morgan Stanley's information systems department went through a tremendous change.

A very strong individual, both politically and personally, took charge of the department then, and he had a clear vision of how he wanted the department to be shaped. So 1979 through 1981 was a period of great transition when many people simply left of their own accord and other people, who had worked with the new department head, were hired. The department was only 35 to 40 people strong at that time because we only had a New York-office. Today, there are 700 people, located in London, Tokyo, Frankfurt and Geneva, with new offices opening in Hong Kong and other areas in '88.

Describe your curriculum for the information systems organization.

There are three strands in our training: the technical, which starts as soon as an employee comes into the organization and continues through his career; the business, which starts toward the end of the first year and continues; and management training, which begins in the latter part of the second year.

At the entry level, rather than hire computer operators, we bring in college students. Their training begins by performing that function. They are brought into operations at the data center, and for the first six months, they are in a formal program. For the first two months, they work 60 hours a week. Forty hours of that is actually working as operators, and 20 is on-the-job training.

After qualifying as operators, they learn programming for four months. At the end of six months, we have people who have worked as operators and are able to cycle into our systems development or applications programming department.

What about more advanced training?

We teach everything from advanced natural programming techniques to user consulting skills. In addition, we teach our people about the investment banking community. They learn financial accounting and corporate finance in courses taught by faculty from MBA programs at local universities.

What are the components of management training?

Management training includes courses ranging from very basic management skills, like effective business communication and time management, to project management. Our entry-level people will typically be managing others after about two years.

Who teaches these programs?

We use a mix of in-house staff teaching in their areas of expertise and external consultants. The curriculum is developed cooperatively by our staff and the consultants.

ALAN WITSCHONKE

Terry Ebert

On the technical side, the Adabas courses are all taught by our senior staff in that area. We have an optimization group, which works to make our code more efficient, and members of that group teach courses in the programming area. Structured design and testing is taught by Arthur Young Co.

In the advanced training, we use some of our traders — people who actually work at the business of the firm — to teach about their markets.

Do you meet with any resistance from your technical people concerning their need to learn management and business skills?

We don't, partly because we select the people to work in this environment very carefully. We require bright people, but because of the emphasis on business and leadership, we are very different. A lot of people who do

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Management

CONTINUED FROM PAGE S4

International, Inc. in New York, deals with interpersonal skills, managing work relationships and motivating DPers.

After taking the leadership class, managers move on to a course in managing work relationships developed by Ridge Associates, Inc. in Casanovia, N.Y. The course provides participants with an understanding of how others view their behavior. It includes a review of the managers' personality strengths and weaknesses and examines how they respond under stress. Managers also learn how to adjust their personality styles to work more productively with others.

WHILE formal management programs allow all of a company's managers to attain the same skills, informal ones give managers an opportunity to develop their own ideas about necessary management skills.

Customizing each course to address the specific needs of the company's information systems managers is an important part of the curriculum. Learning International and Ridge Associates were chosen as vendors because their courses could be designed to apply to the practical needs of the department, Triolo says.

Unlike Prudential-Bache, other companies provide only minimal DP management training to supplement generic corporate education.

In these environments, managers must seek out their own courses or petition the company to bring a consultant in-house for a one-time presentation.

"Large companies identify a fast-track route for certain individuals, and they offer specific management programs to train them," says John Cargill, the Data Processing Management Association's (DPMA) director of education. "Smaller companies do not have the resources to implement their own programs, so they need to take advantage of outside seminars."

In and out of the nest

American Fletcher National Bank & Trust Co. in Indianapolis, recently acquired by Bank One, offers some supplemental DP management training on an as-needed basis, but managers are encouraged to seek out their own courses. "Traditionally, we have provided training through human resources as the primary source," says Phil Shaw, information center analyst. "But we also contract with vendors for occasional in-house programs."

When a batch of DP managers needs to be trained, Shaw provides multimedia seminar programs from Deltak Training Corp. in Naperville, Ill. The programs, which include "Time Management" and "The Middle Manager as Innovator," allow self-paced learning using text and video cassettes. Besides the Deltak program, the bank also uses an informal buddy system that pairs new managers with experienced ones.

While formal management programs allow all of a company's managers to attain the same skills, informal programs give managers an opportunity to develop their own ideas about necessary management skills. At Bank One, Paul Bangert's development from a systems programmer to asistant vice-president of DP included a mixture of in-house and vendor training.

After 12 years as a programmer, Bangert now manages the bank's systems programming staff of 10 programmers working in IBM's CICS, VTAM, VM and MVS environments. He acquired his management skills through in-house human resources courses, such as working with people, rational decision making and performance appraisals, as well as by attending management courses offered by local schools and an IBM course in project management. But the key to Bangert's satisfaction with his current post is that he still maintains his technical expertise.

"I still like being a technician. I enjoy training some of the junior people, and I am very much trying to stay technically current by working closely with my staff. I would not want a position that is 90% management and 10% technical," Bangert says.

The transition is not without some sacrifices, however. "One of the more difficult things is not having as much hands-on work," he says. "Now, I'm working through two layers of people, which is hard to get used to. I had to develop trust in the competence of the technicians working for me."

Hiring from within

A lack of resources for management training doesn't mean the training needs to be unavailable. Even small companies can find creative solutions to meet their requirements.

At Star Market Co. in Cambridge, Mass., DP Director Allen Williams identifies which technical people would be suited for management by assigning senior staff members to train newcomers and observing their performance. If the staff member likes the training experience, he can then take a series of courses offered by an outside vendor to develop

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Management training requires $3,000 a year, or 50% of Williams' training budget and less than 1% of the DP budget.

Another alternative to in-house seminars are sessions sponsored by professional associations. The DPMA offers annual seminars nationally and regionally to provide business and technology education. The DPMA is currently considering offering management training courses in its 1988 programs.

Budget limitations notwithstanding, a healthy vendor community is growing to meet MIS managers' educational needs. Seeing a lucrative market niche, management consultants and technical training companies are targeting management training for technical professionals. However, not all the vendors are as expert in the area as they claim.

Trust the vendor?

"Choosing a vendor is really difficult, because a lot of them say the same things," says Terri Pawlowski, manager of technical education at the Hartford Insurance Group in Hartford., Conn. "They are very articulate, send you jazzy brochures and sound good, but you never know until you have them in."

Many of the vendors come from psychology and marketing backgrounds rather than MIS. Vendors who do not have experience as MIS managers fail to provide practical training, Lockheed's Folick says.

"There is not a lot of practical experience in these courses. Everything is very theoretical," Folick says. These consultants should really go into a shop and become part of a project team. Then they could come back with real-life experiences."

Measuring the effectiveness of management training, whether developed in-house or purchased from a vendor, is particularly difficult. "Most companies don't have any systematic way to determine whether the training worked," says Charles Wilson of Southern Training Corp. in Columbia, S.C.

Although most of the results of management training, such as changes in employee behavior, often defy quantitative measurement, companies can do a better job of determining effectiveness if they first identify exactly what they hope to gain by the training, Wilson says.

He says that objectives should be spelled out for the class and then, three to six months later, the trainer should ask the participants, "Based on the objectives, what are you doing differently?" Then he should ask the supervisor if he sees any changes in the trainee's behavior. The same kinds of questions should be asked of the trainee's employees.

Many companies use evaluation forms filled out by the participant to determine the effectiveness of management training. Others are also debating whether to interview other people in the trainee's department.

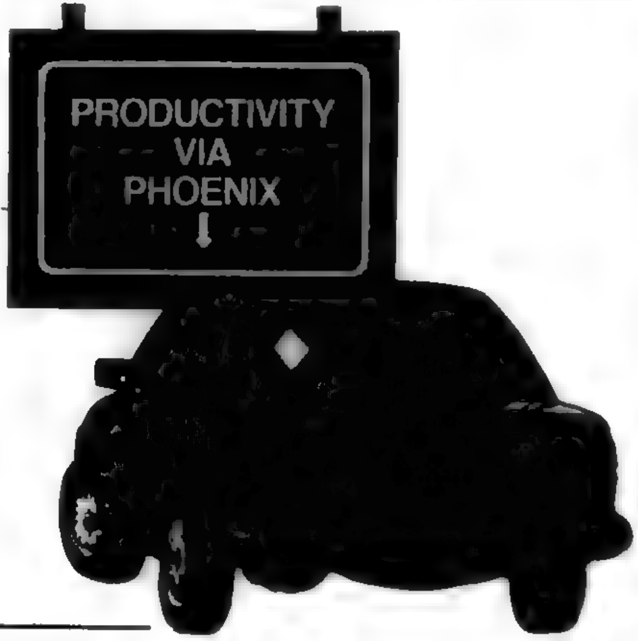
On one side of the debate is Bank One's Shaw.

"Talking to the manager's manager often leads to inaccurate perceptions. He isn't out in the trenches to see what's going on. He only sees whether the job is getting done and whether the reports are on time. He says, 'I don't see a whole lot of people quitting, so it must be OK,' " Shaw says.

On the other side, Prudential-Bache's Triolo says he is considering conducting interviews of the manager's employees to evaluate effectiveness. The managers will probably not like the idea, Triolo says, but the need to assess the effectiveness of the training may override their concern.

Prudential-Bache's Bigham rates management training by how useful the skills are to his situation. For example, he says he knew he was skillful at getting people to do things his way, but he didn't know why. After taking a course in managing work relationships, he discovered that he was unconsciously flexing his personality style to accommodate the style of the person he dealt with.

"Many of the things you learn in management training you knew intuitively, but you didn't know why they worked," he says. "Once you find out why, you can make them work almost every time." ●



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Thoughtful mix of media provides best delivery

The ideal MIS training program would include computer-based courses for technical subjects, interactive video systems for specific project skills and dynamic seminars led by popular management consultants for complex business issues.

However, few organizations can afford such an ideal combination of training media. For example, hiring an outside consultant to conduct a traditional instructor-led seminar can cost up to $1,500.

Computer-based training (CBT) can cost substantially less, since courseware runs on existing hardware. Vendors provide personal computer diskettes for a few hundred dollars per course and sell mainframe-based products for the price of an annual software license. However, the cost to develop an in-house CBT system can range from $2,000 to $20,000.

Combining CBT with video, some companies are using interactive video instruction (IVI). Because specialized hardware is required to run IVI programs, setup costs can run up to $100,000.

"There are a number of trade-offs between types of training. With CBT and video, the costs come from the development of the course, but delivery is relatively inexpensive. Classroom training is just the opposite," says Curtis Plott, executive vice-president of the American Society for Training and Development.

Moving along, but slowly

IVI is expected to become more affordable as the technology develops. Many companies are expected to eventually replace instructor-led training with more interactive, individualized programs.

"Training technology is proceeding at an incremental, rather than a revolutionary, rate," Plott says. "Companies are moving toward sophisticated technologies because they're cost-effective."

Evidence of this trend can be seen within MIS, particularly in technical training. Besides mainframe-based courses that allow users to duplicate a systems environment on a terminal, many companies are implementing PC-based courses to allow individuals to learn at their own pace.

However, CBT and IVI are not as frequently implemented for management training. Many instructors say that interpersonal skills cannot be adequately taught using a computer-based product.

"When you are presenting information about the changing nature of management, it is harder to teach through technology," Plott says. "Management skill development is experiential and requires practice in dealing with groups of people rather than individually."

"The best way to offer management skills to technical people is through an instructor-led course that shows them on paper what will be covered and when," says Terri Pawlowski, manager of technical education for the Hartford Insurance Group.

At the executive level, technology is rarely used because senior managers demand a customized program. "Typically, executives are not the type of audience that sit in front of a PC," says Suzanne Rambach, marketing manager for end-user and professional development at Deltak Training Corp. "They go to seminars where someone dynamic is up there sharing personal experiences."

Another objective of the instructor-led management skills workshop is to convince MIS professionals of the need for training. "There is a tremendous amount of marketing that goes on," says Ann Bankead, training and organizational development specialist for a bank in the Southwest. "If we were solely depending on CBT, that opportunity would be lost."

Despite the desirability of interpersonal contact, cost-cutting programs are forcing MIS trainers to make some concessions in the management area. The most significant example of this trend is replacing live speakers with video tapes.

More affordable than instructors, videos allow for consistent presentation quality and guarantee that all participants receive the same message even if they attend different viewing sessions.

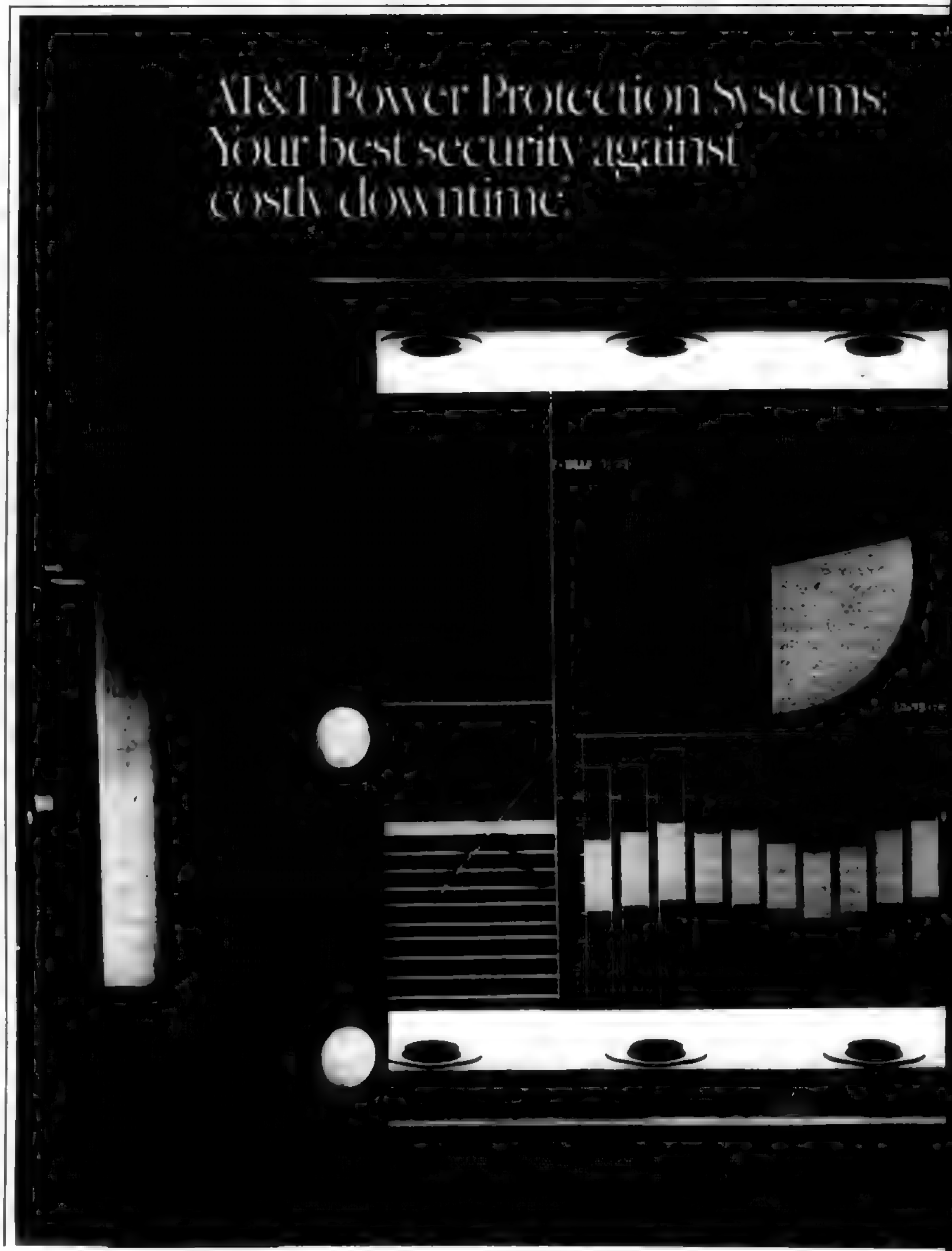
Videotaping participants and then allowing them to view their performance is another cost-effective method used by many companies. "Dispensing information in the classroom produces one level of retention; dispensing reinforced by visuals and seeing how to do it produces an increased amount; hearing, seeing and practicing produces an even larger amount of retention," Plott says.

In the future, Plott says, IVI will become as useful as video for management training. "It is a way to take the material away from the classroom and practice."

Training vendors such as Deltak indicate they are planning to implement IVI in their professional development offerings when it becomes more affordable.

"Interactive video is great for simulations and checking information," Rambach says. "It's like using a flight simulator. You practice almost crashing a 747 before you learn how to fly it."

MICHAEL SULLIVAN-TRAINOR



VENDOR VIEWPOINT

Going from systems professional to manager means learning to live with some uncertainty

BY STEWART STOKES

My client was a senior systems manager in a well-known company. He and I were discussing changes in his career. I asked him to describe his most difficult challenge, and he replied without hesitating: "The most difficult challenge of my career? That's easy. No, it wasn't technical. It had nothing to do with hardware or software, but it did involve communications — and I don't mean data communications.

"My most difficult challenge was making the transition from 'doer' to manager," the client continued, "and frankly, I'm still working on it! Why is this so difficult for us? I suspect it has something to do with change and giving up predictability for ambiguity." Learning to live with uncertainty is only one of six key challenges systems managers face as they make the transition from systems professional to systems manager.

Countless conversations during the past 15 years have convinced me that most new systems managers confront six challenges as they make one of their career's most demanding transitions:

- Developing management-mindedness; learning to appreciate the power of perception or the fact that not everyone perceives, understands and acts on an issue in the same way.
- Managing vs. doing, or learning to let go.
- Delegating, the most important time-management strategy of all.
- Living with ambiguity, or uncertainty vs. certainty.
- Influencing people over whom you have no control; understanding sources of power and influence.
- Understanding and analyzing motivation.

Developing management-mindedness means learning to step outside one's technical orientation to see the big picture. It means learning to understand and appreciate differences in perception and the ways these differences influence behavior. This insight in itself helps resolve major interpersonal communication problems.

"I THOUGHT that managing meant controlling and always being in command. I soon learned there are few answers and that the only certainty is lack of certainty."

MIS MANAGER

As a new systems manager told me, "I never realized how significant it was that my staff, our users and my fellow managers could all look at the same set of circumstances and understand them so differently. No wonder we seldom agree on a course of action."

Another aspect of management-mindedness is learning to think conceptually to understand how the pieces fit together. Some senior information systems managers are currently both exhibiting and fostering this skill by educating their people about the business, its products, markets, channels of distribution and competition.

The second hurdle, that of managing rather than doing, haunts some systems managers throughout their careers. They become managers because they were good "doers," but when they turn a career corner and become project leaders, their focus of accountability shifts. They are now responsible for managing and coordinating the work of others, many of whom are actually outside their chain of command.

New information systems managers often find this kind of assignment unbearably vague. While their activities as "doers" had a degree of certainty and predictability, their managerial assignments are filled with ambiguity.

"The lack of clear and concise answers was what bothered me," another client once confided. "I thought that managing meant controlling and always being in command. I soon learned there are few

Continued on page S13

Stokes is vice-president of QED Information Sciences, Inc. in Wellesley, Mass.

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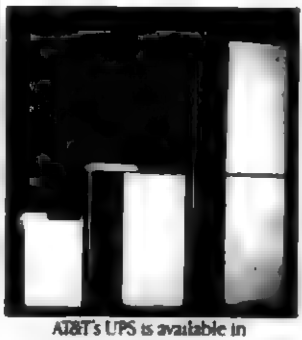

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What's so difficult about technical training?

BY PATRICIA CINELLI

Technical trainers of data processing personnel must wrestle with a number of challenges. Often, they are required to teach technical and end-user courses as well as develop the curriculum. They must deal with a lack of support and interest on the part of their students' managers. And what is worse, technical trainers often find themselves in a classroom with people who don't want to be there or think they already know how to operate the system.

Trainers from across the country spoke with *Computerworld* about some of these challenges. They were asked three questions:

- What do you find is the most difficult aspect of technical training?
- What kind of course is the biggest challenge?
- What sort of person makes the most challenging student?

Donohue

Bill Milburn is a DP training specialist for the Auto Club of Southern California in Santa Ana. He researches, analyzes and develops training to be administered by himself and others. Milburn remembers an entry-level training class built around PL/I as one of his more challenging teaching experiences. "Getting all the information together for a complete curriculum on a subject as complex as that is probably the most difficult aspect of technical training," he says.

Bell

Similarly, he says, the type of course that presents the biggest challenge is one for which he has no prior knowledge and has to learn about the topic. "We seem to be one of these companies on the leading edge and are always pioneering something. Even in the PC area, we can't settle for a program like Wordstar. Instead, we purchase an all-encompassing modular approach like the Personal Decision Series, which no one anywhere teaches. That means I have to learn it from manuals and from IBM marketing people," Milburn says.

The type of student who presents the greatest challenge is one who is not attending the course voluntarily — "the one who is there because his boss said, 'You must learn this,' " Milburn says.

Sandra Donohue is now a consultant and executive assistant to the associate commissioner of systems at the Massachusetts Department of Public Welfare in Boston. Before taking that post, she trained data processing personnel in the department for six years.

According to Donohue, the most difficult aspect of technical training is putting the right people together with the right course at the right time. Often within the same course, she says, some students find the material too simple, while others find it too hard.

Hargrove

Donohue also expresses frustration at the lack of commitment technical training receives from students as well as their managers. "I'm not sure if their bosses pull them out of class or don't let them attend or if people sign up for courses and don't really expect to go, but the actual attendance in a course is usually less than the number who have signed up for it," she says. Donohue has some ideas about why this happens. "Training," she says, "tends to be seen as a benefit and not as part of the job."

The kind of course that presents the biggest challenge, according to Donohue, is one that attempts to provide technical people with skills like writing or management. She has found, she says, that technical people usually enjoy and want to attend technical training courses, but interesting them in training that covers softer and more general-purpose skills takes some work.

Perron

Two types of people can be difficult as students, according to Donohue. The first is an individual who has been in the business for a long time and who already knows a great deal. Often, she says, people like this are trapped in habit and really don't want to learn anything new. On the other hand, she adds, those just out of school can also be difficult to teach because they frequently suffer from the illusion that they already know everything.

Chuck Bell, advanced training instructor at Marathon Oil Co. in Findlay, Ohio, says the low priority accorded to training is particularly frustrating. "People find it hard to set aside time for the courses," he says. "Even though a class is set up ahead of time, some supervisors override attendance at the course with their own projects and make it difficult for employees to take classes at that time."

Teaching courses to audiences of varying skills and interest levels is particularly challenging for Bell, who says end users often show up in classes dominated by technical people. "It becomes a challenge to get working examples throughout the course to cover the needs of varying kinds of students."

Bell's notion of the two types of students that present different challenges includes the introverted student who does not actively participate in class and the inquisitive, aggressive student. "When someone is quiet in class and doesn't ask questions, I don't know if I got through clearly or have blown him away. On the other hand, the person who continually speaks out in class stretches my ability and makes me grow."

Bob Hargrove, security and contingency planner at the University of Texas Health Science Center in Houston, has been conducting technical training classes for about six years. One goal he has yet to accomplish, he says, is that of making training a planned and integral part of the employee development process.

Managers don't plan ahead for

Continued on page S11

Cinelli is a free-lance writer based in Washington, D.C.

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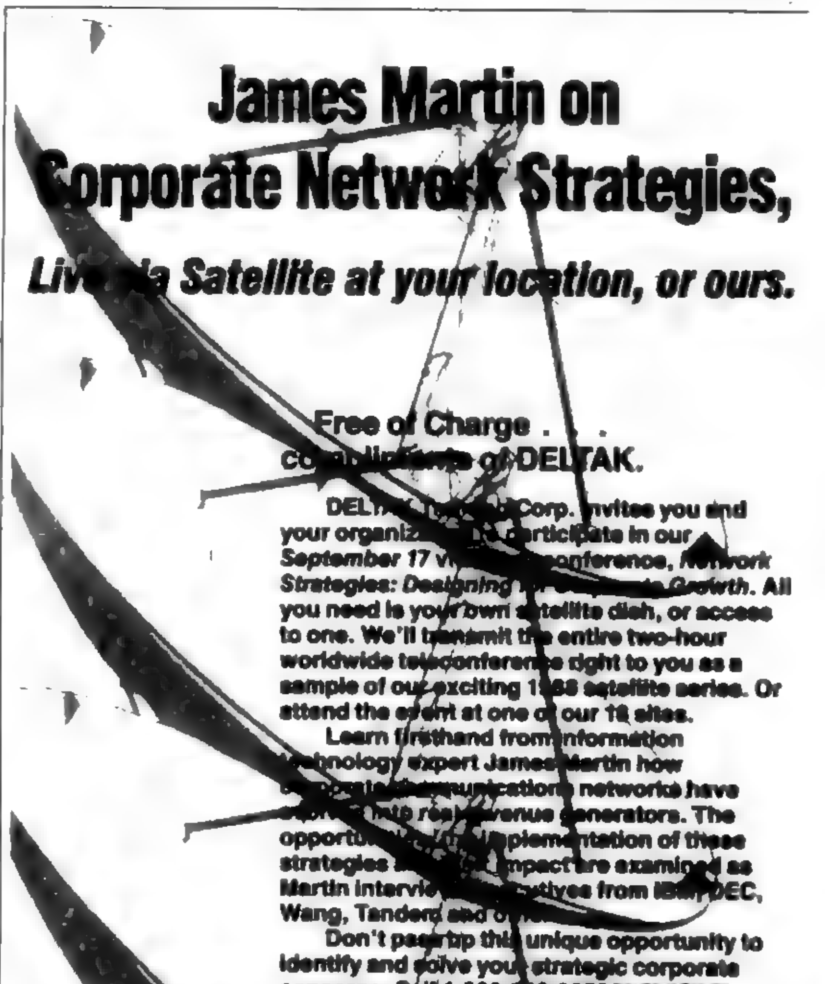

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The American Institute, Inc. (301) 833-1220	Hands-on training seminars, demos, lectures	Yes	Troubleshooting data communications networks, hands-on data communications, X.25, T1, SNA, LANs	Data communications specialist	Training or job experience in data communications	Workbook, glossary, reference manual, [illegible]	Optional	3 days	None	Standard on-site	[illegible]
Applied Science Associates, Inc. (412) 284-7300	Custom-designed user training for delivery in all media (classroom), self-instructional workbooks, CBT[1], videotape, videodisk[2]	Optional	Data entry, retrieval, error recovery	Entry-level to experienced data processing personnel	Elementary keying skills	Instructor manuals, student guides, workbooks and/or job aids as requested by client	[illegible]	1 hour to 6 weeks	None	Standard	Contact vendor
Arvay, Inc. (212) 273-3890	Technical and custom videos, workshop, classroom training	Optional	[illegible], JCL, structured analysis and design	Programmer/analyst	One year programming experience	Workbooks, job aids, free hot line for questions	No	3 days	[illegible]	Standard on-site	[illegible] (per day)
The Atlantic Systems Guild, Inc. (212) 620-4282	Seminars, licensing packages	No	Use of structured analysis, structured design, information modeling tools and strategies	Programmer/analyst	Minimum six months programming experience	Textbooks, bound copies of visuals used in course presentation, hands-on exercises	Optional	2 to 5 days	Management training	Optional	$900
Atre International Consultants, Inc. (914) 987-2007	Consulting and training, DBMS conferences, classroom training, Atre Methodology for Data Base Design	Yes	40 different courses for data base design and implementation	Data base analyst and administrator	Familiarity with data base concepts	Software, workbooks	Optional	1 to 5 days	None	Optional	[illegible] (per student per day)
[illegible] Computer Enterprises, Inc. (301) [illegible]	Classroom training	No	C language, Unix, IMS, PL/I, CICS, TSO	Programmer/analyst	Preferably six months to one year experience in programming language	Instructor manuals, student guides, lab exercises and solutions	Yes	1 to 5 days	None	Optional	$75-$250
[illegible] Data Systems [illegible]	Conferences, classroom training	No	Data dictionaries, data and process modeling, entity and relationship modeling	Data administrator, analyst	None	Textbooks, workbooks	Optional	3 to 5 days	Hands-on experience	Optional	$795-$1,345
Benchmark Technical Services, Inc. (313) 348-4601	Classroom training, seminars	No	Data base design and application programming	Application programmer	Six months programming experience	Workbooks, handouts	Optional	[illegible]	None	Optional	[illegible]
CRWTH Computer Coursewares (800) 382-2373	CBT, courseware	Yes	Project development, decision support, applications development tools, data bases, graphics	Entry- to executive-level DP personnel	Course-dependent	Workbooks, installation guides, course modification guide	No	2 to 20 hours	—	Optional	[illegible]
Ciber, Inc. (313) 271-1221	On- and off-site classroom training	No	CICS, DB2, VSAM, Xpediter, IMS, productivity tools including [illegible]	Programmer/analyst	Six months programming experience	Workbooks, textbooks, exercises, reference cards	Optional	3 to 5 days	None	Standard	$125 (per day on-site), $190 (per day off-site)
The Communication Workshop (718) 875-0000	On-site seminars, one-on-one tutorials	No	Technical writing for the DP professional, improvement of structure, style, format of documentation, memos, proposals	Any systems analyst, programmer, project manager	None	Telephone hot line for immediate feedback on writing	Optional	2 days	Business writing	Standard	$225
Computer Technology Group [illegible]	Interactive videodisks, on- and off-site lectures and classroom training, video	Optional	Unix fundamentals for programmers, Unix fundamentals for nonprogrammers, Unix System V internals, Unix overview, Unix System Shell, C language programming	Entry-level technician to technical support/systems programmer	Course-dependent	Hands-on exercises, tapes, student guides, administrator guides	Optional	1 to 5 days	None	[illegible]	Contact vendor
Compuware, Inc. (313) 540-0900	Live education, classroom training, hands-on workshop	No	Management overview, IDMS, IBM environment, DB2 overview, IMS	Programmer/analyst	Minimum three to six months experience	Extensive student guide, exercises, handouts, labs, supplementary text	Optional	2 to 5 days	None	Optional	Contact vendor
Steve Comstock (303) 355-2752	Training material, classroom training	No	Programming language skills, analysis, JCL, data management skills	Programmer/analyst	Course-dependent	Instructor kit, annotated instructor guide, handouts, exercises, transparencies	No	1 day to 4 weeks	None	Standard	$140 (per student per day)
[illegible] of Computer Education and Programmer Training [illegible]	[illegible] training	No	[illegible], systems analysis and design	Programmer, project manager, director	Course-dependent	Supplied by vendor	Optional	[illegible]	Participation in users groups, subscription to management and technical journals and magazines	Optional	Contact vendor
Institute for Advanced Technology (a division of Control Data Corp.) (301) 468-8424	Seminars, hands-on workshops	No	Voice/data communications, DBMS and DP operations, software-engineered AI, integrating information systems, PCs, professional/management development	Administrators, managers, programmers, analysts	Varies by course	Student handouts, workbooks	Optional	2 to 5 days	—	Optional	$595-$1,195
Corporate [illegible] Associates, Inc. [illegible]	Customized systems, classroom training, seminars, CBT, video courses, interactive videodisks, combined formats	Optional	[illegible]	Entry- to executive-level DP personnel	Course-dependent	Instructor manuals, workbooks, [illegible]	No	[illegible]	—	Standard	Contact vendor
The Courseware Developers (303) 646-4100	CBT	Yes	DB2, SQL/DS, QMF, CSP	Programmer/analyst, end user	Basic DP background	Workbooks	No	14 to 16 hours	[illegible]	Not provided	$2,000-$8,500
Database Management, Inc. [illegible]	[illegible] classroom training, seminars, hands-on workshops	[illegible]	[illegible]	Application development personnel, project designers, systems analysts	One to two years experience programming or design background	Comprehensive manuals/handouts	Optional	[illegible]	None	[illegible]	[illegible]
Data Kinetics, Ltd. (613) 238-6700	Hands-on workshops, classroom training, seminars	No	IMS/DB/DC, table-driven program training, Mark IV, VM/CMS, QMX, Focus	Programmer/analyst	Some programming experience	Exercises, glossaries, reference guides, manuals	Optional	3 to 5 days	None	Optional	$900 (per 5-day workshop)
[illegible] Research Corp. [illegible]	On- and off-site seminars, CBT	Optional	Basics of communications, data and telecommunications, PC networks, micro-to-mainframe connectivity, SNA, network and protocols, IBM teleprocessing	DP professional, [illegible], marketing, technical support	Course-dependent	Notebook, [illegible] reports	Optional	[illegible]	[illegible], related books	Optional	[illegible]
Data Tech Institute (201) 478-5400	Hands-on workshops, in-class demonstrations, classroom training, seminars	No	Examining IBM PC, XT, AT and compatibles, networking IBM PC and compatibles, planning and designing a digital T1 network	Programmer/analyst, DP manager, decision-support manager	Course-dependent	Instructor manuals, workbooks, glossaries, catalogs, some software	Optional	2 days	—	Standard on-site	Contact vendor

[1] Computer-based training [2] Interactive video instruction

The companies included in this chart responded to a recent telephone survey conducted by *Computerworld*. Further product information is available from vendors.

Technical

FROM PREVIOUS PAGE

courses, Hargrove explains. "When they want a course, they always want it yesterday." Instead of treating training like a vigilante operation, he says, managers should incorporate assessment of training needs into performance evaluations.

The biggest hurdle that Hargrove says he encounters with courses has nothing to do with content; it is related to poor planning and coordination on the part of managers who send their staffs to a course on something like CICS when there is no immediate opportunity for them to put it to use. "Often," he says, "students don't get a chance to use what they learn right away, and when that happens, you start running into the skills-extinction curve."

The type of student that Hargrove least likes to have in his classroom is the computer scientist. "Computer scientists know no language except their own," he says, "and they have a mindset about everything."

How much is enough?

Figuring out how much is enough is one of the trickiest parts of a trainer's job, according to Bernie McGinley, data center education coordinator at Pittsburgh National Bank. Students come to McGinley's classroom with differing needs, and tailoring the training to a varied audience can be difficult.

For example, he says, "when we install a new software package, some who take the class need to know the finest details about the package, and others just need to know the barest facts."

Lack of turnover in his industry — in which the average stay of operations personnel is 15 to 20 years — contributes to the difficulty of technical training, McGinley says. People master a certain set of skills and tend to develop set patterns of thinking and working during the course of several years.

"All of a sudden," he says, "we bring in an IBM System/88 [minicomputer], and people have to learn all new skills. It's extremely hard to transfer from their base of knowledge to this new machine." Training students to break out of established patterns "is the type of course that's hardest for me to teach," McGinley adds.

Motivating the "unconsciously competent" student presents McGinley with his greatest test as a trainer. This type of person has so thoroughly mastered the skills needed to perform his job that he can perform them almost without thinking about it. "Trying to make him curious and excited about learning something new is the biggest challenge,"

Continued on next page

COMPANY	TYPE(S) OF PRODUCT OR SERVICE	DESIGNED FOR SELF-PACED LEARNING	SKILLS OR COMPETENCIES COVERED	APPROPRIATE FOR WHAT LEVEL OF STUDENT	REQUISITE EXPERIENCE OR EDUCATION	TYPES OF SUPPORTING MATERIALS PROVIDED	REQUIRES TRAVEL FROM COMPANY SITE	AVERAGE TIME REQUIRED TO COMPLETE TRAINING	RECOMMENDED SUPPLEMENTAL LEARNING	CUSTOMIZATION	AVERAGE PRICE PER STUDENT
[illegible], Thomas & Associates [illegible] 521-0773	Live training, hands-on workshop, classroom training, seminars	No	[illegible] programming, MVS [illegible]	Programmer/analyst	Course-dependent	[illegible]	Optional	3 to 4 days	Independent study programs	Optional	$[illegible] (per day)
Dean Lance Smith (713) 721-5490	Seminars	No	Testing and servicing micros, PC data communications, C language, Pascal, assembler	Programmer/analyst, engineer, DP manager, technician	Course- and option-dependent	Workbooks, exercises	[illegible]	1 to 5 days	Course-dependent	[illegible]	Contact vendor
Deltak Training Corp. (312) [illegible]	Instructor-led training, classroom, seminar, video, interactive video, CBT, full training management	Optional	Applications, operations, data base, data communications and systems development training	Entry-level programmer to chief information officer	Course-dependent	Instructor manuals, workbooks, handouts, [illegible] guides, diskettes, [illegible]	[illegible]	90 min per course	None	Standard	Contact vendor
Digital Consulting, Inc. (617) 470-3870	Public and on-site seminars, symposia, consulting	No	AI, data base and 4GL implementation and technologies, applications development, CASE, corporate connectivity, PC software and hardware, in-house curriculum	Systems developer, project manager, designer, programmer, technical and nontechnical managers at all levels	Course-dependent	Textbooks, workbooks, foils, exercises, reference materials, evaluations	Optional	4 hours to 5 days	—	Optional	$[illegible]-$895
Frank [illegible] & Associates, Inc. (312) [illegible]	Customized on-site seminars	No	VM or VM/CMS training concepts, rules, descriptions, tools	Data entry clerk to applications programmer	Knowledge of general data processing concepts	Technical handouts, lab exercises	Optional	5 days	Hands-on programs, technical manuals	Optional	Contact vendor
Freedman Consulting, Inc. (215) 985 4050	Hands-on workshops, [illegible], seminars	No	[illegible] IBM 370 system, assembler	Programmer	Course-dependent; some knowledge of Cobol or assembler	Self-rated homework assignments, course text	[illegible]	5 days	Prestudy videos	Standard on-site	$950
[illegible] & Associates (415) 461-6944	Classroom training, seminars, [illegible]	[illegible]	Technical offerings including CICS, [illegible], Cobol	Entry- to executive-level DP personnel	Course-dependent	[illegible]	Optional	1 to 5 days	—	Standard	$70-$[illegible]
Goal Systems International, Inc. (614) 888-1775	Seminars, instructor-led training, courseware offerings	[illegible]	CICS command-level programming skills, performance monitoring and tuning VM and MVS	Systems programmer	Six months to one year experience	Manuals, case study materials, foils	Yes	3 to 5 days	CBT, video programs from multimedia producers	Not provided	$150-$200
[illegible] Training, Inc. (312) [illegible]	Live instruction, hands-on workshop, classroom training	No	Troubleshooting [illegible], serial data communications	[illegible] technician	Solid background in digital electronics with some experience in [illegible]	Instructor manuals	Optional	40 hours per [illegible]	Familiarity with operations of test equipment	Optional	$[illegible]
The Hartford Graduate Center (203) 548-2470	[illegible] and off-site classroom training and seminars	No	Application/system programming, data bases, JCL and debugging, structured methods, CICS, IMS, VSAM, MVS, systems analysis and design	Programmer, systems analyst	Course-dependent	Textbooks, hands-on training	Optional	2 to 7 days	[illegible]	Standard on-site	Contact vendor
[illegible] Training Consortium, Inc. (317) [illegible]	Training consortium	No	CICS, structured systems analysis and design, advanced maintenance and testing, PC training, information center personnel	Programmer/analyst	[illegible]-dependent	Manuals	No	2 to 5 days	NA	Not provided	$[illegible] (per day)
Information Builders, Inc. (212) 736-4433	Classroom training, seminars, CBT on Focus	Optional	Developing Focus applications, Focus data base design, advanced techniques and Focus internals	Manager and DP professional	Some programming experience	Instructor manuals, course workbooks, problem sets	Optional	—	—	[illegible]	$475
The Information Engineers (312) [illegible]	Customized courses, classroom training, seminars, CBT, video courses, interactive videodisks, workbook formats	Optional	Programmer training, programming languages, productivity aids, systems analysis and design	[illegible] personnel	Course-dependent	Course-dependent	Optional	2 to 3 hours per [illegible]	Reference manuals	Standard	Contact vendor
Information Technologies, Inc. (800) 431-3460	Seminars, classroom training	[illegible]	Data communications, micro-to-mainframe gateways, SNA, BSC, 3270 data streams, Netbios interface, application program interfaces	MIS/DP manager, systems engineer, customer engineer, network support specialist	General knowledge in topic area	Manuals, [illegible], lab exercises, copies of overhead presentations	No	2 or 4 days	IBM [illegible] programmers guide	Standard	$895-$1,495
[illegible], Inc. (415) [illegible]	On- or off-site live instruction, classroom training, seminars	[illegible]	Software maintenance and support, software engineering techniques, software testing techniques, reducing software complexity	Programmer/analyst	[illegible] college graduate [illegible] experience	Manual with bibliography, course outline, reading	Optional	[illegible] days	JCL, language use	Standard	$[illegible]-$1,[illegible]
Institute for Information Management (408) 550-6911	Classroom training, seminars	[illegible]	Capacity planning, capacity and performance management	Technician, data center manager	None	Textbook, exercises, case studies	Optional	5 days per course	None	Optional	$[illegible]
Integrated Computer Systems (800) 421-8166	Classroom training, seminars, video courses	Optional	Data communications and networks, hands-on PC networking, micro-to-mainframe connectivity, hands-on troubleshooting of data communications and networks	Programmer, engineering manager	General technical [illegible]	Volume of course notes, selected technical articles	Optional	4 days	None	Optional	$[illegible]-$1,[illegible]
International Management Services, Inc (617) 520-1555	On- and off-site seminars, hands-on workshops	No	System and analysis design, design of [illegible] and communications networking	Entry- to senior-level DP professional	Course-dependent	Student manuals	Optional	4 hours to 5 days	—	Standard on-site	Contact vendor
Ken Orr & Associates, Inc. (800) [illegible]	On- and off-site classroom training, seminars	[illegible]	Systems development and methodology, systems planning, project management, data design, requirement development and systems analysis, systems maintenance	Systems analyst, DP manager, programmer	None	Seminar manual	Optional	3 to 5 days	[illegible]	Not provided	$[illegible]
The Knowledge Exchange, Inc. [illegible]	On- and off-site live education, seminars	No	IBM manufacturing language, CICS, data communications, data bases, analysis management, time-sharing, IBM operating systems	Programmer to DP manager	One to 10 years experience depending on course	Workshops using client's factories, student handouts	[illegible]	3 to 5 days	CBT, self-study materials	[illegible]	$960-$1,200 [illegible] expenses per day per [illegible]
[illegible] Technologies, Inc. (408) [illegible]	On- and off-site classroom training, seminars	[illegible]	CICS, VSAM, VTAM	Application programmer	College degree or experience	Workbooks, handouts	Optional	1 to 5 days	None	Optional	$[illegible]

Technical

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McGinley says.

For Barbara Stears, supervisor of computer-assisted instruction at McDonnell Douglas Corp. in Hazelwood, Mo., identifying an ever-changing set of needs and arranging for appropriate training in a timely fashion is the biggest obstacle. Often, by the time such training is found, "the need and the environment have changed," she says.

Compounding the problem is a lack of commitment to training on the part of management. "People begin the training and then are pulled out by their own management. Usually they are pulled out of the course to deal with short-term emergencies, which might not necessarily be the best use of their time."

Although occasionally provoked by the young upstart who thinks he knows it all, Stears says she is inclined to make allowances for this category of student. "That person is often the type who tries a lot of new things and has an open mind," she says. Ultimately, it is the person who has "a set way of doing things and doesn't pay enough attention" that Stears is least pleased to find in her classroom.

Can't be bought

Connie Perren, education coordinator for the DP department at the University of Texas medical branch in Galveston, has been teaching and developing training for almost five years. Before that, she worked as a programmer/analyst.

Perren echoes Stears' experience that finding training in a timely manner is the most difficult aspect of her job. "Some of the education is not something we can buy. We either have to develop it in-house or learn it on our own," she says. And becoming an instant expert is not easy, she adds.

Courses that are of strategic importance to the department and require in-house experts to teach applied theory, as opposed to simple operation, are a particular trial, Perren says, since the training has to wait for a time when that person can be spared from his regular job.

DP managers enrolled in management education classes make the worst students, Perren says. "For some reason, they don't usually apply good management techniques back on the job." Students are expected to apply technical skills learned in a classroom to their jobs, Perren adds, but "softer skills are left in the classroom."

In an "Effective Communication" class, for example, "a significant majority of technical folks and management folks don't think it's worth it to apply the materials learned in the classroom back on the job." ●

COMPANY	TYPE(S) OF PRODUCT OR SERVICE	DESIGNED FOR SELF-PACED LEARNING	SKILLS OR COMPETENCIES COVERED	APPROPRIATE FOR WHAT LEVEL OF STUDENT	REQUISITE EXPERIENCE OR EDUCATION	TYPES OF SUPPORTING MATERIALS PROVIDED	REQUIRES TRAVEL FROM COMPANY SITE	AVERAGE TIME REQUIRED TO COMPLETE TRAINING	RECOMMENDED SUPPLEMENTAL LEARNING	CUSTOMIZATION	AVERAGE PRICE PER STUDENT
[illegible] Training Institute, Inc. (617) [illegible]	Workshops, classroom training, seminars, video courses	Optional	Audit and security	Entry-level to manager	Course-dependent	Comprehensive course notebook, student guide, workbook	Optional	2 to 3 days	None	Optional	[illegible]
MVC Corp. (800) 448-1444	On- and off-site classroom training and seminars	No	Focus training for programmers, advanced Focus training for programmers, PC Focus for programmers	Programmer/analyst	Some technical background, advanced course requires experienced Focus applications programmer	Focus user manual, workbook	Optional	3 to 5 days	Focus user manual	Optional	$475
McDonnell Douglas Information Systems Group (800) [illegible]	Classroom training, seminars	No	Structured techniques: program design and analysis, implementing structuring techniques with [illegible]	Project managers, programmers, analysts, designers, managers	Course-dependent	Manuals, workbooks, handouts	Optional	1 to 5 days	[illegible]	Optional	[illegible]
Mid-Ohio Training Consortium (614) 764-6334	Training consortium	No	CICS, project management, structured methodology	Programmer/analyst	Some experience, college degree	Manual provided by vendor	Yes	3 to 5 days	None	Optional	$125-$150 (per day)
[illegible], [illegible] & Co. (301) [illegible]	Workshops, classroom training, seminars	No	AI, data communications, LANs, troubleshooting IBM PC and compatibles, Basic, Pascal, C, Prolog, introduction to DP	Entry-level to advanced programmers	Course-dependent	[illegible]	No	1 to 5 days	Course-dependent	[illegible]	Contact vendor
Mountain Bell (303) 978-6101	AVIL library, classroom training	Optional	Programming, systems analysis, project management	Entry-level programmer to expert systems analyst	Course-dependent	Workbooks, approval sheets	Optional	1 week to 3 months	Concepts of data systems	Standard	$11-$12 (per student per hour)
National Advanced Systems Education Services (a subsidiary of National Semiconductor Corp.) (800) [illegible]	Lectures, hands-on labs, classroom training, seminars	No	VM, MVS, IMS, data base management systems, project management	Systems programmer/analyst	Knowledge of IBM DP fundamentals	Student guide	Optional	1 to 5 days	Additional curriculum	Optional	[illegible]
Omnicom, Inc. (703) 281-1135	On- and off-site classroom training, seminars, video courses, tutorials	Optional	Data communications (ISO or CCITT) message handling, packet switching, SNA, ISDN, 802 LANs	Technical manager, marketing manager, senior development staff of hardware and software, all DP and telecommunications personnel	Basic knowledge of data communications technology	Copies of standards and manuals, workbooks	Optional	1 to 5 days	Proximity videos	Optional	Contact vendor
[illegible], Inc. (614) [illegible]	Classroom training, seminars	No	MVS, CICS, IMS, operations management training	Entry-level computer operator to operations manager	Course-dependent	Student guides, text manuals	Optional	2 to 5 days	None	Standard	[illegible]-$1,[illegible]
Performance Development Corp. (800) 931-3770	Workshops, classroom training, seminars	No	Data normalization, design of data base systems, data modeling, logical and physical data bases, developing data base systems standards, relational data base concepts	Data administrator, systems analyst, senior programmer	Basic understanding of DP operations	Handouts	Optional	3 days	Follow-up consulting	Standard	$2,400 (per instructor day)
	Workshops, classroom training, seminars	No	Adabas, CICS, Datacom, IMS, Focus, Model 204 data base	Data administrator, systems analyst, senior programmer	Basic understanding of DP operations	Handouts	Optional	3 days	Follow-up consulting, textbook	Standard	$2,400 (per instructor day)
[illegible] Courseware, Inc. (408) [illegible]	CBT	Yes	DP concepts for business including access control and security, computers and components, data and DP, programs and languages, the systems development life cycle, DP personnel	Managerial level	Knowledge of IBM PC or compatibles	12 diskettes, user guide	No	16 to 20 hours	Supplemental reading on individual topics for additional detail	Not provided	[illegible] (per complete course)
QED Information Sciences, Inc. (617) 237-5656	One-day intensive key issues programs for senior systems management and professionals, classroom training, seminars, video courses, CBT, educational planning, consulting, publishing books and monographs	Optional	Data base, CICS, data communications, networking, programming	Entry- to senior-level DP and communications personnel	Course-dependent	Course notebooks, textbooks	Optional	3 days	Bibliography, video, CBT	Optional	Contact vendor
SAS Institute, Inc. (919) 467-8000	Classroom training, video courses, CBT	Yes	SAS software skills	Entry-level professional	Basic computer skills	Manuals, workbooks, reference cards	Optional	Varies	None	Optional	Contact vendor
Software Information Services, Inc. (206) 455-3880	Classroom training, seminars	No	VSAM training, assembler language	Systems and application programmer, data base administrator	One year programming experience	Textbooks	Optional	5 days	Supplemental reading on VSAM	Optional	$375
[illegible] Engineering, Inc. (4[illegible]) [illegible]	Formal instructor-led classroom training on- or off-site with labs	No	General use of IBM systems for professional and managerial personnel, program development/maintenance skills for applications programmers, systems installation/maintenance/performance evaluation skills for systems programmers	Project leader, manager, systems/application programmer/analyst	Prior technical experience	Computer labs, student handouts, workbooks, diskettes	Optional	1 to 5 days	None	Optional	Contact vendor
Triad DP Educators' Council (919) 379-4570	Training consortium, classroom training, seminars	No	CICS, VSAM, DL/1, Intertest, SAS	Programmer, project manager, systems analyst	Course-dependent	Handouts, class manuals, student guides	NA	1 to 5 days	None	Optional	$100 (per student day)
Yourdon, Inc. (212) [illegible]	On- and off-site seminars, consulting services	No	Systems development and training, project management, [illegible], CICS, IMS, MVS	Programmer/analyst	None	Lecture notes, case studies, exercises	Optional	3 days	Optional textbooks	Optional	[illegible]

Uncertainty

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answers and that the only certainty is lack of certainty. Managing is certainly situational. What works once doesn't always work."

Many new systems managers are control-oriented: They have a high psychological need to control events and people. While this may work well for individual contributors, it does not work for new managers, because problems at lower managerial levels are often better solved through "soft" influence strategies than through "hard" control measures.

Be a delegator

The third challenge — delegation — requires that the manager relinquish control, which is often a highly threatening prospect. Delegation is one of the most difficult managerial skills to execute well, and much time is lost on sloppy attempts.

There are a number of ways to improve your delegation skills:

- Decide if the job, task or assignment needs to be done at all.
- If it does need doing, review your people and decide who can carry it out most effectively.
- Explain the purpose of the assignment, and share your expectations and objectives.
- Set a realistic time frame.
- Explain to subordinates exactly what is needed and inform them of any deadlines.
- Make sure everyone knows and agrees on the limits of authority you are granting. Don't assume.

We have already discussed the fourth hurdle, that of learning to live with ambiguity. This is a stumbling block for many systems managers. The key to success is being willing to admit that we cannot always control others, that events often seemingly take on lives of their own and that answers to people problems are usually more difficult and unpredictable than answers to technical problems.

Which brings us to challenge No. 5 — understanding your sources of power and influencing those over whom you have no control. Systems managers often ridicule those "soft" skills that are most necessary when managing outside one's span of control. When we do not possess positional power, we must influence through respect, knowledge, insight, information, vision, trust and confidence. These are qualities that new systems managers must cultivate if they are to survive and become successful.

The sixth and final hurdle is often the highest of all: understanding and applying motivation. Motivation is the stimulus to action, the incentive to do

Continued on next page

Management training for DP

COMPANY	TYPE(S) OF PRODUCT OR SERVICE	DESIGNED FOR SELF-PACED LEARNING	SKILLS OR COMPETENCIES COVERED	APPROPRIATE FOR WHAT LEVEL OF STUDENT	REQUISITE EXPERIENCE OR EDUCATION	TYPES OF SUPPORTING MATERIALS PROVIDED	REQUIRES TRAVEL FROM COMPANY SITE	AVERAGE TIME REQUIRED TO COMPLETE TRAINING	RECOMMENDED SUPPLEMENTAL LEARNING	CUSTOMIZATION	AVERAGE PRICE PER STUDENT
Advanced Systems, Inc. [illegible]	Live education, co-location seminar, CBT[1], video training, interactive video instruction	Yes	38 different programs including effective presentation, effective leadership, time management, motivation, team building	Manager, supervisor	None	Instructor manual, workbook, student guide, appraisal sheets, coordinator guide, diskette, textbooks	No	2 to 16 hours	Management seminars	Optional for live training	Contact vendor
American Management Associations (518) 891-0065	Seminars, audiovisual training, publications	Optional	Disaster recovery, design analysis, project management, PC skills, communications, information systems management skills	Technical professional, MIS executive	None	Manuals, reference reading, case studies, handouts, textbooks, diskette template	Optional	3 days	—	Optional on-site	$750
American Micro Media [illegible] 227-1343	CBT	Yes	Time management, financial training, project management, negotiating skills, performance appraisal, selling skills	New or experienced manager	Course-dependent	Documentation, reference guides, workbooks	No	60 to 90 min	None	Not provided	$89
American Society for Training and Development (703) 683-8100	ASTD conference on technical and skills training with 144 concurrent sessions	No	Managing technical training	Technical manager, specialist, engineer, DP manager	None	NA	Yes	3 days	NA	NA	[illegible] $450
Applied Science Associates, Inc. (412) [illegible]	Self-instructional workbooks, CBT, videotape, video disk	Optional	Features and functions of systems software, analysis and interpretation of system reports	Entry-level to experienced DP personnel	Elementary keying skills	Instructor manuals, student guides, workbooks and/or job aids as requested by client	Optional	1 hour to 6 weeks	NA	Standard	Contact vendor
Arsenault & Ouellette (603) 625-6164	Seminars, video, independently administered learning systems, interactive limited-enrollment workshops, on-site consulting services	Optional	People skills, improving consulting skills of the information processing professional, how to deal effectively with end users	Information center manager, consultant, programmer, analyst, MIS manager	Information center, MIS or DP environment	Student workbooks	Optional	1 to 3 days	Real-life case studies	Optional	[illegible] $795
The Atlantic Systems Guild, Inc. (212) [illegible]	Seminars, licensing packages	No	Software project management, fourth-generation methodologies, project estimating, strategies for rapid and accurate requirements definition	Senior technical personnel, second-level manager, project manager	Three to five years experience in management capacity, familiarity with tools of structured design and information modeling	Textbooks, bound copies of visuals used in course presentation, handout exercises	Optional	2 to 5 days	—	Optional	$500
Barnett Data Systems (301) 762-1266	Classroom training, seminars, conferences	No	Data administration, strategic data planning, improving systems development classes	Data administrator, technician, senior executive	None	Textbooks, workbooks	Optional	2 to 3 days	Hands-on experience	Optional	[illegible] $995
Better Communications, Inc. (617) [illegible]	Individualized business and technical writing workshops, instructor-tailored workshops using on-the-job writing, classroom training	Yes	Analyzing your audience, pen and paper problem solving, organizational ideas for impact, increasing writing speed, choosing effective formats, avoiding gobbledygook	Any	None	[illegible]	No	1 to 5 days	Practice	Standard	Contact vendor
Bowker Writing [illegible] Inc. (713) 955-2325	CBT self-study, classroom workshop, video	Yes	Thinking process for analyzing audience needs, clarity, organization, grammar, style, conciseness	Entry-level to senior-level DP manager	None	Textbooks, handouts, user manuals	Yes (for workshop only)	7 to 14 hours	None	Standard	$173 (approximate)
CRWTH Computer Coursewares [illegible]	CBT, courseware	Yes	Project management, decision support	Entry- to upper-level management	Course-dependent	Workbooks, installation guides, course modification guide	No	3 to 20 hours	—	Optional	[illegible]
CareerTrack (800) 334-6780	On- and off-site seminars, classroom training, video courses	Optional	Time management, presentations, how to deal with difficult people, listening, achieving excellence, power communications skills for women	Any managerial level	None	Workbooks, handouts	Optional	1 day	Audio and video cassette programs	Standard on-site	$48
[illegible], Inc. (301) [illegible]	Floppy disk, job aids designed for individual manager's use only	NA	Leadership skills	Manager/supervisor	Exposure to concepts and skills taught in workshops based on the situational approach to leadership	Floppy disk, user manual	No	User-determined	Workshops on situational leadership approach	Optional	$1[illegible]
	Floppy disk, job aids designed for individual manager's use only	NA	Performance management, analysis of performance situations, increases the manager's ability to coach and counsel for performance improvement with analysis and recommendations for action	Manager/supervisor	Ability to use PC	Floppy disk, user manual	No	User-determined	Understanding of the coaching and counseling process	Optional	$150
	Floppy disk, job aids designed for individual manager's use only	NA	Management feedback systems, basis for performance improvement and management growth and development	Manager/supervisor	None	Floppy disk, user manual	No	User-determined	—	Optional	$150
Consortium of Computer Education and Programmer Training (207) 780-9281	Consortium training	No	Consulting skills, project management, marketing technology in the organization	Programmer, project manager, director	Course-dependent	Supplied by vendor	Optional	2 days	Participation in users groups, subscription to management and technical journals and magazines	Optional	Contact vendor
Corporate Resource Associates, Inc. (415) [illegible]	Customized services, classroom training, seminars, CBT, video, interactive video disk/video, combined formats	Optional	Standardization of project methodology (client-determined)	Entry- to executive-level DP personnel	—	Instructor manuals, workbooks, appraisal sheets	No	Client-defined	—	Standard	Contact vendor
Deanne Rosenberg, Inc. (617) [illegible]-6117	On-site stand-up training, workshop, films, videos, classroom training	Yes	Interviewing/selection, increasing staff efficiency through quality leadership, how to create and manage a winning team, harnessing stress and how to make it work for you, performance appraisal without criticism, encouraging creativity, managerial basics	Manager/supervisor	None	Handouts, outlines, case studies, simulations	No	Client-determined	Self-evaluations, reading lists, additional courses	Standard	Contact vendor

[1] Computer-based training

The companies included in this chart responded to a recent telephone survey conducted by *Computerworld*. Further product information is available from vendors.

Uncertainty

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something and behave in a certain way.

As another client told me, "What makes me tick is the opportunity to achieve something of value — to accomplish a result that will be visible to others and significant to them and to the company. I'm not turned on by working closely with others, but I need to be more flexible about this now that I'm managing.

"I like freedom and discretion when planning and carrying out my activities, and I'll try and provide this for my people," the client added. "Because I value achievement, I appreciate timely and specific feedback about how I'm doing, and I'll try to provide this also.

"Do I know what motivates each of my people? No, but I'm going to learn as much as possible about them, because the more I know, the better we'll do."

The secrets to motivation

As new systems managers learn about motivation, they realize it is not a medicine they administer to others. It is a combination of personal attitudes that — when understood and acted upon — will cause people to achieve far beyond normal expectations. The motivation hurdle is high, because it is often easier to assume we know what motivates others than to invest the time and energy in understanding our people as individuals and helping them satisfy their inner needs and desires.

Here are six suggestions for developing excellent information systems managers. Coupled with an understanding of the six hurdles, they will give you a head start as you develop yourself as well as others.

- Be as sure as you can that your new systems managers want to manage and are not feeling unduly pressured to do it. The more pressure, the more stress, the less the performance.
- Whenever possible, provide good mentors. Coaching is an art; invest in it.
- Involve managers of managers in the development process. This provides the reinforcement, motivation and security to apply new skills.
- Focus on the values, changes and shifts in motivation required when moving into management, and influence the work environment to support these changes.
- When you send your new systems managers to management education courses, be sure they know why they are attending.
- Try to sense when your new systems managers are ready to learn. For many managers, this is after they have been managing for a while as opposed to before they begin. It can help you to know what you don't know. ●

COMPANY	TYPE(S) OF PRODUCT OR SERVICE	DESIGNED FOR SELF-PACED LEARNING	SKILLS OR COMPETENCIES COVERED	APPROPRIATE FOR WHAT LEVEL OF STUDENT	REQUISITE EXPERIENCE OR EDUCATION	TYPES OF SUPPORTING MATERIALS PROVIDED	REQUIRES TRAVEL FROM COMPANY SITE	AVERAGE TIME REQUIRED TO COMPLETE TRAINING	RECOMMENDED SUPPLEMENTAL LEARNING	CUSTOMIZATION	AVERAGE PRICE PER STUDENT
Development Dimensions International (412) 257-2277	Floppy-disk program	Yes	Formulates job descriptions, customized performance appraisal forms and interview guides, aids in job analysis and hiring	Manager/supervisor	Familiarity with IBM PC and compatibles	Full instructor manual	No	2 days	Hiring programs	Optional	Contact vendor
Garrett & Associates (415) 461-8244	Classroom training, seminars	No	Project management, cost/benefit analysis, information systems planning	Entry- to executive-level DP personnel	Course-dependent	Instructor manuals, workbooks	Optional	1 to 5 days	On-the-job experience to follow up training	Standard	$70-$80 (per day)
[illegible] Systems International, Inc. (314) [illegible]-1778	[illegible]	No	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	$1,[illegible] (per course, [illegible])
Gold Consulting (212) 581-4205	On-site seminars	No	Writing skills, management/supervisory skills, delegation, managing change	Entry- to senior-level management	Course-dependent	Bibliography, course notebook, follow-up consultation	No	2 days	Bibliography including reading and films	Standard	$3,500 (per course), $150-$160 (per student)
[illegible] Training Consortium, Inc. (617) [illegible]	[illegible]	No	[illegible]	Entry-level programmer to DP [illegible]	Course-dependent	[illegible]	No	1 to 6 days	No	[illegible]	[illegible] (per day)
Information Builders, Inc. (212) 736-4433	Classroom training, seminars, CBT on Focus	Optional	Information center management seminar, train-the-trainer workshop	Manager, DP professional	Some experience in DP environment	Instructor manuals, course workbooks, problem sets	Optional	—	—	Standard	$475
[illegible] (312) [illegible]	[illegible]	No	[illegible]	[illegible]	[illegible]	[illegible]	Optional	[illegible]	[illegible]	Standard	[illegible]
International Management Services, Inc. (617) 530-1555	On- and off-site seminars, hands-on workshops	No	Project management	Entry-, mid- or upper-level DP manager	Course-dependent	Student manual	Optional	4 hours to 5 days	—	Standard on-site	Contact vendor
[illegible] (617) [illegible]	[illegible]	No	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	Standard	[illegible]
Learncom (division of Sandy Corp.) (617) 576-3100	CBT	Yes	Project management, improving employee performance, forecasting, business writing, strategic planning, PC literacy, finance and accounting for nonfinancial officers	Any managerial level	None	Manual	No	90 to 300 min per lesson	None	Optional	$100-$200 (per module)
[illegible] (800) [illegible] [illegible] (in Conn.)	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Livingston & Associates (216) 826-4196	On- and off-site interactive seminars	No	Strategic planning, developing successful data centers, advanced user interface, technical writing	MIS manager, information center manager/professional	None	Manuals, evaluations	Optional	2 to 3 days	Past and practice work	Standard	$150 (per student day)
[illegible] (617) [illegible]	On- and off-site [illegible] workshops	No	[illegible]	Any managerial level	[illegible]	[illegible]	Optional	1 to 3 days	[illegible]	[illegible]	Contact vendor
McDonnell Douglas Information Systems Group (800) 325-1087	Classroom training, seminars, videos, CBT	Optional	Effective listening, time management, stress management, technical presentation skills, effective interviewing, process management skills	Computer operator to executive-level manager	None	Student handouts	Optional	16 to 20 hours	Interactive videos, role-playing	Optional	$240 (per student day)
National Computer Training Institute (312) [illegible]	Public and in-house classroom training and seminars, [illegible] services	No	[illegible]	Trainer, [illegible] level	[illegible]	[illegible] National Network of Computer Trainers	Optional	1 to 4 days	[illegible]	Optional	[illegible]
O. D. Resources, Inc. (404) 455-7145	Consulting services, written programs, seminars	No	People skills, change facilitation skills	Any managerial level	None	Concept papers, workbooks, practical applications	Optional	4 hours to 3 days	Immediate application	Optional	$675-$775
Performance Development Corp. (609) [illegible]-1770	Classroom training, seminars	No	[illegible]	[illegible]	Basic understanding of data processing	[illegible]	Optional	3 days	Follow-up consulting [illegible]	Standard	$1,[illegible] (per [illegible] day)
QED Information Sciences, Inc. (617) 237-5656	One-day intensive key-note programs for senior systems management and professionals, classroom training, seminars, video courses, CBT, education planning, consulting, publishing books and monographs	Optional	Systems development, information systems management, interpersonal skills	Entry- to senior-level manager	Course-dependent	Course notebooks, textbooks	Optional	2 to 5 days	Bibliography, video, CBT	Optional	Contact vendor
Ridge Associates, Inc. (215) [illegible]	Seminars, workshops with video feedback	Yes	Interpersonal communications skills, listening, performance appraisals, positive reinforcement, conflict and resolution	First-line supervisor, mid- to upper mid-level management	None	Charts, video feedback, activity-oriented workbooks, handouts	Optional	2 to 4 days	Additional reading, follow-up training	Optional	$[illegible]-$175 (per day)
Development Dimensions International (412) 257-2277	Floppy-disk program	Yes	Formulates job descriptions, customized performance appraisal forms and interview guides, aids in job analysis and hiring	Manager/supervisor	Familiarity with IBM PC and compatibles	Full instructor manual	No	2 days	Hiring programs	Optional	Contact vendor

Fast track

FROM PAGE S5

well elsewhere just aren't going to do well here. The fit of the individual to the environment is important in our hiring process.

Do you turn away people who are technically proficient but lack an interest in business training?
That really depends on the position. We have people in voice and data communications who don't take the business training. But they are quite unusual. For the most part, people do have to have an interest in the business.

Who participates in the advanced training?
That is open to the staff. All the people who have come through the six-month training program, people we have hired to fill certain positions and experienced staff members attend those courses.

How do you address the different needs of the entry-level group and the experienced staff?
We meet with every person as they come into the firm and review their background and identify what skills they will need. Then we create a training calendar for each person.

Do technical people receive recognition for their proficiency, or are the top positions reserved for business people?
We have a technical career path as well as a management career path. We pay our technical people very well. We have an IBM 3090 Model 400, and we're going to get one of the first Model 600s that rolls out. We write software for internal use that is sold on the outside, so people take significant pride in their technical work, and that work brings in dollars to the firm.

How high does your technical career path go?
The head of the information systems department is a principal of the firm. He will probably make managing director this year, and that is one of the most senior positions in the firm. The telecommunications head is also a principal and is on his way to becoming a managing director. Technical people can rise to very senior positions on the nonbusiness side.

Can they rise to high-recognition positions without becoming a manager?
Probably not. You can rise to quite a significant role without being a manager, but you will be capped off. The cap is at the project manager role. Project managers, for example, often are paid $100,000 a year at our firm. It's unusual, and those are not the majority, but it does occur. ●

COMPANY	TYPE(S) OF PRODUCT OR SERVICE	DESIGNED FOR SELF-PACED LEARNING	SKILLS OR COMPETENCIES COVERED	APPROPRIATE FOR WHAT LEVEL OF STUDENT	REQUISITE EXPERIENCE OR EDUCATION	TYPES OF SUPPORTING MATERIALS PROVIDED	REQUIRES TRAVEL FROM COMPANY SITE	AVERAGE TIME REQUIRED TO COMPLETE TRAINING	RECOMMENDED SUPPLEMENTAL LEARNING	CUSTOMIZATION	AVERAGE PRICE PER STUDENT
[illegible]	Seminars, workshops with video feedback	Yes	Coaching, counseling and [illegible]	Upper mid-level manager to CEO	None	[illegible]	Optional	1 to 4 days	Additional reading, follow-up coaching	Optional	$145-$175 (per day)
	Seminars, workshops with video feedback	Yes	[illegible]	First-line supervisor to upper mid-level management	None	Charts, video feedback, [illegible] workbooks, handouts	Optional	[illegible]	Additional reading, follow-up coaching	Optional	$145-$175 (per day)
Thoughtware, Inc. (800) 848-9273	Video disk, CBT	Yes	Organizational effectiveness, personal interaction, motivation, time management	Any managerial level	Familiarity with IBM PC, Macintosh	Manuals, workbooks, bibliography	No	2 to 3 hours per program	—	Optional on large scale	$89 (per module)
[illegible]	Workshops, seminars, classroom training, [illegible], video courses, CBT	Optional	[illegible]	All levels of management/ administration	None	Course-dependent	Optional	—	—	Standard	Contact vendor
[illegible]	Stand-up workshop-oriented classroom training	Yes	Human skills, professional analysis skills, professional systems skills, project management	Programmer, systems analyst, project manager	None	Binders, handouts	Optional	1 to 5 days	Course-dependent	Standard	$130 (per student per day)
[illegible]	Classroom training, seminars, video courses, CBT	Optional	[illegible]	Project leader, director, vice-president of information systems	Course-dependent	Student workbooks, manuals, video, custom design	Optional	4 hours to 5 days	Action planning	Standard	Contact vendor

DP trainers must develop a high tolerance for heat

BY JANE STEIN

Data processing trainers sit squarely on what information technology consultant Michael Hammer has called "the hot seat," an uncomfortable perch located at the intersection of technology, the people who use it and the business purpose for which it is deployed.

Hammer's description suggests that the first quality a good DP trainer must have is a high tolerance for heat, and few in the field would disagree. A competitive business environment, increasingly dominated by the twin phenomena of strategic systems and end-user computing, generates a lot of heat, and those who are overly sensitive have mostly sought cooler resting spots.

The definition of a good DP trainer must start with superior classroom skills. For bottom-line competence, a trainer needs subject matter knowledge combined with basic transmittal skills. Truly gifted teaching, however, is a matter of attitude. "A trainer has to have genuine openness, an absolutely overwhelming need to give out information," says Ralph Desmond, a Boston-based free-lance trainer and consultant. "You want to have somebody who would make a really terrible poker player."

Because of the sheer number of areas a DP trainer may have to address — microcomputer software packages with their never-ending updates and revisions, DP subjects for everyone from applications development programmers to technical support people and, in many companies, "soft skills" such as communications — flexibility is another essential characteristic. The majority of today's DP trainers must be able to handle a variety of topics with authority.

Trainers cannot be satisfied with simply knowing the technology; they also have to be able to relate it to the business it serves. "It's not enough to teach button-pushing" is an exhortation heard so routinely these days in reference to end-user training that it's in danger of slipping into cant. The responsibility for desktop computing's inability to as yet fully deliver office productivity gains is often laid, at least partially, at the feet of trainers — and not unfairly so. Facility with the ins and outs of the myriad features of Lotus 1-2-3 or DB2 or a fourth-generation language is a nice beginning, but the potential of end-user computing lies in the creative application of those features to business purposes.

> DP TRAINERS occupy a somewhat nebulous space between troops and management. The good DP trainer will play that position for everything it's worth.

With one foot in each world, DP trainers are in the best position to combine a thorough understanding of the features and capabilities of the technology with knowledge of a company's business needs and procedures. A good DP classroom instructor, therefore, is one who will also take the lead to suggest ways business users can apply the technology at hand to get a new angle on an old business problem or even to initiate an entirely new business strategy.

What about the DP classroom itself? Here, the mandate is to transform the single-minded techie into a contributing business partner. The DP trainer may teach business writing skills, consulting skills and even basic interpersonal communication skills to technical people. But this responsibility is not fulfilled by scheduling an occasional half-day course in business or communication for programmers. It requires that this attitude and approach to the context of technology permeate the teaching of even the most arcane technical subjects.

Despite the business orientation, Mary Texer, supervisor of training and administrative services at the Federal Reserve Bank of Minneapolis, sounds a common theme when she says she finds her best DP trainers to be those who have "been in the trenches actually working with the systems." As she sees it, "We have to train our people in the business. If we have business illiterates, we're not going to meet our users' needs, and our company's not going to make it in the marketplace."

School's never out

What happens in the classroom, though, is only part of the job. Excellent trainers do not limit themselves to looking around for problems to which they can apply a training solution. DP trainers occupy a somewhat nebulous space between troops and management. The good DP trainer will play that position for everything it's worth.

Because of the visibility of their classroom role, DP trainers are the most apparent source of general technical support, even out of the classroom. They are sought out to answer questions, straighten misconceptions and solve problems in a wide variety of technology-related areas. Therefore, they have to be good listeners, and being a good listener means being a good diagnostician, with a quick eye for organizational consequences and interrelationships.

It may come as a surprise, but a superior DP trainer is also one who can look away from the course catalog and realize that more and better training is not the answer to every problem. What may seem on the surface to be a failure of training often turns out on closer inspection to be something else altogether — poorly designed work flow, inappropriate tool selection or low morale. The ability to recognize which is which is a crucial skill.

Once the diagnosis is made, it remains to convince the powers that be to apply the remedy. And here's where the DP trainer has to become a politician. Just as programmers can't hide in the computer room forever, DP trainers can't be effective if they sit in the training department brooding over their class rosters. Another requirement in DP training, then, is to be proactive.

Ineffective trainers can often be heard complaining that training is the wallflower at the corporate dance; it will surely ever be if the training function is content to wait for an invitation to the dance floor. But the DP trainer who wants to take an initiative posture rather than a reactive one had better have solid political skills.

One DP training manager describes this approach as "a little bit of conniving," although others would prefer to say salesmanship. Whatever you call it, effective training involves strong interpersonal skills, the ability to learn and use management's language and an instinct for the interplay of formal and informal channels of communication and influence.

A good DP trainer, then, is a technician, an evangelist, a businessman, an analyst, a counselor and a politician. Some of these roles are contradictory, so we have to add a postscript: A good DP trainer has to be something of a chameleon. That "really terrible poker player" who energizes a classroom has to be able to change gears on demand and, with equal facility, play cards with the experts or sling technical and business jargon.

The final word comes from Federal Reserve's Texer. A nonnegotiable requirement for being a successful DP trainer is, she says, a good sense of humor. ●

Stein is editor of *Data Training*, a Boston-based monthly publication for DP educators.

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Upcoming SPOTLIGHT Issues

Issue	Topic	Ad Closing Date
Sept. 14	DB2 Market	Aug. 28
Sept. 21	Hardware Roundup: Large & Medium Scale Systems	Sept. 4
Sept. 28	Hardware Roundup: Small Scale Systems	Sept. 11
Oct. 5	Hardware Roundup: Micros	Sept. 18
Oct. 12	Leasing & Used Equipment	Sept. 25
Oct. 19	Capacity Planning/ Performance Monitoring Software	Oct. 2
Oct. 26	Unix	Oct. 9
Nov. 2	The Macintosh Market	Oct. 16

Workstations

CONTINUED FROM PAGE 79

ket information can be consolidated on one monitor.

"All financial services companies are fighting a MIPS battle on the desk top," Golden says, referring to processor speed, which is typically measured in millions of instructions per second (MIPS). "They're all so reliant on technology. If a company can identify an opportunity five minutes before the guy down the street, it will make more money."

Sun has carved out business with more than 30 financial services customers, including nine of the 10 largest securities companies and a variety of value-added resellers and systems houses. One of Sun's major deals was with Quotron Systems, Inc., which recently signed an OEM agreement to market Sun-3 workstations with its financial information systems.

In its fiscal year ended June 30, Sun sold about $15 million worth of equipment to the financial services industry. The company expects to at least double that amount during the current fiscal year, Golden estimates. "It's the fastest growing market within our various business segments," he says.

Breaking ground

One of the earliest adopters of Sun workstations was Kidder, Peabody & Co., which last year replaced its IBM PC ATs with Sun 3/50 entry-level workstations in its formula trading area. In formula trading, a trader uses a workstation to scan the market for price aberrations and then send trade orders to the trading floor.

"We had been using ATs for 1½ years and had become intolerant of them because they were not fast enough," says Paul Sobota, a Kidder Peabody vice-president. "We needed multitasking and multiuser capabilities, and there was nothing around until Sun."

Market Vision Corp., a New York-based provider of computerized trading analysis and information services, recently ported its system to run on Sun workstations as well as on the IBM RT PC and Compaq Computer Corp. micros. "Advanced planners at all the brokerage houses feel the key point is that you can get more information for trading in less time with greater clarity," notes William Adiletta, vice-president of engineering. "That's very important to a Wall Street firm's success."

Apollo, which only started selling into the financial services market within the last year, counts Salomon Brothers, Inc., Morgan Stanley & Co., First Boston Corp., Citicorp, The Chase Manhattan Bank NA and Manufacturers Hanover Trust Co. among its major customers.

Like archrival Sun, Apollo has also focused on securities trading, banking and expert systems development. The Chelmsford, Mass., firm has also won a lot of business with packages tailored for financial services to handle office automation, data management and network monitoring and management.

Apollo expects that between 3% and 5% of its overall revenue will come from the financial services business next year, according to Frank. That could be $10 million to $30 million, he projects. Frank notes that a key test for Apollo and other workstation vendors will be pending automation contracts for stock exchanges in Chicago, London and Toronto.

Sniffer

CONTINUED FROM PAGE 79

Sniffer's potential as a revenue source — and the future of privately held Network General — hinges on convincing users that the product will pay for itself by keeping their networks healthy.

Saal claims that users tend to automatically buy an expensive component — such as an Intel Corp. 80386 server or a new bridge — to fix a network response-time problem that may not actually be the fault of the network.

Establishing where the fault lies, particularly on a multivendor network, is the Sniffer's specialty.

Users at Amoco Corp., for example, were running transmissions between an IBM MVS host and a VM host via Fibronics International, Inc. front ends, Proteon, Inc. gateways, another vendor's T1 multiplexers and yet another vendor's Ethernet LAN. "It was very slow; at certain times data couldn't get through at all," Saal says.

The Sniffer determined that the use of only one box was inadequate to handle packets coming in at high speed during busy times. "At least an interim solution was to expand that box's buffer size," Saal says.

To avoid tying the Sniffer to one network architecture, Saal has been steadily diversifying the product; it now supports the IBM Token-Ring network, Ethernet, Starlan and Datapoint Corp.'s Arcnet.

Currently, vendors make up a large portion of Network General's revenue. "Virtually every computer and communications company — including DEC and IBM — has at least one Sniffer," Saal says. Last week, Data General Corp. announced an agreement with Network General under which the two companies will jointly develop Sniffer to support DG's Starlan and Ethernet network architectures.

But Saal says he has high hopes for Sniffer sales through direct and indirect channels to users. Bridge Communications, Inc. and Micom-Interlan, Inc. are both said to be planning to resell Sniffer to users, as well as to use the product internally. "We think the market is not vendors," Saal says.

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— Phil Thomas
Thomas Business Systems

Phil Thomas is President of Thomas Business Systems of Boca Raton, Florida. Thomas Business Systems buys, sells and leases new and used IBM, DEC and Data General equipment. They've been doing so for 10 years.

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Read-Rite cans top managers, lays off 100

BY JAMES A. MARTIN
CW STAFF

MILPITAS, Calif. — Read-Rite Corp., the troubled thin-film head supplier to hard disk drive manufacturers such as Maxtor Corp., recently fired its top management staff. Additionally, the firm laid off some 100 employees, more than 20% of its work force.

The company has been experiencing significant manufacturing problems since May, which have resulted in shipment delays for Maxtor and others that use the Read-Rite head for their 380M-byte, 5¼-in. hard-disk products.

Read-Rite's problems, however, are not expected to significantly affect those vendors that offer minicomputers, engineering workstations and microcomputers with the high-end thin-film media hard disk drives.

In-house disk drives

Some 15 vendors currently use that technology, including Apollo Computer, Inc., Digital Equipment Corp., IBM, Texas Instruments, Inc. and Floating Point Systems, Inc. But many of those vendors make their own hard disk drives and components for internal consumption, according to Dennis Waid, an industry analyst with Peripheral Research Corp. in Santa Barbara, Calif.

Maxtor, Micropolis Corp. and others that buy the critical hard disk drive component from Read-Rite are experiencing temporary declines in product shipments, however.

Maxtor, for example, recently said it expected to lose $20 million in revenue as a result of the decrease in Read-Rite's components.

Although Read-Rite is only one of a handful of thin-film head suppliers, one of its competitors, Peripheral Components International, Inc. in Minneapolis, has been increasing its manufacturing capacity and is expected to help fill the void.

Another alternative for hard-disk makers is to use the less expensive, more conventional hard-disk head technology in place of the newer, and more difficult to find, thin-film medium, Waid said.

New team being prepped

John R. Osborne, a Read-Rite founder and chairman, and President Wade Meyercord have been forced out, sources said, and a new management team is being put together by the company's financial backers.

Other staff cutbacks have focused on manufacturing and administrative personnel.

Read-Rite officials were not available for comment.

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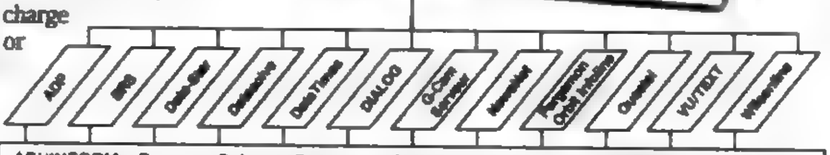

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NICKELS & DIMES

Uccel Corp. announced that revenue in the second quarter ended June 30 increased 39% to $47.6 million from $34.2 million a year earlier, when results included $3.2 million from software operations since divested. Profits from continuing operations before an extraordinary credit were $4.1 million, or 24 cents per share, up from $3.4 million, or 20 cents per share, in the like quarter of 1986.

Wyse Technology announced revenue for the first quarter ended July 3 of $80 million, compared to $52.6 million in the previous year. Profits were $5.7 million, or 44 cents per share, compared with $4 million, or 34 cents per share, in the like period a year ago.

Compugraphic Corp. announced revenue for the second quarter ended July 4 of $91.6 million, compared with $83 million a year ago. Net income was $2.6 million, or 31 cents per share, compared with a net loss of $1.8 million, or 22 cents per share, last year.

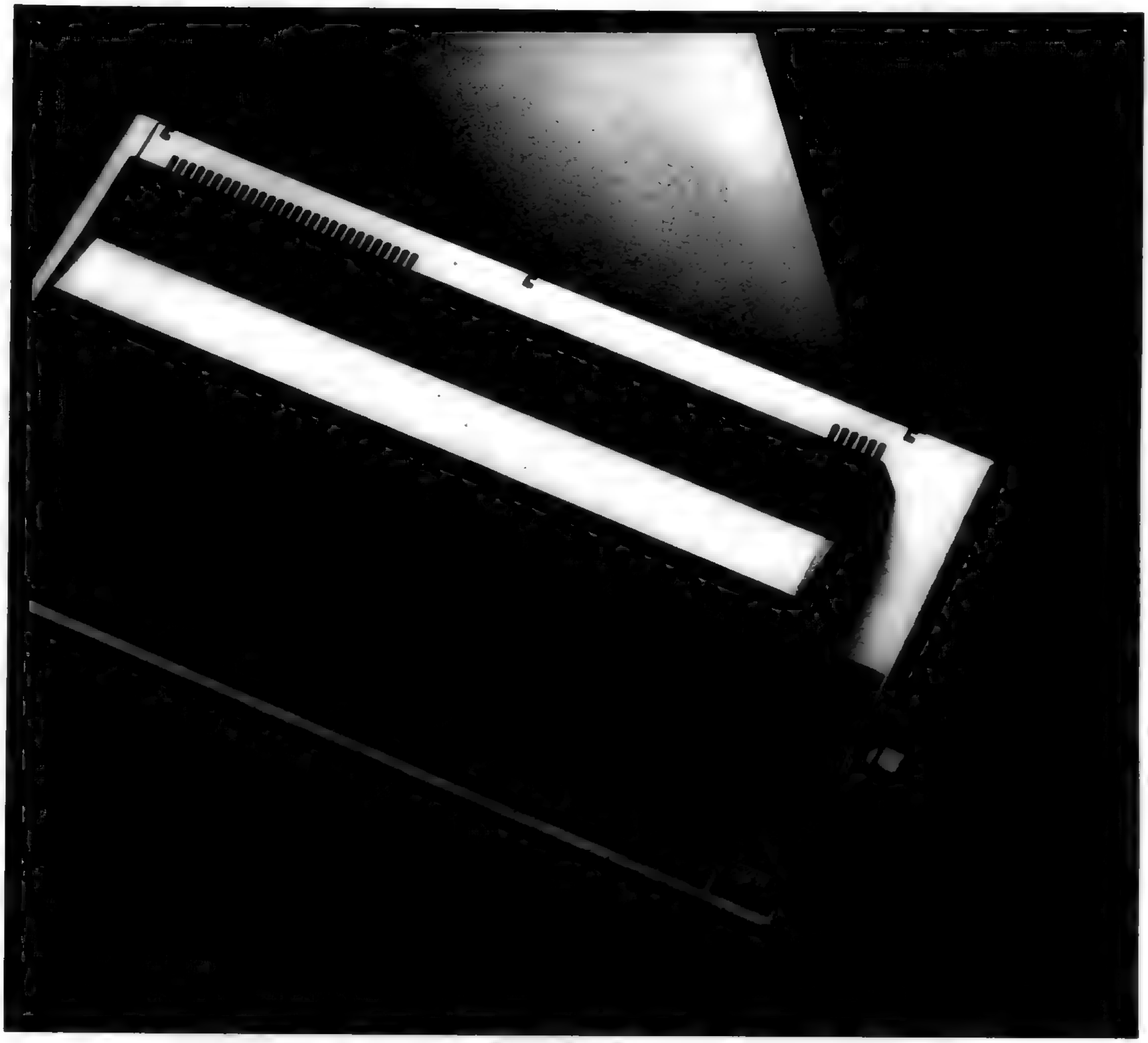
Software AG Systems, Inc. reported revenue for the fourth quarter ended May 31 of $19.5 million, compared with $18.7 million last year. Profits were $2 million, or 35 cents per share, compared with $1.9 million, or 33 cents per share, in the previous year.

Convex Computer Corp. announced revenue for the second quarter ended June 30 of $16.7 million, compared with $9.1 million in the previous year. Profits were $2.2 million, or 12 cents per share, compared with $920,000, or 7 cents per share, reported in the comparable period last year.

Sterling Software, Inc. announced revenue for the quarter ended June 30 of $46.7 million, compared with $56.5 million in the comparable period in the previous year.

Profits were $1.7 million, or 17 cents per share, compared with $2.1 million, or 20 cents per share, a year ago.

Policy Management Systems Corp. announced net income of $6.5 million, or 25 cents per share, on revenue of $43.6 million for the second quarter ended June 30. This compares with net income of $4.7 million, or 20 cents per share, on revenue of $35.2 million reported in the previous year.



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Data training jobs abound, offer path to management opportunities

BY NANCY
BLUMENSTALK MINGUS
SPECIAL TO CW

An area not known for high salaries or rapid advancement, data training provides openings for MIS professionals who want to use their experience to help others implement information systems effectively.

"DP training allows people to use all their skills and communicate their experience to others," says Bill Milburn, data processing training specialist at the Auto Club of Southern California. "It's also a good background for any other position."

Many data trainers move on to management positions in other DP or user areas. This movement keeps the trainer from burning out in the long run. More important, as trainers rotate into management positions, companywide training tends to improve.

Openings are being created in many companies as people continue to move up the ladder. Technological changes are also increasing the demand for data trainers.

"There will always be a need for primary entry-level training and upgrading of analytical skills," Milburn says. "Right now, however, the thrust for PC and end-user training is much higher."

Personal computer user training is the primary entry into the data training field currently and will continue to be for the next few years.

"A lot of exciting things are happening in end-user training," says Jane Stein, editor of *Data Training* magazine. "That's probably the growth area because hard-core DP has not changed a lot. Technical DP training will continue to become more critical and have a higher level of emphasis in the future."

Earning expectations

Salaries for DP trainers fluctuate depending on the nature of the training. For instance, computer-based training (CBT) instructors need "extensive qualifications and get minimal dollars — rarely above $35,000," says Travis Piper, president of Creative Approaches, Inc., a CBT vendor in East Bloomfield, N.Y.

Most other trainers are in the same bind, with average earnings between $20,000 and $40,000 per year, usually far less than their programmer/analyst counterparts with similar experience.

Many people see the salary differential as a severe drawback to data training. Also, other than moving up the management ladder, training provides few other career paths.

"Where do you go from there?" asks Linda Rode, president of DP Training Resources in New York. "Just as not all programmer/analysts necessarily make good managers, many trainers may not be good as managers, either. And finding other opportunities may be difficult."

> "SOMEONE who can apply a good technical background to business problems and has a flair for teaching would have a good opportunity in this field."
>
> JANE STEIN
> *DATA TRAINING* MAGAZINE

While there may be drawbacks, data trainers also say there are currently many opportunities within the field.

As Milburn says, "Eighty percent to 90% of the companies across the U.S. have data trainers of some kind." Data training positions range from training administrators (who order and track vendor courses) to training specialists (who evaluate, design and deliver training) to data training managers.

In addition to different levels of trainers, there are differences among target populations as well. For instance, some trainers are responsible for just programmer/analyst training, some for the entire DP department and some for any computer training companywide.

Because of this diversity, specific qualifications for data trainers vary with the position, but there are some common points.

Piper looks for three things from candidates for jobs to develop CBT courses. "First and foremost, they have to have communication skills, especially written," he says. "Second, they need project control skills for course scheduling, handout development and so on. And third, they need a logical mind."

Whether a person is developing CBT or delivering stand-up training, these three traits are standard for all DP trainers, trainers say.

Technical skills crucial

Technical expertise is also a necessity. In fact, some give technical skills top priority. "The person must be a good instructor and communicator, but above all, he needs extensive experience with the product," Rode says.

Many companies require their trainers to have three to five years of experience with any given product.

"Someone who can apply a good technical background to business problems and has a flair for teaching would have a good opportunity in this field," Stein says.

Formal education requirements are not strict. Some companies do not require a degree at all, while others require a master's degree in education.

Whether or not formal credentials are expected, "some grounding in learning is beneficial, as is an affinity for teaching," Stein says.

Rode adds that trainers should possess some experience in classroom techniques, "which might not come to a person intuitively."

Companies also want trainers with some background in instructional, or course, design.

As one trainer says, "A lousy instructor can get by with a well-designed course, but an excellent instructor still muddles through with a poorly designed one."

Above all, the interaction with the students is the most important aspect of the training. "If you enjoy people, this can be an enormously gratifying profession to move into," Rode says.

Blumenstalk Mingus is a free-lance writer based in Buffalo, N.Y.

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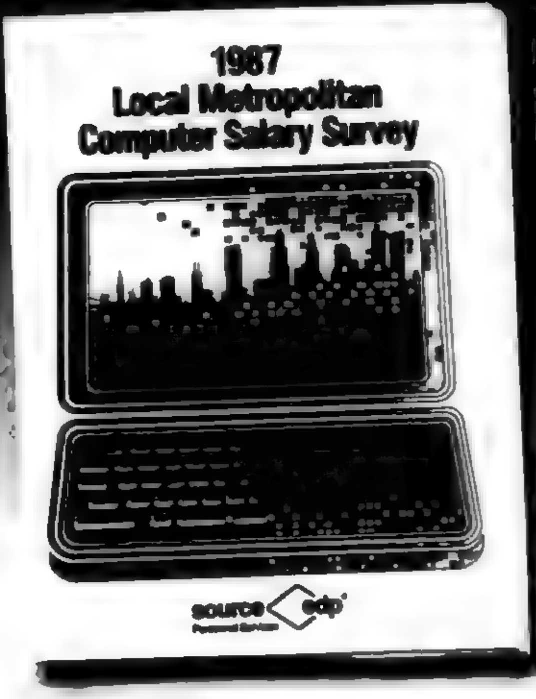

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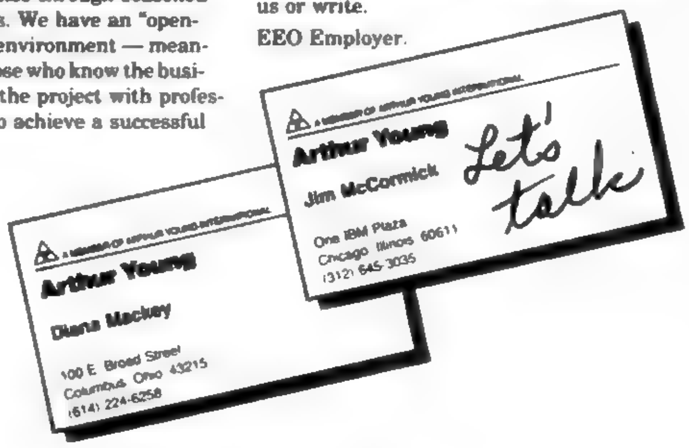

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Requires 7-10 years experience as a TP Systems Programmer with a working knowledge of ACF VTAM/NCP in MVS/XA environment, IBM data communications hardware I.C. 3705, 3725, 3720, 3274, 3174 communications controllers and 3728 Matrix switch. Working experience with IBM network software tools such as NETVIEW, NCCF, NPDA, NLDM, NPA and NPM are essential. Background in medium to large shops in Multiple System Network Facility (MSNF) and problem determination experience desired.

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IMS SYSTEMS PROGRAMMER

Requires 7-10 years experience in support system software such as IMS/DB/DC REL. 1.3 DASD logging, DBRC, ADFII; DB/DC data dictionary, IMS DB/DC MSC, SDF; CICS REL. 1.6, DELTA/IMS required. SAS, SAL-DLI, FOCUS optional. The operating environment includes IBM mainframe 4381, 3084Q; IBM DASD/Controllers 3380, 3380-01/03/D13/D2; IBM magnetic tapes 3420-6, 3480; Operating System MVS/XA V2.1.7, JES 2 V2.1.5, TSO, SPF, IMS V1.3, CICS V1.6, DFHSM V2, ACF2, V4.0, IMS (UCC-1), VTAM V3, VPS, NCP V3, Large IMS /CICS shop.

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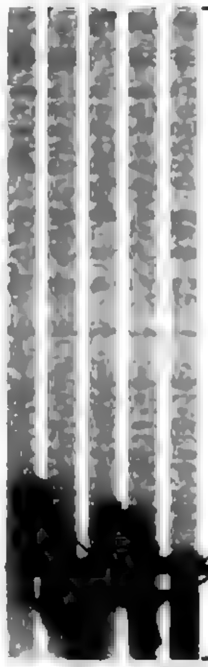

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These positions involve technical support of distributed superminicomputer systems and scientific workstations. Duties include systems software development and support, hardware and software acquisition, and user consultation. A degree in computer science and four years' experience with DEC VAX (VMS) or HP 3000 (MPE) minicomputers and FORTRAN, Pascal, or "C" programming language required. Experience with UNIX operating system desirable.

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The Language of instruction in the College of Engineering & Petroleum is English. All candidates must possess the Ph.D. at the time of application. Application forms and conditions of service can be obtained from:

Kuwait University Office
3500 International Drive, N.W.
Washington, DC 20008

Applications must be accompanied by non-returnable copies of academic credentials and representative publications. These must be sent directly to:

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This position is responsible for all data communications activities, including planning, designing, installing, and maintaining on-line data communications networks. Interfaces with data processing management staff to coordinate communications software, hardware and systems capabilities. Assigns personnel to various projects, directs their work and prepares performance reports. Consults with and advises the University community in the use of data communications. Prepares activity and progress reports regarding the data communication department. Responsible for the administration of data networks by preparing user documentation, conducting training in the use of networks, establishing logging and security procedures, establishing and implementing procedures necessary to repair the networks, and managing the connections to them. Coordinates activities of equipment vendors and common carriers, and maintains internal systems to assure that network components are operational.

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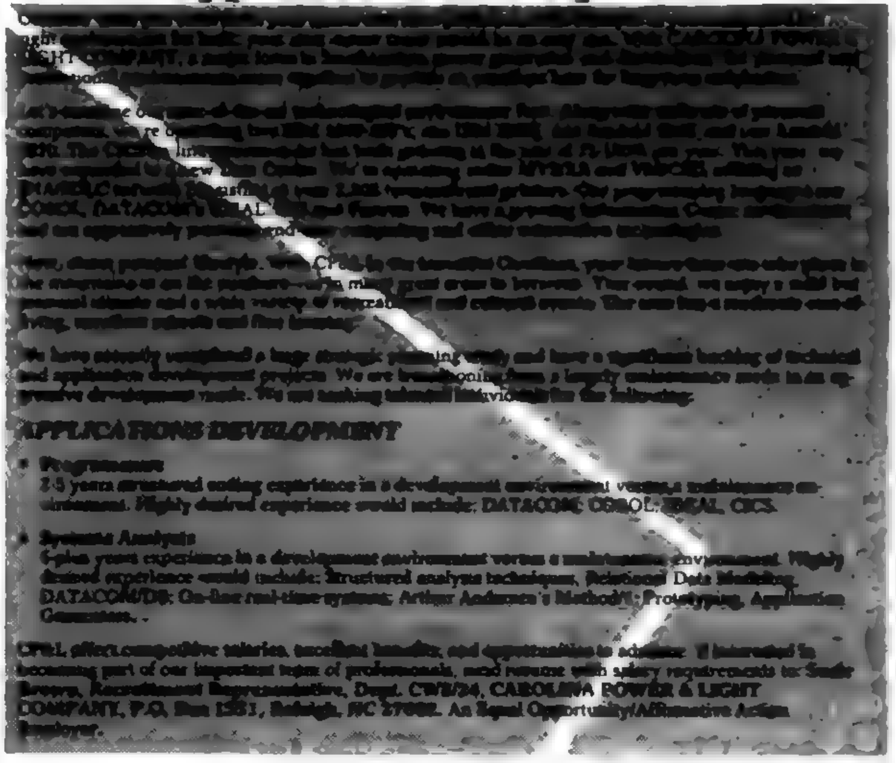

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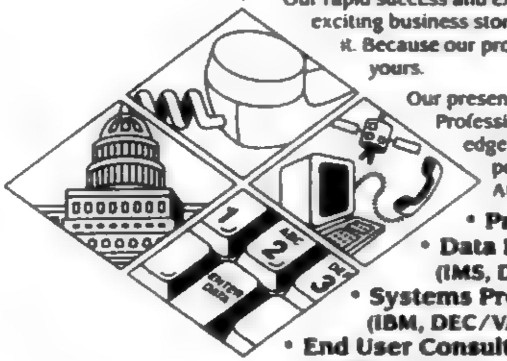

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SENIOR PROGRAMMER ANALYST - Design and develop pseudo code, documentations and specification test plans for development of modules for small subsystems. Require BS Computer Science or Engineering and two years experience and verifiable references. Job and interview site: Anaheim, CA. $29,300 per year. Send this ad and your resume to: Job #SK7742, PO Box 9560, Sacramento, CA 95823-0560, no later than 9/8/87. If offered employment must show you have legal right to work.

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SYSTEMS	MIPS (Millions of Instructions Processed Per Second)	MEGABYTES
•9373-20	0.5	4 to 16
•9375-40	0.5	8 to 16
4331-2	0.5	1 to 4
S/38-300	0.58	6 to 8
S/38-400	0.75	6 to 8
4341-1	0.88	2 to 4
S/38-600	0.98	8 to 16
S/38-700	1.1	16 to 32
•9375-60	1.2	8 to 16
4381-11	1.4	4 to 16
4361-5	1.45	2 to 12
4341-2	1.5	2 to 16
4341-12	1.65	2 to 16
†4381-21	1.9	8 to 16
4381-1	2.1	4 to 16
•9377-90	2.5	8 to 16
4381-2	2.7	4 to 32
4381-12	2.7	8 to 32
†4381-22	3.2	16 to 32
4381-13	3.6	8 to 32
3083EX	4.4	8 to 32
4381-3	4.5	8 to 32
†4381-23	4.7	16 to 64

SYSTEMS	MIPS (Millions of Instructions Processed Per Second)	MEGABYTES
3033-UP	[illegible]	4 to 24
4381-14	[illegible]	16 to 32
3083BX	6.8	8 to 32
•3090-120E	7.5	32 to 128
†4381-24	7.4	16 to 64
3083JX	[illegible]	8 to 32
3090-[illegible]	[illegible]	32 to 64
3081D	10.0	16 to 32
•3090-150E	10.0	32 to 64
3081GX	11.9	16 to 64
3090-180	[illegible]	32 to 64
3081KX	[illegible]	16 to 64
•3090-180E	17.5	32 to 64
3090-200	27.7	64 to 128
3084QX	28.7	32 to 128
•3090-200E	31.9	64 to 128
•3090-300E	44.3	64 to 128
3090-400	50.0	128 to 256
•3090-400E	56.0	128 to 256
•3090-600E	76.0	128 to 256

• First Installation 1987
† First Installation 1st Qtr 1988

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SYSTEMS	MIPS	MEGABYTES
5840	8.4	16 to 128
5850	11.8	16 to 128
5860	14.8	16 to 128
5867	22.0	24 to 128
5868	22.0	32 to 256
5870	25.6	32 to 128
5880	28.6	32 to 256
•5890-190E	22	64 to 256
•5890-200E	31	64 to 256
•5890-300E	40	64 to 256
•5890-400E	58	128 to 512
•5890-600E	67	128 to 512

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SYSTEMS	MIPS	MEGABYTES
AS 9060	11	16 to 64
ASXL 50	15	32 to 64
AS 9070	16	16 to 64
AS 9080	20	16 to 64
AS XL-60	28	64 to 256
AS XL-80	50	64 to 256
•AS XL 90	67	128 to 512
•AS XL 100	80	128 to 512

The above information is intended as a guideline for computer users on relative computer systems instruction cycle times. All data have been derived from published documentation and represent reasonable estimates of average MIPS ratings. However, Randolph is not responsible for the accuracy of the MIPS data. Cycle times will vary based on hardware software configurations and system manufacturers continually modify computer models as design improvements in hardware and software arise.

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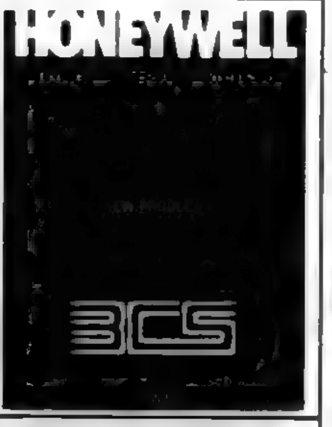

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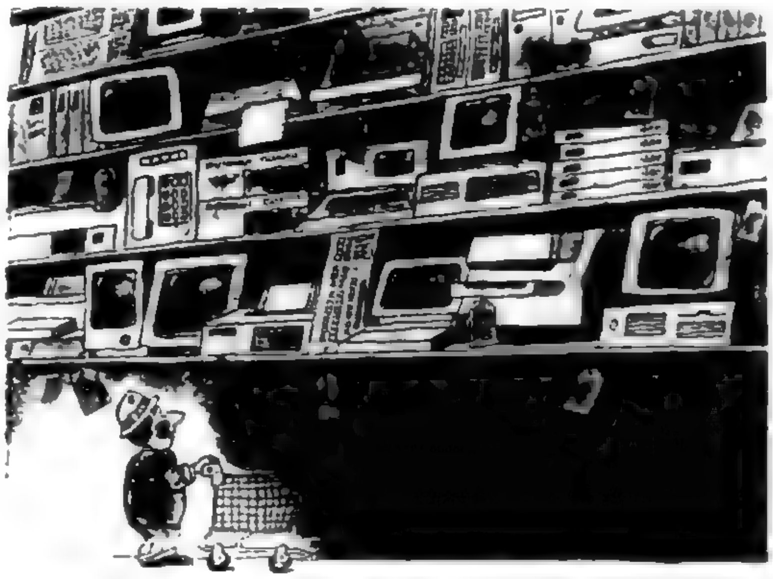

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Sept. 21	Hardware Roundup: Large & Medium Scale Systems	Sept. 4
Sept. 28	Hardware Roundup: Small Scale Systems	Sept. 11
Oct. 5	Hardware Roundup: Micros	Sept. 18
Oct. 12	Leasing & Used Equipment	Sept. 25

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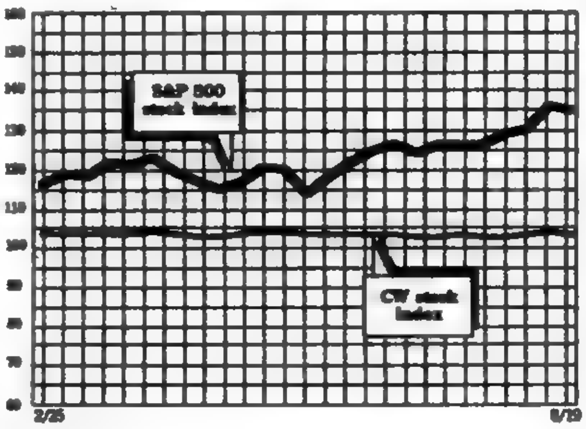

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Peripherals & Subsystems	118.5	**116.1**
Leasing Companies	119.5	**118.8**
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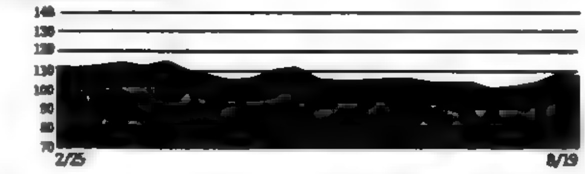
Communications



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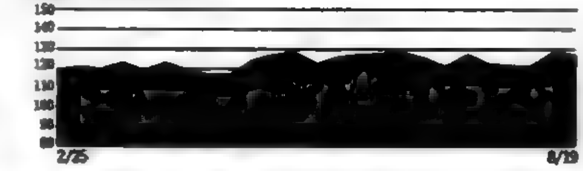

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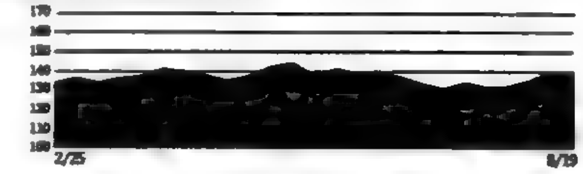

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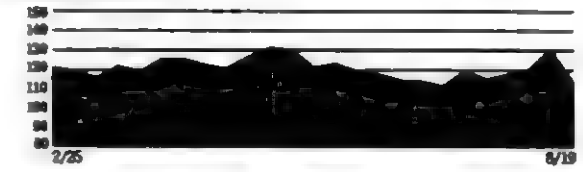

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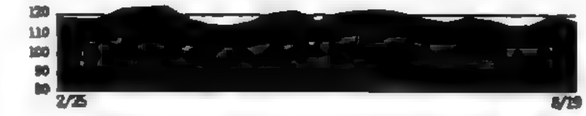
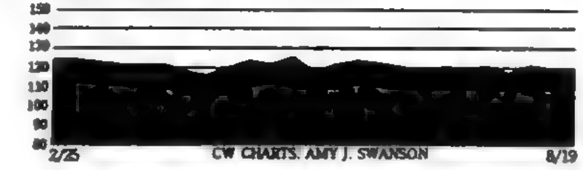


Leasing Companies



CW CHARTS: AMY J. SWANSON

Computerworld Stock Trading Summary

CLOSING PRICES WEDNESDAY, AUG. 19, 1987

Communications and Network Services

EXCH		PRICE 52-WEEK RANGE (1)		CLOSE AUG. 19 1987	WEEK NET CHNGE	WEEK PCT CHNGE
N	AMERICAN INFO TECHS CORP	101	77	94.50	+1.6	+1.7
Q	ANDREW CORP	19	14	17.00	+0.3	+1.5
Q	ARTEL COMM CORP	5	2	2.88	+0.0	+0.0
N	AT&T	36	22	34.25	-0.4	-1.1
Q	AVANT GARDE COMP INC	7	3	4.25	+0.0	+0.0
N	AVANTEK INC	19	13	14.63	-0.4	-2.5
N	AYDIN CORP	38	18	31.88	+0.3	+0.8
N	BELL ATLANTIC CORP	77	62	74.88	+0.8	+1.0
N	BELLSOUTH CORP	46	36	42.63	+1.1	+2.7
Q	BRIDGE COMMUNICATION	27	11	22.75	-0.5	-2.2
Q	COMPRESSION LABS INC	12	4	4.50	-0.1	-2.7
Q	COMPUTER NETWORK TECH	7	4	3.69	-0.1	-1.7
O	CONTEL CORP	40	27	37.50	-0.3	-0.7
Q	DATA SWITCH CORP	9	5	6.25	-0.1	-2.0
Q	DIGITAL COMM ASSOC	49	18	37.13	-0.4	-1.0
Q	DYNATECH CORP	44	27	31.00	+1.8	+6.0
Q	EQUATORIAL COMM CO	6	2	3.25	+0.0	+0.0
Q	GANDALF TECHNOLOGIES	11	5	7.25	-0.1	-0.9
Q	GENERAL DATACOMM INDS	14	8	8.00	-1.1	-12.3
N	GTE CORP	45	34	42.75	-1.3	-2.8
Q	INFOTRON SYS CORP	12	7	9.25	+0.0	+0.0
N	ITT CORP	68	47	63.38	-1.6	-2.5
N	M A COM INC	16	12	15.13	-0.4	-2.4
Q	MCI COMMUNICATIONS CORP	9	5	9.13	+0.5	+5.8
Q	MICOM SYS INC	18	10	12.00	-0.9	-6.8
Q	NETWORK SYS CORP	19	8	11.38	+0.0	+0.0
N	NORTHERN TELECOM LTD	24	14	22.88	-0.5	-2.1
Q	NOVELL INC	27	10	22.25	+0.4	+1.7
N	NYNEX CORP	78	59	74.25	+0.4	+0.5
N	PACIFIC TELESIS GROUP	31	23	30.50	+1.6	+5.6
N	PARADYNE CORP	9	4	8.13	+0.5	+6.6
A	PENRIL CORP	8	4	4.38	-0.1	-2.8
N	PLESSEY PLC	41	24	28.50	-1.9	-6.0
N	SCIENTIFIC ATLANTA INC	20	9	19.25	+0.0	+0.0
N	SOUTHWESTERN BELL CORP	42	33	40.88	-0.1	-0.3
Q	3 COM CORP	24	9	16.88	-0.1	-0.7
N	TIMEPLEX INC	41	15	31.75	-2.0	-5.9
Q	UNGERMANN BASS INC	16	7	10.13	+0.4	+3.8
N	US WEST INC	62	46	56.50	+1.4	+2.5

Computer Systems

EXCH		PRICE 52-WEEK RANGE (1)		CLOSE AUG. 19 1987	WEEK NET CHNGE	WEEK PCT CHNGE
Q	ALLIANT COMPUTER SYS	37	15	18.25	+0.3	+1.6
Q	ALPHA MICROSYSTEMS	7	3	5.00	-0.1	-2.4
Q	ALTOS COMPUTER SYS	17	10	13.50	+0.0	+0.0
A	AMDAHL CORP	44	17	40.75	-1.3	-3.0
Q	APOLLO COMPUTER INC	25	11	21.13	+0.8	+3.7
Q	APPLE COMPUTER INC	50	16	50.00	+1.3	+2.6
N	BOLT BERANEK & NEWMAN	30	19	21.13	-0.5	-2.3
Q	BRITTON LEE INC	5	3	3.25	-0.3	-7.1
N	COMPAQ COMPUTER CORP	55	14	54.25	+1.0	+1.9
Q	COMPUTER AUTOMATION INC	17	2	13.00	+0.5	+4.0
A	COMPUTER CONSOLES INC	12	7	7.50	+0.0	+0.0
Q	CONCURRENT COMP CORP	20	13	19.25	+0.3	+1.3
N	CONTROL DATA CORP DEL	35	22	34.75	+1.3	+3.7
Q	CONVERGENT TECH	12	4	7.75	+0.1	+1.6
Q	CONVEX COMPUTER CORP	22	8	15.00	-0.8	-4.8
N	CRAY RESH INC	136	69	110.50	-0.9	-0.8
Q	DAISY SYS CORP	13	7	7.63	-0.1	-1.6
N	DATA GEN CORP	38	25	33.25	-1.3	-3.6
N	DATAPOINT CORP	9	4	7.75	+0.8	+10.7
N	DIGITAL EQUIP CORP	186	89	179.50	-2.6	-1.4
N	FLOATING POINT SYS INC	17	8	10.50	+0.1	+1.2
N	GOULD INC	24	16	22.88	+1.3	+5.8
N	HARRIS CORP	43	27	37.50	-1.5	-3.8
N	HEWLETT PACKARD CO	69	37	65.00	-2.6	-3.9
N	HONEYWELL INC	91	56	88.88	-2.9	-3.2
N	IBM	175	116	172.63	+2.3	+1.3
Q	INFORMATION INTL INC	17	13	13.88	+0.1	+0.9
Q	IPL SYS INC	3	2	2.75	-0.4	-12.0
Q	MASS COMPUTER CORP	10	5	9.50	-0.1	-1.3
N	MATSUSHITA ELEC INDL LTD	178	88	169.00	-6.6	-3.8
Q	MEGADATA CORP	7	2	4.75	+0.0	+0.0
Q	MENTOR GRAPHICS CORP	34	13	30.88	-2.4	-7.1
N	NBI INC	14	8	11.88	+0.0	+0.0
N	NCR CORP	86	42	82.38	+0.0	+0.0
N	PRIME COMPUTER INC	30	16	27.63	+1.5	+5.7
Q	PYRAMID TECHNOLOGY	12	4	7.75	-0.3	-3.1
Q	STRATUS COMPUTER	41	18	30.00	+0.3	+0.8
Q	SUN MICROSYSTEMS INC	48	13	35.63	-0.9	-2.4
Q	SYMBOLICS INC	7	4	4.13	-0.3	-6.7
N	TANDEM COMPUTERS INC	38	16	30.25	-1.6	-5.1
N	TANDY CORP	56	31	48.75	+1.4	+2.9
N	ULTIMATE CORP	33	13	31.50	+0.9	+2.9
N	UNISYS CORP	48	22	44.75	-2.6	-5.5
A	WANG LABS INC	19	11	17.75	-0.6	-3.4

Software & DP Services

EXCH		PRICE 52-WEEK RANGE (1)		CLOSE AUG. 19 1987	WEEK NET CHNGE	WEEK PCT CHNGE
Q	ADVANCED COMP TECH	6	3	3.63	+0.0	+0.0
N	ADVANCED SYS INC	26	12	26.00	+0.5	+2.0
N	AGS COMPUTERS INC	22	8	19.25	-0.6	-3.1
Q	AMERICAN MGMT SYS INC	19	7	17.25	-0.4	-2.1
Q	AMERICAN SOFTWARE INC	22	8	17.25	-0.3	-1.4
N	ANACOMP INC	11	3	9.88	-0.1	-1.3
Q	ANALYSTS INTL CORP	9	3	8.38	-0.1	-1.5
Q	ASHTON TATE	30	12	24.00	-1.3	-5.0
Q	ASK COMPUTER SYS INC	17	10	14.25	-0.6	-4.2
Q	AUTODESK INC	34	10	27.50	-0.1	-0.5
N	AUTO DATA PROCESSING	54	30	52.75	+2.1	+4.2
Q	BOOLE & BABBAGE INC	12	4	10.50	-0.5	-4.5
N	COMPUTER ASSOC INTL INC	31	10	28.88	-0.6	-2.1
Q	COMPUTER HORIZONS CORP	15	10	12.50	-0.9	-6.5
N	COMPUTER SCIENCES CORP	61	30	58.75	+0.4	+0.6
N	COMPUTER TASK GROUP INC	18	11	13.13	+0.8	+6.1
Q	COMSHARE INC	28	11	25.25	-1.0	-3.8
N	CULLINET SOFTWARE INC	13	6	12.88	+0.0	+0.0
Q	CYCARE SYS INC	12	7	9.25	-0.5	-5.1
Q	DUQUESNE SYS INC	33	12	17.25	-1.6	-9.2
Q	ENDATA INC	12	5	10.00	+0.5	+5.3
N	GENERAL MTRS (CLS E)	49	24	47.38	-0.4	-0.8
Q	HOGAN SYS INC	17	9	12.38	+0.5	+4.2
Q	INFORMIX CORP	23	7	19.75	-1.3	-6.0
Q	INTELLICORP INC	11	4	7.00	-0.1	-1.8
Q	KEANE INC	10	5	7.13	+0.4	+5.6
Q	LOTUS DEV CORP	37	11	33.50	+0.8	+2.3
Q	MANAGEMENT SCI AMER	21	11	12.38	+0.3	+2.1
Q	MICRO PRO INTL CORP	8	2	5.63	-0.3	-4.3
Q	MICROSOFT CORP	128	26	102.50	+2.5	+2.5
Q	NATIONAL DATA CORP	34	17	31.88	-0.9	-2.7
Q	ON LINE SOFTWARE INTL INC	22	6	19.88	-0.1	-0.6
Q	ORACLE SYS CORP	30	7	24.25	-1.6	-6.3
N	PANSOPHIC SYS INC	23	12	18.75	-0.3	-1.3
Q	POLICY MGMT SYS CORP	30	15	23.25	-1.0	-4.1
Q	PROGRAMMING & SYS INC	13	8	12.63	+0.1	+1.0
Q	REYNOLDS & REYNOLDS CO	42	27	38.25	+0.0	+0.0
Q	SEI CORP	18	8	16.50	-0.5	2.9
Q	SHARED MED SYS CORP	53	23	25.63	-0.1	-0.5
Q	SOFTWARE AG SYSTEMS INC	20	10	12.63	-0.1	-1.0
Q	SOFTWARE PUBG CORP	17	5	10.13	+0.9	+9.5
A	STERLING SOFTWARE INC	19	9	9.75	+0.4	+4.0
Q	SUNGARD DATA SYS INC	21	10	18.25	+0.0	+0.0
Q	SYSTEMATICS INC	30	14	28.00	+1.3	+4.7
N	UCCEL CORP	52	20	48.75	-0.3	-0.5
N	URS CORP	21	13	19.00	+1.3	+7.0
Q	VM SOFTWARE INC	46	15	19.50	+1.0	+5.4

Semiconductors

EXCH		PRICE 52-WEEK RANGE (1)		CLOSE AUG. 19 1987	WEEK NET CHNGE	WEEK PCT CHNGE
N	ADV MICRO DEVICES INC	25	13	20.38	-0.1	-0.6
N	ANALOG DEVICES INC	24	14	20.75	-1.6	-7.3
Q	ANALOGIC CORP	13	10	12.25	-0.3	-2.0
Q	INTEL CORP	52	18	50.25	+0.3	+0.5
Q	LSI LOGIC CORP	17	8	11.13	-0.8	-6.3
Q	MONOLITHIC MEMORIES INC	19	10	0.00	-17.8	-100.0
N	MOTOROLA INC	67	34	62.88	-1.8	-2.7
N	NATL SEMICONDUCTOR	17	8	14.38	-0.6	-4.2
N	TEXAS INSTRS INC	70	35	69.00	+0.1	+0.2
A	WESTERN DIGITAL CORP	29	13	27.38	-0.4	-1.4

Peripherals

EXCH		PRICE 52-WEEK RANGE (1)		CLOSE AUG. 19 1987	WEEK NET CHNGE	WEEK PCT CHNGE
N	AM INTL INC	9	5	8.25	+0.4	+4.8
Q	AST RESH INC	23	11	16.88	-1.3	-6.9
Q	AUTO TROL TECH CORP	9	3	6.00	-0.6	-9.4
Q	BANCTEC INC	16	8	12.25	-0.5	-3.9
Q	CIPHER DATA PRODS INC	18	9	10.38	+0.1	+1.2
A	COGNITRONICS CORP	5	2	4.38	+0.5	+12.9
N	COMPUGRAPHIC CORP	25	18	24.75	+0.0	+0.0
N	COMPUTERVISION CORP	23	12	14.75	-1.1	-7.1
N	CONRAC CORP	30	12	0.00	+0.0	+0.0
A	DATAPRODUCTS CORP	16	10	11.63	-0.1	-1.1
A	DATARAM CORP	10	7	7.38	+0.0	+0.0
N	DECISION INDS CORP	13	7	10.88	-0.3	-2.2
N	EASTMAN KODAK CO	102	52	100.13	+1.4	+1.4
Q	E M C CORP MASS	38	11	38.00	-0.3	-0.7
Q	EMULEX CORP	10	6	7.50	-0.3	-3.2
Q	EVANS & SUTHERLAND	40	20	33.25	-0.8	-2.2
Q	ICOT CORP	13	5	6.25	+0.0	+0.0
Q	INTERLEAF INC	20	8	16.75	-0.1	-0.7
Q	IOMEGA CORP	12	2	2.75	-0.5	-15.4
Q	LEE DATA CORP	10	5	4.88	-0.3	-4.9
Q	MASSTOR SYS CORP	8	2	4.88	+0.3	+5.8
Q	MAXTOR CORP	34	12	14.50	+0.0	+0.0
Q	MICROPOLIS CORP	44	14	33.75	-3.5	-9.4
Q	MINISCRIBE CORP	18	5	13.75	-1.5	-9.8
N	MINNESOTA MNG & MFG CO	83	50	79.38	-0.1	-0.2
A	MSI DATA CORP	19	10	18.25	-0.1	-0.7
Q	PRIAM CORP	8	2	3.63	-0.4	-9.4
Q	PRINTRONIX INC	14	10	11.25	-0.6	-5.3
N	QMS INC	22	11	22.00	+0.9	+4.1
Q	QUANTUM CORP	35	15	17.25	-0.3	-1.4
Q	RAMTEK CORP	6	4	5.63	+0.1	+2.3
N	RECOGNITION EQUIP INC	27	12	19.38	+0.0	+0.0
Q	REXON INC	14	5	10.00	-0.3	-2.4
Q	SCAN TRON CORP	17	11	12.50	+0.0	+0.0
Q	SEAGATE TECHNOLOGY	46	12	30.13	-1.0	-3.2
N	STORAGE TECH CORP	5	2	3.13	-0.3	-7.4
Q	TANDON CORP	7	2	4.13	+0.1	+3.1
A	TEC INC	7	3	4.50	-0.3	-6.5
N	TEKTRONIX INC	43	29	38.88	+0.4	+0.9
Q	TELEVIDEO SYS INC	3	2	2.94	-0.1	-4.1
N	TELEX CORP	102	55	63.50	+0.1	+0.2
Q	WYSE TECH	35	13	32.00	+0.6	+2.0
N	XEROX CORP	83	51	80.00	+0.6	+0.8
Q	XIDEX CORP	20	11	12.63	-1.3	-8.0

Leasing Companies

EXCH		PRICE 52-WEEK RANGE (1)		CLOSE AUG. 19 1987	WEEK NET CHNGE	WEEK PCT CHNGE
N	COMDISCO INC	33	15	30.63	-0.3	-0.8
N	CONTINENTAL INFO SYS	14	7	11.13	-0.4	-3.3
Q	PHOENIX AMERN INC	8	3	4.38	+0.1	+2.9
Q	SELECTERM INC	7	5	5.25	+0.0	+0.0
N	US LEASING INTL	56	40	53.25	-1.0	-1.8

EXCH: N—NEW YORK; A—AMERICAN; Q—NATIONAL;
O—OVER-THE-COUNTER; S—SPLIT

O-T-C PRICES ARE BID PRICES AS OF 3 P.M. OR LAST BID
(1) TO NEAREST DOLLAR

High times

IBM, DEC, Compaq join crowd reaching yearly highs

Although the surge in computer industry stocks slowed last week, a strong market gain Thursday kept most issues on a modest upswing.

IBM and Digital Equipment Corp. were both among those reaching new highs for the year on the New York Stock Exchange Thursday. IBM closed at 174¾, up 1½ points in four trading days, while DEC rose 1¼ points to 184¾. Compaq Computer Corp. was one of the industry's best performers, climbing 3½ points to close Thursday at 56½, also a new high.

Apple Computer, Inc. continued to reward investors on the over-the-counter market, rising 2¾ points to 51¾, its high since a stock split earlier this year. Other over-the-counter issues recording new highs included Massachusetts Computer Corp., 10⅜; MCI Communications Corp., 9⅜; Norsk Data A.S., 41⅛; and Scientific Micro Systems, Inc., 7⅛.

Endata, Inc., a Nashville-based vendor of computer imaging and microfiche services, rose almost 40% Thursday, up 3¾ points to 13¾, after its announced $65 million acquisition by First Financial Management Corp.

CLINTON WILDER

Spectrum bears business fruit

HP ships processors to customers, enters non-HP terminal field

BY JEFFRY BEELER
CW STAFF

PALO ALTO, Calif. — Hewlett-Packard Co. this week will begin shipping limited quantities of the first business-oriented by-product of its Spectrum development project.

In addition to that announcement last week, the company made its first foray into the non-HP terminal arena with the introduction of display units for IBM, Digital Equipment Corp. and general-purpose ASCII environments.

A company spokesman declined to specify the number of units in its initial batch of HP 3000 Series 930 departmental processors and would only identify one customer, a software developer and reseller of HP systems.

ASK Computer Systems, Inc. in neighboring Los Altos, Calif., is scheduled to take delivery of a 930 later this week.

David Sohm, the firm's vice-president of marketing, said the processor will join the existing HP 3000 Series 58 and three Series 70s in developing and supporting the 19 integrated modules of ASK Computer's Manman line of manufacturing-oriented applications.

End of a chapter

This week's shipments to ASK and other selected HP hardware buyers close a long and often troubled chapter in the 930's history. Introduced in February 1986 and embodying HP's unconventional Precision Architecture, the machine was scheduled to become available in limited quantities by the end of last year but was delayed first to mid-1987 and later to this month.

In the terminal arena, HP introduced the HP 700 family of display units. Included in the new HP 700 terminal line are the following:

- The Model 71, an IBM-compatible product priced at $695, 45% less than IBM's 3191 Models A and B.
- The $575 DEC-compatible Model 22, which undersells DEC's VT220 by 22%.
- The Model 41, which, with its $375 price tag, reportedly ranks among the industry's least expensive general-purpose ASCII terminals.
- The Model 92, which, at $895, replaces and sells for 35% less than the existing HP 3000 series-compatible Model 2392 terminal.

The introduction of Models 71, 22 and 41 marks the first time in HP's 12 years as a terminal maker that the firm has offered display units for customers of other vendors' hardware, according to company sources.

Along with the terminal announcement, HP announced it had cut by 36% the price of its HP 9000 Model 318M engineering workstation. The new price is $4,990. That pricing change accompanied the introduction of four additional models that start at $12,950.

Tandem PCs lashed to Nonstop CPUs

BY JEFFRY BEELER
CW STAFF

CUPERTINO, Calif. — Tandem Computers, Inc. today is expected to extend its IBM-compatible workstation line with the announcement of seven personal computer models built around Intel Corp. 80286 and 80386 microprocessors.

Members of the Tandem PSX/200 and PSX/300 workstation families complement the company's existing 6AX series of IBM Personal Computer AT-compatible desktop devices. The PSX machines are intended to serve primarily as intelligent terminals in a network built around Tandem's Nonstop family, according to Jim Pawlik, product manager with Tandem's Micro Products Division.

To tailor the workstations for a Tandem environment, the systems' features include the following:

- Software that allows the desktop units to communicate with Tandem hosts by emulating the vendor's Model 6530 terminal.
- A capability to transfer files between Microsoft Corp. MS-DOS 3.2-based workstations and Tandem's Guardian system.

The PSX models also support ANSI 3.64 terminal emulation to enable them to communicate with Tandem's recently introduced Unix-based LXN distributed processing system.

On the 80286 side of the PSX introduction, Tandem is offering five models, ranging from the PSX/200, a diskless unit with an 8-MHz microprocessor that is priced from $1,195, to the PSX/240, which has a 40M-byte hard disk and a 12-MHz CPU and is priced from $3,795. Filling out that line are the Model 201, which starts at $1,395 and lacks a hard disk, and the 220E and 220, which both have 20M-byte mass-storage subsystems. The $2,395 Model 220E runs at 8 MHz, and the $2,995 Model 220 operates at 12.5 MHz. On the 386 side, the $4,895 PSX/340 and the $5,695 PSX/370 both use the same 16-MHz microprocessor but have different hard-disk capacities.

Play it again

FROM PAGE 1

industry matures. A survey conducted by the Data Processing Management Association in November 1986 found that 42% of that group's members are more than 40 years old and that 20% are over 46. In addition, MIS professionals are taking advantage of too-good-to-be-true early retirement incentives from companies seeking to thin out the ranks.

Too good to refuse

Oldenburg admits he "never really thought about retiring" from his MIS director position at Chevron. But when the oil industry hit a slump last year, he found he could not resist an early retirement offer.

Since he retired in December 1986, Oldenburg has continued his active involvement in the industry. He recently returned from Italy, where he taught a two-day MIS seminar for 35 of the country's top businessmen. This fall, he will begin a part-time teaching assignment in MIS at the University of California at Berkeley.

Oldenburg says he enjoys juggling a plateful of activities with his time. And he boasts that he can now go to his mountain cabin on a Thursday, for example, instead of waiting until Saturday when his workweek ended.

"I'm really enjoying myself," he says. "I have flexibility to do the things I want to do."

The throng of MIS directors leaving the job ranks yet remaining active in their professions is good for both them and the industry, observed John Kalleis, vice-president of ARA Services, Inc., a Philadelphia-based management services firm. With a wealth of experience in planning and technology, these new retirees are able to dispense practical advice rather than spout theory.

Roy Dickson, former chief information officer at Phillips Petroleum Co. in Borger, Texas, worked there for 33 years. Dickson left in June 1986 under an early retirement program.

"I am not quite 53 years old, and I thought then that this would be a nice opportunity for me to do other things," Dickson recalls. His retirement did not last long. A month later, IBM flew Dickson to New York to attend a management meeting. Harvard University's Business School also asked him to give a lecture on cost control in data processing.

Charles Oldenburg

Dickson today runs Dickson Associates, an MIS consulting firm. Half of his time is spent formulating marketing strategies for industry vendors such as IBM. The rest is spent consulting with large user corporations, including Illinois Bell, American Airlines and Equitable Life Insurance Co.

Not ready yet

"I was not ready to throw it all away," Dickson says of his decision to go into consulting. "I don't think I will consider real retirement until I am about 60. For now, I enjoy the issues and problems of managing technology, and I want to be able to use my skills."

Consulting is a prevalent second-career option among former MIS managers. Many say they dreamed for years about scheduling their own hours and being their own bosses. But many also acknowledge the inherent danger of jumping back into the rat race too soon.

Jack Lanahan, 73, served as a consultant for three years after retiring from his job as MIS director at Inland Steel Co. Lanahan says he "got into consulting to taper off from the full-time job. After I retired in 1979, I didn't just want to drop everything altogether."

However, Lanahan soon found he was spending every sixth week on business trips. He retired permanently three years later and now lives in Santa Barbara, Calif.

Irvine, Calif.-based Ken Garrison, 59, says he also hoped that his consulting work would give him the luxury of managing his own hours. "When you are a consultant, you have to fit your hours to your client's business requirements," explained the former vice-president of information systems at Pacific Mutual Life Insurance Co.

David Blackwell

When he started Kenneth T. Garrison Associates, many of his contacts were insurance industry clients based on the East Coast. Garrison says that although he enjoyed his new career, traveling and working long hours were rapidly turning retirement into a full-time job.

"To manage your time, you have to schedule your fun activities and make them just as important as your consulting," he adds. "It's too easy to become a workaholic and wind up straying far from your original plan."

For some MIS managers, the transition to retirement is the difficult part. MIS managers at Fortune 500 companies typically work 10- and 12-hour days, direct departments of several hundred employees and handle responsibilities that affect the corporation's bottom line.

Waking up in the morning to none of those duties can be hard for those who thrived on their jobs.

"When you have worked for 33 years, adjusting to retirement is a struggle," Dickson says. "You have to prepare yourself mentally to leave it. It's kind of like leaving home. It is a big part of your life."

David Blackwell says he also found the change startling. Blackwell, 60, a former MIS official at Massachusetts Mutual Life Insurance Co., says he misses the people he worked with and the corporate support staff. As a consultant, "I do all the mail myself," he says.

Who needs it?

But one former MIS executive, who wishes to remain anonymous, says he found no problem adjusting at all and did not want to have anything to do with "technobabble" after he retired last year at age 58. The closest he ever got to considering employment again, he says, was clipping an MIS help-wanted ad out of the Wall Street Journal.

"Who needs the rat race? After I left, I lost 20 pounds, my blood pressure returned to normal and my relationship with my wife improved," he says. And since then, he has taken two cruises, signed up for cooking classes, learned how to play bridge and completed two Spanish courses. Next month, the former exec will go to Europe for the sixth time in his life.

"Call me a maverick, but there's a whole other world out there. Life is not all bits and bytes."

Western Digital funding Tandon

IRVINE, Calif. — Western Digital Corp. and Tandon Corp. reportedly are negotiating an agreement to jointly manufacture and market a 3½-in. hard disk drive product for Tandon and OEM microcomputer vendors.

Under the terms of the agreement, Western Digital will lend Tandon some $12 million to increase latter's working capital.

The loan will be secured by assets and technology owned by Tandon. The agreement would enable both companies to cut costs and offer greater opportunity for product enhancements.

"The agreement will allow Western Digital to put together a single process designed to manufacture intelligent Winchester drives, which will reduce costs and risks in quality and reliability," according to Kathy Braun, vice-president and general manager of storage products.

The agreement will allow Western Digital to move swiftly into the disk drive market and toward its goal of being a complete OEM systems supplier, according to James Stone of Shearson Lehman Brothers, Inc. "It's a situation that is highly beneficial to them both," Stone added.

CASE

FROM PAGE 1

pears more likely to address the need for a DB2 dictionary. IBM has yet to provide a dictionary capability for its relational data base management system.

The $200,000 Casepac features mainframe-based graphics using IBM 3270 terminals, Graphical Data Display Manager and ISPF and an integrated data dictionary that allows all information collected during the development cycle to be shared by developers and data administrators.

On-Line Software officials said the mainframe orientation ensures data consistency.

The CASE features can be used to create data flow diagrams and entity models from which data can be mapped into the Casepac dictionary and validated. The same dictionary can then be used to support the finished application.

The Casepac dictionary supports IBM's Data Definition Language, can generate tables based on dictionary entries and can create indexes. The company said the dictionary can also be populated from existing IBM IMS Program Specification Blocks (PSB), Cobol data division statements and DB2 catalogs.

The Casepac dictionary does not address a major shortcoming of IBM's data dictionary approach — the lack of referential integrity — but an On-Line Software spokesman claimed referential integrity is useless unless the data base supports it.

IBM's only approach to a DB2 data dictionary is a product that can be used to handle physical DB2 data base design [CW, May 25]. IBM has called this dictionary an interim solution while the company works on a real data dictionary for DB2, a development that is at least three years away, analysts said.

Casepac was originally developed for Fireman's Fund Insurance Co. in San Francisco, which was seeking an integrated data dictionary to replace six incompatible data dictionaries. The insurer is using Casepac because of DB2's data dictionary shortcomings, according to Ronald Voell, Casepac project director at Fireman's Fund.

Tired of waiting

"We can't wait anymore for IBM," Voell said. "Two hundred thousand dollars is peanuts compared with the productivity that comes from this product."

Voell said his firm expects to use the product beginning next month as its primary means to develop DB2 applications. In its three beta-test projects, Fireman's Fund is using Casepac to develop a data archiving facility and an automated electronic forms-generation facility and to build a large data base for its commercial lines of business.

On-Line Software is also working with Tata to develop a Casepac interface for its recently unveiled application generator, called Intelagen. The link would position Casepac and Intelagen as a mainframe-based alternative to Excelerator, which can be linked to Pansophic Systems, Inc.'s Telon application generator via a recently unveiled interface [CW, Aug. 10].

Index Technology's XL/Interface Telon is expected to be available later in the third quarter. Pansophic reportedly intends to offer the link in its next release of Telon, scheduled for mid-1988.

Howard Sorgen, president of On-Line Software, would not commit to a shipping date for the Intelagen-Casepac interface but said it would be available before XL/Interface Telon.

By linking Casepac with Intelagen, On-Line Software says it hopes to eliminate much of the redundancy in data specification setting and report generation that occurs when using front-end design tools and application code generators separately.

Ronald G. Ross, editor of the "Data Base Newsletter," questioned the need for mainframe-based CASE products, saying most users are looking for personal computer-based bit-mapped graphics and mainframe-like repositories for designs and dictionaries. "I don't think anyone would argue the advantages of the PC unless they were entrenched in the mainframe mind-set and have blinders on," he said.

Shaku Atre, president of Atre International Consultants, Inc. in Rye, N.Y., said Casepac's strength is its data dictionary, which facilitates the design of DB2 applications. Even though it is called a CASE tool, the product still needs some work as a full-fledged application design aid, she added.

Although targeted primarily at DB2 users in IBM MVS shops, Casepac can also be used to develop applications to run under IMS or IBM's VSAM, Tata and On-Line Software said.

INSIDE LINES

Get out the umbrellas. A source at Goldman Sachs reports that the Wall Street investment firm is billing insurance companies $13 million for damages suffered when a water pipe cracked above company headquarters' data center [CW, Aug. 3]. The bill covers the replacement of several IBM mainframes and reportedly includes $800,000 for four days of labor. The two insurers facing the claims aren't pleased.

An A937 or, perhaps, a 9/1100? On Sept. 2, Unisys will reportedly announce a mainframe product that is geared toward entry-level users. The product will be compatible with old Burroughs systems, a source close to the company said. Unisys Chairman W. Michael Blumenthal will preside at the proceeding, which, Unisys says, is to "celebrate the birth of a new computing concept."

U.S. Grade A. The U.S. Department of Justice put its stamp of approval on Computer Associates' acquisition of Uccel last week. The final purchase price was set at $830 million. No announcements about potential organizational changes were made last week. Computer Associates Chairman Charles Wang and President Anthony Wang will meet with Uccel executives in upcoming weeks to merge the two organizations.

All DEC'd out. DEC is expected to round out its VT300 line Tuesday by announcing the VT320 text terminal. Many analysts were surprised that DEC didn't introduce the product, which replaces the VT220, at the April debut of the monochrome VT330 and color VT340 text and graphics terminals. "This is the longest awaited birth on record," one analyst quipped. The new unit should cost a little less than the $795 VT220.

On the warpath, again. Although AT&T has been scaling back its computer business lately, look for the telecommunications giant to announce a multiprocessor system containing between eight and 16 of its WE32000 series 32-bit microprocessor chips next month. One source says the new system may replace many of AT&T's existing and "generally uninteresting" 3B2 systems, which have not fared very well in the commercial area.

Netview freedom fighters. A cabal of "major computer and communications companies" secretly working on an alternate network management standard to IBM's candidate, Netview, is reportedly headed by (who else?) AT&T. The vendors are concerned that IBM has already gained considerable industry support for Netview/PC as a common interface for sending alerts and other data to the host-based Netview. The group may come out into the open soon. "We predict aggressive action quickly to combat the IBM initiative through a pretty powerful development effort," says a spokesman for Timeplex, an admitted member of the cabal.

Behind Curtain No. 1 . . . A well-known mid-range system consultant says DEC's to-be-announced "Microvax III" will be known as the Microvax 3000 when it's rolled out at Decworld next month. The 2- to 3-million-instruction-per-second system will offer better price/performance than its predecessor, the Microvax II, which will remain on the market, the analyst predicts.

The grass isn't always greener. The proposed acquisition of Tallgrass Technologies by CMS Enhancements has fallen through, according to both companies. In a letter of intent signed July 7, CMS said it planned to acquire Tallgrass for an undisclosed amount of stock and cash. But last week, a CMS spokesman said the letter had been allowed to expire without the two companies agreeing on terms.

Post-Postscript? Quadram is expected to announce at PC Expo a Postscript laser printer designed to compete with the likes of AST Research's Turbolaser/PS model. The company would not say if the printer uses the actual Adobe Systems Postscript-licensed driver or if the printer is only Postscript compatible. Meanwhile, Adobe is apparently not pleased at the increasing number of Postscript clones appearing on the market.

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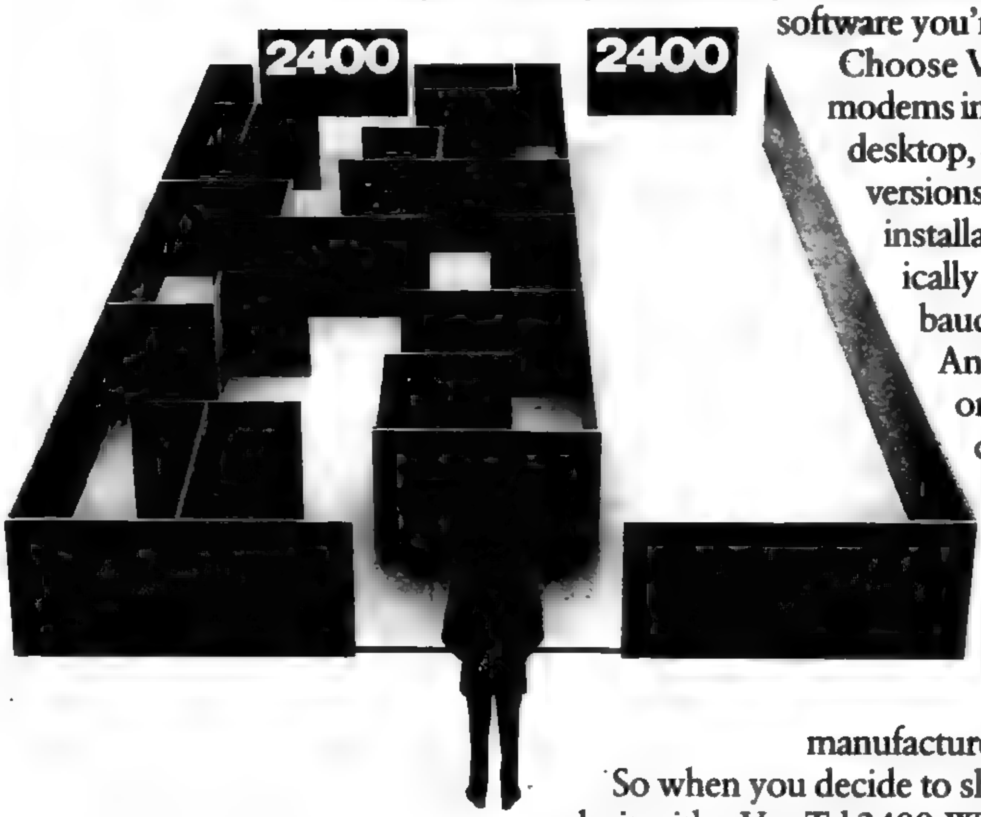

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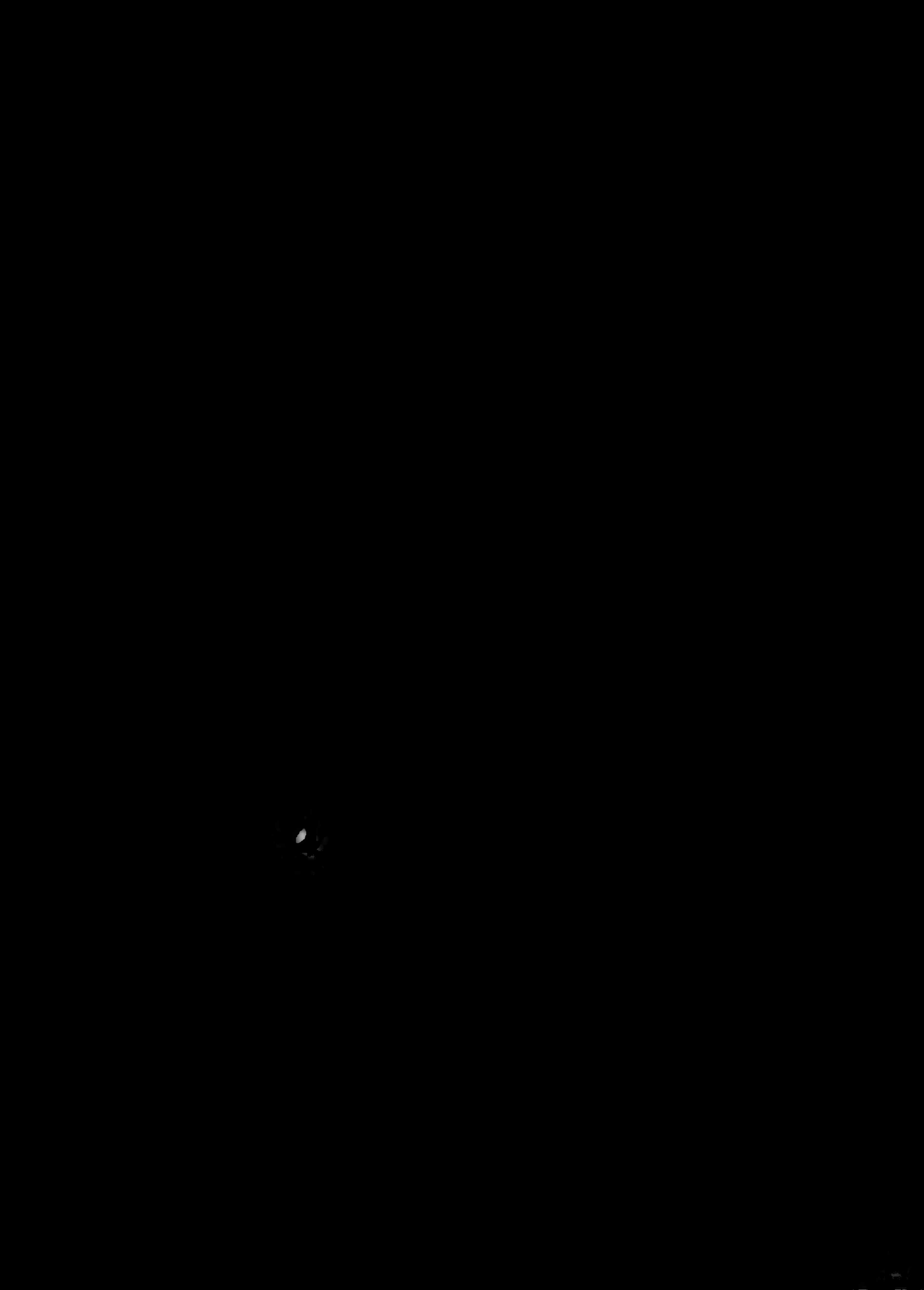

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COMPUTERWORLD

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Computerworld and the Data Processing Management Association team up with a comprehensive MIS salary survey. Almost 1,500 MIS professionals in 25 job categories rate their salaries and benefits.

NCR props up Tower

Responds to 32/800 problems with free upgrade

BY JAMES CONNOLLY
CW STAFF

DAYTON, Ohio — Reacting to weak benchmark results and user complaints about poor performance, NCR Corp. last week confirmed that it will offer free retrofits to users of its 6-month-old multiprocessor Tower 32/800.

The changes, which start with the replacement of a Motorola, Inc. 68010 microprocessor with a Motorola 68020 chip, could mean tenfold performance gains for some users, according to an independent benchmark.

The 32/800 was announced in February as the most powerful member of the Unix-based 32-bit Tower family but scored poorly in an independent benchmark report issued three months later [CW, May 11]. According to an NCR official, the system has performed well in most cases but has not tested well in specific areas, such as the file processor's handling of small record blocks.

Degraded experience

"When we first released the 32/800, we discovered in our own internal testing that the file processor would not provide the performance required in certain situations," said Van Aggelakos, director of product management for the Tower product line. He said a few customers complained that the weakness caused performance to degrade in situations like selected data base applications.

The 32/800, which features an architecture in which power is added in increments with extra

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Ada drive stalling at DOD door

BY MITCH BETTS
CW STAFF

Seven years ago, the U.S. Department of Defense launched a rich, powerful programming language called Ada that supporters preached would revolutionize the world of software design and maintenance.

Today, experts say Ada will gradually make modest inroads both in its intended military market as well as in commercial markets — but no revolution is in sight.

"In fact, there is ample reason to believe that the Ada marketplace won't begin to approach its incredible potential until the mid- to late 1990s, if at all," says Peter Burris, a software research analyst at International Data Corp. in Framingham, Mass.

Ironically, Ada — the product of a billion-dollar investment by the DOD — is struggling most noticeably on its home turf. It seems more popular in European banks than in some DOD offices,

Continued on page 22

Microsoft board to Excel-erate 8088s

BY DOUGLAS BARNEY
and KATHY CHIN LEONG
CW STAFF

NEW YORK — Microsoft Corp. last week laid a hardware foundation for the imminent debut of its PC Excel integrated spreadsheet. The company announced the Mach 20, an accelerator board that will also allow low-end microcomputers to run both PC Excel and Microsoft's MS OS/2.

Microsoft is also expected to announce today a new version of Microsoft Mouse.

The products represent a step toward broadening the base of machines capable of running PC Excel, the unannounced integrated spreadsheet package that will require an Intel Corp. 80286 microprocessor and a mouse to achieve acceptable performance.

In addition to allowing Intel 8088-based machines to run Excel at acceptable performance levels, the Mach 20 will let existing personal computers run MS OS/2, Microsoft's next-generation operating system scheduled for availability next year.

Microsoft hopes to entice users of 8088-based machines to buy PC Excel by bundling the software with a mouse and a Mach 20 speedup board for about $1,000, according to a source briefed by Microsoft.

Gates leaves it open

Although Microsoft Chairman Bill Gates declined to confirm or deny the reports, when asked when users would be able to buy a version of PC Excel for 8088-based machines, he replied, "Maybe when you can buy the Mach 20. Let's just say sometime in the future."

The board is scheduled to be available by Sept. 21. Microsoft declined to provide details of the new Mouse or to confirm the announcement.

The bundling offer would also be Microsoft's trump card in convincing users of existing personal computers to migrate to OS/2, the operating system jointly developed by IBM and Microsoft. Like PC Excel, OS/2 requires an 80286 microprocessor, making it unusable by

Continued on page 8

MAINFRAME SOFTWARE

An industry restructures

BY CHARLES BABCOCK
and MICHAEL SULLIVAN-TRAINOR
CW STAFF

First in a two-part series.

Until last year, Applied Data Research, Inc. in Princeton, N.J., was enjoying a 25% annual growth rate, considered typical for mainframe software houses through much of the 1970s and '80s.

Then, in 1986, the cushion of growth collapsed like a flat tire. Revenue that had been $150 million the year before and was expected to reach $187 million fell to $132 million instead. By the end of 1986, ADR was cutting staff and had installed a polished, young executive from its new owner, regional Bell holding company Ameritech.

ADR's experience is typical of the troubles that have plagued major mainframe software vendors during the last two years. Estab-

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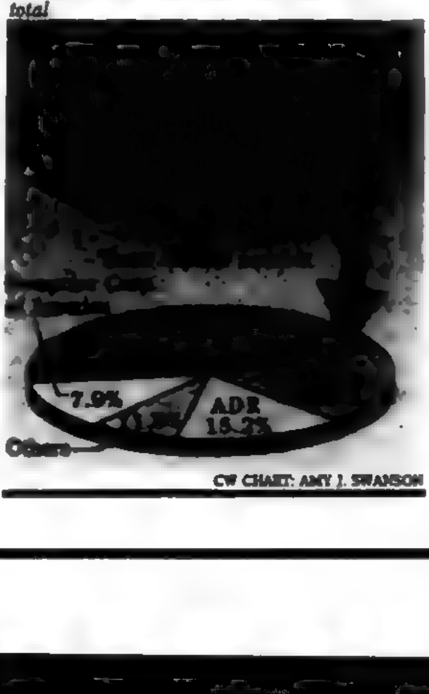
Mainframe data bases
The leading vendors slice up the rest of the pie after IBM takes more than 60% of the total



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Out of the closet. DEC's new net scheme integrates Disoss, Profs and SNADS in Decnet V, while HP concentrates on its 10M bit/sec. Ethernet LAN, which connects PCs and hosts across common unshielded twisted-pair wiring. Pages 4, 6.

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NEWS

Share meets in Chicago

IBM users find support, product directions

BY JEAN S. BOZMAN
CW STAFF

CHICAGO — More than 4,600 IBM mainframe users converged on Chicago's Loop last week as the Share, Inc. users group met to discuss future product directions with hundreds of IBM technical specialists.

Some users said they found comfort in numbers, which gave them the confidence to question IBM. They also used the forum to weigh their own plans to procure IBM hardware and software products.

"Coming to Share gives you a sense of the collective power of users," said one attendee from Texas. "When you sit down with IBM on an individual basis, you have no idea whether your problem is unique or not. Here, you can see that you are not alone."

Because IBM actively seeks feedback from Share users on many systems products, the meeting served as a forum for complaints about existing products. Share members presented IBM with a list of requests for product improvements.

At each of its several meetings every year, Share solicits such requests and presents them to IBM. It then compiles IBM's responses and circulates at future meetings a set of documents that brings users up to date on IBM's intentions.

According to Share documents circulated last week, IBM has already accepted users' idea of enhancing initialization procedures for its VM/CMS environment and providing better support for CMS under its VM/XA operating system. Both changes, which IBM plans to announce soon, had been requested by Share members during 1986.

Also on the list were items that IBM has assured Share are future product objectives. Among those goals, requested by Share during the last five years, were the following:

- A greater degree of file sharing for VM/CMS users.
- A new compiler for the REXX real-time development system.
- The development of a VM/CMS batch system.
- Improved high-level language support under CMS.
- Enhanced automatic restart capability in CMS.

Tech talk

Technical briefings dominated the conference's dozens of seminars, where topics ranged from detailed techniques for DB2 programmers to the maintenance of aging Fortran code.

Users said that keeping up with IBM technology is the single strongest incentive to attend Share meetings. "Usually, many IBM products are introduced in South America somewhat later than they are in the United States," said David Diaz, a systems analyst with the Venezuelan oil firm Lagoven SA. "We attend Share every year to see what works and what doesn't and to gain from the experience of early users of new IBM products."

Another reason users cited for attending is the opportunity they gain, through Share's special-interest groups, to share tips and techniques for programming under various IBM products.

IMS in spotlight

IBM reviewed the newest version of its IMS data base manager — Version 2, Release 2 — at last week's Share meeting.

The latest in a series of IMS products, IMS 2.2 appears to supersede IMS 2.1. Although it was announced last year, IMS 2.2 is only now beginning to ship to customer sites, IBM confirmed.

According to IBM letters to customers, IMS 2.2 provides virtual-storage constraint relief for both IMS/VS DB/DC users and Fastpath users under MVS/XA.

Part of the performance improvement stems from an increase in the size of the system's control blocks, IBM said. IMS 2.2 also includes improved buffering, which is said to speed sequential processing in IMS/VS full-function data bases. Since IMS 2.2 is becoming available shortly after the previous version, IMS 2.1, IBM is suggesting that users choose the updated version.

No hardware changes are necessary to move from IMS 1.3 to IMS 2.2, IBM said. The monthly license fee for the basic IMS 2.2 package is $3,900.

IMS 2.2 runs on a variety of mainframes, including the IBM 370 Models 158 and 168, the IBM 4341 Group 2, the IBM 3033, the entire IBM 3080 line and the newer IBM 3090 models. All of these machines must run IMS under MVS/SP or MVS/XA.

JEAN S. BOZMAN

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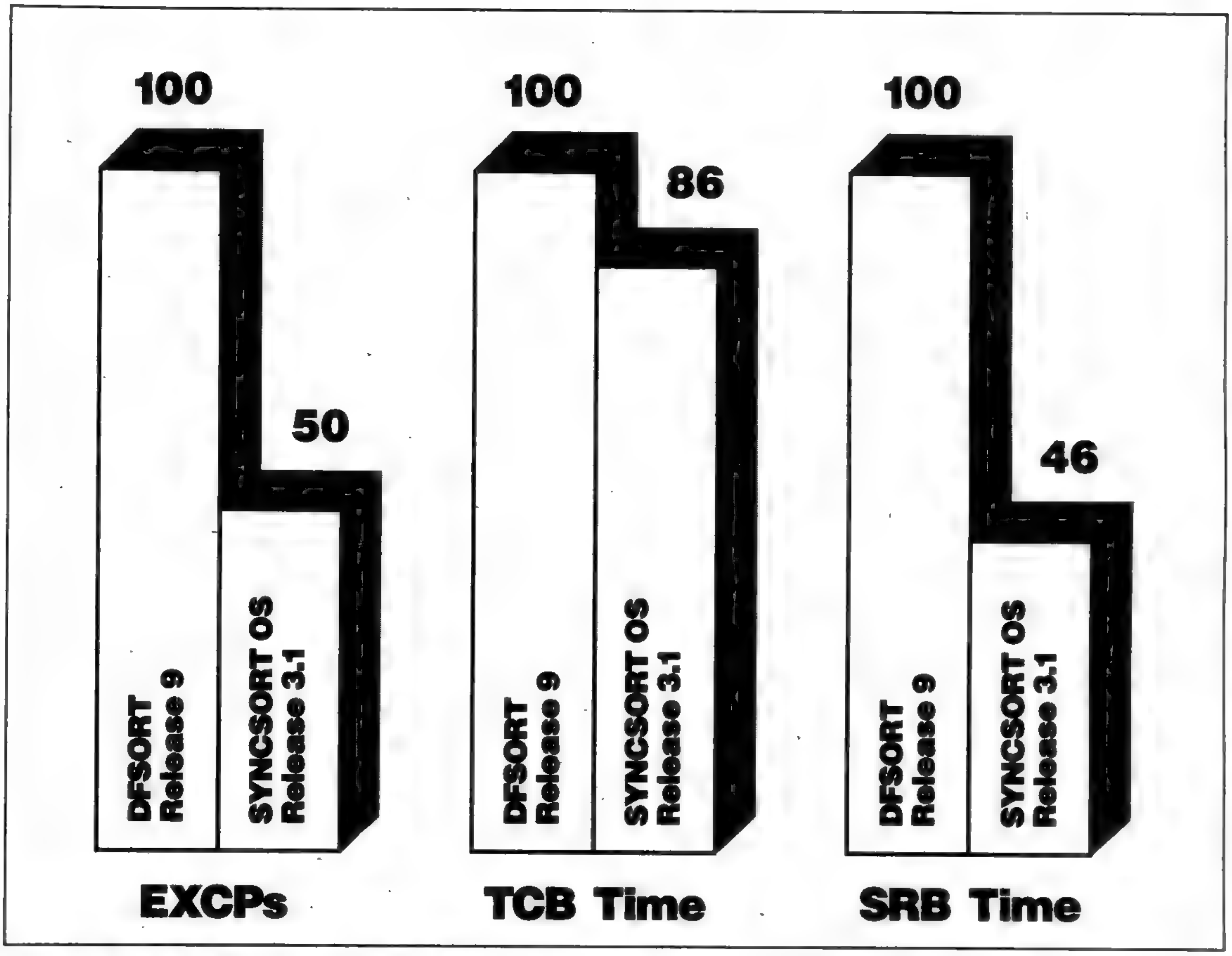

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DG extends low-end CPU line

Firm says MV/1400 DC underprices Microvax 2000 by 10%

BY JAMES CONNOLLY
CW STAFF

WESTBORO, Mass. — Data General Corp. last week extended the low end of its departmental processor line with a smaller version of its MV/2000 DC minicomputer designed to compete with the Digital Equipment Corp. Microvax 2000.

The company announced the MV/1400 DC, which DG officials claimed extends their strategy of providing systems priced at least 10% lower than DEC products. The machines will compete with other vendors' supermicrocomputers and networked personal computers, the officials said.

The MV/1400 DC uses the same single-board CPU and cabinet as the MV/2000 DC but was designed to support fewer users.

At the same time, DG enhanced the 1½-year-old MV/2000 DC and the DS/7500 graphics workstation by replacing the machines' original 256K-bit memory chips with 1M-bit chips and boosting their minimum memory from 2M to 4M bytes and their maximum memory from 10M to 12M bytes.

The MV/1400 DC was designed, in part, to provide an upgrade path for users of DG's 4-year-old Desktop Generation 16-bit multiuser systems.

"Essentially, this allows customers who have been interested in the MV/2000 DC, but for whom the 2000 was too big, to purchase a smaller member of the MV family," said Gordon R. Haff, product manager for MV integrated systems.

Haff said he expects the low-end system to be used as a departmental system by value-added resellers and large firms, which will combine the machine in networks with MV/2000 DCs.

In pitting the MV/1400 DC against supermicrocomputers sold by various vendors, Haff said, basic versions of the DG system are more complete than entry-level supermicros.

The MV/1400 DC carries a base price of $9,995 in a configuration with 4M bytes of memory, a 38M-byte hard disk drive and a 737K-byte floppy disk drive. Comparable MV/2000 DC configurations start at $19,150, and comparable Microvax 2000s cost $14,800. DG effectively raised the base price of the MV/2000 DC from $17,500 to $19,150 and added 2M bytes of memory, the floppy disk drive and a one-year warranty.

One-upmanship

The MV/1400 DC was designed to support two to five users in a typical application. It supports a physical maximum of eight asynchronous ports, 160M bytes of storage and 8M bytes of memory, compared with 24 ports, 320M bytes of storage and 12M bytes of memory offered on the MV/2000 DC.

The key limitation of the MV/1400 DC vs. the MV/2000 DC is that the new system's ports connect directly to the CPU board, while the MV/2000 DC off-loads some I/O tasks to a second or third board, said analyst Chris Hallgren of Framingham, Mass., market research firm International Data Corp.

"It seems to fit nicely into a small hole that existed in the Data General product line," Hallgren said.

DG's low end

MV/1400 DC, MV/2000 DC sandwich DEC's Microvax 2000

	MV/1400 DC	Microvax 2000	MV/2000 DC
MIPS[1]	1	0.9	1
[illegible]	4M to 8M	[illegible]	4M to 12M
I/O bandwidth	8M bytes	3.3M bytes	8M bytes
[illegible]	8[2]	4 to 16[3]	24
Base price	$9,995	$14,800	$19,150

[1] Millions of instructions per second

[2] Refers to physical limit. The typical number of users is two to five for MV/1400 DC and four to 20 for MV/2000 DC.

[3] Four direct connections or 16 with network connections.

CW CHART

IBM suits thwart PS/2 name in ads

BY KATHY CHIN LEONG
CW STAFF

In a move that underscores IBM's stated intent to aggressively defend its property rights on the Personal System/2, the company recently filed trademark-infringement suits against two leading expansion board makers.

The litigation, filed late last month without publicity, challenges the use of the PS/2 name in Orchid Technology, Inc. and AST Research, Inc. advertisements and demands that the ads be dropped. The amount sought for damages was unspecified.

Realizing that it would be a very long, hard battle to fight IBM, both Orchid, based in Fremont, Calif., and AST, based in Irvine, Calif., have stopped running their ads.

In the suit against Orchid, filed in U.S. District Court in San Francisco, IBM inferred that the PS/2 name was misused in an Orchid ad because readers would be led to believe that the memory expansion capabilities the company offered were from IBM. Orchid's ad for its Ramquest 50/60 product reads, in part, "introducing PS/2 memory expansion."

A source at Orchid said the company had canceled the campaign before the suit was filed in court and that miscommunication with IBM led to the filing.

Products not contested

"Nothing is wrong with our products," the source said. "The suit is just about the ad." Meanwhile, AST pulled a print campaign that read, "PS/2 memory — our name says it all," as well as ads that endorsed its Rampage/2 and Advantage/2 memory boards. IBM had objected to the phrase "PS/2 memory" and said AST violated IBM's trademark by using the designation "/2" in product names.

Dennis Leibel, AST vice-president and treasurer, said the firm stopped the ads right after the suit was filed in U.S. District Court in Los Angeles. "Our ads acknowledged that the PS/2 was a trademark of IBM, but IBM objected to the way we used the name for the slogan and the name of the products," he said.

According to Leibel, the slogan will be replaced, but AST intends to keep the names Rampage/2 and Advantage/2.

"We disagreed with IBM, but it didn't hurt us to change the ad," he said. "We are talking to IBM about keeping the name of the product. We're confident the issue will be resolved favorably."

DEC preps network product parade

BY ELISABETH HORWITT
and STANLEY GIBSON
CW STAFF

After months of comparative inactivity on the networking front, Digital Equipment Corp. is expected to use next week's Decworld as a forum to announce a spate of communications-related products — including an enhanced Decnet with built-in IBM connectivity and network management and 10M bit/sec. Ethernet on twisted-pair wiring.

Computerworld has learned that the Decnet announcement, reportedly scheduled for Sept. 9, will provide Decnet-resident links to IBM's Distributed Office Support System (Disoss), Professional Office System (Profs) and Systems Network Architecture Distributed Services (SNADS) networking products.

Those products and a discussion of future product directions will lay the groundwork for DEC's networking strategy into the 1990s, according to a source at DEC. The new networking scheme will integrate Disoss, Profs and SNADS into Decnet, the DEC source said.

John McCarthy, of Cambridge, Mass.-based Forrester Research, Inc., said he had learned from DEC sources that the company plans to introduce Decnet V, with "further embellishment" of network management functionality designed to counter IBM's network management system, Netview. He emphasized, however, that DEC will keep its system distributed rather than try to duplicate IBM's hierarchical management architecture.

McCarthy also said that DEC plans a Decworld announcement of a VAX-resident gateway between its All-In-1 office automation software and Profs. "DEC has been using Soft-Switch, Inc.'s [IBM-resident] gateway, but it has to offer its own to be competitive with Data General, Wang and the rest," McCarthy commented.

Another planned Decworld announcement, McCarthy said, is an upgraded Decnet/SNA Gateway that will run on a VAX. The current gateway, which runs on a DEC PDP-11, only handles 7K to 10K bit/sec. data rates, according to a recent benchmark test by Intel Corp.

"DEC has to offer a faster gateway if it wants to get into major IBM accounts," said David Terrie, editor of Patricia Seybold's "Network Monitor" newsletter and president of Boston-based Newport Consulting. "What it really needs is a channel-based gateway." DEC is rumored to be working out a marketing agreement with channel-based network vendor Fibronics International, Inc.

George Colony, president of Forrester Research, said he is expecting an announcement of 10M bit/sec. Ethernet to run over twisted-pair telephone wire. Previously, DEC had sold Ethernet to run only over special coaxial cable.

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Computer Associates slashes 300 Uccel jobs

BY CLINTON WILDER

DALLAS — Moving swiftly to consolidate the software industry's largest merger to date, Computer Associates International, Inc. last week dismissed 300 Uccel Corp. employees — 25% of the firm's work force.

The announcement came just five days after Garden City, N.Y.-based Computer Associates was given clearance by the Department of Justice to complete the acquisition of Uccel in an exchange of stock valued at $760 million. Uccel spokesman Richard Hanlon said the layoffs were concentrated in middle management and clerical positions; direct sales, field service and software development employees were not affected.

Hanlon also confirmed that two Uccel vice-presidents will be leaving the company after an unspecified period. Resigning are Peter J. Barris, vice-president and general manager of the Systems Software Division, and Michael G. Cocks, vice-president and general manager of the London-based International Software Division.

Seen coming

Although the speed of Computer Associates' action surprised some analysts, the idea of a major Uccel work force reduction did not. Computer Associates Chairman Charles Wang "told Uccel employees from day one that corporate headquarters would be the biggest risk," said Jim Poyner, an analyst who follows Uccel for Dallas investment firm Rauscher Pierce Refsnes, Inc. "Uccel had about $10 million in management overhead, and it was no surprise that Computer Associates would want to get rid of $7 million to $7.5 million of it," Poyner said.

One hundred jobs were eliminated in Dallas, where Uccel previously employed 600. One hundred other layoffs were divided among six U.S. locations, including Boston, Chicago, Herndon, Va., and San Jose, Calif. The remaining 100 positions were eliminated overseas.

The layoffs also included approximately 20 employees in Uccel's Banking Applications Software Division, based in Dallas and Maitland, Fla.

"The total number was higher than we expected," said Ted Jastrzembski, a software analyst with International Data Corp. in Framingham, Mass. "They must have found more duplication than they expected. But announcing the cuts as fast as they did was kinder than just letting these people dribble away."

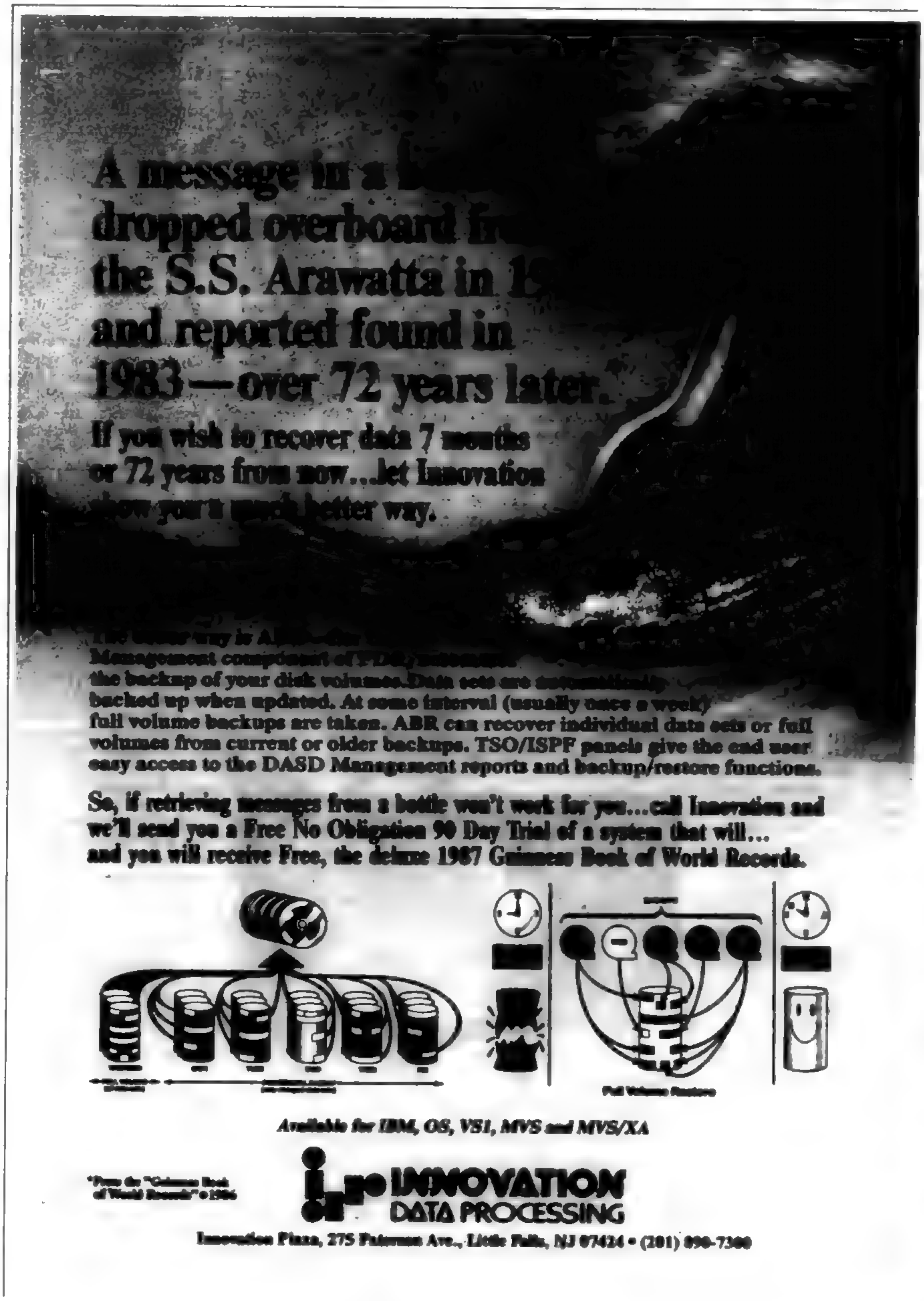
Computer Associates said no further layoffs are planned. However, the Uccel and Computer Associates sales offices in certain cities may be combined, depending on office lease terms and other factors.

Most of the layoffs involved Uccel middle management employees who were responsible for a specific function that was duplicated within Computer Associates, such as accounting, according to Hanlon. "These aren't just secretaries they're getting rid of," Poyner said.

Poyner expressed confidence that Computer Associates will be able to retain most of Uccel's sales force if it wishes. "What other company can you name in which a marketing guy has as many systems products to sell?" he said.

Uccel will keep its plans to move into a new leased corporate headquarters in the Dallas suburb of Las Colinas. That indicates Computer Associates intends to maintain much of Uccel's key organization and its product line, Poyner said.

"They don't want to run anyone off," Poyner said. "In the next two years, I don't think they'd do anything radical on the Uccel products. They saw very graphically where Uccel messed up when they tried to drop support for [mainframe security package] ACF2. Computer Associates didn't get to where they are today by hacking off clients."



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HP's 10M bit/sec. LAN needs no special wiring

BY ELISABETH HORWITT
CW STAFF

Hewlett-Packard Co. will formally announce today the first large-system vendor to announce a 10M bit/sec. Ethernet local-area network that will connect its hosts and workstations across ordinary unshielded twisted-pair wiring.

The HP Starlan 10 will allow users to support high-speed applications and workstations — particularly the new wave of Intel Corp. 80386-based personal computers — without the need to install new building wiring, according to Bernard Guidon, a vice-president in HP's Information Networks Division. Companies can use their buildings' existing unshielded twisted-pair wiring in 80% of all cases, he added.

Hadson Gas Systems, Inc. in Irving, Texas, has already installed HP's 1M bit/sec. Starlan to link IBM Personal Computers with HP Micro 3000XE hosts at sites across the country. The company plans to evaluate the HP Starlan 10 as a possible replacement for the 1M bit/sec. network, said Ray Thomas, Hadson's manager of office automation.

"The 1M bit/sec. Starlan is fine for normal work, but some large spreadsheets that require the full 2M bytes of memory now take up to five minutes to send," Thomas said.

Thomas said that Hadson plans to start evaluating the HP Starlan 10 in October, with the idea of eventually using the product in the place of its current network.

'Hardware plus software'

The upgrade will be inexpensive, involving only "a small amount of hardware plus software," according to Thomas.

The HP Starlan 10 will include a 12-port hub that will support IBM and HP personal computers at a cost of less than $1,000 per user, plus $100 to $150 for PC servers, Guidon said. HP's 1M bit/sec. Starlan product is priced at $599 per user, he added.

Each HP Starlan 10 hub supports up to 12 workstations. Up to 12 hubs can be daisy-chained together at one wiring closet, Guidon said.

Host access

Another product to be introduced today is a bridge that will allow the users of the HP Starlan 10 to access HP 3000 hosts residing on a coaxial Ethernet. Guidon indicated that HP will announce an HP 3000 version of the HP Starlan 10 at an unspecified time.

The HP Starlan 10 system that Hadson said it will beta-test in October also includes an HP 3000 Starlan 10 product, according to Thomas.

The HP Starlan 10 is scheduled to ship in the first half of 1988.

Networking vendors Synoptics, Inc. and 3Com Corp. also market 10M bit/sec. unshielded twisted-pair Ethernet products.

Synoptics' offering is available now, while 3Com's product is scheduled to ship this fall, the company said.

'A definite advantage'

"As the first major computer vendor to bring 10M bit/sec. twisted-pair networking to the marketplace, HP has a definite advantage," said Craig Symons, vice-president of the small computer systems group at the Gartner Group, Inc., a Stamford, Conn., research firm.

"If Digital Equipment Corp. had delivered 10M bit/sec. [Ethernet] over twisted-pair wiring some time back, they might have headed off the IBM Token-Ring craze," Symons said.

The HP Starlan 10 is compatible with and can communicate with HP's existing 1M bit/sec. Starlan network, according to Guidon.

This compatibility will enable users to mix and match 1M and 10M bit/sec. network hubs on the same twisted-pair system.

The HP Starlan 10 is said to support distances of up to 325 ft between wiring closets and workstations. "This is crucial because a recent AT&T-Northern Telecom, Inc. study found that 80% of user workstations are within 300 ft of the nearest wiring closet," Guidon noted.

Haggling on standard

HP presented a proposal for its HP Starlan 10 system at a recent meeting of an Institute of Electrical and Electronics Engineers, Inc. subgroup formed to discuss the viability of a 10M bit/sec. Starlan standard.

Other vendors' reactions to HP's proposal were positive overall, according to Bernard Guidon, a vice-president in HP's Information Networks Division.

However, the IEEE subgroup members moved to cut the meeting short, thereby putting off further discussion of the proposals from HP and other companies until the subgroup's next meeting, which is scheduled for September.

Product development

"A fair number of vendors that have not yet done much work on their own 10M bit/sec. products are afraid they'll have to implement someone else's network," Guidon claimed. "They may not be able to develop a product by September, but at least they'll have a position by then."

"HP's proposal has merit, but it needs to be looked at in the context of other proposals, many of which are not yet on the table," observed Glenn Goldberg, a product marketing manager for 3Com.

"3Com will definitely have a proposal, and other people in the meeting clearly had their own thoughts," Goldberg continued, "even if they were not ready to present them. The idea is to combine the strengths of many products." The standard will still take a long time to develop, "as usual," Goldberg noted.

At the September meeting, the group hopes to work out preliminary specifications for a proposal that will be put before a general IEEE meeting in November, Guidon said.

ELISABETH HORWITT

HP begins portable Vectra rollouts

BY ALAN J. RYAN
CW STAFF

PALO ALTO, Calif. — Hewlett-Packard Co. today is expected to roll out the first two portable personal computers in a line it is positioning at office and sales professionals. The units were designed as mobile devices and as replacements for desktop systems.

The HP Portable Vectra CS Personal Computer offerings include a dual 3½-in. 1.44M-byte floppy disk drive version that weighs 17.6 lbs and a 20M-byte hard-disk version with one 1.44M-byte floppy that weighs nearly 18 lbs, according to James Martin, product manager.

The dual-floppy version will begin shipping in volume in October and will sell for nearly $2,500. The hard-disk version will become available in December, he said.

Analyst Peter Heymann of Drexel Burnham Lambert, Inc. suggested that the portables' weight will not work to their advantage. "Anything near 20 lbs is still on fairly shaky ground," he said.

John McCarthy, director of automation service at Forrester Research, Inc. in Cambridge, Mass., agreed and said that while having the ability to use batteries is convenient, "it's 8086 technology. I think they would have been better off waiting until they got a CMOS [Intel] 80286" chip.

Heymann added that HP is also "biting the bullet in supporting the whole IBM approach," with the IBM standards-compatible units. "It will be interesting trying to discern whether or not they will try to add value that will allow them to stand distinct in the marketplace," Heymann continued.

Heymann said price/performance will be a deciding factor in the IBM-compatible marketplace.

The HP Portable Vectra CS *personal computer*

One way HP said it will stand apart is with the units' ability to replace desktop models in many applications. For office use, each unit's 12-in. supertwist LCD diagonal display can be detached and an external monitor attached. The included display offers 640- by 400-pixel resolution, Martin said.

He added that while the units are currently sold with the display attached, future options may include the machine without the display screen.

A full-size keyboard, compatible with the IBM Personal Computer enhanced keyboard, is included in both models.

Dual operation

The Intel Corp. 8086-compatible CMOS 16-bit processor was utilized because it allows the user the choice of both battery and AC operation of the computer, according to Martin.

The Portable Vectra CS PC is equipped with a battery that can run for up to 10 hours in the floppy configuration and up to four hours in the hard-disk model, the company claimed.

A battery fuel gauge that registers the charge on the batteries is included on both models. Recharging the battery takes 10 hours, HP said.

The fully configured dual-disk model sells for $2,495; the hard-disk version will sell for $3,595. Additional battery modules cost $250.

Revenue sags for weakened CPU company

BEAVERTON, Ore. — Financially reeling Floating Point Systems, Inc. last week reported a loss of $12.4 million, or $1.41 per share, on revenue that dipped 12% from year-earlier levels to $18.3 million.

The loss for the organization's third quarter ending July 31 included an $8.1 million charge for recent restructuring moves, particularly the closing of a manufacturing facility in Ireland, which was announced in June.

In the year-earlier quarter, the maker of array processors for scientific computing reported a loss of $2 million, or 23 cents per share, on revenue of $20.8 million.

Floating Point said revenue for the most recent quarter included several systems sales through Digital Equipment Corp. Under a recent agreement, DEC's sales representatives sell Floating Point's M64 series machines with DEC VAX minicomputers.

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SEMINAR DATES AND LOCATIONS

Albany, NY	November 17
Boston, MA	November 16
Cherry Hill, NJ	November 9
Chicago, IL	October 26
Cleveland, OH	October 29
Dallas, TX	October 15
Denver, CO	November 2
Detroit, MI	October 5
Edmonton, AB	October 22
Houston, TX	October 16
Indianapolis, IN	October 1
Los Angeles, CA	November 3
New York City, NY	October 6
New York City, NY	November 10
Omaha, NE	October 27
Research Triangle Park, NC	October 13
Rochester, NY	November 18
San Francisco, CA	November 5
San Jose, CA	November 4
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1-CWX-870831

Microsoft

FROM PAGE 1

the vast majority of PCs.

The Mach 20 alleviates the microprocessor constraints and provides enough memory to run OS/2. The Mach 20, which comes with 512K bits of random-access memory (RAM), can be expanded to up to 3.5M bytes of on-board RAM, while OS/2 requires at least 1.5M bytes of RAM, according to Microsoft.

To help users of 8088-based machines move to the new operating system without compatibility problems, Microsoft is developing a custom version of OS/2 to run on Mach 20-equipped systems. This version of OS/2 is set to be available 90 days after IBM ships its version of OS/2, which is scheduled for release the first quarter of next year.

According to the firm's press materials, Microsoft is "the first company committed to porting MS OS/2 to an accelerator card for 8088-based machines." MS OS/2 is, of course, a Microsoft product.

OS/2 will run on some, but not all, 80286-based accelerator cards and will require that the operating system be ported to each vendor's card. Vendors will be responsible for porting OS/2 to operate with their cards by using Microsoft's Binary Adaptation Kit, a Microsoft official said. In the majority of cases, the vendors will also have to revise the cards in order to run OS/2.

Whereas OS/2 is aimed at the broad market of PC users, the debut of PC Excel, which sources said has been pushed back from this month until early October, is aimed directly at spreadsheet colossus and Microsoft rival Lotus Development Corp. Sources said they expect PC Excel to sell for $450.

Part of the delay in PC Excel's availability can be attributed to Microsoft Windows 2.0, which has been falling slightly behind schedule, according to a source close to the company. PC Excel requires Windows 2.0, which was to ship by the end of next month but may not ship until October, a Microsoft source said.

Windows that fit

PC Excel had experienced delays prior to the most recent setback. The product was first discussed shortly after the 1985 debut of Excel, , a highly successful Macintosh application that squeezed Lotus almost completely out of the Apple Computer, Inc. Macintosh software market. Microsoft officials at the time disclosed intentions to port Excel to the IBM Personal Computer environment through Microsoft Windows' graphical user interface.

The slowness in bringing Excel to the PC occurred largely because of difficulties in fitting Windows, along with the sophisticated application and data, into 640K bytes of RAM. In addition, the installed base of 8088-based machines ran Windows and Windows-based applications at an unacceptably slow rate, providing little incentive for Microsoft to release the product.

But the increasing number of graphics-equipped 80286-based machines, along with a rise in the average amount of RAM in PCs, has opened up the market to demanding products such as Excel, observers said. A profusion of low-priced accelerator cards, such as the Mach 20, may also boost the market for a product like Excel.

Demand for 3090 accelerates

BY CLINTON WILDER
CW STAFF

FRAMINGHAM, Mass. — IBM price/performance enhancements to the 3090 series earlier this year appear to have succeeded in spurring demand for the high-end mainframes from current IBM 3080 series users, according to a recent user survey conducted by market research firm International Data Corp. (IDC).

Polling 500 large IBM mainframe user sites in June and July on their buying intentions for the next six months, IDC found sharply increased demand for most 3090 models in comparison with its survey of the same sites in December 1986.

By contrast, demand for [illegible]placement 3081 CPUs (excluding upgrades) has fallen sharply since December, although demand for 3083s and 3084s has picked up.

"These results look quite healthy for IBM," IDC analyst Ken McPherson said. "We should see them getting a lot of new systems installed rather than just base churn."

In the mid-range, IDC found a dramatic drop in projected demand for the highly touted 9370. Based on its 500-site survey, the firm projected that high-end sites in the U.S. intend to buy only 1,495 9370s in the next six months, a 42% drop from the projected demand for 2,588 units last December.

The survey polled only sites using IBM mainframes of 4381 power or higher, however, unlike other recent studies that have found strong overall market demand for the 9370 [CW, Aug. 10].

Winter, summer plans

An IDC researcher pointed out that in the December as well as the summer survey, only a small number of sites said they intended to purchase any 9370s, but some of them planned significant volume purchases. Only 17 sites from the IDC sample said they planned 9370 acquisitions in the previous survey, and just 19 indicated purchase plans in the recent survey.

In the 3090 mainframe series, price/performance improvements of up to 15% [CW, Feb. 2] sparked projected purchase increases, some of them dramatic, across the entire line. The 3090 Model 150E, for example, saw projected demand more than triple from 51 units in the previous survey to 186 units.

Projected 180E purchases more than tripled from 21 to 66 machines, 200Es jumped from 101 to 140 boxes and 400Es rose from 42 to 49. Estimated demand for 200E upgrades almost doubled, from 123 to 225 processors.

"In December, we got the feeling that people were holding back, perhaps because of doubts about the economy, or they already had excess power installed," McPherson said. "But in the past six months, processing demand appears to have caught up with capacity."

Hot in June

IDC also estimated strong initial demand for the entry-level 3090 machine announced in June, the 120E, with 208 acquisitions projected. "It seems to be a good introductory box," McPherson said. He noted, however, that projected 120E demand was slightly lower than that for the Model 150 in its preavailability period one year ago.

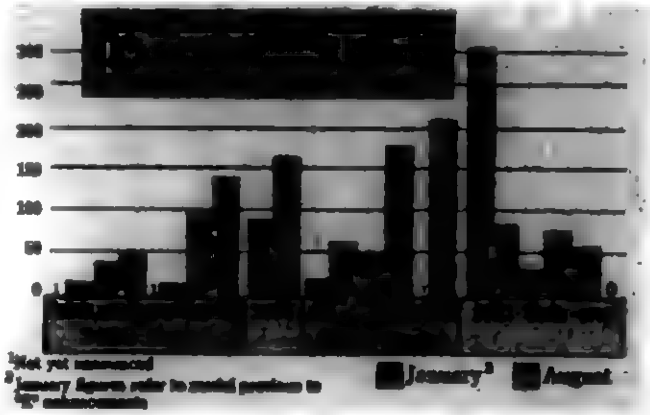
In contrast with the generally strong 3090 demand, the projected acquisition of 3081 replacements plunged from 297 CPUs, the highest number for any category in the previous survey, to just 94. The projected number of users who plan to upgrade from a 3081 to a 3084, however, rose from 47 to 90.

Surprisingly, not a single high-end mainframe site polled had any plans to acquire a 4381 machine, compared with 57 projected unit sales indicated in December. But McPherson downplayed the significance of the zero figure, noting IDC's concentration on the very high end of the mainframe market.

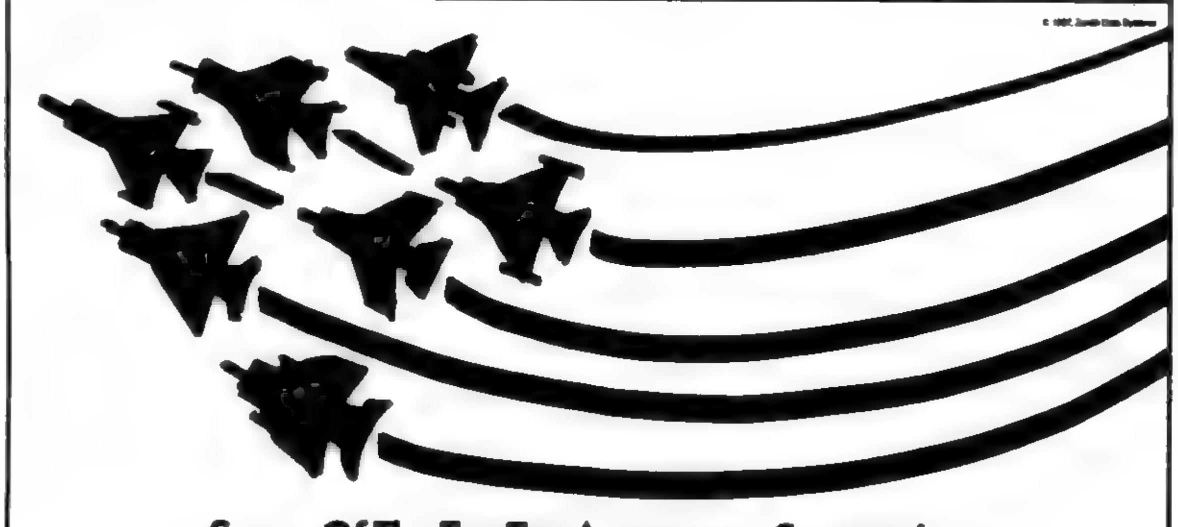
"Ours is not a sufficient base from which to make statements about the 4381 world," he said. "You would expect some cannibalizing of the 4381 by the 120, but it's hard to say if that is the effect we're seeing here."

Moving up

Buying intentions indicate that migration from the 3080 series to the 3090 series is accelerating



INFORMATION PROVIDED BY AN INTERNATIONAL DATA CORP. SURVEY OF 500 IBM MAINFRAME SITES
CW CHART



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3Com, Bridge step up merger plan

SANTA CLARA, Calif. — 3Com Corp. and Bridge Communications, Inc. in Mountain View, Calif., announced late last week they had received government approval to complete their proposed merger by late next month.

The companies said the Federal Trade Commission (FTC) had granted their request for early termination of the required waiting period under the Hard-Scott-Rodino Antitrust Improvements Act.

The FTC approval signals that the companies have satisfied the notification and filing requirements of the act and are free to complete the proposed merger, subject to shareholders' approval.

3Com investor relations manager Barbara Shapiro said that both of the companies are currently receiving comments on the joint proxy prospectus by the commission.

Following the printing of the prospectus, the document will be mailed to shareholders. That will most likely happen within one week, Shapiro said.

3Com will then schedule a special shareholders' meeting at its annual gathering late next month, and a vote on the merger will be taken at that time, she added.

Bridge Communications will also call a special shareholders' meeting on the merger.

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Paradyne tool runs T1 speeds on channel nets

BY ELISABETH HORWITT
CW STAFF

LARGO, Fla. — Paradyne Corp. is expected next month to announce a software product that reportedly will clear a longstanding bottleneck that has constricted the speeds attainable by IBM Systems Network Architecture (SNA)-based applications over IBM host-to-host channel networks.

As a "small application" running under VTAM, XL Express lets existing applications written for the host-based communications system transmit over channel-to-channel connections at speeds of 45M bit/sec. or higher, according to Paula Uselis, Paradyne's product manager.

Most other channel-based networking products, including Paradyne's existing Pixnet XL product, have been unable to make full use of a T1 link, Uselis claimed, because they are based on IBM's Channel-to-Channel Adapter.

Designed to support communications between co-located hosts, the adapter requires the sending system to get an acknowledgment from the receiving system before it can transmit the next block of data. "This can cause major propagation delays over a remote host-to-host connection," said David Passmore, a principal with Fairfax, Va., consulting firm Network Strategies, Inc.

Better use of channel speeds could be a key factor in the "high-speed host-to-host channel market, which is about to take off," Passmore added.

Adapter-based products typically attain 800K bit/sec. speeds over a channel-to-channel connection, Uselis claimed. Some vendors, such as Network Systems Corp., are said to achieve true T1 speeds through their own host software. However, such products reportedly cannot work with standard VTAM-SNA applications.

Byte blocking

XL Express reportedly circumvents the adapter, deals directly with VTAM protocols and incorporates its own blocking techniques to optimize performance running over Pixnet/XL, Uselis said. Blocking — the stringing of bytes together into a packet to be sent — has been another area in which VTAM applications have reportedly not been able to take full advantage of channel-to-channel speeds.

IBM is said to have dealt with some of the above limitations with its June 16 introductions of Advanced Communications Function/VTAM Version 3, Release 1 and 3737 Remote Channel-to-Channel Unit.

The VTAM release reportedly improves channel-to-channel performance because it "can handle larger block sizes and optimize block size according to whether communications is through a front-end processor or a 3737," claimed Roger Brzostek, senior marketing support administrator for telecommunications products at IBM.

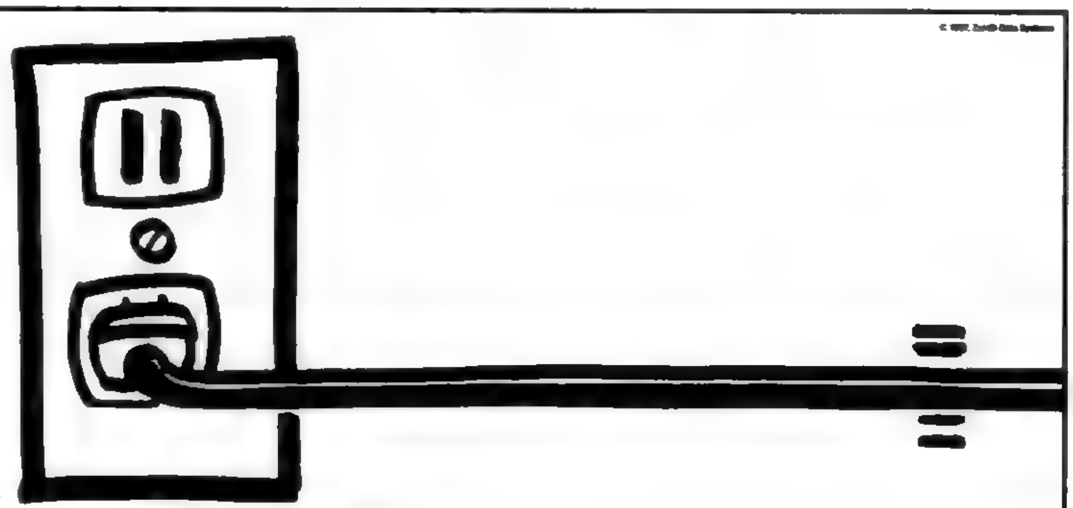
VTAM Version 3 can also "string a greater number of larger blocks of data together and send them as one block, saving VTAM and operating system cycles," Brzostek noted.

The 3737 eliminates the need to acknowledge each block of data. It fools VTAM into acting as though it were getting acknowledgments so that it continues to send blocks until the 3737's buffer is filled, according to Brzostek.

The 3737 can handle T1 speeds in both directions concurrently. Actual throughput depends on many variables but will always be somewhat slower than T1 speeds, Brzostek said.

NTX Communications Corp. in Sunnyvale, Calif., also claimed to have circumvented the VTAM and adapter problems with its NTX 3800 series of channel-to-channel network processors, achieving speeds of up to 6M bit/sec.

Priced at $10,000 each, XL Express is scheduled to be available in the first quarter of next year.



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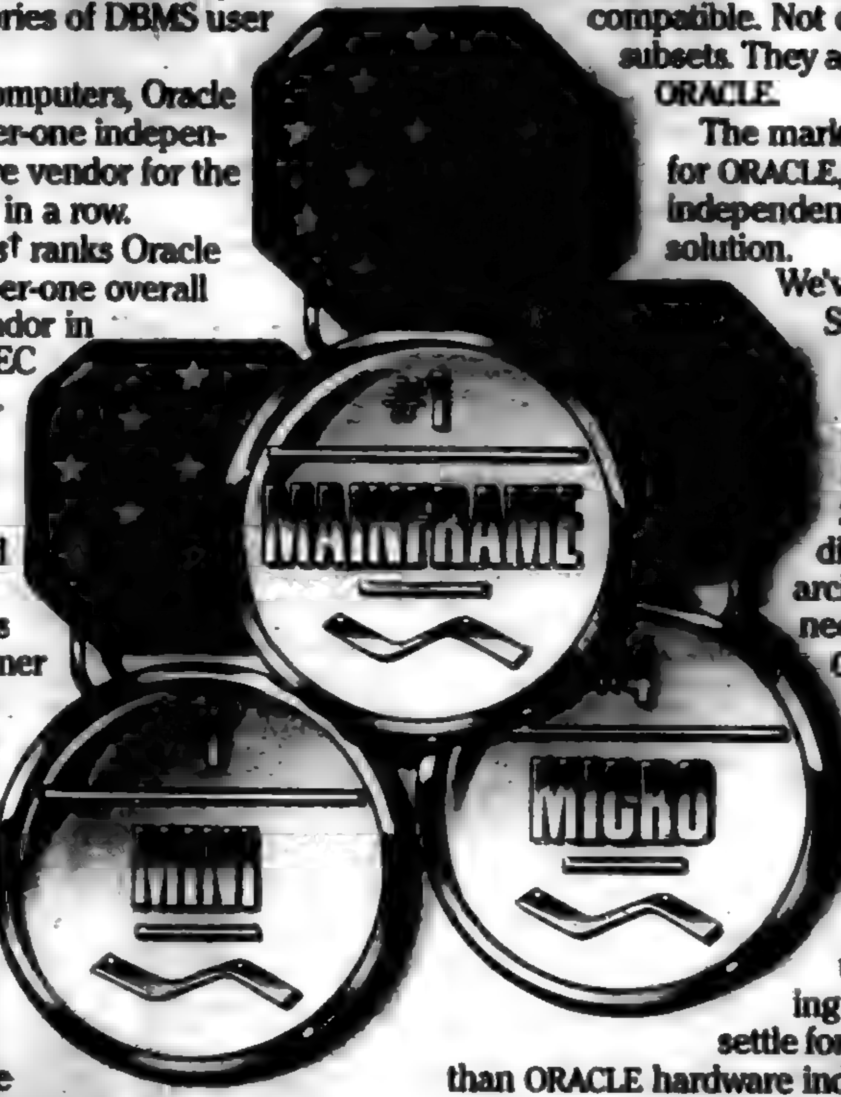

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	Los Angeles	Sep 8, Sep 30, Oct 15, Oct 29, Nov 12
	Newport Beach	Sep 17, Oct 6
	Sacramento	Oct 15
	San Diego	Sep 10, Oct 8
	San Francisco	Sep 15, Oct 20, Nov 17
	San Jose	Sep 2, Oct 7, Nov 5
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	Denver	Sep 15, Oct 15, Nov 12
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DE	Wilmington	Sep 1, Oct 1, Nov 5
FL	Ft. Lauderdale	Nov 5
	Jacksonville	Sep 9
	Orlando	Nov 4
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GA	Atlanta	Sep 16, Nov 11
HI	Honolulu	Sep 17
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	New Orleans	Oct 23
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	Grand Rapids	Nov 4
	Traverse City	Oct 28
MN	Minneapolis	Sep 29, Oct 29, Nov [illegible]
MO	Kansas City	Sep 22, Nov 19
	St. Louis	Sep 16, Oct 13, Nov 10
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	Iselin	Sep 16, Sep 29, Oct 8, Oct 22, Nov 5, Nov 17
	Princeton	Sep 22, Oct 14, Nov 12
NM	Albuquerque	Sep 22, Nov 5
NV	Las Vegas	Sep 9, Oct 27
NY	Albany	Oct 6, Nov 4
	Buffalo	Sep 29
	Long Island	Sep 15, Oct 15, Nov 12
	New York City	Sep 9, Sep 17, Sep 23, Oct 7, Oct 21, Oct 28, Nov 4, Nov 18
	Rochester	Sep 22, Oct 22, Nov 18
	Syracuse	Oct 15
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	Cleveland	Sep 17, Oct 15, Nov 12
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	Dayton	Sep 22, Oct 20, Nov 17
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	Tulsa	Oct 20
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PA	Harrisburg	Sep 15, Oct 22, Nov 12
	King of Prussia	Sep 17, Oct 29
	Philadel.	Sep 10, Oct 8, Nov 5
	Pittsburgh	Sep 8, Nov 4
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	Memphis	Oct 14
	Nashville	Oct 21
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	Austin	Oct 9
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	San Antonio	Oct 8
UT	Salt Lake City	Sep 29, Oct 29
VA	Norfolk	Oct 20
	Richmond	Sep 8, Nov 17
	Virginia Beach	Oct 15
VT	Burlington	Sep 2
WA	Seattle	Sep 3, Oct 15, Nov 10
WI	Madison	Nov 12
	Milwaukee	Sep 3, Oct 14

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† Digital News, December 1, 1986. ‡ Gartner Group currently available research.

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Restructures

FROM PAGE 1

lished mainframe data base vendors like ADR, Software AG of North America, Inc., Cullinet Software, Inc. and, to a lesser extent, Cincom Systems, Inc. and Computer Corporation of America have been hit by sagging profits and declining data base management system market share.

Among the factors contributing to what is becoming a fundamental restructuring of the large systems software industry are IBM's successful launch of DB2; slow revenue growth and dramatically shrinking profits; and management teams, many reflecting a founder's influence, that have remained deeply committed to products that were introduced 10 or 15 years ago.

At ADR, not long after selling the company to Ameritech, founder Martin Goetz stepped down to a technical post and relinquished the presidency to Ameritech executive Dennis Strigl. This week, the 41-year-old Strigl will take over as chief executive officer when current CEO and Chairman John Bennett relinquishes the former title. That management transition reflects a broad move by the mainframe software companies to adjust to the rapidly changing marketplace.

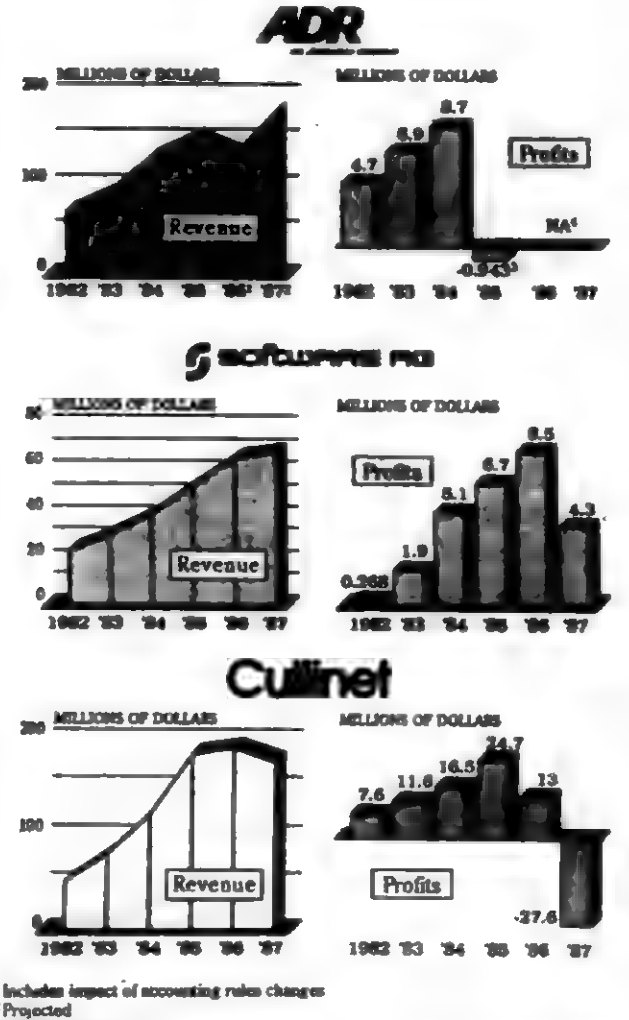
Of the 100 publicly traded software companies that he tracks, Kidder, Peabody & Co. Vice-President Bahar Gidwani says 40 firms have changed their top management in the last three years, often reflecting a passage from founders to professional business managers. Many of those that have not yet changed their management style will do so during the next five years, and some of them will do so as a result of disasters, Gidwani says.

Without changes in its accounting practices, ADR's 1986 revenue would have been close to even — or "stabilized," as ADR officials like to say — with that of 1985. But staying even represents a dramatic falloff from compounded 25% annual growth.

Staying even for software companies means living off maintenance revenues gained from sales during previous years. It indicates that new product sales are flagging and that the company's ability to conduct research and development will suffer if the initiative cannot be regained. It is the equivalent of falling behind in technology and eventually falling behind the competition, according to industry observers on Wall Street.

Trying times

Three data base vendors reflect the rigors of intense competition



¹ Includes impact of accounting rules changes
² Projected
³ Acquired by Ameritech
⁴ Profits not reported

CW CHART: MITCHELL J. HAYES

Although ADR officials say they were able to avoid any such fallback, an ADR customer remembers the 1985-86 downturn from a different perspective. "We started having support problems with [ADR's DBMS] Datacom/DB. We didn't know if they were going to have the resources to support us," says Woodson Hobbs, executive vice-president for data processing at Charles Schwab & Co. in San Francisco. Hobbs says ADR soon received the capital it needed from Ameritech to boost support.

Changing of the guard *at ADR saw veteran Martin Goetz (left) relinquish the presidency to 41-year old Dennis Strigl (above).*

One cause of disappearing growth at companies like ADR is the slowdown in IBM mainframe sales. When the corporate mainframe becomes the slowest growing segment of the computer business, the companies that sell software for it suffer. As a result, development teams at each of the mainframe houses are scrambling to get on top of new technology and extend their product lines to processors in the minicomputer and microcomputer arenas. In this respect, the mainframe software companies are falling back on their more innovative and aggressive roots.

'Swallowing fish'

What is different today, however, is that the industry is also undergoing a wave of consolidation. "It's like the old cartoon of the big fish swallowing the smaller fish," says Prudential-Bache Securities, Inc. Vice-President Charles Taylor. "The industry is evolving from a highly fragmented, large number of companies to a more limited number of participants."

It is the latter possibility that lends urgency to the repositioning already under way. If they do not wish to be gobbled up by a more successful competitor — as Uccel Corp. was recently by Computer Associates International, Inc. — or go out of business, the mainframe software vendors must launch new product lines while, at the same time, keeping costs under control.

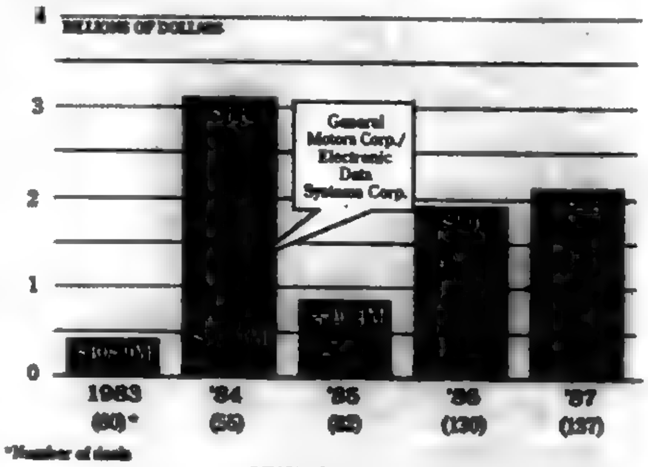
As a move in the latter direction, Cullinet this month started trimming executive salaries higher than $50,000 by 5% or more, according to industry sources. In its most recent quarterly earnings report, the company stated that it lost $8 million on a record revenue, marking its fifth consecutive losing quarter.

Cullinet has said it does not expect to return to profitability until its third or fourth quarter in January or April 1988, and most of its hopes ride on a bet that the $50 million it has spent on acquisitions and new technology during the last year will move it into lucrative new markets.

"Our new products in data base, applications and tools represent a very substantial broadening of our product lines," says David L. Chapman, Cullinet's president and CEO.

Software mergers: A five-year growth path

Total value of software and services mergers and acquisitions in the first six months



*Number of deals

INFORMATION PROVIDED BY BROADVIEW ASSOCIATES
CW CHART

Once a highflier on Wall Street, Cullinet's stock today trades at $13 per share, compared with a high of $33 in 1985 after a split and a low of $6 in the last 12 months.

Guessing where new markets will emerge is different from dressing up old products to serve existing customers, one of the mainframe vendors' bread-and-butter activities for many years.

Attempts to launch breakthrough products make today's software industry more closely resemble its roots. But in a climate of restructuring, the effort may produce some of the disasters Gidwani predicts.

"It's very tough to crack new markets. If you're in insurance, it's hard to move to health care," says Scott Smith, vice-president of Donaldson, Lufkin & Jenrette, Inc. in New York.

In some cases, the traditional mainframe houses are not anticipating new markets so much as trying to catch up with younger, more aggressive firms already occupying them.

Indeed, the mainframe data base vendors, with their investment in hierarchical, inverted-list and networked DBMSs, were slow to sense their customers' interest in relational technology.

While many of the vendors scoffed last year, IBM offered its DB2 product for a six-month free trial period.

"They used a 'Try it, you'll like it' technique, which stopped many shops from evaluating systems from independent vendors," complains Lynn Pearce, executive vice-president of sales at Software AG, producer of Adabas.

Even IBM was surprised at the result. "We're elated" at the way DB2 has caught on, said IBM's Robert F. Berland, vice-president of vendors and development operations for the firm's Application Systems Division.

In effect, IBM froze decision making on all mainframe DBMS systems as buyers evaluated DB2, according to market researchers.

International Data Corp. in Framingham, Mass., estimates that mainframe DBMS sales dropped between 45% and 78%

for each of the independent vendors that year, with the exception of Cincom and Computer Corporation of America.

Today, with IBM having sold an estimated 2,400 DB2 licenses and Oracle Corp. threatening to catch up with Cullinet's revenue with sales of its relational DBMS, the mainframe vendors are belatedly committing themselves to supplying relational products.

One DBMS market researcher, Michael Cohn of Input; Inc. in Mountain View, Calif., predicts that if Oracle and Cullinet go head to head in mainframe relational systems, "Oracle is clearly going to have an edge. There's too much brand recognition for Oracle as a relational product. . . . Cullinet is a late entry."

One way that Cullinet and several other mainframe-oriented companies have reacted to the need for new technology has been to acquire other companies. During the past two years, Cullinet has acquired five firms, including Distribution Management Systems, Inc. in Lexington, Mass., (for its expert system technology) and Esvel, Inc. in San Jose, Calif. (for its IBM SQL-based relational system).

Computer Associates entered the minicomputer marketplace and beefed up its mainframe general ledger offering by acquiring Software International Corp. in Andover, Mass., last year. The company also added graphics and spreadsheet software through acquisitions of Issco, Inc. and The Mega Group, Inc. Most recently, it signed an agreement to buy Uccel. Now the largest independent software company in the industry, Computer Associates has acquired 10 companies during the last two years.

Carnegie Group's Yablonsky

Industry analysts say acquiring technology is one way for the established vendors to put their growth plans back on track, but it has its pitfalls.

Management Science America, Inc. (MSA), the Atlanta applications giant, appears to be integrating two recent acquisitions into the fold: Information Associates, Inc., a producer of higher education applications, and Comserv Corp., a maker of manufacturing software. But MSA is having trouble with a third acquisition, Real Time Systems in Dublin, a producer of IBM System/36 and 38 manufacturing software.

According to Prudential-Bache's Taylor, MSA planned on replacing Real Time Systems' management when it acquired the firm but found, to its chagrin, that "the sales team was every bit as bad as the management." It hired a new sales team, then ended up paying both of them as the existing sales force negotiated stiff terms of separation with MSA.

MSA will lose $10 million on the deal this year, Taylor predicts. MSA Vice-President Edwin D. Goodnight says, "Acquisitions added significantly to operating costs and resulted in a net loss" in the second quarter.

'Marketing game'

Although acquisitions have their hazards, Wall Street analysts question whether the mainframe software companies will be successful without developing a knack for making them. "It's like basic blocking and tackling. It's a marketing game — not a technical game anymore," says Paine Webber, Inc. analyst Robert M. Therrien.

One mainframe vendor that stayed apart from the rush for acquisitions at the end of last year was McCormack & Dodge Corp., the Natick, Mass.-based applications vendor owned by Dun & Bradstreet Corp. M&D will make acquisitions, says Chairman Frank Dodge, only if the target company has a strong product line that complements existing M&D products. So far, M&D's revenue has continued to grow above 25% without recent acquisitions, he says.

The net effect of acquisitions is to reduce the number of brand names that customers must confront in running their installations.

Through development and acquisition, Computer Associates has put together a set of system utilities and performance monitors that it markets together as CA-Unicenter.

Large users seem to prefer the simplicity of a single supplier. Frank Leser, president of Financial Technologies, Inc. in Chantilly, Va., recently bought banking applications from Hogan Systems, Inc., even though he says he knew Hogan had been "shaky" prior to its 20-year marketing deal with IBM. Leser says he "wanted to have a single vendor" to deal with in case of problems.

Dennis Yablonsky, ex-president of Cincom and now president of the Carnegie Group, Inc. in Pittsburgh, echoes what is on the minds of many mainframe software executives as they scramble for new positions: "You've got to be a big No. 2 or No. 3 [after IBM]. There's not room for more."

Next week: Strategies for success in the 1990s.

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Software Publishing yanks desktop package

Also withdraws high-end professional publisher, winds down push into market

BY STEPHEN JONES
CW STAFF

MOUNTAIN VIEW, Calif. — Software Publishing Corp.'s excitement over its new PFS:Professional Write Plus word processing and desktop publishing package turned to disappointment last week as the firm put the still-unshipped product in mothballs for an indefinite period.

Surprise about the announcement was compounded by Software Publishing's decision to immediately discontinue its Harvard Professional Publisher, a high-end desktop publishing program that analysts said failed to take on the likes of Aldus Corp.'s Pagemaker.

Apparently downgrading its push into desktop publishing, Software Publishing is now left with only one entry in that burgeoning market: a program called PFS:First Publisher, which has limited capabilities that confine it to the low end of the market.

Some industry watchers speculated that the delayed PFS:Professional Write Plus might also be scrapped if changes cannot be made to placate dissatisfied dealers. Software Publishing denied such claims but would not say when an improved version of the package will be released.

Originally scheduled for release this week, PFS:Professional Write Plus was criticized when it was demonstrated to about eight of Software Publishing's top dealers at an Aug. 12 meeting, sources said. The dealers reportedly said the product has limited capabilities and expressed concern that its combined features could hurt sales of the vendor's stand-alone products.

"The dealers gave it a big 'thumbs down,'" said a meeting attendee who asked not to be identified.

Awkward position

That spelled the end for the first version of PFS:Professional Write Plus, which Software Publishing President Janelle Bedke had heralded only days before as a "critically important product" for the company.

Software Publishing was left in an awkward position — forced to announce that the package would not be released just three days after the vendor had promised a September shipment. "The timing of the announcement could have been a lot better," admitted Signe Ostby, Software Publishing's vice-president of marketing.

PFS:Professional Write Plus was designed to merge the full-featured word processing of the vendor's PFS:Professional Write with its PFS:First Publisher desktop publishing package.

The product was aimed at occasional desktop publishing users who want fancy business documents but have no interest in mastering sophisticated high-end programs. Sources said bundling the two products might have frustrated dealers who feared losing current business for the individual packages.

"I would prefer to have two separate packages, because I don't think everybody wants all the capabilities of PFS:Professional Write Plus," said Ed Anderson, vice-president of marketing for the Computer Factory, an Elmsford, N.Y., retail chain that sells a broad line of Software Publishing products.

Sources said the product was hastily put together in response to leaks late last month that rival Symantec Corp. was preparing to release Q&A Write, a program similar to PFS:Professional Write Plus.

Trio targets info services

BY MITCH BETTS
CW STAFF

WASHINGTON, D.C. — Ameritech, the Chicago-based regional Bell holding company, last week stuck its foot in the door of the information services market in a three-way joint venture with Bell Canada Enterprises, Inc. and Telenet Communications Corp.

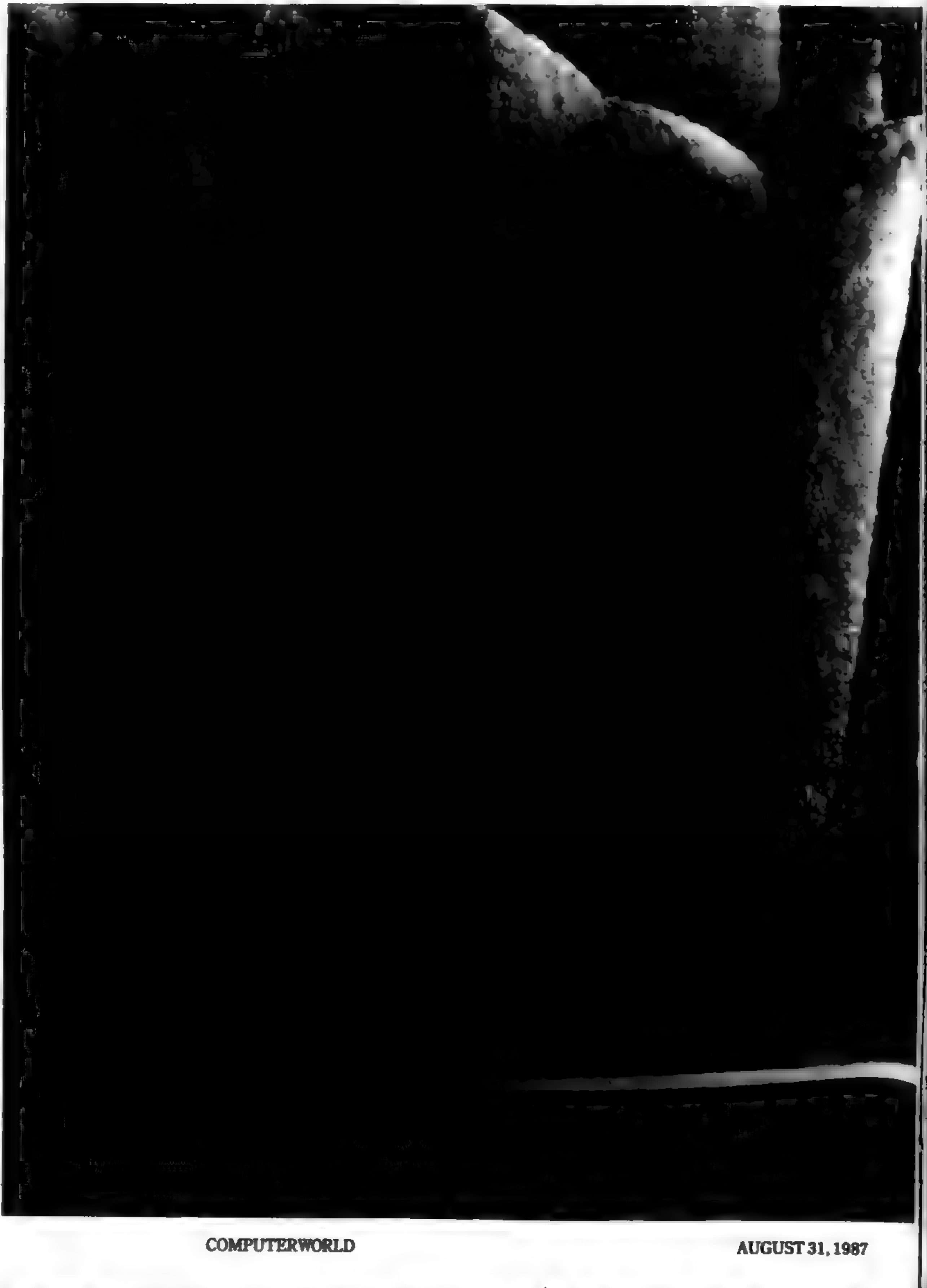
The trio of vendors formed a U.S. company that will provide a network gateway to a variety of on-line data bases and electronic messaging services, using Telenet's packet network as the backbone. The Inet service is aimed at businesses, trade associations and government offices and is scheduled to begin Sept. 1.

In addition to connecting its local packet network to Telenet's backbone, Ameritech paid $5 million for an option to acquire a 15% equity interest in the venture.

However, Ameritech's financial interest in the venture is subject to approval by U.S. District Judge Harold H. Greene, because the 1984 AT&T divestiture judgment prohibits the Bell companies from offering information services.

Kenneth E. Millard, Ameritech's senior vice-president of corporate strategy,

Continued on page 15



Ashton-Tate hires to build Dbase staff

BY DOUGLAS BARNEY
CW STAFF

TORRANCE, Calif. — Ashton-Tate recently shored up its future Dbase development staff by hiring two top developers from suppliers of mainframe and minicomputer software.

The company announced that Arvola V. Chan, formerly with Computer Corporation of America (CCA), and Michael K. Benson, designer of Spectra, the query language for Cincom Systems, Inc.'s Supra data base management system, have joined Ashton-Tate to develop advanced data base products.

The move by Ashton-Tate coincides with the firm's ongoing efforts to acquire technology from a large systems software vendor.

Key component

Such technology is to serve as a key underlying component of a future version of Dbase designed to run on a local-area network (LAN) server and provide multiuser capability.

The prime candidates for a licensing agreement or potential acquisition by Ashton-Tate are Relational Technology, Inc., XDB Systems or Informix Software, Inc., according to a source close to Ashton-Tate.

With the shift to more complex microcomputer operating systems, the microcomputer data base market will evolve from single-user orientation to one characterized by LANs, data base servers and shared access to data, all areas in which Ashton-Tate has little experience.

And while Ashton-Tate has been building its development staff to reach these new markets, the firm admits it is also open to acquiring data base technology.

"We remain open to combining not just inside and outside talent but combining inside and outside products and technologies. It is not against our philosophy to look for an opportunity to get a step ahead on the strength of acquired technology," said Roy E. Folk, executive vice-president of Ashton-Tate's software products division.

According to Folk, Benson and Chan will work on the next release of Dbase, which runs in the existing Microsoft Corp. MS-DOS environment, as well as more advanced work for data bases that are intended to run under Microsoft's MS OS/2, a large-memory, multitasking operating system that is scheduled for release next year.

Connectivity concerns

"We are very concerned about connectivity between the DOS Dbase and the OS/2 Dbase," Folk explained. Ashton-Tate will offer an OS/2 product for individual workstations as well as a product that will run on data base servers.

Chan, who worked on CCA's Adaplex DBMS prototype for minis and mainframes and the Distributed Data Manager component of the Adaplex product effort, will serve as Ashton-Tate's senior scientist for distributed data bases.

Benson, the former development team leader for Cincom's Spectra, will serve as Ashton-Tate's chief architect for knowledge-based systems.

What ISDN is doing for McDonald's data networking capabilities is no small potatoes.

When McDonald's Corporation took a hard look at its telecommunications needs a few years ago, it saw 9400 restaurants in 46 countries, served by more than 20 networks. And a new restaurant opening every 17 hours.

McDonald's needed a telecommunications system that could grow with it, but one simple enough that the company could concentrate less on telecommunications and more on talking to customers.

The solution: the nation's first customer application of ISDN, the Integrated Services Digital Network, made possible by the cooperation of Ameritech's Illinois Bell and AT&T Network Systems.

McDonald's will use ISDN to send voice, data and video over ordinary telephone lines simultaneously. An AT&T 5ESS™ switch at Illinois Bell will support digital phones, integrated voice/data terminals, facsimile, voice mail, host access and modem pooling, giving McDonald's a real competitive advantage in its data networking capabilities.

"In business language, this means we're going to do an even better job for the 30 million customers that we serve every day," said Bonnie Kos, McDonald's Vice President of Facilities and Systems.

"ISDN provides an information outlet to every workstation, thereby eliminating time-consuming and costly wiring, as well as enhancing messaging and network control capability."

Thanks to ISDN, McDonald's will enjoy better customer service, more current market information, better tracking of product promotions, more efficient inventory control, and reduced administrative workloads.

Ultimately, higher level applications of ISDN on the public switched network will replace most of the company's myriad networks, linking all its offices and restaurants around the world.

As we are doing for McDonald's, AT&T and your telephone company can help your business realize the networking efficiencies and cost savings of ISDN. To find out all that ISDN can do for you, write on your business letterhead to: AT&T Network Systems, P.O. Box 1278, Room 2966, Morristown, N.J. 07960-1278.

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Info services

CONTINUED FROM PAGE 14

said he is "guardedly optimistic" that Greene will grant the necessary waiver.

"The Inet project demonstrates the kind of new services the Bell companies can bring to U.S. customers once the government gets out of the way of progress," Millard said.

The seven regional Bell holding companies have urged Greene to eliminate the restriction on information services altogether, and a decision is expected this fall [CW, June 29].

If freed from the court-ordered restriction, Ameritech could provide marketing support, information services and advanced network services to the Inet venture, Millard said.

Ameritech's involvement in the Inet venture is the latest of several efforts by the Bell companies to get a taste of the forbidden market.

"The Bell operating companies are testing the waters to try to learn more about data communications and the information services market," said Jerome G. Lucas, president of Telestrategies, Inc., a McLean, Va.-based research and consulting firm.

The new joint venture, called Inet Company of America, is based in Chantilly, Va., and reportedly will replicate in the U.S. the information service that Bell Canada has offered in Canada since November 1985. Inet users will dial into Telenet's network and then select from a menu of information retrieval, electronic mail and conferencing services.

Stuart B. Erskine, president of the company, said the Inet service can be customized to provide a closed system for a particular trade association or users group.

He said the service will cost $17 per hour during peak hours and $10.20 per hour during off-peak hours.

Wordperfect preps tools for 370 VM/CMS use

BY ALAN J. RYAN
CW STAFF

OREM, Utah — Wordperfect Corp. confirmed last week that it plans to introduce software for use on IBM 370 hardware running under VM/CMS during the first quarter of 1988.

While acknowledging limited demand for mainframe word processing, the company said it believes that porting key features from its current word processing products to large systems could tap a potential market for thousands of units.

"The 370 is not a machine that lends itself to full-blown word processing, but there are a lot of nice ways to use [the software on] the machine," said Pete Peterson, executive vice-president. "We're going to concentrate on file management and printing."

Doug Lloyd, executive director of large-account marketing, said, "Our indication is that most large companies are thinking of three environments: standalone personal computers, networks and also the host as a node off a network." With the software, "they can communicate in all three environments."

Wordperfect has been polling its customers about the need for a word processing text editor. "Six or nine months ago, the message we were getting from the customer base was we need software to compete with IBM's Displaywrite," Peterson said. "But now, the message we're getting is that people are not that excited about word processing on the 370."

For the first two quarters of 1987, the Wordperfect family held approximately 22% of the dollar share and 20% of the market share for word processing package sales through computer specialty stores, according to IMS America Ltd.'s "The National Computer Retail Report." Of the company's PC word processing sales, Peterson said, 80% to 85% are for IBM Personal Computers.

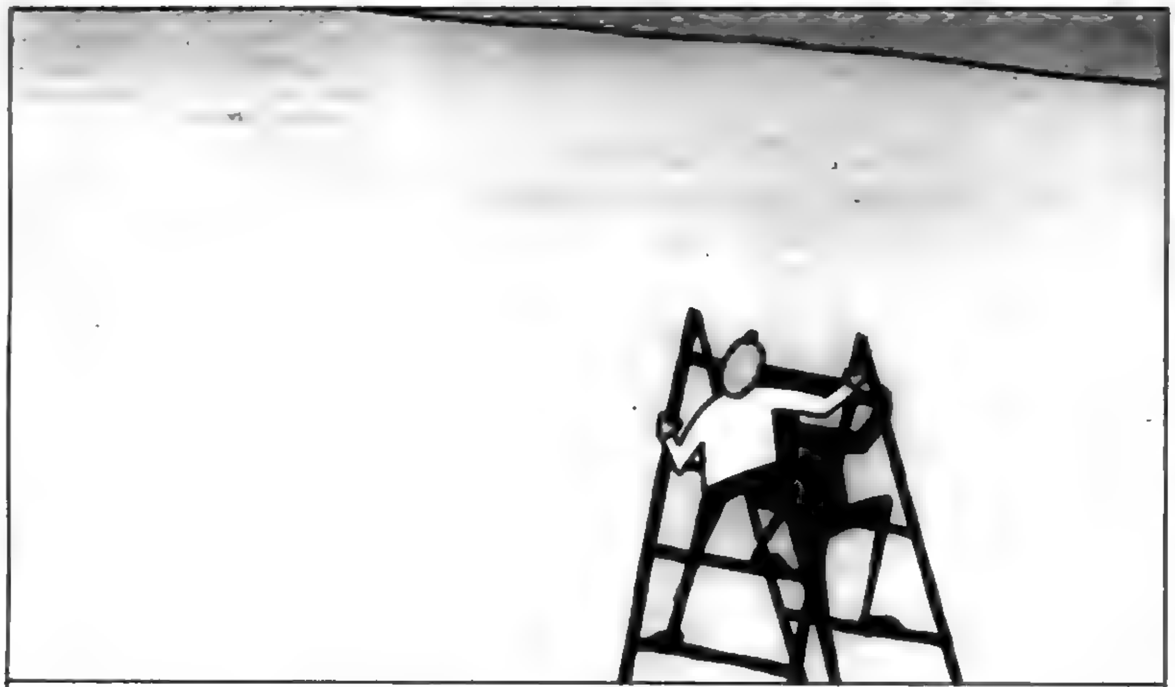
According to an internal Wordperfect newsletter, the first release of the new product, which may be called Wordperfect 370 Link or Wordperfect 370 File Management, will allow users to treat files on the mainframe as if they were files in any other directory. Also included will be a mainframe Wordperfect document file server and the ability to convert documents to and from the Wordperfect format.

Roy E. Folk, executive vice-president and general manager of the software products division at Ashton-Tate, said his firm believes it is important to interface with the most significant word processing tools, including IBM's Professional Office System (Profs) and Distributed Office Support System (Disoss) and others. "IBM has defined the Document Content Architecture that lays out the documents their machines will process," he said.

But a Wordperfect spokesman said one problem with the IBM interfaces is that they are not user-friendly. "We want the [Wordperfect] product to be friendlier to users than Disoss and Profs. Those tend to be cryptic in their command structure," said Dan Lunt, vice-president of marketing.

However, Wordperfect's philosophy is similar to IBM's in some ways, Lloyd said. "They are pushing PCs, rather than terminals, as the wave of the future because users get more functionality out of them. We're trying to optimize the host in the environment it has been designed for while utilizing the PCs."

Wordperfect software also runs on the Digital Equipment Corp. VAX under VMS and on Data General Corp. equipment under AOS and AOS/VS, Lunt said. He said a Unix version is scheduled to be released in the first quarter of 1988.



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DEC shows color ink-jet printers

MAYNARD, Mass. — Digital Equipment Corp. last week announced two low-priced color ink-jet desktop printers expected to substitute for more expensive plotters in many cases.

The new units were designed for use with DEC terminals connected to DEC VAX systems, DEC Vaxmate personal computers, DEC workstations and IBM Personal Computers.

The serial interface LJ250 printer and the parallel interface LJ252 unit list for $1,695. Key features include quiet operation, a weight of less than 10 lbs and a text printing speed of 167 char./sec.

According to product marketing manager Frits Riep, the new printers are well suited for business graphics and engineering and scientific operations. A typical application might be in defining brake drum temperatures by color, he said.

The devices print up to seven primary colors at 180 by 180 dot/in. resolution and up to 255 colors at 90 by 90 dot/in.

Riep said new optional software added by DEC enhances the output of existing applications and increases the flexibility of the printers. Called Retos, the host-resident software provides such graphics features as scaling and positioning.

The printers accept single sheets of paper, fanfold paper and transparencies.

Deliveries are scheduled for October, DEC said.

DEC VT320 late, but low price surprises

BY DAVID BRIGHT
CW STAFF

MAYNARD, Mass. — Answering competition in the ANSI text terminal market, Digital Equipment Corp. last week introduced a smaller, improved terminal priced 31% less than the popular VT220 model it replaced.

The announcement of the VT320 came at least four months later than expected, according to analysts, who had generally anticipated that DEC would introduce the terminal at last April's debut of the VT330 and VT340 graphics terminals. But the sharp price reduction from $795 to $545 was surprising to some observers.

"Nobody expected this," said Eileen O'Brien, who tracks the terminals market at International Data Corp., a Framingham, Mass.-based market research firm. "They're making a statement with this price. Some of the smaller companies cannot react to this."

VT220 a grizzled vet

DEC claims to have manufactured more than one million VT220 terminals. In 1986, with 165,000 units shipped, DEC commanded a 42% share of the ANSI text terminal market — double the share of second-place Wyse Technology — according to IDC.

But O'Brien called the VT320 a "catch-up product" because many vendors, such as Wyse, Hewlett-Packard Co. and Televideo Systems, Inc., are already selling terminals that offer a similar set of features. Product marketing manager Ralph Pecora would not explain why the product was late, merely stating that the VT320 development was on a "separate program" than the VT330 and VT340.

Scheduled for October availability, the VT320 includes a 14-in., antiglare, flat-surfaced screen said to provide higher resolution and better readability than the VT220's 12-in. screen.

When purchased with a system, the VT320 will be priced at $495. In quantities of 100, the unit price falls to $475. An international version of the terminal, with a bigger power supply and an RS-232 port, will be available for $595.

To satisfy existing contract requirements, DEC will sell the VT220 through June 1988.

FTS 2000 delayed — again

BY MITCH BETTS
CW STAFF

WASHINGTON, D.C. — Under intense pressure from Congress, the U.S. General Services Administration (GSA) last week amended its proposal for a $4.5 billion intercity voice and data network and extended the bidding deadline until Sept. 30.

The action, the third delay in the Federal Telecommunications System (FTS) 2000 procurement, was prompted by a new round of criticism from members of Congress and the General Accounting Office (GAO) that the government could be locked into a single vendor for the 10-year duration of the contract [CW, Aug. 10].

Sen. John Glenn (D-Ohio), chairman of the Senate Committee on Governmental Affairs, released a GAO report that faulted GSA management and its winner-take-all approach to the program.

The GSA responded by amending its request-for-proposals document to explicitly provide an escape clause allowing the government to use other vendors after the GSA reaches the guaranteed minimum expenditure of $450 million — a point estimated to be about four years into the contract.

The GSA gave bidders a month to reevaluate the procurement in light of the amendment.

One on one

The FTS 2000 competition is down to two bidding teams, one led by AT&T and Boeing Computer Services Co. and the other led by Martin Marietta Corp. and MCI Communications Corp. A third bidding team dropped out earlier this year due to the regulatory uncertainties and delays.

Martin Marietta, which has threatened to withdraw from the competition if major changes are made in the contract, is reviewing the latest amendment, a spokesman said. He added that the Bethesda, Md.-based firm is also trying to evaluate "whether this is likely to be the last delay."

An AT&T spokeswoman said the delay was a disappointment but that "Congress has raised some valid concerns, and we hope the 30 days provides an opportunity to resolve the issues and provide some stability to the procurement process."

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EDITORIAL

Reconstruction

Last week, *Computerworld* carried a front-page story that summarized the sweeping changes under way in the basic pricing structure of large systems software — changes initiated, for the most part, by IBM.

This week, on page one, we begin a two-part series that records other tremors emanating from deep within the very heart of the independent software market. The disturbances observed and their aftershocks are profoundly changing this market, which, for more than a decade, has seen one year of double-digit growth heaped atop another — until recently.

The good news, which part two of the series will show next week, is that the dynamics of this marketplace, driven by user demand, are reshaping some of the more venerable software companies. What's most intriguing is that these dynamics are driving companies like ADR, Cullinet and others back to the basics that made them successful in the first place.

The engine of so much of this change and of the problems the third-party market faces is IBM. This is somewhat ironic since the third-party market was born, went through adolescence and later thrived largely as a result of IBM's foibles in the software arena.

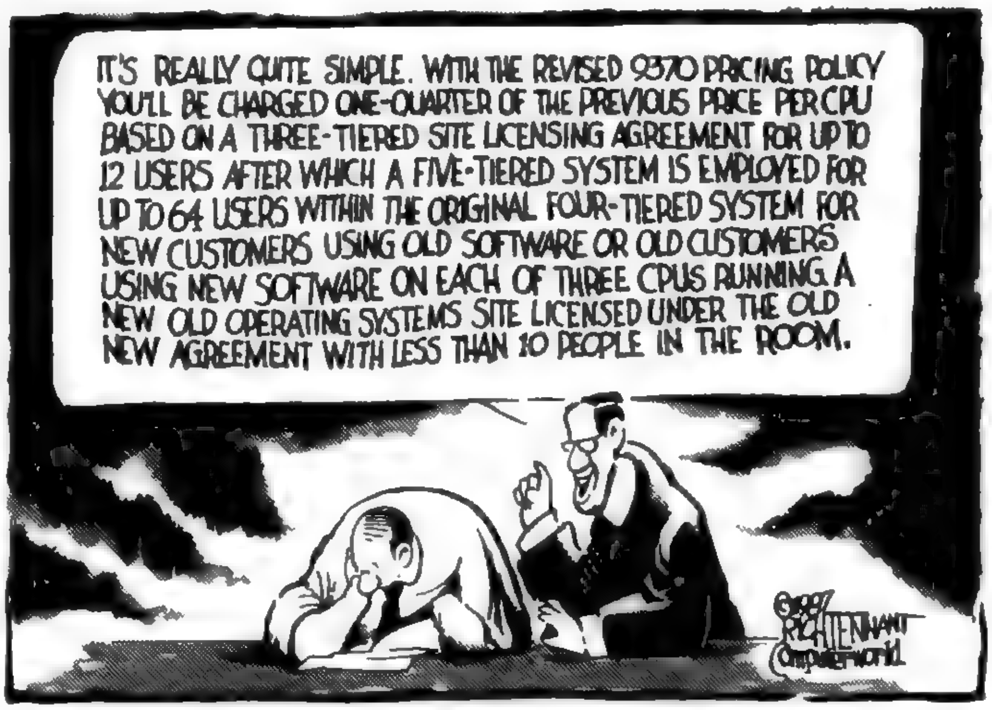
But all that has changed. IBM is playing for keeps in software. Witness the tenacity with which the company is attacking the data base market with DB2, tenacity that has caused some mainframe data base competitors' sales to plummet almost overnight.

So now many elements of the third-party software market find themselves in the difficult position of fighting rear-guard actions on the one hand — namely, struggling to prop up revenues with maintenance income from the installed base — while hammering out strategies to penetrate new markets. This situation has sent many firms on the acquisition trail and has ushered in a new generation of younger and more aggressive company managers. According to one estimate, four in 10 top management teams of the publicly traded software companies have been replaced in the last three years alone.

The revamped companies that actually succeed into the 1990s will be those that have learned the lessons of the past. Success will come to those that 1) do not underestimate IBM, 2) pay attention to customer needs and 3) understand there's more to life than mainframes.

The last two points are the most important. Increasingly, the traditional mainframe software firms are realizing that what their customers want is broad connectivity across a wide range of incompatible computer systems. IBM isn't likely to provide that, but the independents can.

Finally, mainframe software makers must again seize the reins of technical innovation. Advances in ease of use, communications, data integration and customer support are coming more and more from the microcomputing sector. The mainframe companies have the tools to compete. Now they must put them to work.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LETTERS TO THE EDITOR

Care and caution

After reading "Users give thumbs-up to 9370" [CW, July 27], I felt frustrated. While the article made it clear that there was a significant difference in performance between IBM's 4361 Model Group 5 and its 9370 Model 90, the statistics that were used did not quantify the difference.

I realize that benchmark results must be summarized, but this must be done with caution and insight. The only figures given were "percentage of CPU utilization," but this is valid for comparison only if a single factor, such as CPU or direct-access storage device (DASD), is changed. In this case, both CPU and DASD were changed, making the percentage of CPU utilization practically meaningless for the purpose of comparing the overall performance of these systems.

How much of the change in CPU utilization can be attributed to the DASD type used? How much faster did the test jobs actually run on the 9370? After reading the article, I still don't know for sure. Unfortunately, readers who did not ponder these questions may think they now know how much faster a 9370 is than a 4361.

John C. Ford
Software Developer
Davis, Thomas & Associates, Inc.
Minneapolis

Ignoring benefits

As president of Language Technology, a company whose fundamental business is helping MIS overcome "those maintenance blues," I must convey my disappointment in the Executive Report on code structuring [CW, June 29]. Unfortunately, and contrary to the article's apparent purpose, the report did nothing to advance a much needed understanding of how Cobol structuring tools are actually (and successfully) being used by hundreds of DP shops across the country.

Instead, the user roundtable was a superficial session among three individuals and a moderator who were "familiar" with structuring products, only one of whom had actually implemented and used a structuring product. Even that user did not represent a typical user, because he had only one choice in a vendor due to his former Burroughs Corp. hardware environment.

It is a shame that CW did not seek out a few of the many active structuring users when compiling the report. These users, who better represent today's head-out-of-the-sand trend toward implementing maintenance productivity tools, would have provided a much more useful and accurate view of how, when and why structuring tools are being used. What you would have found are companies that have solid productivity gains, short paybacks and return-on-investment results to report — firms that are benefiting from what is now tried-and-true technology available to all DP shops. One example is a user of our Recoder product who determined that a conservative 4% to 5% gain in programmer productivity would justify acquisition of a structuring tool. This user has experienced gains exceeding 20%.

CW has distinguished itself over the years by keeping MIS informed of important new ideas, trends and technologies. In the case of the "Those maintenance blues" report, however, you presented a viewpoint on structuring that did not reflect what is really going on in the industry today. I hope a follow-up piece based on the experience of the many MIS pros who can go beyond speculation and share some truly useful information and advice about Cobol structuring will be published.

William Engel
President
Chief Executive Officer
Language Technology
Salem, Mass.

This week in history

Aug. 29, 1977
An armed terrorist group in Milan, Italy, has singled out state and corporate computer centers as "instruments of the capitalistic system." The group has exploded bombs at 10 such facilities throughout the country in the last 10 months.

Aug. 30, 1982
The Senate passes a sweeping immigration bill that mandates development of a national identity system for employment purposes. Critics blast the move as the first step toward a totalitarian state.

Computerworld *welcomes comments from its readers. Letters may be edited for brevity and clarity and should be addressed to Bill Laberis, Editor,* Computerworld, *P.O. Box 9171, 375 Cochituate Road, Framingham, Mass. 01701.*

Building that same mousetrap better

MARTIN A. GOETZ

The Lotus Development Corp. vs. Paperback Software International suit is one of several cases currently before the U.S. lower courts dealing with the "look and feel" of software. The outcome of these cases is critical to the growth and competitiveness of the software products industry.

On the surface, the Lotus case appears to be limited to copyright law: Should a company using a different software program be permitted to copy the commands, functions and screen appearance of an existing program? I believe the issue is much broader. It involves competition in general and how U.S. laws can encourage or inhibit the free enterprise system.

Independent software companies have competed in the software products industry for many years using the existing U.S. copyright, patent, trade secret and antitrust laws to protect their interests. Their strategy was to build that better mousetrap and build it first.

> CAN a company build a better mousetrap by building an identical product more quickly and economically?

Today's industry software standards and entrenched software systems such as MVS, Unix, CICS, Cobol and 1-2-3 have changed that strategy. Companies now have shares of 50% or more in software market niches such as operating systems, data base management systems and spreadsheets. Also, IBM is fostering System Applications Architecture to make systems look similar and be compatible.

Most existing laws on competition were written years before the 1960s when software was first sold as a product. Today, companies producing software should be viewed as manufacturers. Terms such as maintenance, warranties, research, development, installation, training, value-added reseller and OEM are just as appropriate for a software company's product as for a manufacturer's mousetrap.

The Lotus case raises the following questions:

What guidelines should companies use when they compete in the open marketplace? Can a company build a better mousetrap by building an identical product more quickly and economically? Does the product have to look and operate differently? If Lotus wins its case, would it mean that a company could not build a competitive but identical CICS system or a competitive but identical MVS system?

A company's decision to make a product with similar or identical external characteristics is driven by whether the company is going after an existing or new market. The decision also depends on user needs and the de facto standards of that market.

For example, IBM has a monopoly on mainframe operating systems and transaction processing monitors. Undoubtedly, IBM users would welcome competition in these areas. Should a company be required to build a product competitive to MVS or CICS using different external characteristics? Better external characteristics can be built, but users demand compatibility.

Consider compatibility in the context of IBM and Microsoft Corp.'s recently announced OS/2 operating system. What if IBM and Microsoft stated that the 200-plus commands that provide the interface to OS/2 were proprietary to them? And what if users worked with these commands through interactive terminal screens? Does that mean a company would be prohibited from building a compatible system that is cheaper, more efficient or more reliable?

Fair and open competition has been the conerstone of the U.S. free enterprise system. Laissez-faire and "building the better mousetrap" have driven the entrepreneurial spirit of people throughout the free world. Building the same mousetrap more economically is in that same spirit.

But the question remains: Do U.S. copyright laws permit a software products company to build the identical mousetrap better or cheaper? This matter is the essence of the Lotus case and at least three others in the lower courts, Digital Communications Associates, Inc. vs. Softklone Distributing Corp.; Lotus vs. Mosaic Software, Inc.; and SAPC, Inc. vs. Lotus. All three cases involve the "look and feel" of software.

These cases may reach the Supreme Court before a final decision is made. Until then, confusion will reign.

Goetz is senior vice-president/chief technology officer of Applied Data Research, Inc. in Princeton, N.J. He holds the first patent for software, awarded in 1968.

Circling the corporate wagons

Considering whether an uneasy alliance of capitalist businesses will work

HARVEY NEWQUIST

American industry is consortium-happy.

U.S. corporate competitors are circling their wagons to fight off foreign competition. When it appears that we are on the brink of losing every vestige of leadership in a particular industrial arena, we form consortiums. Nowhere is this trend more evident than in computers and their related industries.

The most notable consortium is actually a corporation — Microcomputer Computer Corp. (MCC) in Austin, Texas. You've read enough about its woes and asperations here and in other places to probably not want to read much more about it at all. In fairness, though, MCC finally produced a commercial product this summer, introducing an expert system for designing semiconductors in conjunction with NCR Corp.

Backstabbers

As little as 10 years ago, consortiums might have been considered organizations in violation of antitrust and monopoly laws. Given the Reagan administration's hands-off attitude toward big business, however, companies that normally might stab each other in the back try to peacefully coexist in the name of higher ideals, namely the preservation of the American way.

The Software Productivity Consortium (SPC) was formed in 1985 by 12 aerospace companies under the direction of the U.S. military. Its purpose is to increase the efficiency of aerospace applications in three areas: reusable software, rapid software prototyping and knowledge-base systems.

The need for work in these areas results from the fact that the military's software system is on an efficiency par with its hammer purchasing system. At the time of the consortium's founding, software purchase, development and maintenance was projected to reach $25 billion by 1990. SPC was formed to look into rectifying this quagmire of computing costs.

Most of the major aerospace defense contractors joined SPC, and even if they don't succeed as a consortium, they get the chance to peek over each other's shoulders to see what their respective competition is up to.

Rome Air Development Center (RADC) formed the Rome Artificial Intelligence Consortium in 1985 to strengthen AI research in both universities and the military. Eight institutes of higher learning signed on with RADC to pursue various AI technologies and their possible development. Most of these schools are located in New York State, which brings up a significant point: Consortiums are not only good for America, they are good for the states, municipalities and towns that bid to have them located there.

Not all consortiums are such in the traditional sense. For instance, the Fort Worth Chamber of Commerce recently announced the formation of the Advanced Robotics Research Institute (ARRI). The institute is administered by the University of Texas at Arlington and specializes in applications of automated manufacturing systems utilizing methods such as robotics, AI, speech recognition, pattern analysis and related technologies.

BOB DAHM

The goal of ARRI is to spearhead American companies' immersion into these advanced technologies, something that its backers feel is necessary to revitalize U.S. industry. The founders should probably talk to Roger Smith at General Motors Corp. about that. He could tell them an interesting story about how throwing millions of dollars of advanced factory automation onto a factory floor doesn't necessarily create a better factory. Better management, on the other hand, successfully turned around one of GM's lowliest plants in northern California. But that's a different story.

So who are the participants in ARRI's consortium? There aren't any just yet. ARRI is counting on support from U.S. corporations to fund cooperative development projects. (Sounds a little like their neighbors over in Austin, doesn't it?). The institute's primary spokesman is not a renowned pioneer in the field of robotics — he's the mayor of Fort Worth, Texas.

Another even more interesting twist on the consortium approach is one recently undertaken by Artificial Intelligence Corp. The company has been one of the leading vendors of natural language interfaces for years and has decided to get into the expert system market.

This move, however, is not easy; it takes a lot of money to develop a new AI technology from scratch. So the company formed what it calls a "corporate consortium" of companies to invest in its research and development of a knowledge base management system for IBM mainframes. Each of the initial four companies are kicking in money. In return, the consortium will have first crack at trying the new system before it hits the market. It will also get six months of training on the system, plus credit toward future purchases. Artificial Intelligence Corp. is making this deal available to other companies in hopes of attracting more consortium members in the coming months.

Where does all this "consorting" get us? No one is quite sure yet. Still, it *is* hard to imagine groups of competitive companies getting together in any situation in which they would be willing to put the common good before the good of shareholders and the company itself.

However, consortiums seem here to stay — at least until they have to prove their worth by producing results.

Newquist writes and consults on artificial intelligence and other advanced high-technology topics from his office in Scottsdale, Ariz.

For reasons ranging from national security to bringing home the vision of Earth hanging silently in space, NASA remains committed to human space flight. The Unisys commitment to NASA is just as serious.

When the next Space Shuttle mission flies, NASA knows it will be handled by people who have experienced every aspect of space flight. Astronauts and ground controllers who were trained on NASA's Shuttle Mission Simulators, computer-driven by Unisys Defense Systems under contract to Rockwell International.

The three simulators give crews the chance not only to experience a shuttle flight, but to actually "fly" specific missions in real time.

The challenge with these dry runs is that the simulator software has to be changed for each mission. Every one of the thousands of internal systems, as well as views of the Earth and constellations are synthesized by two Unisys 1100 mainframes.

"Working side by side with the trainers on every mission profile is a mammoth task, but we've got it covered," says Nora Williams. "Over 700 Unisys Defense Systems people, all of them seasoned professionals, are on the job here full time at the Johnson Space Center.

"Of course, all these people aren't just watching the simulator. Unisys machines provide a good deal of NASA's computing power. There's a lot of coordination between Unisys and NASA. It's the power of ². It's what NASA expects from us. And it's what we expect from NASA."

Unisys and NASA. The power of ².

"It simulates the complexity, the feel, even the wonder of space flight."

Nora Gonzalez Williams,
Simulation Applications Manager, Unisys

UNISYS
The power of ²

SOFTWARE & SERVICES

SOFT TALK

Daniel R. O'Connell

Wait and see best tactic

Although relational data base management systems offer great flexibility and power for the user, they still have one major problem — performance. The larger the relation, the slower the response.

Because of the state of our current technology, many organizations are implementing "relational-like" data base systems or extracting data from conventional DBMSs such as IBM's IMS and importing limited amounts of the data into relational facilities.

In my opinion, there are inherent problems with both of these approaches. The benefits derived from relational-like systems as they exist today may fall far short of the cost incurred to convert to such systems. Although they provide greater flexibility than many older data base systems, they are built on the same technology. Problems such as broken chains, blown indexes and lost data are still apparent in many of these systems.

Perhaps a more severe problem is extraction of data from an older DBMS and importing the data into a relational system in limited amounts. This may have unexpected effects on the integrity and reduced redundancy of the data.

For example, I was once in-

Continued on page 24

Up, up and away: Costs hiked 40% since '84

BY ROSEMARY HAMILTON
CW STAFF

The average user will dole out nearly 40% more by the end of this year for software purchases than he did three years ago, according to a recent report by Culpepper and Associates, Inc. in Atlanta.

Culpepper's Software Pricing Trends survey indicates that the total cost of all components of a software purchase, including the software product and associated maintenance, support and training, is on the rise.

Culpepper, a consulting and market research firm, has conducted four pricing surveys since it started polling vendors in 1980.

Increasingly, vendors report that competitive pricing affects the final price tag that they put on a product. This year, vendors ranked a product's value to the customer as the No. 1 consideration when establishing a price. They ranked a competitor's pricing the second consideration.

The same order held true in the 1983 Culpepper survey, the most recent prior to this year's poll.

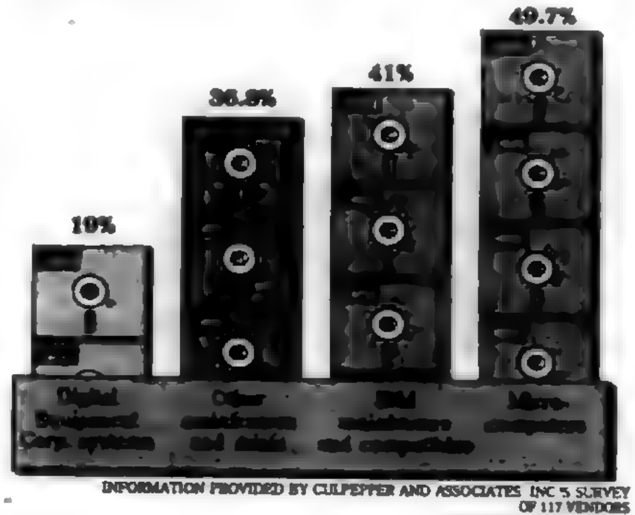
In 1983, however, when survey respondents were asked to rate pricing issues on a 0-5 scale, with 5 indicating the greatest importance, there was a 1.5-point spread between the ranking of value to customer and competitor's pricing. This year, the spread was reduced to 0.5.

Culpepper based its findings on a questionnaire sent to 1,200 software vendors earlier this year. From that group, 117 responded to a survey that covered

Continued on page 26

Software pricing

Average increase from 1984 to 1987 by hardware environment



INFORMATION PROVIDED BY CULPEPPER AND ASSOCIATES, INC.'S SURVEY OF 117 VENDORS
CW CHART: MITCHELL J. HAYES

Unisys hot on 4GL intros

Second debut in a month aims 4GL at B25s

BLUE BELL, Pa. — Unisys Corp. made its second fourth-generation language product announcement this month with the recent introduction of PDS-Adept, a program and data base generator intended for three different operating systems.

PDS-Adept is made by Parameter Driven Software, Inc. in Detroit. Unisys said it will market the product for its B25 workstations that run under Unisys's BTOS operating system as well as for Unix- and Microsoft Corp. MS-DOS-based systems.

Unisys has been marketing PDS-Adept to overseas users of equipment from the former Burroughs Corp. since last summer, the company added.

Early this month, Unisys introduced Ally, a fourth-generation language development and execution system that was designed for Unix- and MS-DOS-based systems. Ally does not run on B25 hardware, a company spokeswoman said.

Unisys said it will offer interface programs for PDS-Adept that will let programs developed in one environment, such as Unix, run in another PDS-Adept environment, such as BTOS.

PDS-Adept will cost $1,890 for a BTOS license, $2,600 for a Unix license and $595 for an MS-DOS license, Unisys said.

Currently, a program generator called Data Manager is available for BTOS-based systems. A spokeswoman said the generator is not sophisticated enough to be considered a fourth-generation language product.

MCBA adds to MRP II for the VAX

GLENDALE, Calif. — MCBA, Inc. recently added four modules to its Manufacturing Resource Planning (MRP II) system for the Digital Equipment Corp. VAX.

The latest release includes the core MRP II module, the company said. MRP II software is used to control the components used in manufacturing and when they are used, based on the company's production schedule. The introduction of MCBA's MRP II module comes after the introduction of a number of other modules earlier this year.

MCBA's manufacturing software is intended for repetitive manufacturers and jobs shops. The packages, which range in price from $2,500 to $12,000, are available immediately, the vendor said.

In addition to the core package, MCBA released the Master Scheduling module, which, when used in conjunction with the MRP II module, provides a detailed master production schedule and allows users to perform "what-if" scheduling based on expected demand, the company said.

MCBA also rolled out a Job Costing package. It is said to al-

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Inside

- Sun to offer third-party CAD/CAM system on Sun-3, Sun-4. Page 26.
- Macro 4 adds VTAM session-management tool. Page 31.

Spotlight

It's 2 o'clock in the afternoon!
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Ada

FROM PAGE 1

where program managers seek waivers to avoid using it.

Ada is the DOD's standard language for use in embedded systems such as jet fighter navigation systems, but so many DOD program managers have obtained waivers to use other languages that this past spring, the Pentagon established stringent new rules to make it virtually impossible to get a waiver.

Donning civvies

Ada has progressed so slowly in the military environment that some observers say its real future lies in commercial MIS and factory automation markets.

"I predict that by 1990 the commercial use of Ada will far exceed military use of Ada, even in the U.S.," says Edward V. Berard, president of EVB Software Engineering, Inc., an Ada software and consulting firm in Frederick, Md.

Analysts warn that it is too early to call Ada a failure. Years ago, many computer scientists thought Ada would never get off the ground, but Ada is now in use in 37 military systems, and there are about 120 Ada compilers covering virtually all processors, including personal computers.

In addition, Ada is expected to be used in such high-profile projects as the Pentagon's Strategic Defense Initiative, the National Aeronautics and Space Administration's space station program and the Federal Aviation Administration's new air traffic control system.

The kind of systems that employ Ada can take eight years or more to build, so it is hard to gauge Ada's success in operation. "I think it's a little early to judge the overall efficacy of the language. The results aren't in," says William Suydam, editor of the "Ada Data" newsletter, published by International Resource Development, Inc. in Norwalk, Conn.

But Suydam says Ada will never reach the high expectations of its early backers. "The Ada old-timers really thought the language was going to make all the difference in the world, as if it was magic. It's not magic. It's a computer language, a very complex computer language," he says.

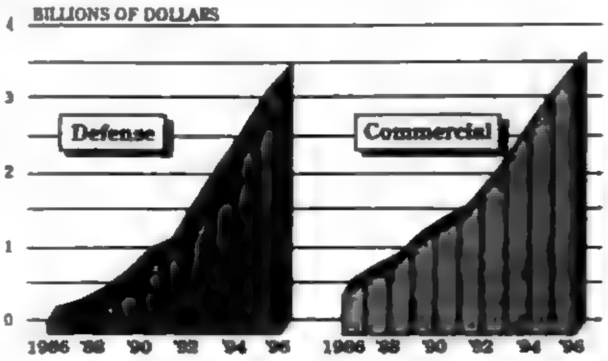
The DOD developed Ada and its software engineering environment in the 1970s in hopes of curtailing the proliferation of special-purpose languages and cutting its skyrocketing costs for software development and maintenance.

The resulting language, widely regarded as elegant and complex, is touted as being portable, readable, easily maintainable, reliable, adept at parallel processing and modular, so that packages or blocks of code can be reused.

On the other hand, critics say Ada is intrinsically unsuited for embedded systems and real-time processing because it produces code that is too bulky and slow. In response, Pentagon officials point to several systems, including the F-20 Tigershark fighter plane, that have demonstrated Ada's successful use in real-time applications.

Prospects for Ada

Ada markets are not likely to take off until the mid-1990s



INFORMATION PROVIDED BY INTERNATIONAL RESOURCE DEVELOPMENT, INC.
CW CHART

Directive issued

In June 1983 the Pentagon issued a directive that made Ada the standard computer programming language for mission-critical systems, but by most accounts, the directive was not strictly enforced.

"The DOD seems to be able simultaneously to commit to Ada and to avoid using it in actual applications," says Kenneth G. Bosomworth, president of International Resource Development, a market research firm.

Originally, the DOD allowed program managers to get waivers from the Ada mandate if they had already started using another language. But Bosomworth says that in the last few years there has been a tendency to find excuses to avoid using Ada and that the excuses have gotten less and less plausible.

So many waivers to the directive were granted that on April 2 the Pentagon issued DOD Directive 3405.1 with stringent provisions intended to make it extremely difficult to get a waiver.

"Ada is, in fact, being rammed down their throats," Bosomworth says, referring to the top-down imposition of the language.

Analysts say mid-level program managers in the DOD resisted Ada for a variety of reasons, including the fear that using an unproven language would increase the risk of their projects going over budget or behind schedule.

For one thing, the Ada language system is a drastic departure from the life-cycle software development methodology that DOD managers have become accustomed to using. "Ada takes a good many shortcuts through this life-cycle software development path," says Andrew J. Ventre, president of Computrol Corp., a software engineering firm in Huntsville, Ala.

"It's not just a decision about whether to use a new language but a decision to embrace a new philosophy of software development," Ventre says.

In addition, mid-level DOD managers have complained about the lack of production-quality Ada compilers. Although compilers must be run through a suite of some 2,500 tests to ensure they meet the Ada standard, the validation tests do not evaluate performance quality.

Compiler quality

At the moment, some Ada compilers are slow but produce high-quality code, while others are very robust but produce low-quality code, a compiler expert says. "There aren't very many compilers at all that have combined usability and code quality," says Tucker Taft, technical director at Intermetrics, Inc., a Cambridge, Mass.-based systems software house with military contracts.

Taft and other analysts say the problem with code quality is not inherent with Ada but that better optimizing compilers will require a huge financial investment by the Pentagon.

While there are probably no bug-free compilers, the Ada compilers are improving. "We're entering the age of production-quality compilers in Ada," Suydam declares. "Right now, I'd say you can buy really good compilers for [Digital Equipment Corp.'s] VAX," he adds.

Suydam predicts that Directive 3405.1, which firmly establishes Ada as the standard language for all weapons systems, will produce a turnaround in the military's resistance to Ada. "I see people suddenly taking Ada more seriously now," he says, reflecting the view of other observers.

Furthermore, the DOD's Ada Joint Program Office (AJPO) is taking some steps to improve Ada's fortunes:

- The AJPO has issued a contract to develop tests that evaluate the performance of Ada compilers in specific applications.
- An AJPO task force is developing minor revisions to the Ada standard, for implementation in the 1990s, to ensure that it works as effectively as possible.
- In September the DOD will begin to dole out about $20 million in research contracts for Ada development tools.
- In a crackdown on "counterfeit" compilers — those that falsely claim to be validated by the AJPO — the office is issuing certification stickers to vendors of validated Ada compilers.

The DOD also issued a directive this year requiring the military services to use Ada for all new data processing systems, such as accounting and payroll systems.

Suydam says DP systems have the same need to save on design and maintenance costs as embedded systems. "The difference is that Ada technology is really much further along for the data processing people," because today's compilers are good enough for traditional data processing tasks, he adds.

But cracking the commercial MIS world will be no easy task for Ada, mostly because Cobol is entrenched there.

"Unlike the European banking community, U.S. financial MIS shops are firmly attached to Cobol, which shows no signs of conveniently disappearing," IDC's Burris says. "Unless IBM leads the way, no U.S. bank will board the Ada train."

Burris says Ada is most likely to be used in process-control applications requiring heavy real-time processing, such as those in the oil industry, manufacturing and commercial avionics.

Commercial applications

Already the Commercial Ada Users Working Group has identified several commercial applications of Ada, including major banks in Finland, a seismic data program at Shell Oil Co., the development of a new airplane by Boeing Commercial Airplane Co. and a stock quote service at Reuters Ltd.

The users group, formed in July 1986, aims to provide accurate information to help corporate managers make decisions about Ada as well as encourage vendors to provide products that meet the needs of commercial users, according to David M. Dikel, chairman of the group and director of Washington, D.C., operations for Addamax Corp. in Tysons Corner, Va. The group is part of the Association of Computing Machinery's Special Interest Group on Ada (Sigada).

"Remember that Cobol was developed by the DOD," consultant Ventre says. "To the best of my knowledge, Cobol is not used in any embedded system, but it is the most widely used programming language for business. Maybe Ada, if there's any success in its future, will be used more in the commercial environment than in the military environment."

Ada milestones

① **1974 to 1976** — Department of Defense officials discussed adoption of a common programming language. DOD formed the High-Order Language Working Group to develop the specifications.

② **1977 to 1979** — DOD held a design competition for a language to meet the specifications. Competition won by the CII-Honeywell, Inc.-Compagnie des Machines Bull team, led by Jean Ichbiah of France. Language named "Ada" after Lady Augusta Ada Byron (1815-1852), considered to be the first programmer.

③ **1980** — Ada design finished and published as a military standard (MIL-STD-1815). DOD's Ada Joint Program Office formed.

④ **1983 to 1984** — Ada became an American National Standards Institute standard (ANSI/MIL-STD-1815A-1983). DOD Directive 5000.31 made Ada the standard language for DOD mission-critical systems.

⑤ **1985** — Ada selected for use in NASA's space station program and the FAA's new air traffic control system. Ada cited as a Federal Information Processing Standard.

⑥ **March to April, 1987** — International Standards Organization adopts Ada as a standard. DOD Directives 3405.1 and 3405.2 require the use of Ada for all new weapons systems and DOD data processing systems.

CW CHART; MITCHELL J. HAYES

What will be Ada's legacy?

Researchers predict that the Ada market will take off sometime in the mid-1990s. But by then, Ada may be an outdated language, overtaken by new developments in software engineering or replaced by a new language, according to several Ada observers.

"It is entirely possible that by the time the Department of Defense finally gets around to implementing Ada . . . it will be a prior-generation language," says Ken Bosomworth, president of International Resource Development, Inc.

Given the history of computer languages, Bosomworth says, it is very possible that in about 1995, the DOD will initiate development of a new "Son of Ada" language.

Moreover, while the DOD strictly regulates Ada's development, the next five years will give rise to new computer-aided software engineering (CASE) technologies for more established computer languages. "These developments could obviate the commercial, and perhaps even the military, need for Ada," says Peter Burris, an analyst at International Data Corp. "The Ada train may ultimately arrive in Edsel land."

Ada is remarkable for the fact that software engineering played a central role in its development, Burris acknowledges. "There was so much excitement about Ada . . . but it's still 1970s technology, and it's still controlled by the DOD, which means it will be slow to change," he says.

Edward Berard, president of EVB Software Engineering, Inc. in Frederick, Md., argues that Ada will not be replaced by new software engineering technology but will accelerate those developments. For example, he says, CASE packages will be more useful if they are written in Ada, a portable language with reusable blocks of code. "Ada's a tool kit. It was created because we have all this good, modern software engineering technology and we need a language to deliver it," he adds.

William Suydam, editor of the "Ada Data" newsletter, asserts that Ada is a clear improvement in software engineering over C and Fortran and may prove more adaptable than its critics suggest. However, he adds, "I personally doubt that 25 to 35 years from now, Ada will be the language of choice — it may be something derived from Ada."

Ada may have a small role in MIS software development centers of the future, particularly for parallel processing systems, just as LISP had a role in developing commercial expert systems, according to Gig Graham, software program director at the Gartner Group, Inc., a research firm in Stamford, Conn.

"Ada provides a glimpse of the future," Graham says. "Existing languages will evolve, not as elegantly but nearly as effectively, to do what Ada demonstrates can be done."

MITCH BETTS

Cullinet ships CASE tool geared to data base design

WESTWOOD, Mass. — Cullinet Software, Inc. last week began shipping the latest version of its computer-aided software engineering (CASE) tool and said that the next release of the CASE product will be out in October.

Version 3.0 of Auto-Mate Plus, a personal computer-based package intended for the development of mainframe systems, includes features for data base design, the company said.

Auto-Mate Plus was originally designed by Learmonth Burchett Management Systems, Inc. in London. Cullinet acquired rights to the source code last year and has since been working to bring it into the Cullinet IDMS/R data base management system fold. With the October release, the product reportedly will be renamed IDMS/Architect. That release will be more fully integrated with the Cullinet DBMS, the company said.

Version 3.0 is said to allow users to automatically create a physical data base design. It can then generate a Bachman Schema Diagram from its physical data base structure.

The Bachman Schema Diagram is used by data base designers to determine where the data is located in a data base.

It is named after Charles Bachman, one of the original developers of IDMS, which Cullinet acquired from B. F. Goodrich Co. in 1973.

From the Bachman diagram, the system generates an IDMS/R data definition language syntax that can be used to describe what the data base will look like, Cullinet said.

The company said the latest version includes a text transfer utility that uploads schema syntax to the mainframe.

Version 3.0, which runs on IBM Personal Computer AT-class machines, has a license fee of $8,000. The previous release, Auto-Mate Plus Version 2.5, also costs $8,000 and was introduced in April.

Users can upgrade based on their maintenance agreement with Cullinet. For example, a single-unit renewal fee is 12% of the total cost under some contracts, the company said.

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Tactic

CONTINUED FROM PAGE 21

volved in the establishment of a corporate information center. The center's system ran under IBM's VM/SP operating system and included IBM's ADRS, ADRS/Business Graphics, APL and APL Data Interface (a bridge to get information from APL or DOS/VSE into ADRS). The basic data was stored under IBM's DOS/VSE within the DL/1 data base system.

> BECAUSE OF THE state of our current technology, many organizations are implementing "relational-like" data base systems or extracting data from conventional DBMSs and importing limited amounts of the data into relational facilities.

Aim of center

The purpose of the information center was to allow management to access frequently requested data and to manipulate data with the relational tools supplied by this IBM information center software.

The theory behind this approach is to reduce the programming burden on information services and to improve service to the users. After installation, it was soon apparent that the programming burden was not decreased and may have increased as a result of various types of extraction programs necessary to copy the data from DL/1 into a form usable by ADRS. The integrity of the data suffered at times. It was now a manual effort to ensure the following:

- The appropriate extraction program was run successfully.
- The DOS/VSE work file created by the extraction program was successfully copied into ADRS.

It was quite possible for the extract program to abend, leaving a partial file to be imported into ADRS.

Keeping integrity intact

I believe that whenever integrity is removed from the controlling software, problems will occur. While the data resided in DL/1, the integrity could be assured because of the software control.

However, the work file used as a bridge between DL/1 and ADRS has no built-in control and is at the mercy of the programmer and computer operator.

To a limited degree, security became a problem. Security facilities built into DL/1 and CICS do not apply to the ADRS work spaces. Separate security facilities under VM must be used, thus requiring a dual effort from those technical personnel responsible.

No room at the disk?

Disk space was a major concern. If large amounts of data were extracted from DL/1, then large amounts of disk space were required for the DOS/VSE work file, APL Data Interface file and ADRS work space.

When extracting limited data in a manner similar to that described, it is necessary for all users to fully understand that modifications to the data residing in their own relations will not be reflected in the DBMS that originally stored the data. The bridge from the original DBMS is a one-way connection in most [illegible]

Data imported into a relation from an extract program must be data that is not dynamic in nature. On-line modifications to the original DBMS from on-line facilities such as CICS will not be restricted in the relations. If the changes are to be incorporated into the relational-like data base system, then the entire load procedure must be repeated.

What I feel is needed is a true relational DBMS capable of supporting massive processing. Until it is clear that relational systems can provide this, a wait-and-see approach is needed on data base replacement decisions. And relational-like systems will only serve the needs of users for a short time.

O'Connell is assistant professor of computer science at the State University of New York at Fredonia and a consultant.

MCBA

CONTINUED FROM PAGE 21

low users to keep track of costs of a job, including parts and labor. Users are able to compare actual costs with what they had predicted, which can be a method of detecting problem areas if differences show up between real and expected costs, the company said.

Finally, MCBA introduced a Standard Product Routing program that is used to provide a trace of all the operations, tools and processes used to make a particular product. Data from this module can be incorporated in bills of labor, MCBA added.

The MRP core package ranges in price from $6,000 to $12,000, depending on the DEC hardware. Master Scheduling starts at $4,500. Entry price for Job Costing is $4,000, and the low-end price of Standard Product Routing is $2,500.

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Costs

CONTINUED FROM PAGE 21

cost issues and asked for the vendors' plans regarding discounting and concessions to customers. Respondents came from the mainframe, minicomputer and microcomputer software markets and included such companies as Cincom Systems, Inc., Software AG of North America, Inc., Relational Technology, Inc., VM Software, Inc. and SPSS, Inc.

Based on the software companies' responses, users have paid an average annual increase of 8.4% for software products since 1983, showing a 38.4% increase in a three-year span.

Further, vendors reported that they expect to increase prices by an average of 6.1% by the end of this year. But Culpepper noted that earlier surveys showed that the predicted increases supplied by vendors are conservative and said this year's increase is expected to top 6.1%.

Users who made purchases in the system control and development category — operating systems, programming languages, data bases and applications generators — experienced a much steeper increase than average. Since 1983, the average price increase for these products has more than doubled. The average cost of system control and development products this year is $65,700, a 63.5% increase from 1983, the survey found.

Meanwhile, the smallest increase occurred in the cross-industry systems category, which covers applications software — such as general ledger, decision support, human resources and word processing — used in a variety of industries. Since 1983, these prices have increased an average of 25.6%. This year, the average purchase price for cross-industry applications is $79,600.

Actually, vendors from the integrated systems category, made up of value-added resellers, reported only a 4% increase in prices during the last three years. However, that reflects, in part, the lower costs of hardware, Culpepper reported.

Across-the-board hikes

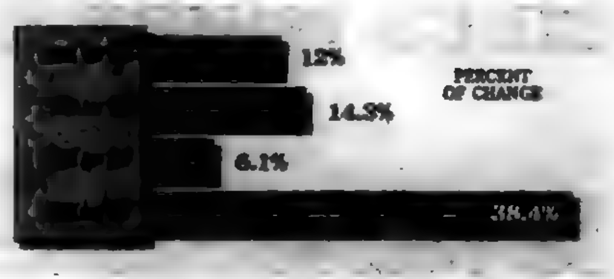
The three remaining categories — microcomputer software, vertical market software and system operation and utility software — all showed substantial increases, with micro software coming in above the overall average increase at 49.7%.

System operation and utility software was also higher than average at 44.5%, while vertical market software showed a smaller increase of 27.1%.

Beyond price increases, vendors reported increases in maintenance and support charges. They said the average annual maintenance charge was almost 15% of a total license fee, up from 12.2% in 1983.

Software pricing

Average increase from 1984 to 1987



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Sun markets CAD/CAE tool

MOUNTAIN VIEW, Calif. — Sun Microsystems, Inc. said recently it will offer a computer-aided design and engineering (CAD/CAE) system from The MacNeal-Schwendler Corp. on Sun-3 and Sun-4 computers.

Under the agreement, Los Angeles-based MacNeal-Schwendler's MSC/Nastran finite-element software will become one of the third-party CAD/CAE products Sun offers for its line of technical workstations.

The large-scale, general-purpose digital computer program reportedly will be designed to take advantage of the advanced floating-point performance of the Sun-4 and will offer up to 128M bytes of memory.

Finite-element use

MSC/Nastran is used by designers and engineers to test the strength and dynamic response of structures and products. Using the finite-element method, the program analyzes material and geometric nonlinearity, heat transfer, acoustics and electromagnetism.

MacNeal-Schwendler currently sells the package on a variety of high-performance computers from companies such as Cray Research, Inc., IBM, Digital Equipment Corp. and Apollo Computer, Inc.

Applications include problem solving in the automotive, aerospace and heavy manufacturing industries.

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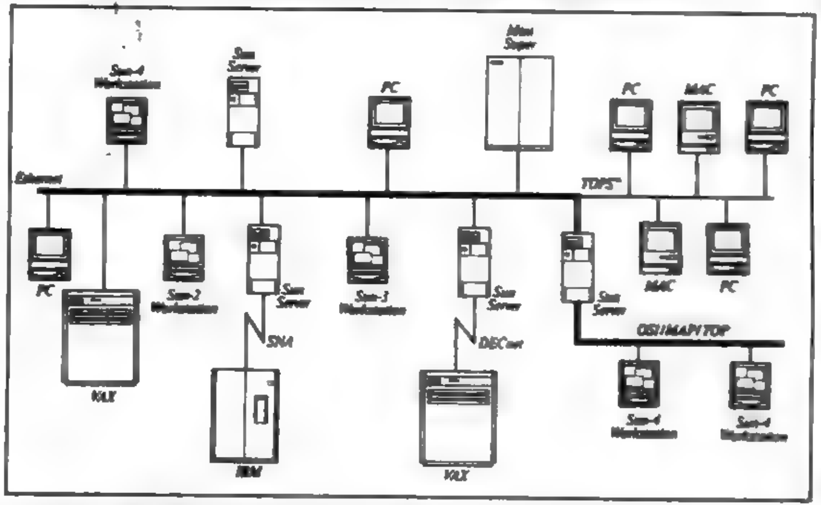

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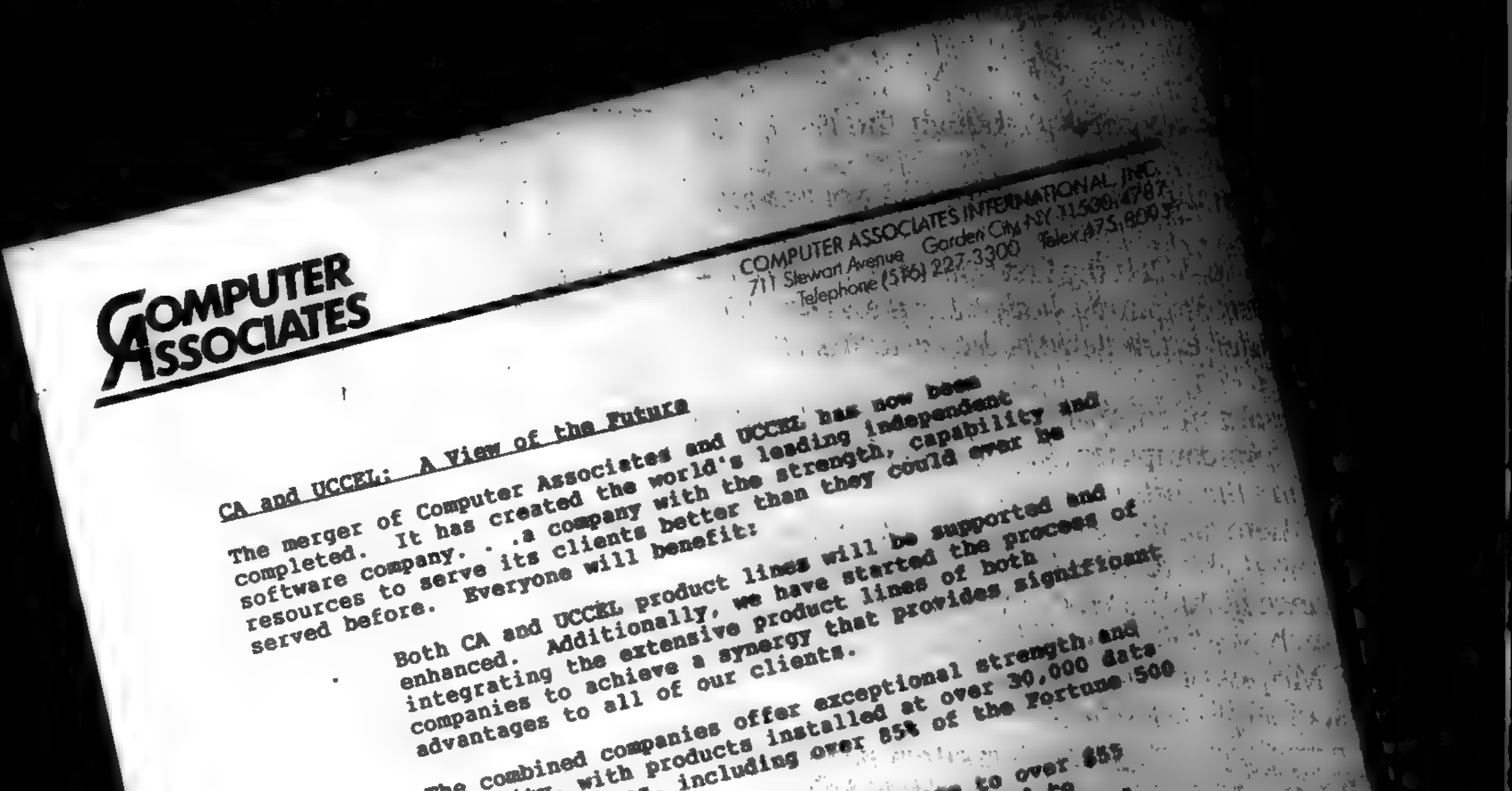

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NEW PRODUCTS

Systems software

Software designed to provide IBM VTAM session management in multiple on-line environments has been announced by **Macro 4, Inc.**

Tubes/VTAM is said to provide all logged-on users with a means of accessing all applications needed in a VTAM environment. Each Tubes/VTAM user may be allowed concurrent access of up to 24 applications.

Tubes/VTAM can be configured to automatically pass input to an application when the session with it is initiated or going to be terminated.

Tubes/VTAM is available on a one- or two-year lease for from $400 per month.

Macro 4, Brookside Plaza, Mount Freedom, N.J. 07970.

Applications packages

A user-defined electronic resource management scheduling calender has been announced by **Cradle Technologies** for use on IBM's System/36 and Personal Computer and compatibles.

The Scheduler, written under an open architecture philosophy, allows the user to schedule people or items in a variety of increments. Schedule conflicts are highlighted, the vendor said, and scheduling periods can extend to the year 2100.

The Scheduler/36 costs $239. The Scheduler/PC costs $119.

Cradle Technologies, 12266 W. Holt Ave., Milwaukee, Wis. 53227.

Languages

A compiler for IBM's System/36 assembly language, the **Ressemble/36**, has been announced by **Kisco Information Systems.**

Ressemble/36 provides access to all privileged superior areas in main memory and on disk, including the print spool, job queue and the list of active users and jobs.

The compiler includes a subroutine library with standard routines to access tape and diskette devices. Assembler source code for all subroutines is also provided.

Ressemble/36 is available for a one-time license fee of $600.

Kisco Information Systems, 120 Beverly Road, Mount Kisco, N.Y. 10549.

Utilities

An enhanced version of **Costar**, an interactive software cost-estimation tool based on the Constructive Cost Model, has been announced by **Softstar Systems.**

Version 1.21 runs on any Digital Equipment Corp. VAX/VMS system or IBM Personal Computer.

It is said to allow users to make preliminary estimates during a project's initial definition, then produce more and more accurate forecasts as the project's definition is refined.

The VMS version of Costar costs $1,500. The PC version costs $800.

Softstar Systems, 28 Ponemah Road, Amherst, N.H. 03031.

Development tools

Goal Systems International, Inc. has added two options to its Classical/AL on-line applications development system.

The **Classical/AL DL/1 Access** and **Classical/AL IMS Access** offer programmers high-level access to DL/1 and IMS hierarchical data base management systems.

According to the vendor, the options allow users with little knowledge of data base structure to access DL/1 and IMS with the same verbs and framework used to access IBM's VSAM.

The Classical/AL DL/1 and IMS options cost $5,000 for DOS and IBM's VSE. The Classical/AL system costs $35,000 for DOS/VSE and $44,800 for IBM's OS/MVS.

Goal Systems, 5455 N. High St., Columbus, Ohio 43214.

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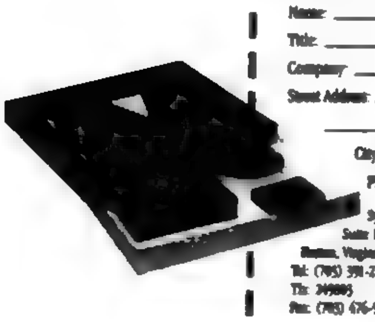

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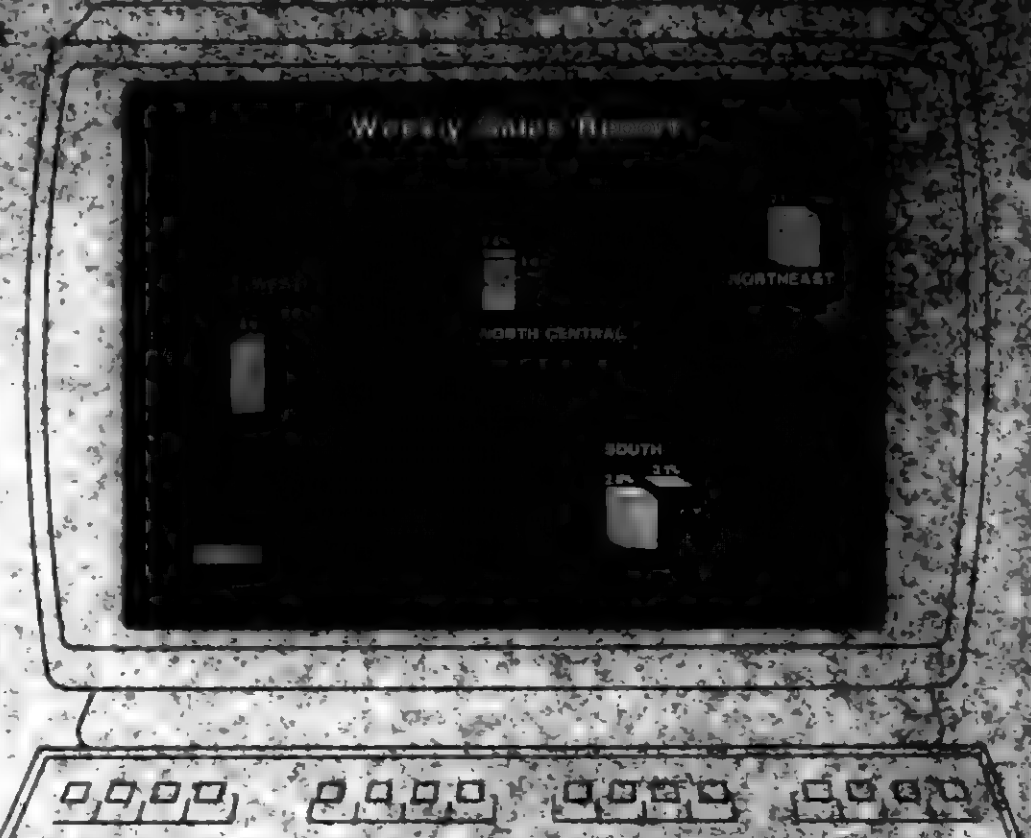

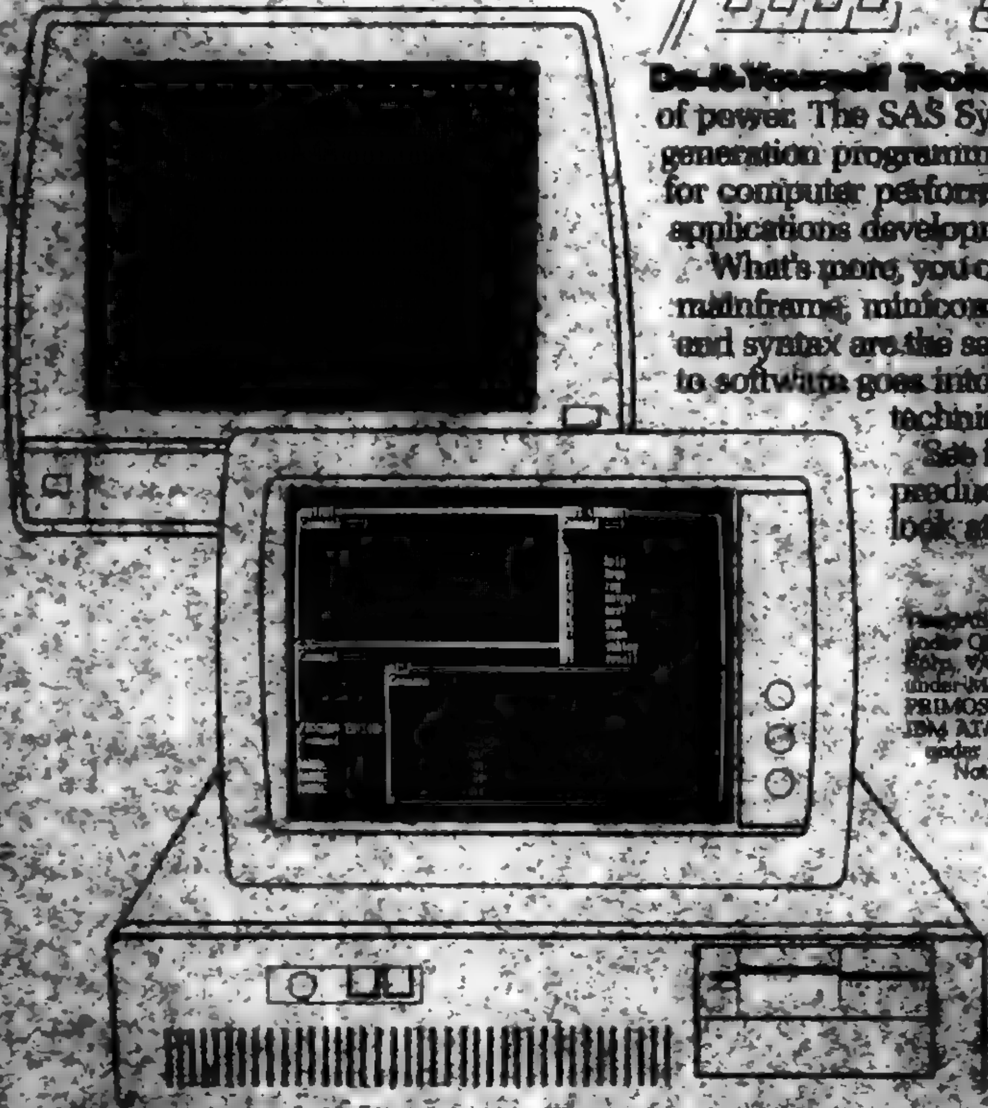

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MICROCOMPUTING

SMALL TALK

William Zachmann

The price is right

Once I lived next door to a large, quietly elegant house owned by an older gentleman who had graduated from Harvard University in the 1930s. I remember him commenting once that he preferred not to shop at Brooks Brothers. "I simply see no reason," he said, "to pay $12 for a shirt and then another $12 for the label."

That seemed as sensible then as it does now. It also goes a long way toward explaining why I welcome products like Dell Computer Corp.'s PC's Limited 386-16. Here is a quality-built, high-performance personal computer based on a 16-MHz 32-bit Intel Corp. 80386 microprocessor at a price that carriage trade brands charge for 12- or even 10-MHz Intel 80286-based systems.

But for some reason, Dell's press materials concentrate on the PC's Limited 386's list prices relative to competitive 386-based products like Compaq Computer Corp.'s Deskpro 386 (about $2,000 more than the PC's Limited product) and

Continued on page 36

PS/2 models in competition

BY JAMES A. MARTIN
CW STAFF

The advent of multifunction boards for IBM's Personal System/2s may make IBM's low-end PS/2 Model 50 machine a potential competitor to the more expensive Model 60 for single-user applications, users and board makers said recently.

The add-ins may also sidetrack IBM's intent to gear the Models 50 and 60 toward separate, distinct markets.

The differences between the basic configurations of the models are hard-disk capacity, memory expansion limits, the number of expansion slots and at least $1,700.

However, using expansion boards that are set to become available this year, users can erase all but the expansion slot disparities, turning a Model 50 into a Model 60 for several hundred dollars less, vendors said.

While IBM claimed the Model 60's random-access memory (RAM) can be expanded to 15M bytes while the Model 50 is limited to 7M bytes, board makers said that is not so.

Cumulus Corp., a start-up company in Cleveland, recently introduced a multifunction card that is capable of adding up to 8M bytes to the Models 50 and

Continued on page 36

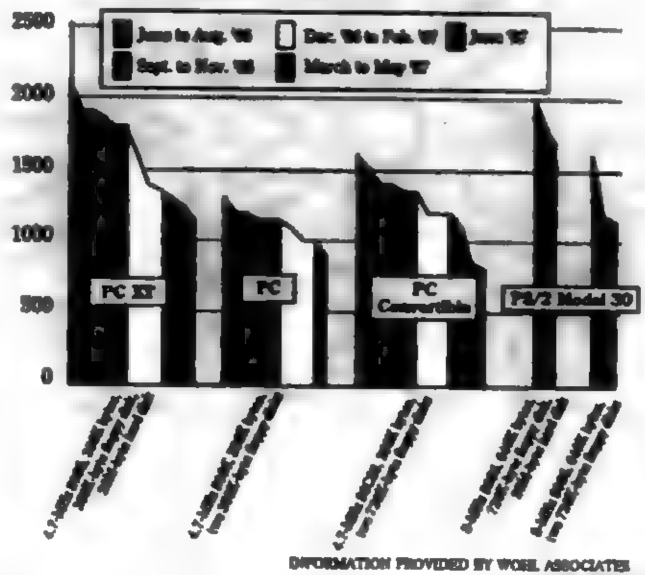
Inside

- Owl International plans an upgrade that allows its Microsoft MS-DOS-based Guide to read files from Apple's Hypercard. Page 38.
- Psion, Inc. introduces a hand-held computer that provides desktop PC features. Page 39.

Data View

Retailers' discounted microcomputer prices

Prices for Intel Corp. 8088- and 8086-based IBM Personal Computer and Personal System/2 families



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CW CHART

Ex-software evangelist peels back Apple's skin

Apple Computer, Inc.'s ebullient "software evangelist" Guy Kawasaki resigned from the company in April, after helping create a third-party software industry responsible for an installed base of some 2,500 Apple Macintosh programs.

As founder and president of Acius, Inc., Kawasaki is now a third-party developer for the Macintosh, the very product he nurtured as director of product software management at Apple.

Kawasaki recently spoke with *Computerworld* West Coast correspondent Julie Pitta about Apple's evolution and challenges and about his new baby, Acius, which recently began shipping 4th Dimension, a relational data base manager.

Acius's Kawasaki

How does Apple develop software without risking its relationship with third parties?

It cannot, and that's why Claris [Apple's independent software company] is a good thing. Anytime Apple does any software, it risks its relationship with its developers. It's just much better that Claris publishes it than anyone else.

Describe Acius's first product, 4th Dimension.

4th Dimension is a high-end relational data base for the Macintosh. The keys to it all are that it has a programming language in it: an [Apple] Macdraw-like, object-oriented graphics editor.

It's an open-architecture data base in the sense that you can write routines in other languages and import them into 4th Dimension. In addition, it's a multiuser data base, and we will

Continued on page 38

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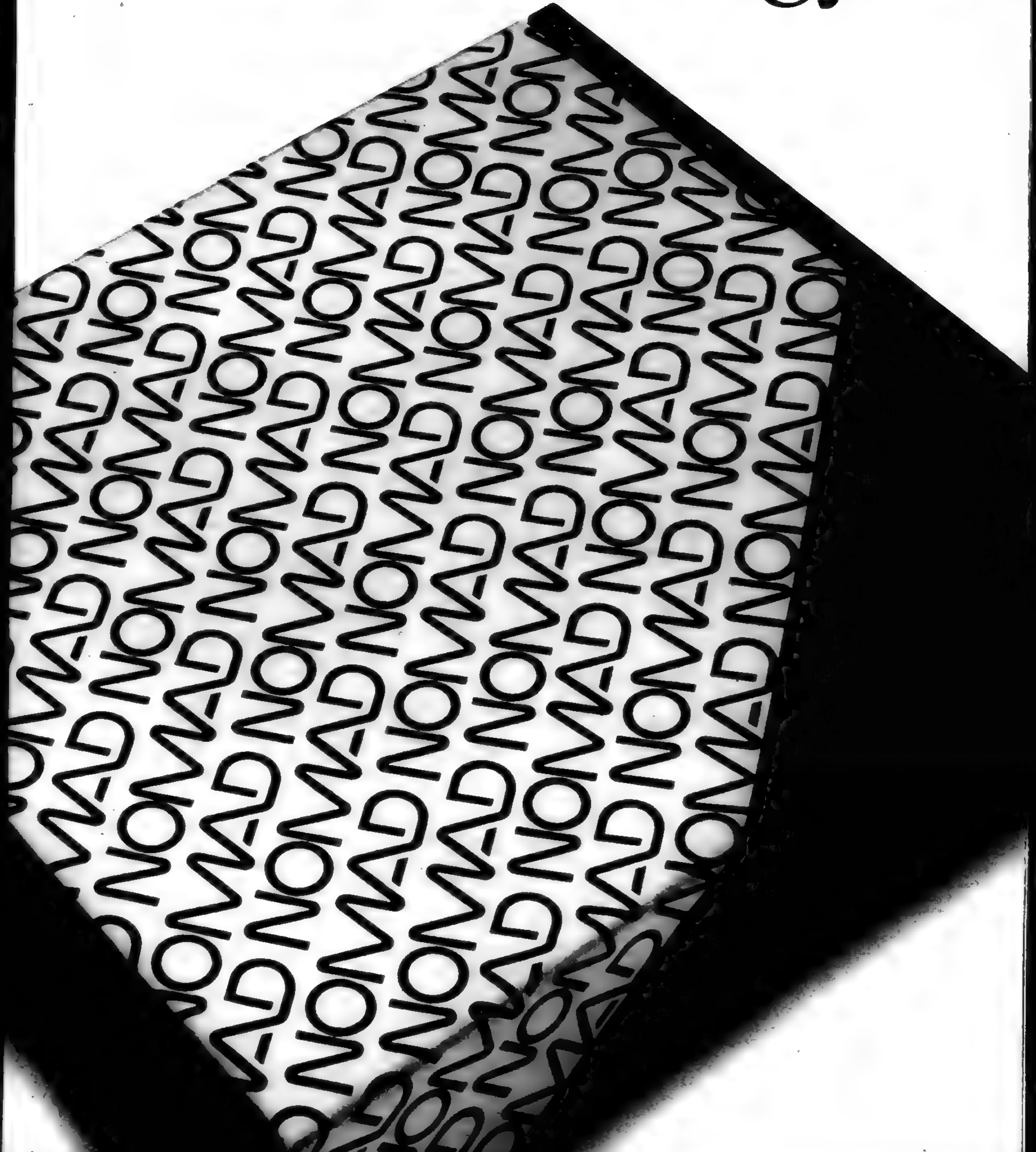

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Models

CONTINUED FROM PAGE 33

60. The Model 50 could support two Cumulus cards, totaling 17M bytes of memory, President Martin Alpert said.

"The reason IBM said 7M bytes is the maximum is because they only offer a 2M-byte card and the machine has only three slots, so for an IBM solution, the ceiling would be 7M bytes," Alpert said.

Engineers at Quadram Corp. in Norcross, Ga., have also run 16M bytes of RAM on the Model 50, said Clint Cowan, PS/2 product manager. "Our engineers say it can be done, so we're designing enhancement products that can add a total of 16M bytes on both machines," he said.

Although the Model 50 and 60 share many features, the Model 50 has only three expansion slots, compared with the Model 60's seven slots. In addition, the Model 50 is equipped with only a 20M-byte hard disk drive. The Model 60 is available in 44M- and 70M-byte hard-disk configurations with access times roughly half that of the Model 50's drive.

"The major shortcoming of the Model 50 is the hard-disk capacity," said Norm De Witt, a microcomputer analyst for Dataquest, Inc. in San Jose, Calif.

"The biggest criticism I have of the Model 50 is the 20M-byte hard disk," said John Robinson, manager of corporate information systems for Cox Enterprises, Inc. "But the Model 50 is small, and, in most cases, the three slots are enough."

In the hard-disk arena, Plus Development Corp. in Milpitas, Calif., is expected to release a version of its Hardcard storage expansion board for IBM's Micro Channel in three to nine months.

But there are disadvantage to adding higher capacity hard disks and other features to a Model 50 in hopes of constructing a lower cost Model 60. The Model 50's retail price is $3,595 but is often discounted by $1,000. The 44M-byte Model 60 retails for $5,295 and often sells for $4,250, while the 70M-byte version retails for $6,295 and can be purchased for around $5,000 in some markets.

A Plus Development Hardcard retails for $795 but can be purchased for between $500 and $600. Memory expansion cards run from $300 to $1,000.

Price

CONTINUED FROM PAGE 33

IBM's Personal System/2 Model 80 (about $3,000 more). Having spent several weeks putting this PC through its paces, there isn't much doubt where I'd prefer to put my money.

The PC's Limited 386 is a zero- to one-wait state system using static random-access memory (RAM) instead of the more common dynamic RAM, which is used in products like IBM's, Static RAM does not require periodic refresh signals like those that interrupt even block data transfers on the PS/2's Micro Channel architecture.

The PC's Limited 386's performance with comparable software should equal or exceed that of the PS/2 Model 80-041 and Model 80-071 at a price below that of the much slower 286-based Model 60. The PC's Limited 386 racks up an impressive 18.4 performance index relative to an IBM Personal Computer XT on the Norton index.

The base configuration of the PC's Limited 386 includes 1M byte of static RAM, a 1.2M-byte floppy disk drive, two serial ports, one parallel port, a new IBM-style enhanced 101-key keyboard and seven slots (five available).

Configurations range from a monochrome system (including display and adapter) with a 28-msec average access time 41M-byte hard drive for $4,499 to an IBM Enhanced Graphics Adapter (EGA) system with an 18-msec 150M-byte hard drive, which lists for $6,499. The EGA system with a 28-msec 70M-byte hard drive that I've tested lists for $5,399. By comparison, a PS/2 Model 60 with a 10-MHz 286 microprocessor and a 40M-byte 40-msec hard drive lists for exactly $104 less without a monitor.

"Let's Make a Deal"

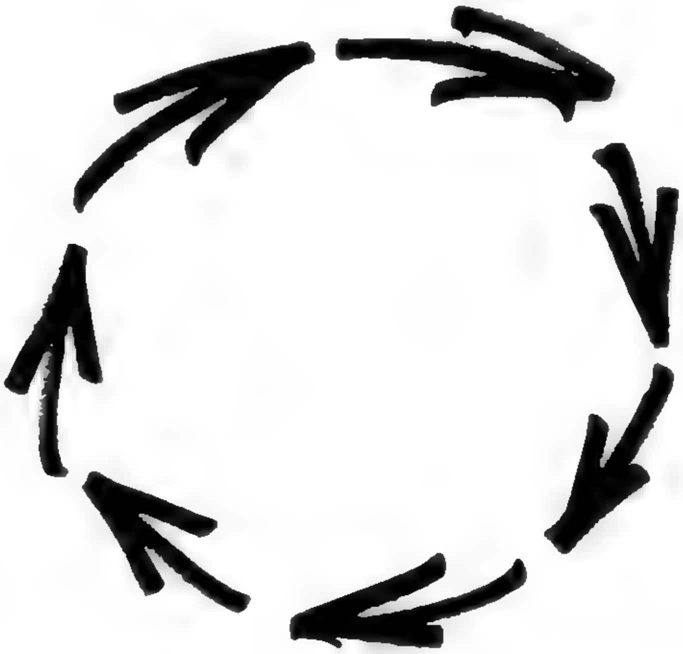
You can, of course, get substantial discounts from IBM's list price, but corporate buyers interested in quantity can play "Let's Make a Deal" with Dell just as easily as they can with IBM or with any other vendor that is serious about competing in the PC market.

The evaluation unit I tested had some problems with a bad backup battery. I deliberately bypassed Dell's public relations people and, working through Dell's technical support, had no trouble getting a replacement. Their support was certainly better than what I have received from larger, better known vendors.

In addition, I found that while my Microsoft Corp. MS OS/2 prerelease version built for the IBM PC AT seems to work all right in protected mode on the PC's Limited 386, there seems to be a problem running real-mode Microsoft MS-DOS 3.0 and higher emulation. I suspect there may be a conflict between MS OS/2 and the built-in (in read-only memory) system setup routine in the PC's Limited 386. The Dell folks in Austin, Texas, assure me, however, that they will offer a licensed version of MS OS/2 Standard Edition.

While the PC's Limited 386 may not appeal to the carriage trade buyer the way better known brands do, for people like my former neighbor and me, it's a great way to concentrate on the shirt and avoid paying for the label.

Zachmann is vice-president of research at International Data Corp.



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Owl version to offer read access to Hypercard files

BY ALAN J. RYAN
CW STAFF

BELLEVUE, Wash. — By year's end, Owl International, Inc. plans to release a new version of its Microsoft Corp. MS-DOS-based Guide hypertext program that will allow MS-DOS Guide to read files from Apple Computer, Inc.'s new Hypercard.

Guide is a hypertext system for both the Macintosh and the IBM Personal Computer that is similar to Apple's Hypercard, a package that allows users to integrate text, graphics and video.

With Guide, users can manage text and graphics through electronic documents and live areas on the screen called buttons.

Users can organize information graphically, and Guide files can be accessed while the computer is running another program.

The yet-to-be-introduced enhanced version of Guide for MS-DOS, code-named William Tell, will include a hook that will allow Guide to read Hypercard, according to Barb Landis, Owl International's sales manager.

"But we're not promising that [version] until toward the end of the year," she said. The current version for MS-DOS sells for $199, and the Macintosh version sells for $134.

Additionally, the upgrade will include a serial hook that will allow Guide to interface with any external device that can be attached through a serial port, Landis added.

While Apple's Hypercard requires 1M byte of random-access memory (RAM), the Owl hypertext offerings require only 100K bytes of RAM.

The upgraded version will feature a fourth command button that will reportedly allow users to create links between Guide files and files in other programs. For instance, Landis explained, a user could click on a name in Guide and have it go to a Windows spreadsheet application. "The user can jump from program to program," and Guide will return to the point of departure from the other program, she said.

Out since fall

The original version of Guide for the Macintosh was introduced last fall, Landis said. In June, Owl released a version of the program for the IBM PC AT and Personal System/2 that sells for $199.95.

Steven Erde, a physician and a technical director at Cornell University's Medical School, is currently working with Guide for the Macintosh. The medical school was also a beta-test site for Hypercard.

With Guide, Erde said Cornell will be teaching medical school classes, in part, through the computer. The information learned by students in the first and second years of classes is being put on-line, so a student can sit at the Macintosh and read his way through lectures.

At any point, the student can click onto another portion of the information to get into a separate lesson. For instance, a student reading a lesson about the pathologic process can click to get a picture of the tumor or click to an explanation of the drugs used for treatment, Erde explained.

The Hypercard and Guide programs, Erde said, are very similar in function, but "the roots of the two programs are different." Guide uses hypertext, which he equated to a large mass with multiple connections of text and information.

Ex-evangelist

CONTINUED FROM PAGE 33

sell runtimes so that someone doesn't have to own the entire data base; you can buy a much cheaper runtime version.

We, in a sense, are entrenched in the Mac, while Ashton-Tate and other MS-DOS companies are just coming into it. It's David vs. Goliath, the Afghans vs. the Russians, the ability of a teen-ager to land in Red Square.

What will be the impact of Apple's Hypercard and Multifinder?

Multifinder is more important than Hypercard. Multifinder will change people's lives.

The ability to do multitasking on the Macintosh has been needed.

Hypercard is a good thing. It reinforces the belief that Mac users are in control of their personal computer while IBM PC users are controlled by theirs.

How has Apple changed?

Today's Apple is more process- and consensus-oriented than when I was there, which is a good thing. Previously, Apple was either very wrong or very right. Now it's much more controlled and analytical.

What is Apple's greatest challenge?

The greatest challenge that Apple faces is productizing their gadgets, which right now are Mac IIs, Mac SEs and Laserwriters. Now you need connectivity, data interchange, service and support. It's building a cocoon around what was once just great personal, stand-alone hardware.

What will it take for Apple to break into corporate America?

They're already there. It's a done deal. They're selling somewhere between 50,000 and 60,000 Macs a month. They're not going home to keep track of recipes.

But corporate America, in terms of the Fortune 500, is still a Big Blue world?

It's fraying around the edges. The announcement, but not the shipment, of the OS/2, and the fictionalization of OS/2 support by software developers, is a very big contributing factor. It's kind of ironic that in 1987, IBM's pushing ease of use and Apple's pushing power, when in 1984, Apple was pushing ease of use and IBM was pushing power.

What's the most important thing you learned at Apple?

I learned how important relationships are with third-party developers. That is what made Macintosh. That's something that I've tried to bring with me to Acius.

Another thing is what I learned about breaking rules. We had a saying that it's better to ask for forgiveness than permission. I epitomized that.

What's the biggest rule you broke at Apple?

Once I made a commitment for three-quarters of a million dollars to various developers, in total. I had a signature authority of $5,000. The finance person at the Mac division wanted to have me fired.

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MICROCOMPUTING

NEW PRODUCTS

Systems

A handheld computer said to provide all the features of a desktop personal computer has been announced by **Psion, Inc.**

The **Organiser II** features up to 320K bytes of on-board memory, built-in software, plug-in program packs, solid-state drives for storing information and loading programs, plug-in peripherals and links to office-bound systems.

According to the vendor, the Organiser II offers a calculator with 12-digit accuracy, 10 memories and full mathematical and scientific functions. It has a built-in clock/calendar that monitors and controls diary and alarm functions and a programming language that allows programs to be written and stored either in memory or on a program pack.

The Organiser II is priced from $159.95.

Psion, 320 Sylvan Lake Road, Watertown, Conn. 06795.

Software utilities

A menuing and file-management system that provides access to applications on IBM Personal Computer XTs, PC ATs and compatibles has been introduced by **Design Software, Inc.**

Called **DS Manager**, the non-memory-resident program creates a single environment in which users can select various applications from a main menu. The software also offers Microsoft Corp. MS-DOS function capabilities. Other features include file searching, a statistics capability, a menu editor, password protection and a use log.

Separate personalized desktop utilities, such as a calendar, a telephone list, a notepad and a calculator, can be configured for each user of a system.

DS Manager costs $79.95.

Design Software, 1275 W. Roosevelt Road, West Chicago, Ill. 60185.

Development tools

A 32-bit operating multiuser operating system designed for use with Intel Corp. 80386-based microcomputers has been announced by **Theos Software Corp.**

Theos 386 is said to support up to 128 users by running in the 80386 chip's protected mode. According to the vendor, it can physically address up to 4G bytes of memory with a virtual memory space of 64 terabytes. Other features, designed to offer compatibility with IBM's PC-DOS, Microsoft Corp.'s MS-DOS and Unix, include I/O redirection, command pipes and a hierarchical directory structure.

Theos also announced Theos C, a companion C compiler said to serve as a bridge to other operating systems.

Theos 386 costs $799. Theos C costs $599.

Theos Software, Suite 360, 1777 Botelho Drive, Walnut Creek, Calif. 94596.

Software enhancements

International Microsystems, Inc. has enhanced its labeling software program for IBM Personal Computers and compatibles to include bar code capabilities.

Labelmaker II provides support for the Code 39, UPC, Codabar and Interleaved 2 of 5 bar code types. The software features window menus. It is said to work with dot matrix printers and can print full-color labels. Supported data types include serial numbers, date, time and set size. Also, text strings, such as names and addresses, may be imported from another data base or mailing list program. Six font sizes are included.

Labelmaker II costs $395.

International Microsystems, 790 E. Arques Ave., Sunnyvale, Calif. 94086.

Data storage

Qualstar Corp. has introduced the **Ministreamer**, a nine-track reel-to-reel tape drive for Apple Computer, Inc. Macintosh personal computers.

The IBM- and ANSI-compatible drive offers an internal small computer systems interface (SCSI) controller. It handles both 1,600 and 3.2K bit/in. and up to 3,600 ft of tape. Reels can be moved from the Macintosh to IBM Personal Computers, minicomputers or mainframes without loss of data, the vendor said.

The Ministreamer costs $3,995. Macintosh SCSI tape-utility software costs $500.

Qualstar, 9621 Irondale Ave., Chatsworth, Calif. 91311.

Printers/Plotters/Peripherals

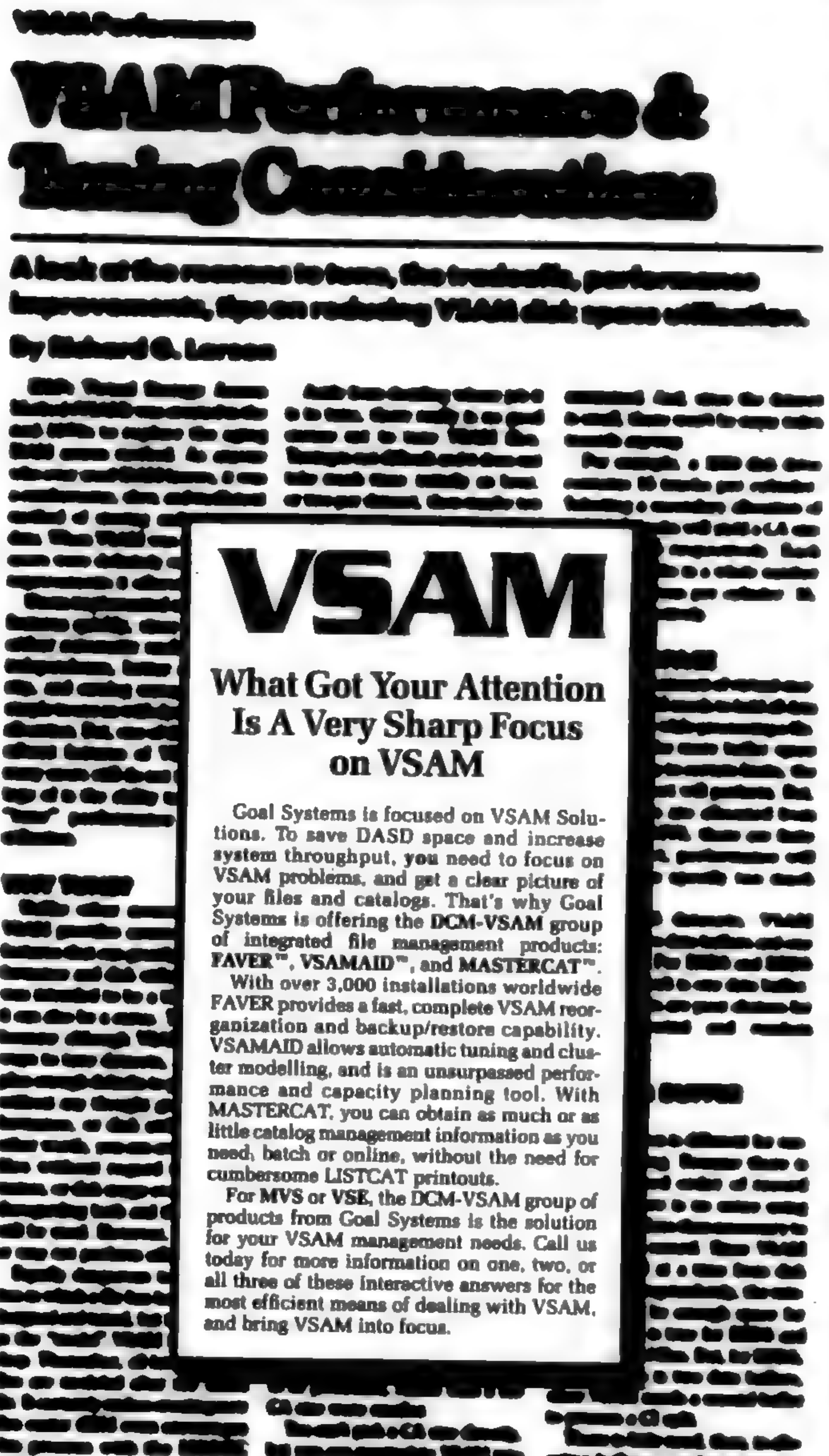
Panasonic Industrial Co.'s Computer Products Division has announced a 24-pin dot matrix printer and an 11 page/min laser printer.

The **KX-P1524** dot matrix printer features print speeds of 240 char./sec. in draft mode, 160 char./sec. in text mode and 80 char./sec. in letter-quality mode.

The **Laser Partner** has five built-in emulations, including Hewlett-Packard Co. Laserjet Plus and Epson FX-85. It offers face-down output.

The dot matrix printer costs $899. The laser printer costs $1,999.

Panasonic, 2 Panasonic Way, Secaucus, N.J. 07094.



VSAM Performance

VSAM Performance & Tuning Considerations

A look at the reasons to tune, the tradeoffs, performance improvements, tips on reducing VSAM disk space utilization.

By [illegible]

[illegible]

VSAM

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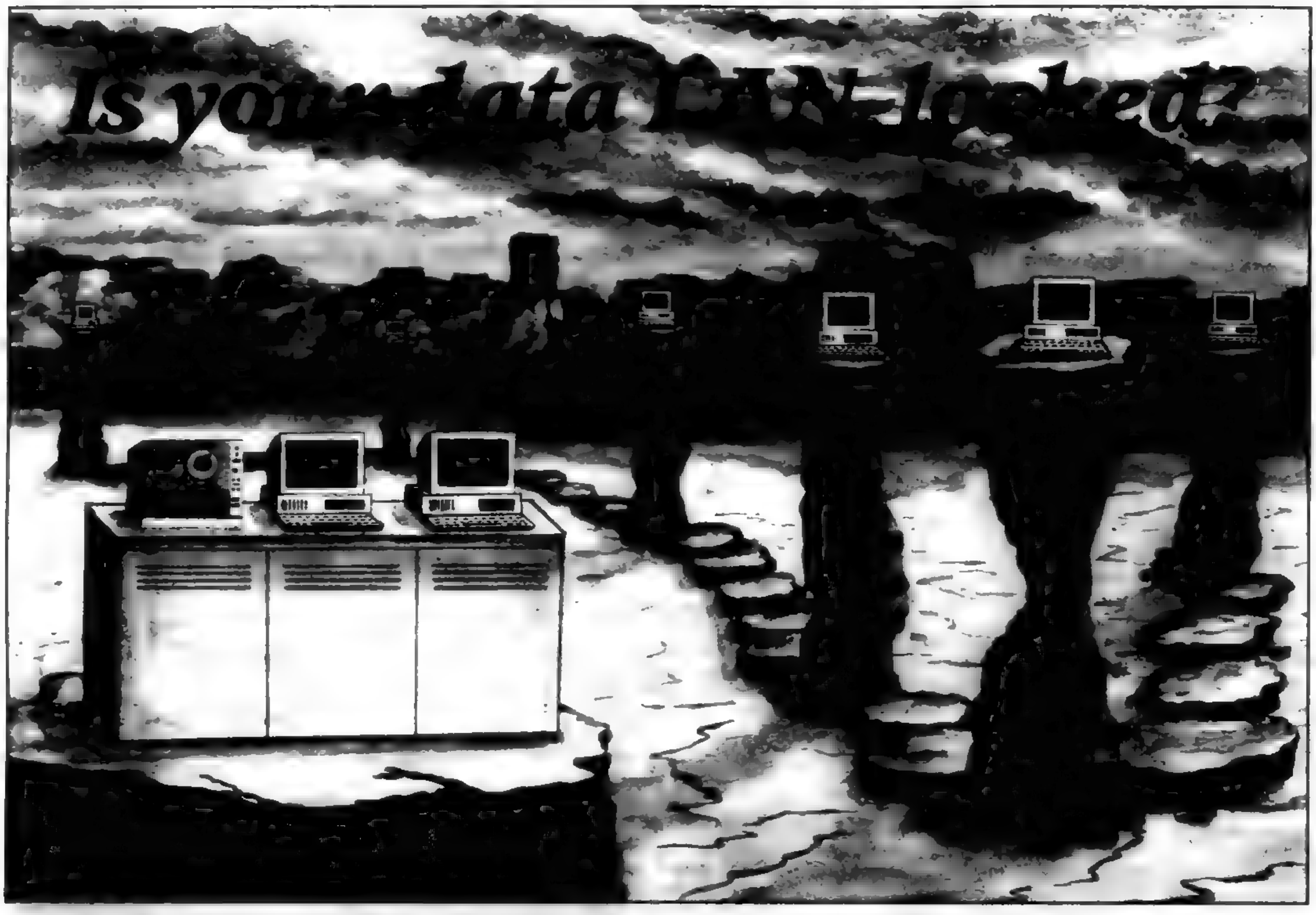
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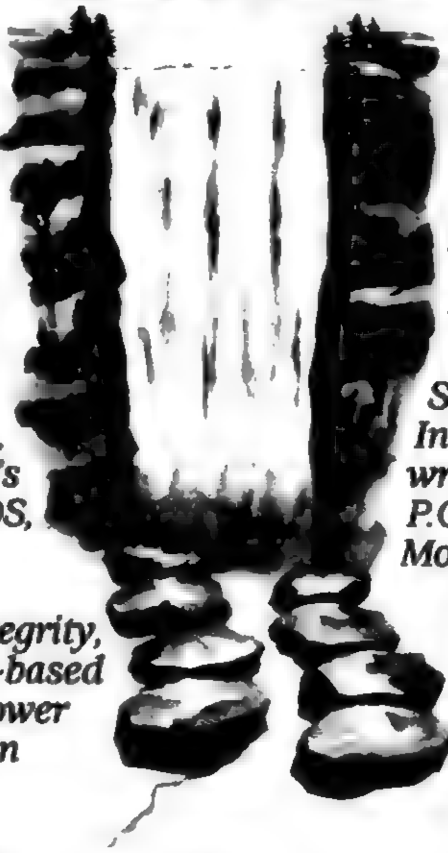

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NETWORKING

DATA STREAM

Patricia Keefe

3Com head shields blows

Fit to be tied. 3Com Corp. President Bill Krause is hopping mad over a report on Novell, Inc. written by Alex Brown & Sons that takes a couple of shots at 3Com. Krause had already gotten a number of calls concerning the report by the time we caught up with him at the recent Macworld Expo.

The report maintains that 3Com's 3+ network software has been losing market share, which has hurt 3Com's growth and profitability. "Absolutely untrue," Krause snapped. He claims the analyst is unfairly factoring in the sales of all Novell subsidiaries when comparing the growth of both companies. Also fueling Krause's ire is a statement in the report claiming that "early evaluations of the OS/2 redirector indicate that, while a significant improvement over DOS, the execution in a networking environment may still be unsatisfactory."

It's worth noting that Alex Brown is Novell's banker. Moreover, Novell is pretty miffed over what it claims are attempts by 3Com and Microsoft Corp. to spread untrue reports that it will not or can not develop file server software compatible with its MS OS/2.

Your server. Following 3Com's recent announcement that it will comarket and possibly resell Atlantic Microsystems' line of fault-tolerant file servers, look for Novell to announce price cuts on its own fault-tolerant family, System Fault Tolerance (SFT). A spokeswoman claims Novell planned the cost reductions prior to 3Com's announcement. Oh. It will be interesting to see whether a 3Com fault-tolerant product featuring server mirroring will speed up the release of Novell's own server-mirroring product, SFT Level III.

Tying up the loose ends. The strategic alliances continue to pile up in Utah. Novell will

Continued on page 45

Much ado about nothing?

Ungermann-Bass, analysts square off over firm's management changes

BY PATRICIA KEEFE
CW STAFF

ANALYSIS

The resignation two weeks ago of a key member of Ungermann-Bass, Inc.'s management triumvirate has some analysts concerned that the general-purpose networking vendor might drift into a holding pattern while struggling to resolve management woes.

Company officials disagree, pointing to the latest change in operations structure as yet another example of Ungermann-Bass's ability to respond quickly and decisively to problems. Cofounder and Chief Executive Officer Ralph Ungermann also had some scathing comments for financial analysts who he said are "talking down" the company simply because it has not performed according to their expectations.

Fueling this squabble is the recent snowballing of management and marketing problems that have caused a number of network vendors to stumble in the past 12 months, compounded by the more recent second organizational restructuring in just over a year at Ungermann-Bass.

Just 13 months after joining the company, Chief Financial Officer Robert K. Dahl resigned, reportedly in frustration over the limited success of Ungermann's three-member management team, according to analysts who spoke with Dahl.

Other members of that management team were Ungermann and Joe Shoendorf, who headed up the company's joint venture with General Motors Corp., the industrial networking group.

Dahl was concerned that the company lacked a clear line of authority, according to Richard Kimball, an analyst with Montgomery Securities. The decision-making process became too cumbersome, said Cecilia Brancato, an analyst with Oppenheimer & Co.

Dahl, who is credited by analysts and a company spokesman with implementing numerous cost-control measures, expressed concern over recent reports alleging political strife at Ungermann. "Those reports are not true," he said, adding that the changes were first discussed in March.

Remolding

Ungermann said he, Dahl and the board of directors agreed that it was necessary to reshape the company into a single operating entity. "We had a number of independent business units and a management committee managing those units, and it definitely was not as cost-effective as we wanted it to be," Ungermann said.

Having dissolved the committee, "We further agreed that the best thing to do was for me to take that role [of chief operating officer]," he added. At that point, Dahl decided "maybe something else made better sense in his career," Ungermann said, stressing that Dahl was not forced out. "He'll stay on the board and work with the company as a consultant."

At issue here isn't so much whether internal political strife exists at Ungermann-Bass, but whether Ralph Ungermann, who is generally perceived as the engineering force behind the company, can also handle the management chores. Analysts tend to doubt it, while Ungermann says he has done it all before.

"Ralph should become chairman and delegate running the company to people with operations experience," Kimball said. Analysts fear Ungermann is taking on more than he can handle. Meanwhile, the company could stagnate while competitors, such as rival Bridge Communications, Inc., race onward.

Analysts also maintain that the company has been marginally profitable over the last four quarters and is implementing a new management structure at a time when Bridge is close to doubling its size.

Continued on page 45

Low-end switcher joins fray

CALABASAS, Calif. — Addressing the increasingly competitive low-end packet-switching market, Protocol Computers, Inc. last week introduced Smartnet 3700, a 16-port switching device said to include a range of features, such as configurable software.

With prices beginning at $6,400 for a six-port version, Smartnet 3700 is intended to fill a gap in the firm's low-end CCITT X.25 product line.

Protocol Computers is a subsidiary of Telematics International, Inc.

The 3700 is compatible with the company's other Smartnet packet switches and packet assembler/disassemblers (PAD).

The introduction comes on the heels of Tymnet, McDonnell Douglas Network Systems Co.'s announcement two weeks ago that it is developing a low-end

Continued on page 44

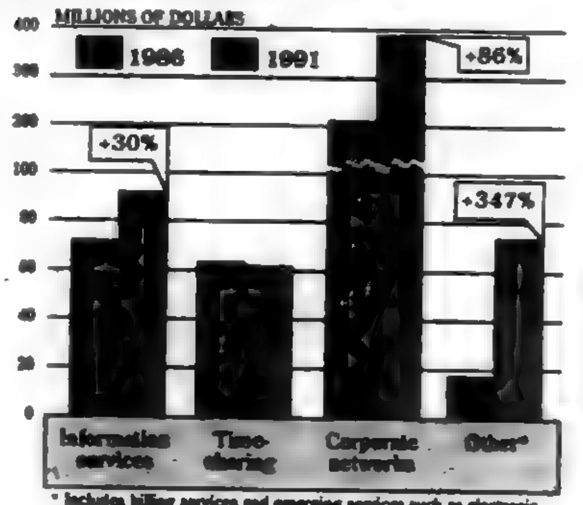
Inside

- Novell gives nets running Netware access to asynchronous resources. Page 48.
- Dual Enterprises device gives full-definition picture of RS-232C lines. Page 48.

VAN clan starts corporate, vertical market move

Value-added networks

Market segment forecast of revenue and percentage change predicts future lies in corporate networks and relatively new services



* Includes billing services and emerging services such as electronic data interchange, credit authorization, electronic payments, electronic markets and data bases.

INFORMATION PROVIDED BY LINK RESOURCES, INC./INTERNATIONAL DATA CORP.
CW CHART

BY ELISABETH HORWITT
CW STAFF

Although value-added networks (VANs) have traditionally been used as inexpensive pipelines to information and time-sharing services, VAN suppliers have recently begun to concentrate their marketing and development efforts on supplying corporate networking needs as well as applications for vertical markets, according to a recent report by Link Resources, Inc./International Data Corp. (see chart at left).

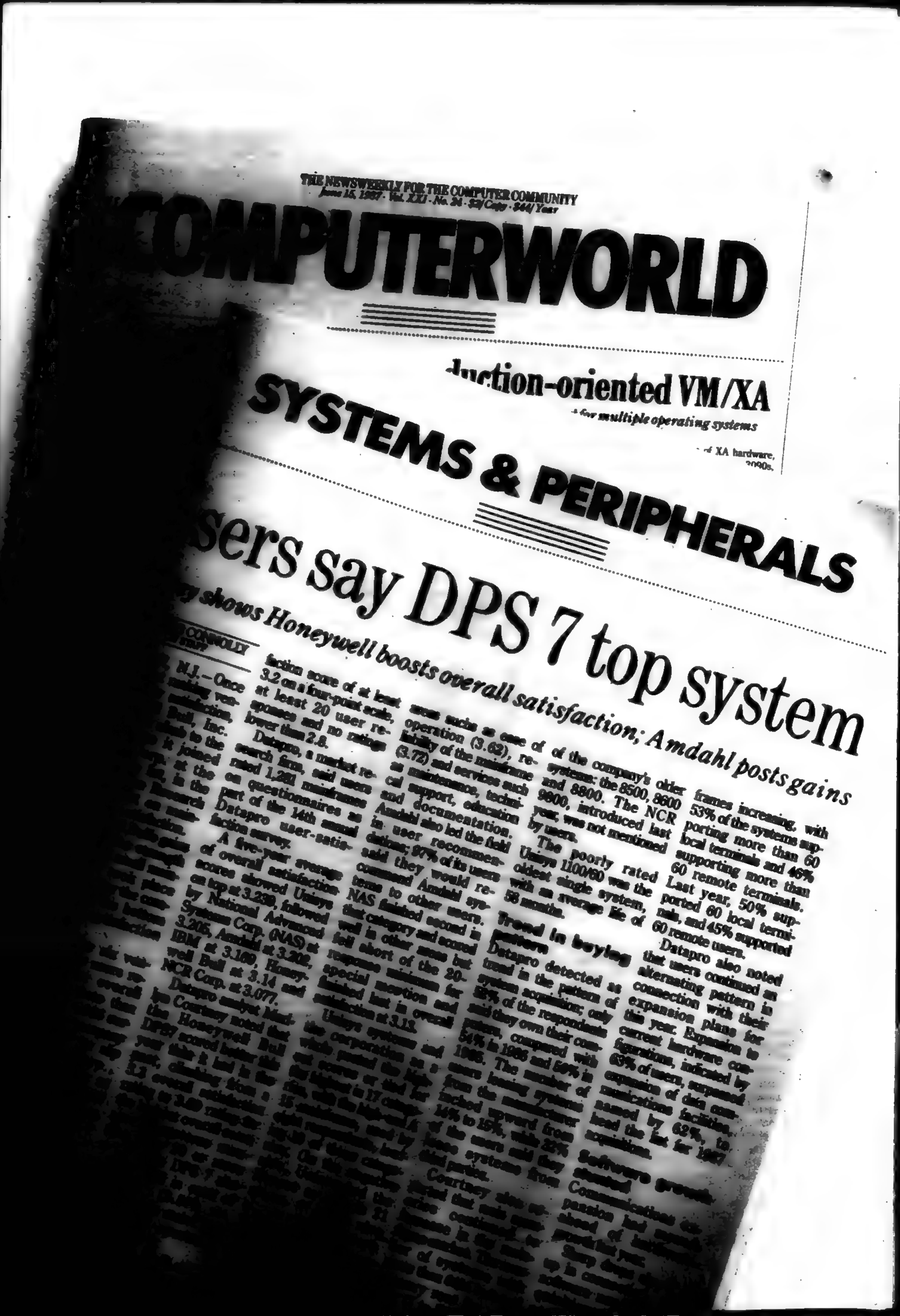
VANs, which first appeared in the 1970s, initially offered packet-switching services as a cost-effective way for customers to access commercial data base and time-sharing services. However, these two markets have begun to dry up. Link's five-year forecast indicates flat growth for the time-sharing market and a 30% accumulated growth for the information services delivery segment.

Hope for future growth lies in corporate networking and in application-oriented niches like electronic data interchange, billing and credit authorization, Link said. VAN revenue from the former will grow 86% between 1986 and 1991, while revenue accrued from the latter will grow 347% during the same period, Link predicted.

For example, major carriers like GE Information Services, a division of General Electric Co., and Tymnet, McDonnell Douglas Network Systems Co. have been providing network applications in vertical markets such as the oil and medical supply industries.

VANs have a better chance of succeeding in specific vertical niches than as plain vanilla transport service providers, Link said. The report cites several

Continued on page 44



THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY
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COMPUTERWORLD

…uction-oriented VM/XA

…for multiple operating systems

…of XA hardware,
…2090s.

SYSTEMS & PERIPHERALS

…sers say DPS 7 top system

…y shows Honeywell boosts overall satisfaction; Amdahl posts gains

…CONNOLLY
…STAFF

…N.J. — Once …

faction score of at least 3.2 on a four-point scale, at least 20 user responses and no ratings lower than 2.8.

Datapro, a market research firm, said users rated 1,281 mainframes on questionnaires as part of the 14th annual Datapro user-satisfaction survey.

A five-year average of overall satisfaction scores showed Unisys on top at 3.239, followed by National Advanced Systems Corp. (NAS) at 3.205, Amdahl at 3.202, IBM at 3.169, Honeywell Bull at 3.14 and NCR Corp. at 3.077.

Datapro analyst … Courtney noted that the Honeywell Bull DPS7 scored better this year than it had in the past, …

areas such as ease of operation (3.62), reliability of the mainframe (3.72) and services such as maintenance, technical support, education and documentation.

Amdahl also led the field in user recommendations; 97% of its users said they would recommend Amdahl systems to other users. NAS finished second in that category and scored well in other areas but fell short of the 20-response minimum for special mention and finished last in overall satisfaction at 3.13.

Unisys systems and the corporation as a …

… of the company's older systems: the 8500, 8600 and 8800. The NCR 9800, introduced last year, was not mentioned by users.

The poorly rated Unisys 1100/60 was the oldest single system, with an average life of 58 months.

Trend in buying pattern

Datapro detected a trend in the pattern of system acquisition; only …% of the respondents said they own their computers, compared with 54% in 1986 and 56% in 1985. The number of users leasing systems from the manufacturer inched upward from 14% to 15%, while 22% of the users said they … these systems from third parties.

Courtney also reported …

frames increasing, with 53% of the systems supporting more than 60 local terminals and 46% supporting more than 60 remote terminals. Last year, 50% supported 60 local terminals, and 45% supported 60 remote users.

Datapro also noted that users continued an alternating pattern in connection with their expansion plans for this year. Expansion to current hardware configurations, indicated by 63% of users, superseded expansion of data communications facilities, named by 62%, to head the list for 1987 acquisitions.

Software growth slowed

Communications expansion had … ahead of …

You said it, not us.

Nothing beats word of mouth advertising. And the word being spoken by users of Honeywell Bull systems is "satisfaction."

In a recent Datapro Research Corp. report, Honeywell Bull scored highest in overall user satisfaction.

Not second highest, or third highest.

Highest.

Period.

And users gave our DPS 7 mid-range computer high marks for its ease of operation and reliability. They also praised its operating system, GCOS 7, that allows it to perform a wide range of functions, such as high-volume transaction processing, office applications, sophisticated networking and communications, and program development. In short, they rated the DPS 7 the best system available.

Again, not second best or third best.

The best.

For months now, we've been telling you that, to Honeywell Bull, customers are more important than computers. That means we don't develop technology for technology's sake. We develop reliable systems that solve problems. And we don't give lip service from 9 to 5. We give prompt service 24 hours a day, anywhere in the world.

Apparently, that philosophy has paid off. Because the same customers that we put first, have now put us *in* first.

Honeywell Bull

Customers are more important than computers.

VAN clan

FROM PAGE 41

major competitors in the transport arena, including local packet-switched networks provided by regional Bell holding companies, satellite-based very small aperture terminal networks and virtual private networks offered by the major interexchange carriers.

VANs under fire

A recent phenomenon that threatens the established VANs' customer base is the growing number of Fortune 500 companies that are reselling their private networking facilities and expertise — among them American Airlines and Sears Communications Co.

Sears, for example, recently persuaded Advanced Micro Devices, Inc. (AMD) to switch over from Telenet's service, according to Link, with promises of better IBM terminal-to-host connections over Sears' own extensive IBM Systems Network Architecture (SNA) network.

AMD's defection from Telenet stemmed in part from a perception "that it is easier to solve networking issues by working with another user than with a vendor," Link said. The Sears network, which uses private T1 lines for its SNA connections, is expected to cost AMD significantly less than what the company paid Telenet on a monthly basis.

AMD's decision carries two potential danger signs for VANs, Link warned. First, IBM shops require effective, low-cost SNA-to-X.25 integration if they are to be weaned away from T1 networking.

Second, with the increasing amount of comparison shopping going on, VANs must continually add value to their offerings and search out new market niches, or they may lose out to a new wave of aggressive competitors.

VALUE-ADDED NETWORKS' hope for future growth lies in corporate networking and in application-oriented niches.

Switcher

FROM PAGE 41

eight-port switch priced at $8,000.

Like the Tymnet device, Smartnet 3700 is targeted largely at branch offices of companies recording financial transactions.

The company said the 3700 is certified to operate with packet-switching services from AT&T, Telenet Communications Corp. and Tymnet.

"We have filled the gap at the low end because we have been seeing a lot of demand" for low-cost switching devices, said Sam Stavro, vice-president of marketing and development.

Smartnet 3700's key features include the ability to download software or new operating systems onto the switch's diskette, the ability to set four of the X.25 links at speeds up to 64K bit/sec. and the option of upgrading the unit with a PAD, Stavro said. The high-speed links can be configured for either CCITT V.35 or RS-232 connections.

Remote monitoring

With the unit's resident network management software, users can configure operating parameters, update routing tables, monitor performance and retrieve statistics either locally or from other points on the network.

Built around an Intel Corp. 80286 microprocessor, Smartnet 3700 reportedly switches more than 100 packet/sec. The model comes with 250K bytes of buffer space for high-speed switching and line concentration. Network management can be centralized with the vendor's Smartview software, which runs on the IBM Personal Computer AT.

Smartnet 3700 will be delivered within 30 days after orders are taken, Stavro said.

Important Breakthroughs From Candle

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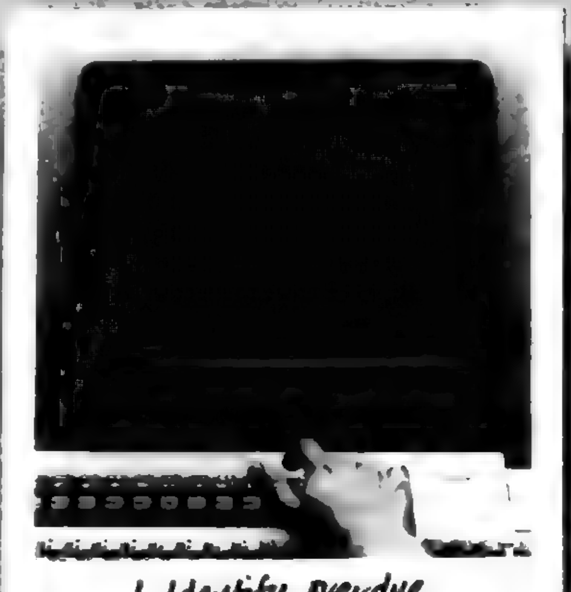

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Resource Impact Profiles

A second breakthrough tool called Impact Profiles

3Com head

FROM PAGE 41

announce a development agreement with Excelan, Inc. this week and a second next week at a PC Expo press conference.

In addition, Novell will announce new hardware and software. The software appears to be yet another Netware upgrade, but the hardware is new.

We're guessing that the Intel Corp. 80386 file server, or perhaps an X.25 hardware card, is in store.

Creeping along. Anxious users of Banyan Systems, Inc.'s Vines network operating system can expect to see the latest release in November, according to sources.

Besides LU6.2 capability, the new release will provide better interaction with the Transmission Control Protocol/Internet Protocol environment; take advantage of the 386, using AT&T's 386-compatible Unix System V Release 3; and provide tool kits and applications program interfaces for the LU6.2 and Unix environments.

More recently, Banyan has unveiled a new value-added reseller program as part of its effort to beef up its user base.

Court and spark. Digital Communications Associates' (DCA) purchase last month of low-end network vendor Fox Research, Inc. has apparently not satiated its desire to purchase network technology. Targeting higher end networking, DCA is said to be looking hard at Ungermann-Bass, Inc., which recently reported unexpectedly low quarterly results and is having some problems, according to analysts.

President Ralph Ungermann would not confirm or deny the rumor, saying only that "there's nothing to comment on." Ungermann, we should note, is more than a little steamed over recent reports detailing political strife racking his namesake. It ain't so, he says.

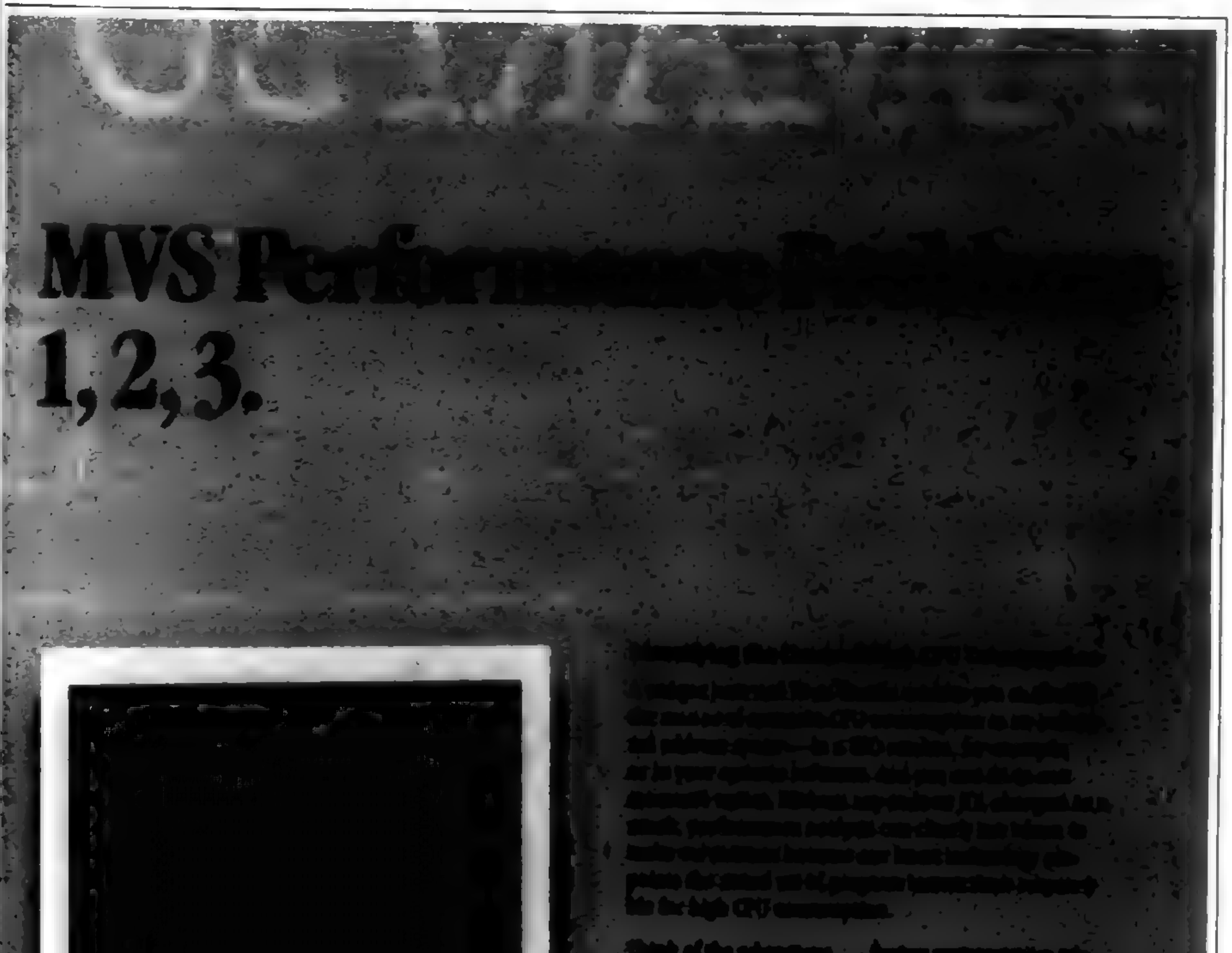
David and Goliath. Meanwhile, busy Fox plans to demo an unbundled version of its 10-Net Netbios version network software on a variety of network hardware, including IBM's Token-Ring, at PC Expo.

Any Netbios-compatible adapter card can run Fox's software, a spokeswoman says. Unbundling 10-Net software would pit Fox against Novell.

The question remains: Even with DCA's bucks, can the sly Fox outwit Novell?

Well, I wonder. Hmmm, Apple has been advertising for people to help write documentation for Unix networking. Tie that in with its recent $1 million investment in SQL-compatible data base vendor Sybase, Inc. and low-end workstation-targeting Sun, and it sure looks like Apple Computer, Inc. is targeting Sun Microsystems, Inc. with a vengeance. Of course, any serious attack will have to be proceeded by Apple and its dealers figuring out how to position Unix.

Keefe is a Computerworld senior editor, networking.



MVS Performance [illegible]
1,2,3.

3. Identify programming statements consuming CPU.

lets you press a key and, in seconds, pinpoint which resources are impacting MVS. No more guesswork!

Candle
Candle Corporation

Much ado?

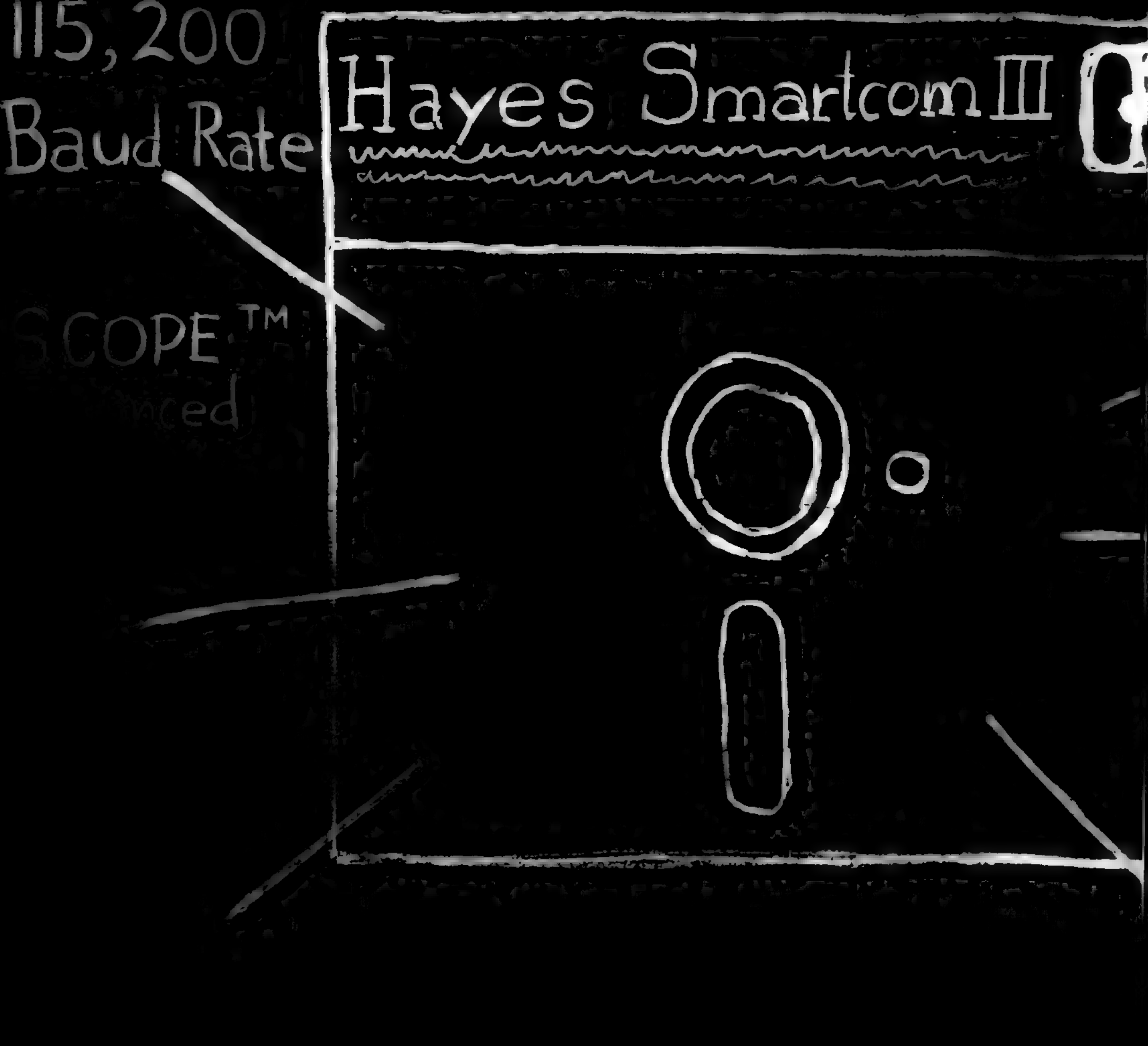
FROM PAGE 41

"I do not think they understand the issues in the company. You have to look at the success the company has had," Ungermann responded, clearly stung by analysts' criticisms.

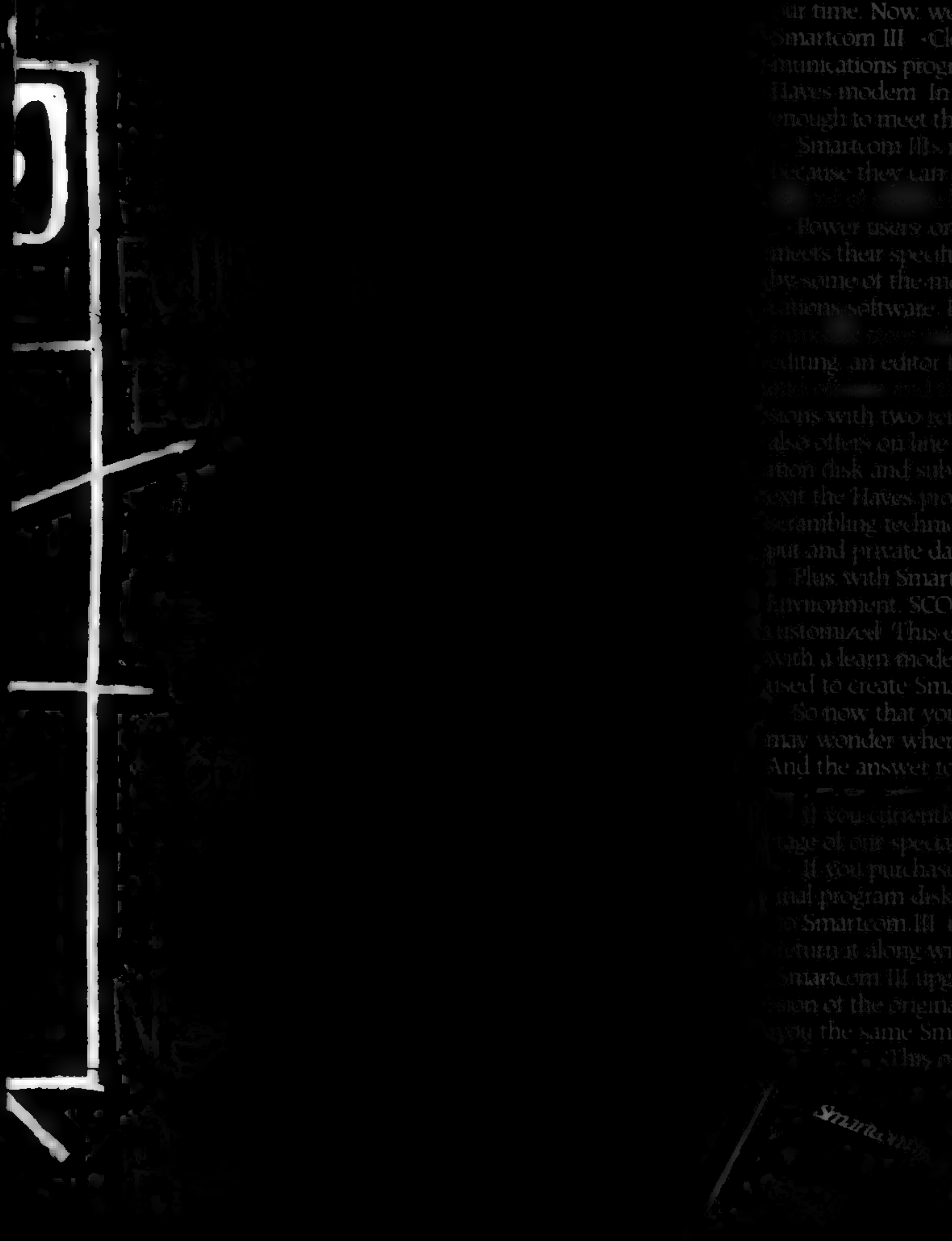
He claimed that Ungermann-Bass' revenue has grown 60% year to year, adding that quarterly revenue was up 16% in the first two quarters. "I don't know what marginally means," he said. Ungermann-Bass made a large investment in the Manufacturing Automation Protocol (MAP) market, which Ungermann admitted has taken off slower than anticipated.

To compensate for that, the company is reallocating resources to support more profitable areas such as its office network business. "Our core business is very solid," Ungermann said. However, Ungermann remains committed to the MAP venture, he said.

THIS TIME WE OUTSMARTED



EVEN OURSELVES.



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Plus, with Smartcom III's Simple Communications Programming Environment, SCOPE, the transmission process can be totally customized. This easy to use scripting language comes complete with a learn mode and provides access to the programming tools used to create Smartcom III itself.

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If you purchased Smartcom II prior to 1 1 87, return the original program disk to us along with $60 and we'll upgrade you to Smartcom III. If you purchased Smartcom II after 1 1 87, return it along with $30 and dated proof of purchase for a Smartcom III upgrade. And if you use Crosstalk, send any version of the original program disk along with $60 and we'll give you the same Smartcom III upgrade.

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For more information, contact your local Hayes Dealer, write Hayes at the address [illegible]

Hayes

Hayes Microcomputer Products, Inc. [illegible] Box 105203, Atlanta, GA 30348

NEW PRODUCTS

Local-area network hardware

A hardware and software system said to turn an IBM Personal Computer, PC XT, AT or compatible into a multiuser, multiprocessor Microsoft Corp. MS-DOS system running the Novell, Inc. Netware operating system has been announced by **The Network Link**.

The basic hardware component of the **Quicklink** system is the Quicklink card. A standard PC-compatible ASCII terminal connects to the card, providing a complete MS-DOS workstation to the multiuser system. Up to 51 Quicklink cards can be configured on a single system. Multiple PC file servers can be interconnected for further growth.

Quicklink operates under Novell's Netware/86 or Netware/286. Each Quicklink board costs $1,095.

The Network Link, Building H-10, 3303 Harbor Blvd., Costa Mesa, Calif. 92626.

Links

Novell, Inc. has announced an asynchronous gateway said to provide local-area networks running its Netware operating system with access to asynchronous resources.

The gateway, called the **Netware Asynchronous Connection Service** (NACS), provides access to the resources through a direct connection to a minicomputer or through modems to remote minicomputers. Access to information services is also provided.

Novell also announced the **Netware Asynchronous Board**, designed to allow personal computers to run off-the-shelf communications programs such as Microstuf, Inc.'s Crosstalk or Hayes Microcomputer Products, Inc.'s Smartcom II.

NACS costs $1,095. The Netware Asynchronous Board costs $149. Both will be available in the third quarter, the vendor said.

Novell, 122 E. 1700 South, Provo, Utah 84601.

Electronic mail

CC:Mail, an electronic-mail package designed for local-area networks (LAN), now offers **Profslink**, a gateway from LANs to IBM Professional Office Systems (Profs) users on mainframe computers, **PCC Systems, Inc.** has announced.

Profslink provides an automatic and transparent connection between any LAN running CC:Mail and any mainframe computer running Profs. The bidirectional link allows personal computer users and IBM VM mainframe users to exchange both text and file messages. Profslink automatically takes care of all connections and delivery and receipt of messages to and from Profs. Connections can also be programmed to the individual needs of the company.

Profslink costs $995 per gateway.

PCC Systems, Suite 201, 480 California Ave., Palo Alto, Calif. 94306.

Modems/Multiplexers

Develcon, Inc. has introduced the **Model 7141** single-card integral statistical multiplexer for use with its Develnet Networking Data private branch exchange.

The Model 7141 is said to multiplex up to 48 channels over a single synchronous link. Channels can operate at speeds of up to 9.6K bit/sec. Link protocol is CCITT X.25 Level II.

The Model 7141 is priced at $4,000.

Develcon, Suite E, 6701 Sierra Court, Dublin, Calif. 94568.

Hayes Microcomputer, Inc.-compatible 2,400 bit/sec. internal modems for use with laptop computers have been announced by **Megahertz Corp.**

Called the **Easytalk 2400** series, the modems include Crosstalk communications software. Compatible with the IBM Personal Computer AT command set, the modems feature automatic answer, dial disconnect, adjust to incoming data speed, full- or half-duplex operation over dial-up phone lines and U.S. and international compatibility.

The modems were designed for use with Toshiba, Inc.'s T1100 Plus, T3100, T1000 and T1200 computers. They will be available in September priced at $599.

Megahertz, Suite 2-102, 2681 Parleys Way, Salt Lake City, Utah 84109.

Diagnostic equipment

A device said to provide a full-definition picture of all 25 lines in an RS-232C data communication circuit has been introduced by **Dual Enterprises Corp.**

By means of 50 red and 50 green LEDs, the **Model T-701 RS-232 Tester** indicates the signal status of all the lines, mark, space and clocking. The LEDs moniter all 25 lines on both the data communications equipment and data terminal equipment sides. In addition to switches to break any of the 25 lines, two switches are given to reverse lines two and three. Strapping posts are provided for cable reconfiguration, and gender connectors with extension cables are permanently attached to the unit.

The T-701 costs $220.

Dual Enterprises, 21 Maple St., Centereach, N.Y. 11720.

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SPOTLIGHT

SMALL-SYSTEM DBMS

Microcomputer DBMS is on the verge of a boom as mainframe software companies and established micro software providers compete for a stake in a new proving ground.

AUGUST 31, 1987 • SPOTLIGHT NO. 20

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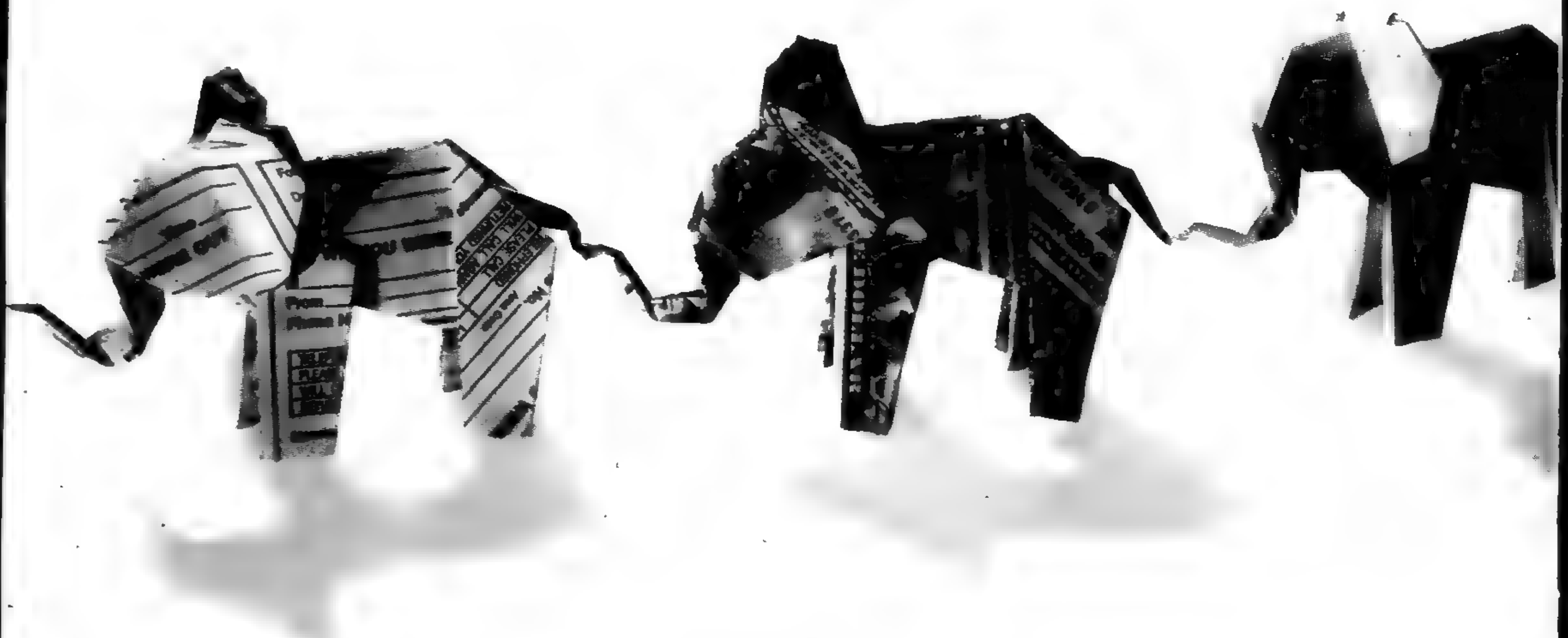
The surprising advantages of size in business communications.



Integrating voice and data for economies of scale. AT&T Comes Through.

It supports 500 lines. It supports *32,000* lines. It supports an A-to-Z of voice and data applications. And the more lines, the more devices you plug in–the more efficient it becomes.

"It" is an AT&T System 85. The company flagship. AT&T's *Big Switch.* The AT&T System 85 integrates *all* of a company's voice and data communications into a single network of networks, opening the door to huge economies of scale.

Saved: Much of the money now spent on single-purpose networks.

Saved: The expense of installing a switch at every business location. With remote modules, one System 85 can serve a 19-square-mile ring of up to 30 offices.

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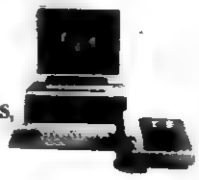
For a detailed evaluation of what your company stands to save–and to gain–from an AT&T System 85, please contact your AT&T Account Executive. Or call 1 800 247-1212 for the AT&T office nearest you.



From equipment to networking, from computers to communications, AT&T is the right choice.

AT&T
The right choice.

INSIDE

Programmer's Helper
Software developer finds application development assistance from a DBMS that is part of an integrated package. Page S3.

Product Face-Off
In the battle for Macintosh DBMS supremacy, Acius's Fourth Dimension is the odds-on favorite. Page S6.

The Popular Vote
SQL is winning the contest for standard data base language because of its consensus-building power. Page S7.

Winner by Decision
The true measure of a data base management system's productivity is the increased quality of the decisions it fosters. Page S7.

New Recruit
A micro-based relational data base package helped police unravel the mystery surrounding a rash of murders in the Los Angeles area. Page S16.

Product Chart
A detailed guide to data base management systems for small systems. Page S11.

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Micros are a rich vein for DBMS developers. By digging there, they hope to reach end users as well as programmers.

GOLD RUSH IN PC TERRITORY

BY RUSSELL LIPTON

MARK FISHER

Once, not so very long ago, there were little computers called micros. And MIS laughed at them because they were named after a fruit, and no one could do anything useful with them. Then along came Dbase II, and hundreds of thousands of people began using this product to produce data bases unlike any data base known to the keepers of the Big Machines. And data ran amok. When the giant, IBM, declared micros were really OK, everyone decided to make money by writing data base software, and products proliferated on the face of the installation. Even the servants of the Big Machines contributed PC-Focus and Oracle. However, all was not happiness because memory ran short, and connectivity was lacking. And over all of this, IBM wrote "C-H-A-O-S."

Now comes the promise of OS/2, MS OS/2, OS/2 Extended Edition, OS/2 Extended V.2 and more. And now venerable Dbase III Plus shall write and read SQL forever — even up to billions of records. The power users smile and look forward to change with anticipation.

But what about the average end users? Do they understand the issues involved? Do they need such great power? Do they know IBM and everyone else now battles for control of these "mainframes-on-a-desk" that, once upon a time, were fun?

Cordial but not personal

Micro data base management system products are poised for some major changes. This transformation is being pushed by the availability of more powerful processors (Intel Corp.'s 80386 and Motorola, Inc.'s 68020) and operating systems (notably IBM's OS/2) that may make it possible for DBMSs to serve as the environmental hub of the software of the 1990s.

Whether this role enhancement takes place at all, and to what extent, depends mostly on how corporations resolve the always-delicate issues of freedom and control posed by the microcomputer. On one hand, companies benefit from the entrepreneurial drive and initiative of their employees. The wild-and-woolly world fostered by personal computer software has, on the whole, provided a healthy, creative spark to the often lumbering central computing organizations.

On the other hand, corporate information professionals are rightly charged with the care, maintenance and security of the corporation's lifeblood — its information. This mission requires the establishment of scrupulous software standards and methodologies that brook little deviation.

Until now, the difficulties of connecting PCs to other machines and, even more important, of attempting to trade applications and data between machines has acted as a kind of natural barrier to real chaos. The user who knows how to move data has typically had a keen awareness of corporate data sensitivity.

In the not-too-distant future, however, architectures like Systems Application Architecture (SAA) from IBM will seamlessly link corporate users, and all users will send their data around

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Lipton is a software consultant for James Frame Enterprises, Inc. in New York. He has written extensively on the subjects of DBMS and fourth-generation languages.

Gold rush

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the networks to interact — for good or ill.

No one denies that it is possible to make the microcomputer an extension of the total constellation of corporate machines. Is it desirable, however, to so drastically reshape "personal" computing? And is it possible to do so without a revolt from the users involved in it? Many people originally bought single-user personal computers, from their own discretionary budgets, to do personal work. Now, these machines are in danger of becoming just another node on the mainframe.

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In fact, the challenge facing software developers — particularly the developers of DBMSs — is to retain or increase the personal feeling for the end user while maximizing the internal, carefully managed interface to the total corporate computing resource. This effort parallels those of system software companies like Microsoft Corp. to hide the exploding complexity of MS OS/2 through presentation environments like Windows.

As Shaku Atre, president of Atre International Consultants, Inc. in Rye, N.Y., points out, "DBMS products are important and will become more so, but we have to acknowledge that, for the true end user, they are still far too difficult to use comfortably."

Trends in micro DBMS

There is no hope of stopping change, however. Micros will be tied to larger systems, and, because DBMSs offer the potential to arbitrate and monitor the passage of data between all types of machines, they will have to expand in the direction of that potential. In fact, a number of trends are already beginning to reshape micro DBMSs:

- The nature of these products is shifting from simple flat-file managers to full-blown data base managers.
- The PC marketplace is rapidly becoming the focal point of all DBMS software efforts, and this concentration will probably continue for at least the next five years.
- OS/2 is exerting a tremendous influence on emerging DBMS products, as are the implications of networking and departmental-mainframe connectivity.
- A headlong rush toward SQL products is taking shape, which brings up issues concerning the relation of SQL to application development and fourth-generation languages.
- There are developments waiting in the wings that relate to application generation, integration of expert systems and interfaces to compact disk read-only memory (CD-ROM) and allied technologies.

While all of the above refers to the IBM world, critical developments are also occurring within Apple Computer, Inc.'s family of products.

Apple's Macintosh continues to be the unheralded source of almost all PC inspiration in the development of user interfaces. The Macintosh II is the first machine with the potential to bring Apple squarely into the offices of true-Blue corporate sites to do heavy computing, especially with Apple Chief Executive Officer John Sculley beginning to make the right connectivity moves for his offering.

Bill Kirwin, program director for personal computing at the Gartner Group, Inc., is a strong booster of the Macintosh, although he specializes mainly in the IBM marketplace. "Basically," he says, "Apple is able to deliver today what will be available on OS/2 by 1990. The irony is that IBM has largely created a Mac clone, blessed Apple and then said that their own usable machine won't really be available for two years."

With the user interface to DBMS offerings growing in importance, we should expect to see both convergence and increased competition between the IBM and Apple architectures.

Pathway for users

There is still the question, though, about how much all of this will, or should, impact the typical user. In an marketplace that is choked with DBMS products ranging from simple flat-file managers to products that are down-sized but otherwise faithful reproductions of complex mainframe products, how is the user to proceed?

It is true that the risks for software consumers grow in direct correlation to the creative ferment taking place. Fortunately, while it has become increasingly difficult to segment product offerings, it is still rather easy to define differing classes of users. From there, we can begin to make sense of the types of DBMS products that are of potential value to these differing groups.

The first class of users — and, in fact, by far the smallest class — consists of professional programmers and application developers. This segment is in seventh heaven about upcoming DBMS trends. They want and require sophisticated products that provide industrial-strength data definition languages, flexibility in specifying data navigation pathways, procedural facilities for building turnkey applications and, not least, extensive tools for managing networking and security.

This class is, as a result, strongly attracted to the types of products discussed so far. As a matter of fact, many of those in it are already faithful customers of one or more of these companies: Ashton-Tate, Microrim, Inc., Oracle Corp, Information Builders, Inc. Informix Software, Inc. and Relational Technology, Inc. Many other companies, such as Data Access Corp., with its product Dataflex, and Cosmos, Inc. with Revelation, also directly target this class.

A much larger pool of customers consists of the class of computer-literate but nonprogramming users of microcomputer DBMSs. This group is often one of the targets of applications designed by the programmers listed above. Additionally, this class often builds its own applications, but these are for its own use or for rough-and-ready employment within small corporate departments.

> "DBMS products are important and will become more so, but we have to acknowledge that, for the true end user, they are still far too difficult to use comfortably."
>
> SHAKU ATRE
> ATRE INTERNATIONAL CONSULTANTS, INC.

The requirements of these applications for connection to other machines are minimal or nonexistent. Not surprisingly, this group of customers is easy bait for every developer in the industry.

The big boys are trying to attract this customer group with friendly reporting tools that can be used to access and manipulate data residing on departmental and mainframe machines. Vendors argue that their simpler application development facilities are usable by any literate end user. This argument is now, for the first time, truly credible, but it remains to be seen whether this type of customer can, or should, be captured by the high-end products.

After all, this user typically requires no less, but also no more, than the following from a microcomputer DBMS product: stable, simple flat-file management structures, maximum ease in defining and maintaining files, a transparent interface to spreadsheet products and visual query systems for retrieving data.

The good news is that there are literally dozens of slick, professionally done PC and Macintosh products that deliver the requisite functionality and ease of use. The bad news is that there are so many that picking one can be perplexing. Fortunately, once it becomes clear that a given company can provide the needed features and reputable support, the rest is largely a matter of taste.

Matching the competition

Two of the best-known PC products, with good reason, are Paradox from Ansa Software and Q&A from Symantec Corp. Both are almost powerful enough to stand comparison with some of the products designed for programmers and provide true ease of use for managers and nonprogrammers.

Both products also emphasize the user interface: Paradox features similarity to Lotus Development Corp.'s 1-2-3 and provides Query-By-Example forms for retrieving data, and Q&A emphasizes a natural-language module (the Intelligent Assistant) that, while a bit awkward, delivers genuine English-like capabilities. In addition, Q&A provides an unusually powerful word processing module that gives a synergistic range of functions to the nonprogrammer.

Another product worth mentioning is Powerbase from Compuware Corp. Powerbase is a menu-driven flat-file manager with a simple, sensible and even elegant user interface that incorporates seemingly major modules like screen painters, functions like data validation and indexing in nearly transparent application-building sequences.

It is arguable that the above products are not significantly easier than the big boys' products. "You could say that the Paradox interface is easier to learn than the Ashton-Tate Dbase command language," says Adam Green, lecturer and writer on DBMS. "But Paradox is like Dbase in that you go back to the programming language to build complex applications, and the programming language is no easier."

The difficulty in defining, describing and designing data base is fairly constant because the conceptual problems of data base management are basically the same across all the products on the market. If there is a difference, it is in the degree of ease provided by the user interface. For this reason, it is not so much that a product such as Paradox is simpler or less robust than Dbase, but rather that it is somewhat easier to use. This demarcates the somewhat different market segment for which Paradox is targeted.

Lazy man's DBMS

Finally, we come to the largest class of users. This class needs to use computers but does not particularly enjoy doing so and wants to interact with them as little as possible. We can describe this group by saying, without the slightest condescension, that they want to manipulate data bases without being required to know how to define the word "data base."

While the IBM world has many products to offer this customer group, and companies like Ashton-Tate, with the now-abandoned Friday and the new Rapidfile, have sought to sign these users up, most in this group would rather fool around with the data management capabilities of 1-2-3 and Lotus's Symphony than move their hard work to any dedicated filing product.

This has not been so true on the Macintosh, where a host of simple and genuinely useful products have appeared. One in particular, Filemaker Plus from Microsoft and Forethought, Inc., is a superb, graphically oriented file manager suitable for use by beginners.

Fortunately, whatever the future may come to pass for users, be they programmers, power end users or novices, one thing is quite certain: A software marketplace that has historically been driven by word processing and spreadsheets will soon be largely driven by DBMSs.

This means many of the advances promised by OS/2 on the IBM Personal System/2 class of machines and by Apple on the Macintosh will appear first in these products. It also means that for vendors and users active in the field, the next five years will bring exciting new products to light while forcing obsolete versions into needed transformation. This is hardly bad news for any user.

It is no longer as easy to define DBMS products for microcomputers, but there is one generalization that can be safely made: Today's products are, for the first time, offering true DBMS capability.

Until this year, most so-called DBMS offerings were not "systems" at all but simple flat-file managers with a modicum of added features to provide flexibility and ease of use to beginners. There was, and is, nothing wrong with providing these kinds of products. However, it has been misleading at best and intentionally deceptive at worst for marketers to appropriate data base terminology with recognized meaning and tack it onto these offerings.

A DBMS is first and foremost provided to eliminate the costly reprogramming required when directly manipulating bytes, record links and indexes at the operating-system or operating-file level.

By separating the data itself from the specification of the descriptions and operations ranging across that data, DBMS products enable users to consider their problem in terms of "customers" and "products" instead of "pointers" and "physical sequence." Microcomputer products have indeed provided this basic capability.

Unfortunately, the provision of this capability implies provision of other, far more sophisticated functionality, which has often not been present.

Rich data-definition languages are needed in order to describe and model the structures of the included data. Data manipulation languages give users the means to retrieve, update and otherwise query their data bases. Security modules provide fine control of access to the data base. Carefully designed rules must arbitrate the interface of the DBMS to the external environment, which is typically a multiuser one. Finally, programmability must be provided to enable applications to make use of the DBMS.

Many microcomputer products contribute shadows of most or all of the above functions. Few can be said to offer them in full-fledged form.

More than a toy?

The conclusion is not the one often drawn by mainframe users, namely, that microcomputer file products are toys of no serious interest. The fact is that most users, and this includes those tied to mainframes by terminals, do not require and do not want to look at a true DBMS. They want and require simple flat-file management of their data with quick and flexible form-building and retrieval capability: The simpler PC products meet their needs.

On the other hand, these same end users do not realize or appreciate the enormous cost and complexity of building a friendly, simple interface to a necessarily sophisticated DBMS that must manage and protect data across diverse machines, operating systems and physical sites.

Fortunately, the PC's ubiquity means it must become the focal point for these complex system products, both to meet the demands of end users who expect ease of use and MIS professionals who expect transparent connectivity to networks and mainframes.

The traditional programmer's DBMS of the '70s is gradually being replaced by transparent user interfaces to the DBMS and through the DBMS to the underlying file and operating system.

With SQL as the underlying data base engine, it is probable that tomorrow's users will plug in and play with a host of data front ends, ranging from Dbase on one end to Buttonware, Inc.'s PC File, Borland International's Reflex, Q&A and even 1-2-3 on the other end. For the Macintosh, Omnis 3 Plus from Blyth Software, Inc., Acius, Inc.'s Fourth Dimension and still another Dbase version from Ashton-Tate will play the same role.

Global strategic market

Five years ago, mainframe and minicomputer DBMS software companies laughed when asked if they had plans to enter the microcomputer arena. Three years ago, when the IBM Personal Computer AT was introduced, these companies began secretly laying their PC plans, and a few, most notably Oracle with PC-Oracle and Information Builders' PC-Focus, squeezed mainframe functionality into then 512K-byte packages and sallied forth to do initial battle with the new Dbase III.

Today, with Intel 80386-based machines and the imminent move to larger memory spaces, we can say with little exaggeration that every company developing a DBMS product at all is also developing one for microcomputers.

Actually, we can go even further. The PC is now and will remain the preeminent machine around which all strategic DBMS development will take place during the next five years. This does not mean departmental and mainframe DBMS will become irrelevant. Actually, their function as connectivity nodes and sophisticated power managers of input coming from PCs will also become more important.

Increasingly, all users will interact and work with DBMS products from the vantage point of the PC, whether that computer is viewed as a stand-alone appliance running a shareware program like PC-File or as an intelligent workstation node running under a network like Relational Technology's Ingres/Star.

This new phenomenon can also be understood as the transformation of all computer users into PC users. From a technical standpoint, this might seem like backward logic, since it would be at least as true to say that PCs are going to disappear and be absorbed into the intelligent-terminal category. But what is really important is that the perception and the functions, features and feel that have marked PC software will now become universal.

This direction can be seen in the fact that menu-driven interfaces, universally available on PC products, are now being retrofitted into mainframe-style products coming to the PC. Lotus ring menus are being adopted by Oracle's Professional Oracle, Informix's Informix-SQL and Relational Technology's PC-Ingres, to name a few. Smart, interactive Help systems and on-line tutorials, creative use of color and drastically rewritten documentation are another beneficial result of this phenomenon.

More important, downsized mainframe DBMS software is increasingly providing prompt-driven application development tools, screen painting utilities and other aids that permit the inexperienced user to prototype a working application without major hassle or expense. PC-Focus, in fact, now provides completely prompt-driven tools for reporting, file definition, maintenance of procedures and even interactive construction of windows for user applications.

Of course, there is a dirty little secret behind these new development priorities: The complexity level of serious microcomputer DBMS products is rising so fast that user-friendly interfaces and tools are not merely desirable as a design goal but absolutely required in order to attract customers.

This is as true, by the way, for mature, traditional microcomputer DBMS products as for the lumbering upstarts entering the market from the mainframe side. Dbase III Plus has become a highly complex and powerful programming language attached to a flat-file manager. This, in turn, drives a host of other third-party products aiming to simplify Dbase and make it more usable by novice and intermediate participants. Microrim's R:base System V boasts, not without reason, of its Application Express tools, which assists users in creation of applications. Still, this facility also serves to veil R:base's complex programming functionality.

The bottom line is that there is a tremendous collision taking place in the micro software marketplace. This collision is generated, on the one hand, by the efforts of former mainframe and traditional microcomputer developers to appeal to the sophisticated programmer or end user who wants the utmost in programmability while offering so-called "beginner's" aids.

On the other hand, all developers, even those that provide simplified file managers, want to constantly expand the usefulness of their products by adding features and functionality. In other words, the not-so-surprising reality is that every software developer would like every user for a customer.

While this collision highlights the challenges facing mainframe vendors that would like to enter

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Integrated approach for developers

BY REBEKAH WOLMAN

A health and safety professional at a manufacturing plant doesn't need to be Sherlock Holmes to pinpoint a "jump in upper torso and shoulder burns at Workstation 10 in the body shop" — at least not with the help of Humantech Incident Analysis and Trend Identification System (HIATIS).

Originally designed for General Motors Corp. and now used at a variety of plants, HIATIS, a software system for IBM Personal Computer ATs and compatibles, uses a series of data bases to track medical, maintenance, personnel and operational costs. This information is sent through a statistical program that formats and generates reports.

HIATIS was developed by Humantech, a Toronto-based industrial engineering firm, using Software Products International's Open Access II, an integrated package with a sophisticated data base management system capable of being used for application development.

HIATIS is the first of three management tools Humantech has developed with Open Access II. Perform, developed for Westinghouse Electric Corp., is a financial analysis program for comparing various resource allocation methods for facility and building projects. Facilities Analysis Strategic Planning and Tracking, still in development, will store resource allocation histories, perform historical analyses of operating, staffing, facilities and equipment costs and then perform five-year projections based on that information.

Brain power

All of these packages reflect Humantech's conviction that "data means nothing until you process it in your own head," says Ted Stout, Humantech's director of operations and one of its principals. "The client has to have full ownership of the process," he explains, adding that it only happens if "you develop a program that you can get the majority of people to use."

That is where Open Access II comes in. "We don't look at it as an integrated package but as an applications tool for customizing software to client applications," Stout says. "We can't be turned on by the latest thing, by the nicest package. We have to look practically at the software — how it's going to be supported and how it's going to work for our clients."

Stout gives a nod to the tool's powerful on-screen menu capabilities, but with Humantech's expertise in ergonomics, he says, it has done a lot of user-interface design and designs its own menus. It has also overcome Open Access II's "one slight problem" — a hard-to-follow manual — by writing its own.

"We like Open Access because it has a statistical package in it," Stout says. "And in the spreadsheet, the capabilities of the attributes and the fields reflect a tremendous amount of flexibility. Our programmers were originally opposed to getting involved with an applications program, but they've ended up being quite impressed with Open Access as a tool."

Formatting flexibility

All these features are attractive from a development point of view, but the most attractive feature — formatting flexibility — is the one that clients experience most directly. "Open Access gives us great latitude in how to format finished data," Stout says. "And we really like the fact that we can take data from the data base, throw it into the spreadsheet, calculate it , format it and print it out — all with one command."

The data base itself has a similar capability, which makes it especially well suited to Humantech's needs. The original version of HIATIS was developed for a combination of data base, statistical analysis and word processing software. "We wrote batch files for producing reports," Stout says, "but every time you wanted a report, you had to go into the word processing software to reformat. People said they didn't have time to do that, so there was automatically a barrier to the use of the thing. With Open Access, we can get around those barriers."

Along with capitalizing on the formatting flexibility of Open Access II, Humantech's developers have done their part to make each of the tools easy to use. "We've designed a Turbo Pascal shell around the software to help people get into it," Stout explains. "We've included lots of prompting, and we've designed a sort of on-line manual that supports the whole process."

With its three Open Access-based systems, Humantech indicates it is trying to avoid situations in which, according to Stout, "people overuse tools to the degree where they're not productive anymore." ●

Wolman is a free-lance writer based in [redacted].

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the microcomputer marketplace, those facing microcomputer developers are probably even more severe in the long run.

It is one thing to downsize a heavy-duty product that handles large-machine operating systems and networking requirements to a far simpler PC operating architecture. It is quite another to stretch the architecture of a PC product upward into the regions of departmental and mainframe machines.

Experience suggests that companies such as Ashton-Tate and Microrim might do well to form strategic partnerships with corporations that have had long experience in those areas. Alan Simpson, an author and consultant who specializes in DBMS, says he feels Ashton-Tate "will probably lose its status as a heavy hitter over the next few years unless major changes are made.

"In a sense," he continues, "considering the changes under way, they are now back at square one."

Microsoft started on this road by purchasing rights from Sybase, Inc. to the technology pioneered in the Unix sphere. Lotus, as well, is now in partnership with Gupta Technologies, Inc., a company run by people who assisted in the development of the original Oracle products.

Companies like Oracle and Relational Technology have, on the other hand, an edge in connectivity that will become very important in the near future. Atre says she is convinced that "these companies have a big advantage, because their minicomputer customers already have every confidence that they can handle the emerging connectivity standards for microcomputers."

On the other hand, she notes wryly, "Ten years ago, the mainframe companies vowed to put the minicomputer vendors out of business, and now the minicomputer vendors are promising to put microcomputer vendors out of business. It won't happen."

The OS/2 invasion

If Paul Revere had been asked to announce the coming of OS/2, he could have ridden to California and back before its arrival. Still, it is coming, and it is likely to have a divisive impact on both the development and delivery of microcomputer DBMS products.

OS/2 will have this effect because many users will wait until an application appears that demands OS/2 usage before they upgrade to it. This means DBMS developers will need to decide whether to target their existing users with new functionality (under Microsoft's MS-DOS 3.X or MS-DOS running as a task under Unix) or entice these users to new packages on OS/2. Unquestionably, OS/2 on 386 machines will ultimately generate applications of tremendous power and flexibility that do attract users but, in the short run, say until 1990, these two different DBMS markets will coexist in varying degrees of cooperation and confrontation.

The two key elements of OS/2 for DBMS developers are the Presentation Manager and the coming IBM provision of an SQL engine to OS/2 Extended Edition. The Presentation Manager will force many developers into a terrible dilemma: Do they redesign and rewrite enormous sections of their code in order to gain the benefits of a common, standardized graphical interface or do they retain their unique user interfaces and risk becoming isolated?

Dave Feldstein, vice-president of Information Builders, has presided over the development of an increasingly slick front end to PC-Focus and feels the Presentation Manager has yet to demonstrate its right to become the sole model for user interfaces. "We'll support Windows, of course," Feldstein says, "but we are working toward a world that includes image, CD-ROM and artificial intelligence applications; a world that, by the early 1990s, will require multiple interface models."

Of course, whether Microsoft's Windows is a good interface is another question altogether. As with the Mac, standardization is shortly to become a fact of life, and the wise will adjust accordingly.

Presentation Manager-based applications with their easy-to-use graphical interface will gain a strong differentiating point in the early part of the OS/2 era. This may even provide the first argument for users to come along to the entirely new product. The real question for developers ought to be: Do I write my product using Windows as the primary interface, or should I provide other interfaces under a Presentation Manager front end?

IBM's provision of an SQL-based engine to OS/2 poses an even thornier question, particularly since "SQL" has become the magic word whose repeated utterance is supposed to propel everyone to success in the next 10 years.

"Data base facilities are now becoming closely integrated with the operating system itself," comments the Gartner Group's Kirwin. "This argues that vendors who are not 100% compatible with these facilities could push their users not only into transparency problems but into serious performance bottlenecks."

Of course, IBM's own motives are understandable, even exemplary. IBM, remember, launched the relational research that became SQL — one of the few times that the company has led the technological band. It should hardly be surprising that IBM is particularly jealous to control the course of its own technology.

As Atre comments, "SQL and DB2 are their own horse, and everything is going

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T-1 Introduction to CD-ROM Industry, Markets, Futures
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T-2 Preparing Databases for CD-ROM, Including catalogs and lists
End users or vendors planning a CD-ROM application will find this session invaluable for exploring database formats, indexing, searching systems display formats and other practical issues. Also included will be the role of consultants and turnkey package suppliers, and problems of maintaining quality and timeliness of information once released. **For:** Publishers and user information systems and records management executives

T-3 CD-ROM Technology: Hardware
This session covers the equipment technology side of CD-ROM in the context of information storage sub-systems including magnetic storage optical discs erasable discs, CD/I and WORM. Discussions will include laser reading/recording methods and reading and error checking/correction. Drive topics will include standalone, ganged, networked and cartridge operations, production of discs; and aspects of implementing multi-drive, multi-user applications, including interface and service questions. **For:** Technically and product-oriented professionals interested in a systems-level understanding of CD-ROM

T-4 CD-ROM As An In-House Publishing Application
Attend this tutorial to examine the suitability of CD-ROM as a replacement for paper and microfilm/fiche methods of publishing catalogs, parts lists, service and software manuals, directories and databases of all sorts. Attendees will discuss questions of economics, frequency of updating, transmission costs, security and access, training and equipment/viewer implementation. The session will also compare in-house production versus outside consultants and implementors. **For:** MIS, records management, field support and training professionals.

1:30-4:30 p.m.

T-5 CD-ROM Technology: Software
This session will look in detail at each step of CD-ROM usage via software, beginning with the user interface, indexing techniques, interaction with applications software including MS-DOS Extensions, and implications of standards issues (i.e., file formats, High Sierra, and others). Discussions will include problems of off-CD-ROM use of data and unauthorized reproduction. **For:** Professionals interested in the effect of software on the flow of information from disc to application.

T-6 Authoring Systems Workshop
Register for this session for detailed exposure to the tools needed to create the CD-ROM database, starting with a mass of data and ending with a useable application. You will learn about premastering, mastering, and service/equipment/programming approaches, including alternatives such as in-house and out-of-house consultants and turnkey suppliers. **For:** Professionals with expected responsibilities for managing CD-ROM product development.

T-7 MIS Applications for CD-ROM and Optical Memory
This session examines where CD-ROM fits in the MIS chain. You will become familiar with CD-ROM's suitability for different types of databases, including financial and other numerical bases, with attention to record length, speed, frequency of access, update scheduling, security/integration and backup requirements. Discussions will also include networking of drives, personal computers and other workstations/mainframes. **For:** MIS-experienced and systems/database management professionals.

T-8 Using CD-ROM in Expert Systems
The massive storage potential in CD-ROM, along with its low cost and reliability, make possible advanced expert or artificial intelligence applications ranging from emergency medicine to point-of-sales retail. This session will introduce some of the applications and the problems providers face with CD-ROM equipment in public or severe environments. **For:** Professionals who work with intelligent, educational, or decision-support systems and who plan to use CD-ROM technologies.

to ride them."

With IBM's DB2 running on mainframes and SQL/DS running almost everywhere else, IBM must provide a compatible SQL component with OS/2 in order to deliver the application portability and transparency that has been promised by SAA. If IBM can deliver a top-notch SQL engine with OS/2, a lot of the development work now being carried on may become moot.

To be sure, many people have become rich betting against IBM's developing a truly superior software product, and the same may happen this time. A very few companies — including Oracle, Relational Technology, Gupta Technologies and Informix — may be able to sell customers on "their" SQL instead of "IBM's" SQL.

> DESPITE ITS proponents, SQL is not particularly well-suited as a language for end users. It is line- rather than form-driven, has minimal on-board facilities for application building and still consumes a high degree of computational resource.

"Companies like Informix are well positioned here," author Simpson says, "since they can easily build things around their existing SQL engine."

However, most companies would probably be wise to take the data base engine for granted and provide the rest of the DBMS and application environment for reading and writing to SQL. After all, it is questionable as to whether SQL is rightly positioned as an end-user product anyway. IBM is probably positioning it just right as a set of services running under and in tight coupling with OS/2.

Kirwin says if he were managing strategy for a company like Oracle, "I'd be compliant with IBM, without question. But," he adds, "Oracle Network Station works very nicely and can flexibly provide mid-frame and mainframe connectivity. More important, Oracle can add value in areas where IBM won't by providing quality connectivity to the Digital Equipment Corp. VAX and other vendors." Adding value is, as always, the real key — not only to survival but also to differentiation.

In any case, SQL is not quite as standard as many people are saying. It resembles the C language in this regard. It features a stable kernel and a high degree of portability. Subtle and important differences abound, however, and these could prove particularly damaging to products competing directly against IBM's SQL, which will, as always, be the de facto standard.

The SQL engine

SQL emerged from the labs of IBM in the late 1970s as the successor to System R and quickly established itself as the emerging standard for relational data base products. Until recently, however, SQL found its home in the mainframe and departmental computing world and especially with IBM's DB2 and SQL/DS systems. Even there, the decade that has already been required to launch relational products should be a tip-off that something more than conservatism has blocked the revolution.

Even its name, Atre says, suggests problems. "I'm still asking someone to tell me why it is called SQL," she says. "It's not structured, it doesn't provide a complete query package, and it certainly isn't an application language."

So there have been very good reasons for the long delay in SQL's adoption. Despite its proponents, SQL is not particularly well-suited as a language for end users. It is line- rather than form-driven, has minimal on-board facilities for application building and still consumes a high degree of computational resource.

Of course, the latter constraint is disappearing, highlighting SQL's prime design strength: It is well-suited to serve as a data base engine surrounded by application building environments. It is no accident that SQL is coming into its own on microcomputers at the same time that these machines are being used as nodes in local-area networks and as intelligent terminals interacting with the mainframe.

None of the above is meant to imply that SQL is a minor or passing phase. Provision of SQL services will become a given throughout the PC universe. At the very least, this means DBMS products will provide a record read-write interface for access to SQL data bases. The user will not necessarily need to know any SQL, since the product will assume responsibility for parsing SQL into the custom product interface.

According to Atre, "SQL will serve as the kernel around which many other facilities will be developed." At most, the user will employ SQL directly in a DBMS product that combines the SQL data base engine with access to application development facilities.

It is too bad that the SQL furor is obscuring other models for structuring and retrieving data. While the relational model does indeed simplify data management and design for programmers, hierarchical and networked data models are more appropriate for many applications.

Relational data bases, especially with their natural and elegant links to AI and logic programming, will rightfully take

Continued on next page

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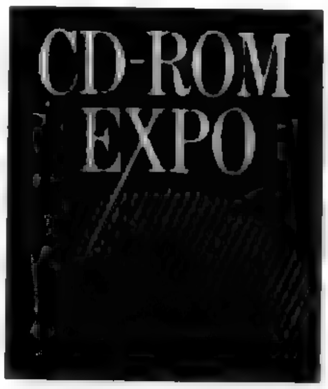

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CW2

PRODUCT FACE-OFF

Acius, Blyth cut to the core of Macintosh DBMS capability

While there are many superb file managers for Apple Computer, Inc.'s Macintosh, few serious data base management systems have appeared for the machine. This situation, however, is about to change.

Ashton-Tate is finally readying its notoriously delayed version of Dbase for the Mac, but it may be a case of too little too late. Rumors of bugginess and design trade-offs aside, the timing of Dbase's release is unfortunate because it has been superseded by the release of another blockbuster product — Fourth Dimension from Acius, Inc.

Fourth Dimension now joins Blyth Software, Inc.'s Omnis 3 Plus in the heavyweight DBMS division for the Macintosh. Whether or not you use the Macintosh, these two products are worth studying because they will both exert, for different reasons, a significant impact on personal computer products during the next two years.

Omnis 3 Plus is a thoroughly debugged, high-performance product that has been available on the Mac for more than two years. The designers behind it have been writing data base software for several years. Omnis 3 Plus is available in single- and multiuser versions.

The flat file is the basic construct within Omnis 3 Plus, but direct support is provided for connecting each file to as many as 11 other files in order to fluently process hierarchical and networked data designs. Pointer management between connected files is handled automatically within the DBMS.

Beginning users can build simple applications by pointing and picking from Macintosh menus and following the control instructions set by on-screen buttons and prompts.

Omnis 3 Plus makes much of the Macintosh interface available to the application builder. While the supplied programming language includes a fairly rich range of control constructs and functions, the product intentionally favors a rather spare approach to application creation. Users iteratively define sequences by choosing combinations of available commands from pop-up menus. Sequences are then assigned either to on-screen mouse buttons or to options on pull-down menus that behave identically to regular Macintosh menus.

Control flow is permitted within sequences, such as if-else or repeat-until. Sequences can be nested, and external sequences can be called from an executing sequence, so it is certainly possible to create turnkey applications with a real Macintosh look. At the same time, nonprogrammers can apply a Lotus Development Corp. 1-2-3 macro programming style to their work without much concern about technical details.

The impact of Omnis 3 Plus is more likely to appear on the PC than the Mac, however. A look-alike, work-alike version is being readied for imminent release under Microsoft Corp.'s Windows. Omnis 3 Plus will thus become one of the first DBMS products to provide users with a fully windowed, mouse-driven style that benefits from the standardization of the Windows interface. When this happens, users will also be able to easily trade applications and data with such products as the Macintosh II.

> THIRD-PARTY vendors were horrified at the thought of Apple putting its reputation behind an already formidable DBMS product.

Celestial event

While Omnis 3 Plus has a lot of benefits, the release of Acius's Fourth Dimension could eclipse it and several other Macintosh DBMS products.

Apple purchased the rights to Fourth Dimension from its French developers and, not surprisingly, intended to direct-market it. Also unsurprisingly, third-party vendors were horrified at the thought of Apple putting its reputation behind an already formidable DBMS product. Finally, a patchwork solution was found — Acius, a start-up, was formed, and Guy Kawasaki, Apple's chief software evangelist, left Apple to run the company.

Fourth Dimension's only problem is an embarrassment of riches. For those with Mac-like sensibilities, it is enough to say that the product requires every single page of its more than 1,000 pages of documentation. Fortunately, the user manual is written and presented beautifully.

The Fourth Dimension user works within three environments: the design environment, where files and layouts are defined; the user environment, where procedures and tasks are executed and where noncustomized applications can be run; and the custom environment, which can be fine-tuned by application developers to present a thoroughly individual appearance and feel.

The most complex of these environments is the design environment, which includes five editors for designing file structure; creating input, output and dialogue layouts; writing procedures; creating custom menus; and defining passwords.

Flat-file approach

Like Omnis 3 Plus, Fourth Dimension favors a flat-file approach to data management. This is supplemented by optional relational links between files and the capability of defining hierarchical structures through the use of subfiles tied to a subfile field within the containing file.

Fourth Dimension shines in the Macdraw-like, object-oriented graphical support that is provided. Color support for the Macintosh II is already available. But Fourth Dimension is unbeatable in the nearly total support it provides the programmer.

Vast portions of the Macintosh toolbox are accessible, and a host of standardized data base subroutines for functions such as adding or deleting records are already available. It is easy to add user-defined subroutines to the total library and nearly as easy to incorporate external functions coded in traditional programming languages. Almost anything that can be done in Pascal or C can be done in Fourth Dimension, with the added benefit that the user is provided with a graphical DBMS environment within which to work.

Although undeniably complex, Fourth Dimension, like Omnis 3 Plus, allows simple applications to be created without forcing beginners into the programming facilities.

Like Microsoft's Excel, which caused power users of PC spreadsheets to consider the Mac for the first time, Fourth Dimension will trigger reexamination of the Macintosh as a vehicle for serious data base work. PC developers who are still agonizing over their own plans for fourth-generation languages or for building next-generation interfaces with Windows should study Fourth Dimension carefully. If they're lucky, it won't be ported to the PC.

RUSSELL LIPTON

Gold rush

FROM PREVIOUS PAGE

the lion's share of the DBMS market, but they ought not, and indeed will not, ultimately eclipse nonrelational offerings.

Dispelling myth of SQL

More serious with SQL is the myth that it is an end-user application vehicle. In fact, when users buy an SQL product, they are actually buying into a particular implementation of a fourth-generation language environment. Every SQL vendor offers, usually explicitly, a fourth-generation language facility to compensate for SQL's weaknesses in that area. In a sense, the SQL portion, especially as time goes by, will be the least important part of these products.

Cathryn Barley, information center manager for Best Products Co., a nationwide retailer, speaks for many when she says, "If we find SQL to be truly user-friendly, we will move toward it. Right now, we have a large staff, with good Dbase skills and lots of stand-alone applications with adequate performance and features."

This suggests that vendors providing a top-notch interface for applications — so long as they can read and write SQL data bases — will ultimately prevail in the microcomputer DBMS marketplace. From sheer inertia of the customer base alone, this could yet save Ashton-Tate and Dbase from obsolescence. Likewise, if Lotus or Microsoft can translate their experience with their own interfaces into the DBMS arena, their customers may follow happily.

It should not be forgotten that many serious microcomputer users have put in a lot of productive hours with these products and companies and have developed strong loyalties.

Patrick Rooney, manager of information systems for the Baseball Hall of Fame in Cooperstown, N.Y., has painstakingly developed an entire accounting system with Dbase and is not going to discard it quickly. "Dbase III Plus is very powerful and, we think, easy to use," Rooney says. "I'm certainly looking at other products, but we are quite satisfied with the results we've already obtained."

Finally, this provides a fresh opportunity for mainframe vendors that have long specialized in that arena. Information Builders, which, for the first time, is selling Focus as an application environment for DB2 without inclusion of the Focus data base, is a prime example. Informix recently provided a full-blown fourth-generation language — Informix-4GL — to its customers to complement its otherwise stand-alone SQL product.

A large number of interesting technologies are already appearing in leading-edge products, and it is a safe bet that at least some of them will be mainstream products within five years.

The most significant trend will be the tight coupling of expert system products to DBMS products. Note that while expert system products are already old news, the coupling we speak of will be new news. Arity Corp., for instance, is dedicated to providing compilers and tools for Prolog programming but has already released a Prolog SQL tool kit that enables programmers to blend relational DBMS within logic programming.

The Japanese Fifth Generation Project has long envisioned a merger of logic programming with relational data bases. Ultimately, this means data bases will provide functionality that enables users to handle additional data types, such as lists, rules, frames and procedures, alongside traditional data types.

Expert system trends also imply that new methods of querying data bases will appear based around AI technology. Q&A's natural language capability, while hardly revolutionary, nonetheless furnishes an early example of this trend. Object-oriented programming is already giving birth to design for object-oriented data bases, an effort that Ingres's designers are pursuing at full speed.

This kind of work shows some promise of providing the next-step technology to substantially extend or even replace relational data base technology within a decade.

Enter CD-ROM

Another trend centers on CD-ROM technology. Assuming CD-ROM will penetrate the industry — a safe, though by no means certain, assumption — DBMS vendors will find themselves challenged by the need to provide qualitatively more sophisticated navigation facilities through multimedia data bases measured in the hundreds of megabytes. Text handling has never been a strong point for DBMS to begin with, and it will be dramatically complicated by the merging of text with image and audio in CD-ROM.

The still primitive navigation tools of today's emerging hypertext products (for example, Guide from Owl International, Inc. for both the IBM PC and the Macintosh) are candidates for transformation and absorption into DBMS products. While Guide is not a data base product today, its design trajectory should carry it into that realm. Guide currently is being used to create highly interactive documentation and textual retrieval applications.

Application generation will also see tremendous leaps forward in the next five years. In author Simpson's view, "Trends like SQL are not as important,

In the data base language contest, SQL places first on popular vote

BY RICHARD FINKELSTEIN

The importance of Structured Query Language (SQL) lies not in its innate power and simplicity of construction but in its emergence as the standard language for data base management.

In February, the American National Standards Institute released its specifications for a standard SQL. In March, IBM officially put its stamp on SQL by declaring it the data base language for its Systems Application Architecture (SAA).

Other languages have competed with SQL for the position of standard data base language. One is Relational Technology, Inc.'s Quel. Many industry experts feel Quel is the better product, but SQL has, nonetheless, emerged as the victor because of strong industry support.

SQL's primary attraction is the promise of standardization, which means substantial economic benefits for users. These benefits are derived from increased portability of applications, reduced training costs, better communication between data processing and end-user personnel, increased connectivity of information and greater longevity of applications.

Edging toward portability

SQL is technically a data sublanguage. It can be used interactively by end users or embedded in an application development system. While SQL can be used within procedural languages such as Cobol and PL/I, most vendors provide nonprocedural application development tools that utilize the full power of SQL.

Oracle Corp. provides SQL Forms, while Relational Technology includes Application-By-Forms within Ingres. Informix Software, Inc. offers Informix-4GL. Sybase from Sybase, Inc. and XDB from Software Systems Technology, Inc. both include advanced, nonprocedural application generators with embedded SQL. All of these products are available on micro and minicomputer platforms.

Since each vendor has its own application development tool set, SQL does not ensure total portability of applications. It does, however, provide a start in that direction. Most vendors are supporting IBM's version of SQL and are trying to mimic its language precompilers and program error handling routines.

Even with standard precompilers, it would also be useful to have standardized nonprocedural application development tools and end-user interfaces. IBM has already announced that its Cross-System Product (CSP) and Query-Management Facility (QMF) will be part of SAA. CSP is IBM's application generator that can be used to develop DB2 applications.

QMF is IBM's end-user interface that allows users to manipulate SQL data bases using SQL commands or Query-By-Example forms. A runtime version of CSP is currently available on the IBM Personal Computer, and IBM has indicated its new operating system, OS/2 Extended Edition, will include a QMF-like front end.

Similarly, Oracle has announced a QMF-like front end, which it calls QMX. IBM will also introduce a nonprocedural application development tool with OS/2 Extended Edition, which may be copied by other vendors.

Other vendors will compete with IBM in the applications development arena. Oracle, Relational Technology, Sybase and Informix are likely to introduce interfaces for their tool sets to DB2 and SQL/DS. Applied Data Research, Inc. recently purchased a license to XDB and will undoubtedly make use of XDB's form-generation system on future products.

All of these vendors offer nonprocedural application development products that are substantially more productive than their mainframe counterparts, and as these products are moved to the mainframe, we should see increased applications portability.

SQL is also being used in non-data base products such as spreadsheets and graphics packages. Lotus Development Corp. has announced a strategic relationship with IBM that will link 1-2-3/M to DB2 on mainframes. Lotus has also announced data base-oriented packages based on SQL on the micro that will probably be similarly linked to 1-2-3.

Signs of diversification

SQL is meant to be used by both end users and DP professionals. Since end users and programmers will be speaking the same language, there will be less confusion when these two groups communicate with one another. And the fact that SQL can be used interactively, as well as within application programs, means that an organization only needs to train their end-user and DP personnel in one language.

SQL also supports the growing demand to link data bases within and between local-area networks (LAN), wide-area networks and micros, minis and mainframes. Gupta Technologies, Inc. currently provides an Advanced Program-to-Program Communications gateway between its data base server, SQLbase and DB2 using CICS. Since SQLbase is based on the requestor/server data base model, users can transparently access multiple servers on a LAN or mainframe system such as DB2. Ingres and Oracle also provide SQL-based distributed data base query capabilities.

Although IBM's SQL data base server for OS/2 Extended Edition could be two or more years away, this should not impede the development process, since SQL vendors will build bridges from their DBMS and DBMS servers to IBM's via SQL gateways. This capability will allow an organization to begin planning and implementing LAN data base systems without cutting itself off from future product developments or exposing itself to excessive conversion costs.

All told, the industry is currently spending millions of dollars on SQL and related product research and development, which ensures the language's permanence. Although the total effect of SQL on the micro world is still unclear, IBM and Ashton-Tate have announced micro DBMSs, and Lotus and Microsoft have definite intentions in this field. Oracle and Informix both appeared on a recent *Business Week* list of fastest growing corporations, and every SQL vendor is experiencing unprecedented growth. •

> ALL TOLD, the industry is currently spending millions of dollars on SQL and related product research and development, which ensures the language's permanence. Although the total effect of SQL on the micro world is still unclear, it can no longer be disputed that it will be the standard.

Finkelstein is vice-president, Midwest region, of the Codd and Date Consulting Group. He also publishes "SQL Review," a quarterly newsletter.

Proof of productivity is found in the quality of the decisions made

BY CHANNING PRESTON

Too much emphasis is being placed on data base management systems' efficiency. Performance issues merely scratch the surface of potential data base use. A more difficult issue to address is whether these data bases are used productively.

Productivity can be examined from several points of view. Primarily, users hear of the vast increase in programmer productivity, as well as better use of machine resources through operational ease of use and improved performance.

However, from a business perspective, data base productivity is measured by decision support, whether data bases are being used to solve business problems or make better business decisions.

In organizations using data bases, there are three types of users: the active, the passive and the deferred user. Each type has recognizable characteristics, and each uses a data base in a different way.

- The active user is typically at the line level and uses the data base in the most traditional fashion, in support of transaction processing.
- The passive user has little actual contact with the data base but uses the information accessible through it to make day-to-day decisions.
- The deferred user is the most difficult to recognise and can be characterised as a "corporate guerrilla," using the data base to maintain his corporate position through strategic thinking.

It is the deferred user who stretches the limits of data base capacity by using the information provided by the other two user types. As business issues arise that cannot be answered easily, it is the deferred user who will seek out new sources of information or use existing information in new ways.

This process can be termed the "pressures and vents" phenomenon: As pressure for new information builds, new routes, or vents, for obtaining that information will be found. In a well-controlled data base environment, these vents will result in a more robust environment from which to draw new information to perform even more sophisticated simulations and answer harder business questions.

How does the deferred user make use of data base systems to gain maximum productivity from the information they can provide?

As business decisions are formulated, he will use the data base to model all aspects of the decision, gathering as much information as possible. Then, the decision-making process can be simulated and, most important, evaluated.

Here is where data base productivity really lies. If decisions

Continued on page S10

Preston is data base administrator for Advanced Systems, Inc., a company specializing in training products and services, in Arlington Heights, Ill.

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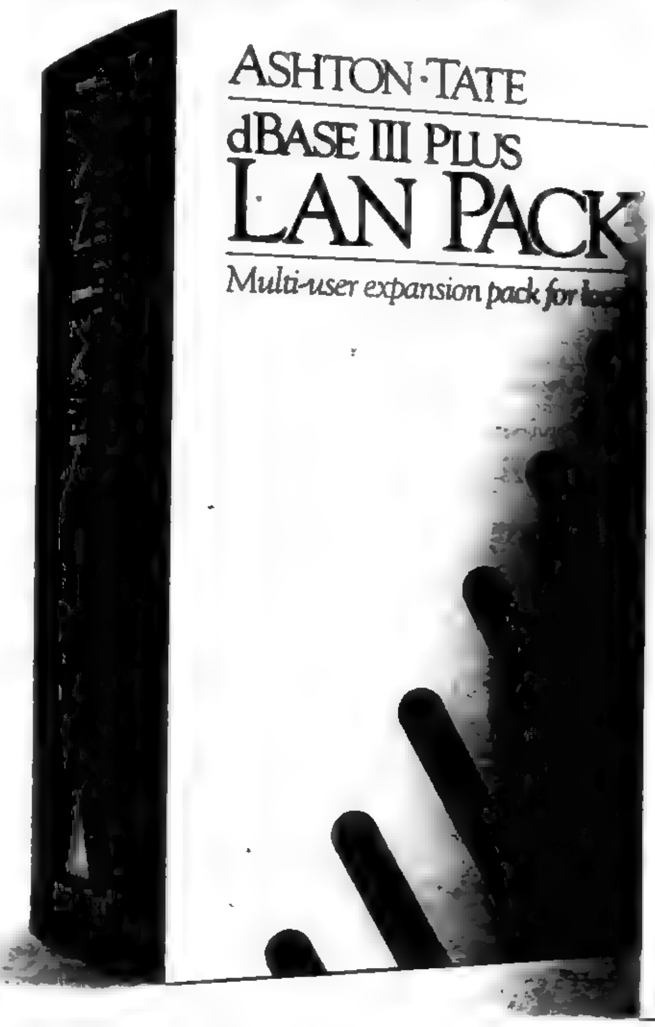

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ultimately, as the continued development of fourth-generation language products. Tools that reduce or eliminate the need for coding will have a much greater impact on the market."

Again, the Macintosh is leading the way in this area, both with data base products like Fourth Dimension and Omnis 3 Plus and with special programming tools like Mainstay's Visual Interactive Programming (VIP).

VIP is particularly revolutionary, since it enables users to construct error-limited programs by picking and choosing from graphical objects that are automatically combined by VIP to produce executable programs.

The problem with the Macintosh has never been lack of innovation but rather lack of clout in the corporate office. The desktop publishing boom changed this to some degree, but Gartner's Kirwin says he believes the new generation of Macintoshes will open more doors.

"Without question," he says, "the Macintosh is now going to make very significant inroads into the corporate market. We predict that Apple will appear on many more corporate-supported lists over the next 12 months."

By synthesizing the above trends, it is not too difficult to arrive at a highly probably scenario for 1992. OS/2 and SQL will have long since stabilized as an operating system and data base engine platform.

Around this platform, a host of vendors will have constructed super-powerful DBMS systems mediated by a Presentation Manager or Macintosh interface that enables users to variously pick and choose from on-screen objects or descend into fourth-generation languages to construct applications that access the entire PC machine.

Meanwhile, users will be poised for full appropriation of developments that will take us to 1997. These developments will incorporate hyper-data bases in CD-ROM that merge textual and graphical data structures using an extended relational model that is mediated by "expert assistants."

These software agents will automatically optimize performance as well as consult with the user to recommend query approaches to data based on observed user behavior.

Just as SQL will have become a largely invisible system data base engine, the Presentation Manager will probably become a very high-level toolbox from which multiple, customized user interfaces will be developed to handle an ever-expanding set of customer requirements. •

Productivity

FROM PAGE S7

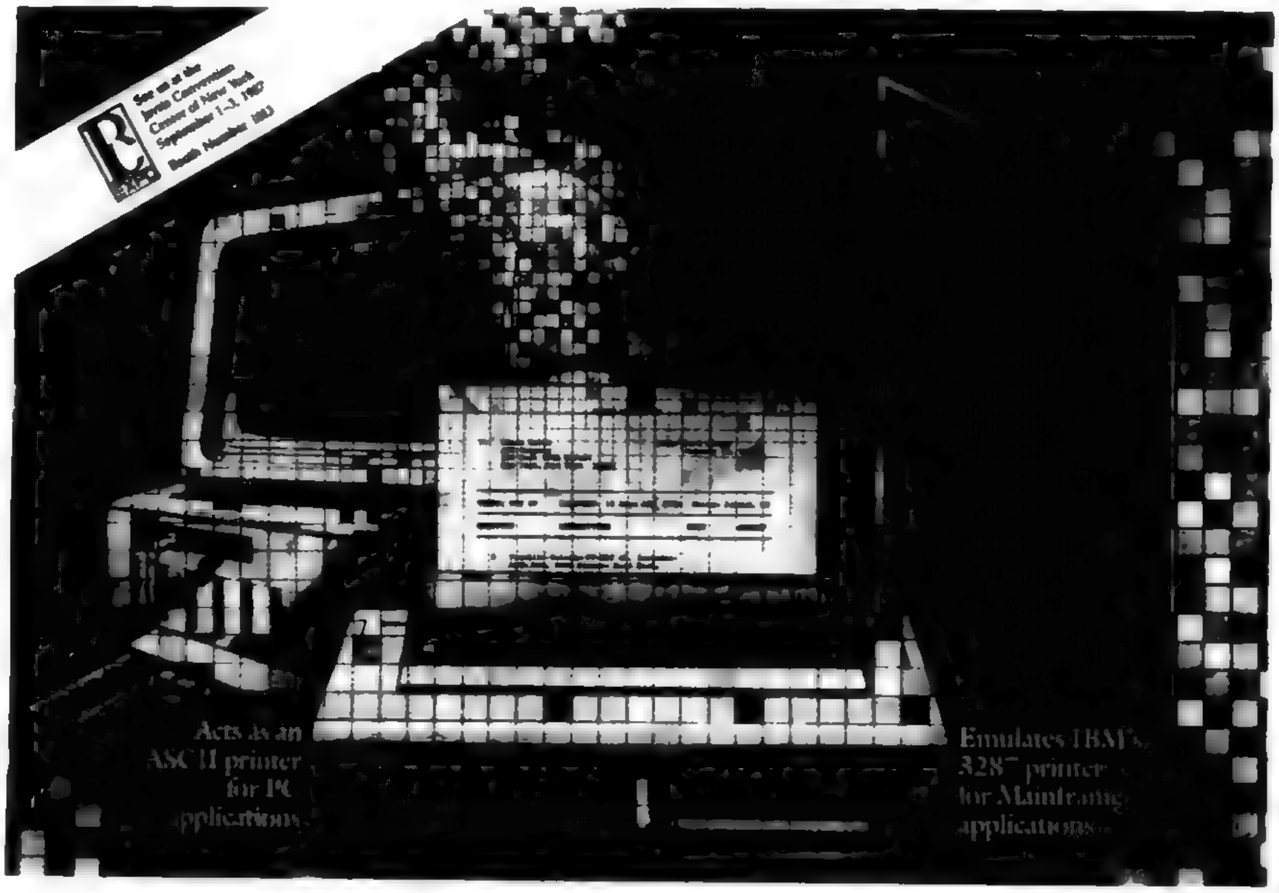
can be modeled and evaluated, the result should be better decisions, not just more of them. If this modeling can occur before the decision is made, catastrophes should be avoidable.

This is the optimum in decision modeling. Even if complete information is not available for use in the simulation, data bases can be used to gather information for after-the-fact evaluation of decision results. In this way, information bases can be built that can eventually be used in the simulation process.

A classic example of decision simulation can be found in product development. By gathering information about a product and about its market, the potential response can be estimated and a decision made as to whether the product should be developed.

Of course, the information accuracy and the reasonableness of the assumptions used in the simulation must be factored into the model or the simulation may not approach reality. When the results of early decision simulations are applied, this process can be refined to increase the accuracy of the simulation, making the simulation a cyclical, dynamic process.

So there are two factors to the decision-modeling process — having the information available to build a model and simulate business decisions and gathering the indicators to evaluate that decision, which will facilitate future simulations. Organizations that use data bases in this fashion exhibit a much higher degree of sophistication than those that use data bases simply to store and access data. •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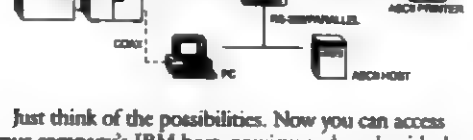

Just think of the possibilities. Now you can access your company's IBM host, preview and work with the data on your desktop PC, and get your printout on any popular, low cost ASCII printer at any remote location. Conversely, you can network the IBM 3287 system without an expensive IBM 3287 printer. Or to put it simply, you can now integrate the same ASCII printer for both PC and IBM or ASCII host applications.

The big advantage of the Infourmer is that it makes more of your ASCII printer capability. Much more. You get more type fonts, faster print rates, higher quality, and quieter operation. And no more waiting for printouts from the basement computer room. You get your hard copy where and when you need it. All for about one fourth of what it costs for an IBM printer.

As specialists in micro-to-mainframe link communications, the Infourmer is precisely the kind of product you would expect from 4G Data Systems. It's our printer adapter with the split personality that brings it all together for you. For more information, call us toll-free 1-800-367-4539. In New York, call 1-800-223-4539.

4G DATA SYSTEMS inc

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Microcomputer and small-system DBMS

COMPANY	PRODUCT	OPERATING SYSTEMS SUPPORTED	HARDWARE SUPPORTED	MINIMUM MEMORY REQUIRED (IN BYTES)	NUMBER AND KIND OF DISKS REQUIRED	MULTIUSER CAPABILITY	SUPPORTS LAN USAGE	MENU DRIVEN	QUERY LANGUAGE INCLUDED	PROGRAMMING LANGUAGES SUPPORTED	FULL DATA TRANSFER WITH OTHER SOFTWARE	MAXIMUM FIELD SIZE (IN CHARACTERS)	MAXIMUM NUMBER OF FIELDS PER RECORD	MAXIMUM NUMBER OF RECORDS PER FILE	SECURITY PROVISIONS	PRICE
Acius, Inc. (408) 252-4444	**Fourth Dimension**	**Macintosh operating system**	**Macintosh**	**1M**	**2 800K floppies, hard drive recommended**	**Yes**	**Yes**	**Yes**	**Yes**	**Proprietary**	**Any ASCII file**	**32,767**	**511**	**16 million**	**Password protection**	**$695 (per copy)**
Advanced Data Institute of America, Inc. (916) 381-8334	Aladin	MS-DOS, Apple DOS	IBM PC, XT, AT, PS/2 and compatibles, Apple II series	192K (IBM version), 64K (Apple version)	2 floppies or 1 floppy, 1 hard disk	No	No	Yes	Yes	Pascal	Any ASCII file	32	512	65,535	Password protection, user-access security	$795 (IBM version), $595 (Apple version) (per copy)
Advanced Microsolutions (415) 365-9880	**DBmagic**	**Basic**	**HP 9000 or Vectra PC**	**1M**	**1 double-sided floppy**	**Yes**	**Yes**	**Yes**	**Optional**	**Basic**	**Proprietary**	**32,000**	**32,000**	**Limited by disk space only**	**Finger-printed disk, security modules**	**$1,495 (for first copy)**
Airs, Inc. (301) 454-2022	Marcon	MS-DOS	IBM PC, XT, AT and compatibles	640K	1 hard disk	Yes	Yes	Yes	Yes	None	Any ASCII file	Limited by disk space only	80 recommended	Limited by disk space only	Field security, function-level security, password protection	$895 (per copy)
Alpha Software Corp. (617) 229-2924	**Alpha/three**	**MS-DOS**	**IBM PC, XT, AT, PS/2 and compatibles**	**320K**	**5 floppies**	**No**	**No**	**Yes**	**No**	**None**	**Any ASCII, DIF, Sylk file**	**4,000**	**128**	**65,536**	**None**	**$395 (per copy)**
American Planning Corp. (703) 751-2574	Boss	MS-DOS, PC-DOS, Xenix 5, CP/M 86	IBM PC, XT, AT and compatibles, hardware compatible with Intel 8088, 8086, 80186, 80386 machines	320K	2 floppies	Yes	Yes	Yes	Yes	Basic, C language, assembler	Any ASCII file	255	255	2 billion	Data encryption, password protection, record locking	$990 (per copy), $1,895 (multiuser)
Analytical Software, Inc. (214) 340-2564	**The Executive Assistant**	**MS-DOS**	**IBM PC, XT, AT, PS/2 and compatibles**	**128K**	**1 double-sided floppy**	**No**	**No**	**Yes**	**No**	**None**	**Any ASCII file**	**25**	**8**	**225**	**None**	**$150 (per copy)**
Ansa Software (415) 595-4651	Paradox	MS-DOS	IBM PC, XT, AT and compatibles, Compaq Plus, Deskpro and compatibles	512K	2 floppies	Yes	Yes	Yes	Yes	Proprietary	1-2-3, Symphony, Dbase II, III, any ASCII, DIF, PFS file	255	255	65,000 up to 2 billion depending on version	Password protection, record locking, protection generation	$495-$725 (per copy depending on version)
Applied Software Technology (408) 370-2662	**Versaform XL**	**MS-DOS**	**IBM PC, XT, AT, PS/2 and compatibles**	**512K**	**2 floppies or 1 floppy, 1 hard disk**	**No**	**No**	**Yes**	**Yes**	**Pascal**	**Any ASCII, text file**	**158**	**100**	**Limited by disk space only**	**None**	**$150 (per copy)**
Aquarius Enterprises (609) 693-0513	AE data base development program	MS-DOS, CP/M	IBM PC, XT, AT and compatibles	384K	2 floppies	Yes	Yes	Yes	Yes	Assembler	Dbase, 1-2-3, any ASCII file	—	—	—	Password protection	$695 (per copy)
ASAP, Inc. (408) 476-3936	**Universal base six**	**MS-DOS, PC-DOS**	**IBM PC, XT, AT PS/2 and compatibles**	**256K**	**1 hard disk with 1M-byte disk space**	**No**	**No**	**Yes**	**Yes**	**None**	**Any ASCII, DIF file**	**80**	**255**	**Limited by disk space only**	**Password protection**	**$395 (per copy)**
Ashton-Tate (213) 329-8000	Dbase III Plus	PC-DOS	IBM PC, XT, AT and compatibles	256K	2 floppies	Yes	Yes	No	No	Dbase, C language, Pascal	Any ASCII, Sylk, PFS file	255	128	Limited by disk space only	Protect utility	$695 (per copy)
Automata Design Associates (215) 646-4894	**ADA Prolog**	**MS-DOS, PC-DOS, Xenix, Unix System V**	**IBM PC, XT, AT and compatibles, 80386 machines**	**640K**	**1 hard disk**	**Yes**	**No**	**No**	**Yes**	**Prolog**	**No**	**Limited by disk space only**	**Limited by disk space only**	**Limited by disk space only**	**None**	**$100-$400 (per copy depending on hardware)**
AV Systems Corp. (805) 569-1618	Database Builder	Apple DOS 3.3	Apple II series and compatibles	48K	1 floppy	No	No	Yes	NA	Basic	No	256	18	Depends on configuration	None	$9.95 (per copy)
Blyth Software, Inc. (415) 571-0222	**Omnis 3 Plus**	**Macintosh operating system**	**All Macintosh computers**	**512K**	**3 floppies, 1 hard drive recommended**	**Yes**	**Yes**	**Yes**	**Yes**	**Proprietary**	**Any DIF, Sylk, ASCII file**	**79**	**1,440**	**Limited by disk space only**	**Password security, library encryption**	**$495 (per copy, single user)**
Business Tools, Inc. (206) 644-2015	TAS-Plus	MS-DOS	IBM PC, XT, AT, PS/2 and compatibles	384K	2 floppies or 1 floppy, 1 hard disk	Yes	Yes	Yes	Proprietary	None	Any ASCII file	256	10,254	65,535 or 16,776,960	None	$69 or $199 (per user, single copy, depending on version)
Buttonware, Inc. (206) 454-0479	**PC File Plus**	**MS-DOS, PC-DOS**	**IBM PC, XT, AT and compatibles**	**384K**	**2 double-sided hard disks**	**No**	**No**	**Yes**	**No**	**Basic, Fortran, Pascal, C language, assembler**	**Dbase II and III, Wordperfect, Wordstar, 1-2-3, Peach Text, Microsoft Word, proprietary**	**1,065**	**72**	**65,533**	**Password protection**	**$69.95 (per copy)**
Cincom Systems, Inc. (800) 543-3010	Ultra	VAX/VMS	All Microvax	1M	Varies with size of data base	Yes	Yes	Yes	Yes	Cobol, Fortran, Basic, proprietary	RMS files	4,000	Limited by disk space only	Limited by disk space only	Password protection, common data directory security	$20,000 (per copy)
Computers Anywhere, Inc. (800) 263-WORD	**Base**	**MS-DOS, PC-DOS**	**IBM PC, XT, AT and compatibles**	**64K**	**1 hard disk, 1 floppy**	**No**	**No**	**Yes**	**No**	**Fortran, proprietary**	**Any ASCII file**	**132**	**2,048**	**Limited by disk space only**	**Password protection**	**$695 (per copy)**
Compuware Corp. (313) 540-2396	Powerbase	MS-DOS, OS/2	IBM PC, XT, AT, PS/2 and compatibles	384K	2 double-sided floppies or 1 floppy, 1 hard disk	Yes	No	Yes	No	None	Any ASCII, DIF, Sylk file	80	1,600	65,000	Applications locking	$349 (per copy)
Conceptual Software Corp. (713) 667-4222	**Prodas**	**MS-DOS, VAX/VMS, Unix**	**IBM PC, XT, AT and compatibles**	**312K**	**1 hard disk**	**No**	**No**	**No**	**No**	**C language, proprietary**	**Any ASCII, DIF, Sylk file**	**200**	**Limited by disk space only**	**Limited by disk space only**	**None**	**$720 (per copy)**

The companies included in this chart responded to a recent telephone survey conducted by *Computerworld*. Further product information is available from vendors.

COMPANY	PRODUCT	OPERATING SYSTEMS SUPPORTED	HARDWARE SUPPORTED	MINIMUM MEMORY REQUIRED (IN BYTES)	NUMBER AND KIND OF DISKS REQUIRED	MULTIUSER CAPABILITY	SUPPORTS LAN USAGE	MENU DRIVEN	QUERY LANGUAGE INCLUDED	PROGRAMMING LANGUAGES SUPPORTED	FULL DATA TRANSFER WITH OTHER SOFTWARE	MAXIMUM FIELD SIZE (IN CHARACTERS)		MAXIMUM NUMBER OF RECORDS PER FILE	SECURITY PROVISIONS	PRICE
Condor Computer Corp. (313) 971-8880	Condor 3	MS-DOS, PC-DOS, CP/M	IBM PC, XT, AT, PS/2 and compatibles	128K	2 double-sided floppies or 1 hard disk	Yes	No	Yes	Yes	Assembler	Any ASCII file	127	127	65,534	None	$495 (per copy)
Conetic Systems, Inc. (800) 854-2807	C/Base	Unix, Xenix, Ultrix, MS-DOS, PC-DOS	IBM PC, XT, AT and compatibles, Unisys 5000 series, Deskpro 286, 386	512K	1 floppy and 1 hard disk	Yes	No	Yes	Yes	C language	Any ASCII file	36	32,767	2 billion	Password protection	$695 (per copy)
Control Data Corp. (612) 853-8400	IM/Personal	MS-DOS	IBM PC, XT, AT and compatibles	512K	Hard disk and disk drive required	Yes	Yes	Yes	Yes	—	Any ASCII, PIF, CSV, Cobol files	2,000	150	Limited by disk space only	Password protection	$495 (per copy)
Cosmos, Inc. (206) 643-9898	Revelation	MS-DOS, PC-DOS	IBM PC, XT, AT and compatibles, all Compaq, Televideo, HP Vectra, Tandy TRS-90 (1000 and 2000), Toshiba portable, Zenith 150, Unisys PC, ITT Xtra	320K	2 double-sided floppies	Yes	Yes	Yes	Yes	Proprietary	Any ASCII file	65,000	65,000	Limited by disk space only	Record locking	$950 (per copy)
	Advanced Revelation	MS-DOS, PC-DOS	IBM PC, XT, AT, PS/2 and compatibles, all Compaq machines	512K	One double-sided floppy, 1 hard disk drive	Yes	Yes	Yes	Yes	Proprietary	Any ASCII file	65,000	65,000	Limited by disk space only	Record locking, password protection, function/key enable/disable capability	$950 (per copy)
Coyne Kalajian, Inc. (703) 522-7036	Responder	Wang VS	Wang VS	512K	10M-byte hard disk	Yes	Yes	Yes	Yes	Cobol, Basic, C language, assembler, RPGII, Fortran, PL/I	20/20, 1-2-3	256	2,000	1 million	Password protection	Contact vendor
DAC Software, Inc. (214) 458-0038	Dac-Easy Base	MS-DOS, PC-DOS	IBM PC, XT, AT and compatibles	256K	2 double-sided, double-density disks	No	No	Yes	Yes	Dbase	Dbase II, SDF, ASCII files	255	60	Limited by disk space only	Password protection	$49.95 (per copy)
SBI Software Products (800) 221-3701	Kaleidoscope	MS-DOS, CP/M	IBM PC, XT, AT and compatibles, Unisys micros	640K	Varies according to hardware	No	No	Yes	Yes	Proprietary	Multiplan, 1-2-3, Supercalc	—	20	Depends on disk storage	None	$195 (per copy)
Data Access Corp. (800) 451-FLEX (800) 331-3980 (in Fla.)	Dataflex	PC-DOS, MS-DOS, CP/M, Netware, 3Com Ethernet, Unix System V	All hardware that runs on operating systems listed	256K	2 floppies	Yes	Yes	Yes	Yes	Assembler, Pascal, C language	Any ASCII, DIF file	255	255	16,770,215	Programmable security, passwords	$695-$1,250 (per server)
Database Applications, Inc. (800) 924-2900	NPLR	MS-DOS	IBM PC, XT, AT and compatibles	256K	1 hard disk	Yes	Yes	Optional	Yes	NA	No	999	255	Limited by disk space only	None	$595 (per copy)
	DNPL Reporter	MS-DOS	IBM PC, XT, AT and compatibles	320K	3 floppies, 1 hard disk recommended	Yes	Yes	Optional	Yes	NA	No	999	255	Limited by disk space only	None	$89.50 (per copy)
Data Ease International, Inc. (800) 243-5123, (203) 374-8000 (in Conn.)	Data Ease	MS-DOS, PC-DOS	IBM PC, XT, AT and compatibles, Wang PC, Rainbow, Victor, Unisys PC and compatibles, Texas Instruments PC	384K	2 floppies or 1 floppy, 1 hard disk	Yes (LAN version)	Yes (LAN version)	Yes	Yes	None	Proprietary	255	255	65,525	Password protection, field security	$600 (per copy), $700 (LAN version)
Data Language Corp. (617) 663-5000	Progress	MS-DOS, Xenix, Unix, Ultrix	IBM PC, XT, AT and compatibles, more than 100 other hardware systems	512K (PC version), 1M (Unix version)	2M-byte hard disk required	Yes	Yes	Yes	Yes	Proprietary	Any ASCII file	2,000	Limited by disk space only	Limited by disk space only	Password protection, user ID	$895 (per copy, PC version)
Datapak Software, Inc. (818) 905-6419	Executive Office	Macintosh operating system	All Macintosh computers	512K	1 800K or 2 400K disks	No	No	Yes	No	None	Any ASCII file	Varies	42	Limited by disk space only	None	$249.95 (per copy)
	Notes n' Files	Prodos 16	Apple II	512K	One 3½-in. disk	No	No	Yes	No	None	Any ASCII file	Varies	15	Limited by disk space only	None	$129.95 (per copy)
Dayflo Software Corp. (714) 474-1364	Dayflo Tracker	MS-DOS, PC-DOS	IBM PC, XT, AT and compatibles	384K	1 floppy, 1 hard disk	No	Yes	Yes	Yes	None	Any ASCII file	32,000	Limited by disk space only	65,000	None	From $99.95 (per copy)
	Dayflo Tracker-720	MS-DOS, PC-DOS	IBM PC, XT, AT and compatibles	512K	2 720K-byte floppies	No	Yes	Yes	Yes	None	Any ASCII file	32,000	Limited by disk space only	65,000	None	From $99.95 (per copy)
Dimension Software Systems, Inc. (214) 580-1045	Free Form	Unix System V, VAX/VMS, PC-DOS	AT&T 3B series, DEC Microvax, VAX-11/750, 11/780, IBM PC, XT, AT and compatibles	524K	Varies according to hardware	Yes	Yes	Yes	Yes	Proprietary	—	255	2^{32}	250	Password protection	Contact vendor
Dynacomp, Inc. (716) 265-4040	Dynamaster Database	MS-DOS	IBM PC, XT, AT and compatibles	128K	2 floppies or 1 floppy, 1 hard disk	No	No	Yes	Yes	C language, assembler, Cobol	Any ASCII file	1,771	99	Limited by disk space only	None	$39.95 (per copy)
Expert-Ease Systems, Inc. (415) 593-3200	Expert-Ease Graphics DBMS	MS-DOS	IBM PC, XT, AT, 386 and compatibles	640K	1 hard disk, 1 floppy	No	No	Yes	No	Basic, Fortran, C language	None	80	99	5,000	Password protection	$3,600 (development software) $1,100 (runtime)
Finder Information Tools, Inc. (404) 872-3488	Finder, The Retrieval Software	MS-DOS, PC-DOS	IBM PC, XT, AT, PS/2 and compatibles	256K	1 hard disk	Yes	Yes	Yes	No	None	Any ASCII file	255	60	Limited by disk space only	Password protection	$1,500 (per copy)
First Desk Systems, Inc. (800) 522-2286	Firstfile	Macintosh operating system	All Macintosh computers	128K	400K, hard disk recommended	No	No	Yes	Yes	None	Any ASCII file	50	100	2 billion	None	$295 (per copy)

COMPANY	PRODUCT	OPERATING SYSTEMS SUPPORTED	HARDWARE SUPPORTED	MINIMUM MEMORY REQUIRED (IN BYTES)	NUMBER AND KIND OF DISKS REQUIRED	MULTIUSER CAPABILITY	SUPPORTS LAN USAGE	MENU DRIVEN	QUERY LANGUAGE INCLUDED	PROGRAMMING LANGUAGES SUPPORTED	FULL DATA TRANSFER WITH OTHER SOFTWARE	MAXIMUM FIELD SIZE (IN CHARACTERS)	MAXIMUM NUMBER OF FIELDS PER RECORD	MAXIMUM NUMBER OF RECORDS PER FILE	SECURITY PROVISIONS	PRICE
First Desk Systems, Inc. (800) 522-2286	**Firstbase**	**Macintosh operating system**	**All Macintosh computers**	**512K**	**800K, hard disk recommended**	**Yes**	**Yes**	**Yes**	**Yes**	**None**	**Any ASCII file**	**256**	**100**	**2 billion**	**Password protection, file locking**	**$795 (per copy)**
Fox Research, Inc. (513) 433-2238	10-Base	MS-DOS	IBM PC, XT, AT and compatibles	256K	1 floppy	Yes	Yes	Yes	Yes	C language, assembler, Basic	Any DIF, ASCII file	1,550	420	Limited by disk space only	—	$495 (per copy, single user), $895 (multiusers)
Fox Software, Inc. (419) 874-0162	**Foxbase Plus**	**MS-DOS, PC-DOS, Xenix, Unix**	**IBM PC, XT, AT and compatibles**	**350K**	**1 hard disk**	**Yes**	**Yes**	**No**	**Yes**	**C language, assembler**	**Any ASCII file**	**254**	**128**	**1 billion**	**None**	**$395 (per copy, single user), $795 (for Xenix)**
General Data Systems Ltd. (215) 985-1780	GDX	MS-DOS	IBM PC, XT, AT and compatibles, Intel 310 supermicros	512K	Hard disk recommended	Yes	Yes	Yes	Yes	Cobol, Pascal, Fortran, C language, assembler	Any	Limited by disk space only	Limited by disk space only	Limited by disk space only	Password protection	$2,500 (PC version)
Goldata Computer Services, Inc. (800) 433-3267	**Goldatabase**	**MS-DOS, PC-DOS**	**IBM PC, XT, AT, PS/2 and compatibles**	**196K**	**1 floppy**	**Yes**	**Yes**	**Yes**	**Yes**	**Basic**	**Any ASCII, DIF file**	**800**	**300**	**Limited by disk space only**	**Password protection**	**$149.95 (per copy)**
Golemics, Inc. (415) 652-5396	Sequitur	PC-DOS	IBM PC, XT, AT and compatibles	256K	1 hard disk or 2 floppies	No	No	Yes	No	None	Any ASCII file	4,000	975	Limited by disk space only	None	$79 (per copy)
Gupta Technologies, Inc. (415) 321-9500	**SQLBase**	**MS-DOS**	**IBM PC, XT, AT and compatibles**	**640K (server), 512K (application nodes)**	**1 hard disk**	**Yes**	**Yes**	**No**	**Yes**	**C language, Cobol**	**Any ASCII or DIF file**	**254**	**250**	**Limited by disk space only**	**Security by record, field, table, user, row**	**$999 (per copy single user)**
IBM (800) 447-4700	Personal Decision Series: Data Edition Version II	MS-DOS	IBM PC, XT, AT, PS/2 Models 30, 50, 60, 80	320K	2 disk drives or 1 disk drive, 1 hard disk	Yes	Yes	Yes	Yes	None	1-2-3, Symphony, Dbase II, III, any ASCII or DIF file	240	100	Limited by disk space only	Password protection	$255 (per copy), $395 (for Network Plus package)
IOTC, Inc. (307) 721-6816	**PDbase**	**P system**	**Apple II, III, IBM PC, XT, AT and compatibles**	**128K**	**1 hard disk or 1 floppy**	**Yes**	**Yes**	**Yes**	**Yes**	**Pascal**	**None**	**32,761**	**—**	**Limited by disk space only**	**Password protection**	**$585 (per copy)**
Information Builders, Inc. (212) 736-4433	PC/Focus	PC-DOS, MS-DOS, OS/2	IBM PC, XT, AT and compatibles	650K	10M-byte hard disk	Yes	Yes	Yes	Yes	Fortran, Pascal, assembler, C language	Dbase	256	256	Limited by disk space only	Password protection	$1,295 (per copy)
Informix Software, Inc. (415) 322-4100	**Informix-SQL**	**MS-DOS, PC-DOS, VMS, Unix**	**IBM PC, XT, AT and compatibles, Microvax, AT&T micros, Concurrent micros**	**640K (MS-DOS version), 1M (Unix version)**	**—**	**Yes**	**Yes**	**Yes**	**Yes**	**C language, Cobol**	**Any ASCII file**	**Limited by disk space only**	**Limited by disk space only**	**Limited by disk space only**	**Limited access by data base, table, field**	**From $795 (per copy)**
	Informix-4GL	**MS-DOS, PC-DOS, VMS, Unix**	**IBM PC, XT, AT and compatibles, Microvax, AT&T micros, Concurrent micros**	**640K**	**—**	**Yes**	**Yes**	**Yes**	**Yes**	**C language, Cobol**	**Any ASCII file**	**Limited by disk space only**	**Limited by disk space only**	**Limited by disk space only**	**Limited access by data base, table, field**	**From $995 (per copy)**
Inmagic, Inc. (617) 661-8124	Inmagic	MS-DOS, VMS	IBM PC, XT, AT and compatibles, HP 3000, Rainbow, Microvax, Wang PC	384K	1 double-sided floppy or 1 hard disk	Yes	Yes	Yes	Yes	None	Any ASCII file	Limited by disk space only	Limited by disk space only	Limited by disk space only	Password protection	From $975 (per copy)
Innovative Software, Inc. (800) GET SMART	**The Smart Data Base Manager**	**MS-DOS, Unix, Xenix**	**IBM PC, XT, AT, PS/2 and compatibles, AT&T 3B series**	**256K (single-user version), 384K (network version)**	**1 floppy, 1 hard disk**	**Yes**	**Yes**	**Yes**	**Yes**	**Proprietary**	**Any ASCII, DIF, Sylk file**	**4,096**	**255**	**1 million**	**Password protection, record locking**	**$695 (per copy)**
Interactive Technology, Inc. (503) 644-0111	RDM The Application Developer	VAX/VMS, MicroVMS, RSTS, RSX, Micro RSX, TSX Plus, POS, MS-DOS, RT-11	All VAX, Microvax, PDP-11, Deskpro 350, 380, IBM PC, XT, AT and compatibles	512K	1 hard disk required	Yes	Yes	Yes	Yes	Pascal	Any ASCII file	255	220 (2,048 bytes per record)	16 million +	Password protection	$895 (PC version), $24,500 (high-end VAX version)
The Key Board (505) 281-1796	**The Data Base**	**MS-DOS, PC-DOS**	**IBM PC, XT, AT, PS/2 and compatibles**	**256K**	**1 floppy, hard drive**	**No**	**No**	**Yes**	**No**	**None**	**Any ASCII file**	**80**	**100**	**32,000**	**None**	**$29.95 (per copy)**
Landmark Software Systems, Inc. (201) 722-5100	X-ample	MicroVMS	Microvax	512K	1 hard disk	Yes	Yes	Yes	Yes	Cobol, C language	Any RMS file	132	1,000	Limited by disk space only	Password protection, user names, function security	$15,000-$20,000 (per copy)
MAI Basic Four, Inc. (714) 730-2440	**MAI Origin**	**Bos/IX, Bos/VS**	**MAI 1800, 2000, 3000, MAI MPX family**	**768K**	**1 hard disk**	**Yes**	**Yes**	**Yes**	**Yes**	**Basic**	**Proprietary**	**32,000**	**999**	**Limited by disk space only**	**Security at the menu, program, file levels, password protection**	**$995-$1,995 (per copy)**
Metafile Information Systems, Inc. (507) 867-4440	Metafile	MS-DOS	IBM PC, XT, AT and compatibles	256K	2 floppies	Yes	Yes	Yes	Yes	Cobol, Fortran, Basic, Pascal	Any ASCII file	256	510	64,000	Password protection	$695 (per copy)
	Metaview	MS-DOS	IBM PC, XT, AT and compatibles	380K	2 floppies, 1 hard disk required	Yes	Yes	Yes	Yes	Cobol, Fortran, Basic, Pascal	Any ASCII file	256	1,024	Limited by disk space only	Data encryption, field security, password protection	Contact Vendor
Michtron, Inc. (313) 334-5700	**Trimbase**	**TOS**	**Atari 520/1040, ST**	**512K**	**1 floppy**	**No**	**No**	**Yes**	**No**	**None**	**Any ASCII file**	**80**	**Limited by disk space only**	**Limited by disk space only**	**—**	**$99.95 per copy**
Micro Business Applications, Inc. (612) 894-3470	PHD	MS-DOS, CP/M 80, CP/M 86, Netware	IBM PC, AT, XT and compatibles	64K (8-bit environment), 128K (16-bit environment)	1 floppy	Yes	Yes	No	Yes	Cobol, assembler	Any ASCII file	80	1,024	16,777,215	None	$200 (per copy)
Micro Data Base Systems, Inc. (317) 463-2581	**Knowledgeman**	**MS-DOS, PC-DOS**	**IBM PC, XT, AT and compatibles**	**512K**	**1 hard disk**	**Yes**	**Yes**	**Yes**	**Yes**	**C language**	**Any ASCII file**	**65,535**	**255**	**More than 1 billion**	**Password protection**	**$595 (per copy)**

COMPANY	PRODUCT	OPERATING SYSTEMS SUPPORTED	HARDWARE SUPPORTED	MINIMUM MEMORY REQUIRED (IN BYTES)	NUMBER AND KIND OF DISKS REQUIRED	MULTIUSER CAPABILITY	SUPPORTS LAN USAGE	MENU DRIVEN	QUERY LANGUAGE INCLUDED	PROGRAMMING LANGUAGES SUPPORTED	FULL DATA TRANSFER WITH OTHER SOFTWARE	MAXIMUM FIELD SIZE (IN CHARACTERS)	MAXIMUM NUMBER OF FIELDS PER RECORD	MAXIMUM NUMBER OF RECORDS PER FILE	SECURITY PROVISIONS	PRICE
Microrim, Inc. (206) 885-2000	**R:base System V**	**PC-DOS**	**IBM PC, XT, AT, PS/2 and compatibles**	**512K**	**1 hard disk or 2 floppies**	**Yes**	**Yes**	**Yes**	**Yes**	**Proprietary, Fortran, Pascal**	**Any ASCII, DIF, Sylk file**	**4,092**	**400**	**Limited by disk space only**	**Password protection, LAN locking, collision detection, table locking**	**$700 (per server)**
Microsoftware International, Inc. (605) 335-7676	EZ Base II	MS-DOS, PC-DOS, Unix, Xenix, VAX/VMS, RT11	IBM PC, XT, AT and compatibles, Microvax, PDP-11	192K	2 floppies	Yes	Yes	Yes	Yes	None	1-2-3, Multiplan, PCwrite	30	108	Limited by disk space only	Password protection	$695 (per copy, micros), $3,995 (VAX)
Microsystems Engineering Corp. (312) 882-0111	**Mass 11 Manager**	**MS-DOS**	**IBM PC, XT, AT and compatibles**	**448K**	**2 floppies, hard drive recommended**	**No**	**No**	**Yes**	**Yes**	**None**	**Dbase II, III**	**1,000**	**256**	**65,000**	**Password protection**	**$495 (per copy)**
Miller Microcomputer Services (617) 653-6136	Datahandler	Requires MMSfourth (proprietary)	IBM PC, XT, AT and compatibles, Tandy TRS-80	48K	1 floppy	Yes	Yes	Yes	No	Proprietary	Proprietary	255	70	64,000	None	Contact Vendor
	Datahandler Plus	MS-DOS, requires MMSfourth (proprietary)	IBM PC, XT, AT and compatibles	128K	1 floppy	Yes	Yes	Yes	No	Proprietary	Proprietary	255	70	64,000	None	Contact Vendor
Must Software International (203) 762-2511	**PC Nomad**	**MS-DOS, PC-DOS**	**IBM PC, XT, AT, PS/2 and compatibles**	**640K**	**1 hard disk, 1 floppy**	**Yes**	**No**	**Yes**	**Yes**	**None**	**Any ASCII, DIF file**	**256**	**499**	**Limited by disk space only**	**Compiled schema**	**$795 (per copy)**
Nantucket Corp. (213) 390-7923	McMax	Macintosh operating system	Macintosh, Mac SE, Mac Plus, Mac II	512K	1 800K-byte floppy	No	No	Yes	Yes	Dbase III, Dbase III Plus	Tops, Maclink, Dyna	255	63	16,000,000	None	$295 (per copy)
	Clipper	MS-DOS, PC-DOS	IBM PC, XT, AT and compatibles	256K	Dual floppy or 1 hard disk	No	Yes	No	No	Dbase III, Dbase III Plus	Any ASCII file	32K	1,024	Limited by disk space only	None	$695 (per copy)
Oak Marketing (division of Anli, Inc.) (301) 445-0536	**[illegible]**	**MS-DOS**	**IBM PC, XT, AT and compatibles**	**128K**	**2 floppies**	**No**	**No**	**Yes**	**Yes**	**None**	**1-2-3, Dbase III**	**67**	**250**	**Limited by disk space only**	**Password protection, field-level protection, menu protection**	**$195 (per copy)**
Odesta Corp. (312) 498-5615	Helix	Macintosh operating system, VAX/VMS	All Macintosh computers, Microvax 2000	1M	Hard disk recommended	Yes	Yes	No	Yes	None	Any ASCII, DIF, Sylk file	32,500	Limited by disk space only	Limited by disk space only	Passwords, user-definable permissions	$595 (per copy), $4,500 (VAX version)
O'Hanlon Computer Systems, Inc. (206) 454-6350	**O'Hanlon Database Solution**	**MS-DOS, PC-DOS, Concurrent PC-DOS, CP/M 86, Turbo DOS 86, Netar**	**IBM PC, XT, AT and compatibles**	**128K**	**Hard disk recommended**	**Yes**	**Yes**	**Yes**	**—**	**NA**	**1-2-3, Multiplan, Wordstar**	**32,000**	**1,000**	**16,777,216**	**Available but not included**	**$995 (multiuser)**
On-Line Software International, Inc. (609) 799-6300	Rams PC Workstation	PC-DOS, MS-DOS	IBM PC, XT, AT and compatibles	512K	1 floppy, 1 hard disk	Yes	Yes	Yes	Yes	None	1-2-3 Dbase, any ASCII, DIF file	75	255	4 billion	Password protection	$375 (per copy)
Open Systems (800) 328-2276	**Harmony Information Manager**	**MS-DOS**	**IBM PC, XT, AT and compatibles**	**512K**	**1 floppy, 1 hard drive**	**No**	**No**	**Yes**	**No**	**None**	**Proprietary**	**30**	**50**	**Limited by disk space only**	**Password protection**	**$290 (per copy)**
Oracle Corp. (800) 345-DBMS	Oracle	MS-DOS	IBM PC, XT, AT, PS/2 and compatibles, Deskpro 386	640K or 1.5M (depending on version)	6M or 4.5M bytes on a hard disk (depending on version)	Yes	Yes	Yes	Yes	C language, Cobol	Any DIF, Sylk, WKS file	255	255	Limited by disk space only	Password protection, selective access to data dictionary, audit capabilities	$695-$1,295 (depending on version)
PC Manager, Inc. (703) 356-4000	**Data Edge**	**MS-DOS, PC-DOS**	**IBM PC, XT, AT and compatibles, Wang PC**	**256K**	**2 floppies or 1 floppy, hard drive**	**Yes**	**Yes**	**Yes**	**No**	**Proprietary**	**Dbase**	**254**	**300**	**Limited by disk space only**	**Password protection**	**$395 (per copy)**
Palentir Software (800) 368-3797	Windows Filer	MS-DOS	Any Microsoft Windows-compatible IBM PC	512K	Hard disk recommended	No	No	Yes	Yes	None	Dbase	256	300	Limited by disk space only	None	$195 (per copy)
Pansophic Systems, Inc. (800) 323-7335	**Easytrieve Plus PC**	**MS-DOS, PC-DOS**	**IBM PC, XT, AT PS/2 and compatibles**	**384K**	**Hard disk required**	**No**	**No**	**Yes**	**Yes**	**Basic, assembler**	**1-2-3, Dbase, EBCDIC, ASCII files**	**4,000**	**2,000**	**16 million**	**Password protection**	**$850 (per copy)**
Paperback Software International (415) 644-2116	VP Info	MS-DOS, PC-DOS	IBM PC, XT, AT and compatibles	256K	2 floppies	Yes	Yes	No	No	Proprietary	Any ASCII file	254	256	65,535	File and record locking	$99.95 (per copy)
Parameter Driven Software, Inc. (313) 540-4400	**PDS-Adept**	**MS-DOS, Unix, CTOS, BTOS**	**IBM PC, XT, AT and compatibles, Convergent Technology Unix hardware, Unisys Unix hardware, Towers, AT&T 3B, Convergent Engens, B25 series**	**512K**	**Hard disk drive required**	**Yes**	**No**	**Yes**	**No**	**Proprietary**	**Any ASCII, Sylk, DIF file**	**60**	**99**	**Limited by disk space only**	**Password protection available under BTOS**	**$585-$10,000 (per copy depending on hardware)**
Peachtree Software, Inc. (800) 24-PEACH	Peachtree Data Query	MS-DOS	IBM PC, XT, AT and compatibles	256K	2 floppies, 1 floppy, hard drive	No	No	Yes	No	—	Any ASCII file	Limited by disk space only	Limited by disk space only	Limited by disk space only	None	$199 (per copy)
Pearlsoft, Inc. (503) 683-3636	**Pearl Base**	**PC-DOS, CP/M**	**IBM PC, XT, AT and compatibles**	**256K**	**Hard disk recommended**	**No**	**Yes**	**Yes**	**No**	**None**	**Dbase, any ASCII file**	**70**	**Limited by disk space only**	**Limited by disk space only**	**Password protection**	**$295 (per copy)**
Pecan Software Systems, Inc. (800) 63-PECAN (718) 851-3100	Jack2	MS-DOS, PC-DOS	IBM PC, XT, AT and compatibles	128K	2 floppies or 1 floppy, 1 hard disk	No	No	Yes	Yes	None	Any DIF file	255	Limited by disk space only	Limited by disk space only	None	$99.95 (per copy)
	Swan Relational Data Base	PC-DOS, MS-DOS, Prodos, TOS, VAX/VMS, PDP-11, Amiga DOS	IBM PC, XT, AT and compatibles, Apple II series, Atari ST, Commodore Amiga	128K	1 floppy	Yes	Yes	Yes	Yes	Pascal	Any ASCII file	Limited by disk space only	Limited by disk space only	Limited by disk space only	Password protection	$59.95 (per copy)

COMPANY	PRODUCT	OPERATING SYSTEMS SUPPORTED	HARDWARE SUPPORTED	MINIMUM MEMORY REQUIRED (IN BYTES)	NUMBER AND KIND OF DISKS REQUIRED	MULTIUSER CAPABILITY	SUPPORTS LAN USAGE	MENU DRIVEN	QUERY LANGUAGE INCLUDED	PROGRAMMING LANGUAGES SUPPORTED	FULL DATA TRANSFER WITH OTHER SOFTWARE	MAXIMUM FIELD SIZE (IN CHARACTERS)	MAXIMUM NUMBER OF FIELDS PER RECORD	MAXIMUM NUMBER OF RECORDS PER FILE	SECURITY PROVISIONS	PRICE
[illegible]	[illegible]	PC-DOS, MS-DOS, Prodos, TOS, VAX/VMS, PDP-11, Amiga DOS	IBM PC, XT, AT and compatibles, Apple II series, Atari ST, Commodore Amiga	[illegible]	1 floppy	Yes	Yes	Yes	Yes	No	Any ASCII file	NA	NA	NA	Password protection	[illegible] (per copy)
Polytron Corp. (800) 547-4000	Polydesk III	MS-DOS	IBM PC, XT, AT and compatibles	100K	1 floppy, 1 hard disk recommended	No	Yes	Yes	No	None	Dbase III	255	128	Limited by disk space only	None	$99 (per copy)
[illegible]	[illegible]	[illegible]	IBM PC, XT, AT and compatibles	[illegible]	[illegible] hard disk, 1 floppy	No	No	Yes	Yes	[illegible]	Proprietary	[illegible]	[illegible]	Limited by disk space only	[illegible]	[illegible] (per copy)
QAX International Systems Corp. (904) 596-2090	Fl. Personal Data Base	Super-DOS, RDOS	IBM PC, XT, AT and compatibles, most DG microcomputers	64K	1 hard disk	No	No	Yes	No	None	No	60	240	65,000	Password protection	$495 (per copy)
[illegible] Systems Corp. [illegible]	[illegible]	[illegible], Xenix, Unix System V, CTOS, BTOS, VAX/VMS, [illegible]	IBM PC, XT, AT and compatibles, any micro that uses Intel or Motorola chip	[illegible]	1 floppy, 1 hard disk	[illegible]	[illegible]	Yes	Yes	Cobol, C language, Basic	1-2-3, any ASCII file	[illegible]	[illegible]	Limited by disk space only	[illegible], record locking, password protection, encryption	[illegible] (per copy) ([illegible])
The Rapport Corp. (212) 968-6270	Rapport	MS-DOS	IBM PC, XT, AT and compatibles	640K	Hard disk required	No	No	Yes	Yes	Fortran, Cobol	None	Limited by disk space only	Limited by disk space only	Limited by disk space only	Password protection, data encryption	$1,500 (first copy)
[illegible] Technology, Inc. [illegible]	[illegible]	[illegible]	IBM PC, XT, AT, PS/2 and compatibles	[illegible]	1 hard disk, 1 floppy	[illegible]	[illegible]	[illegible]	[illegible]	C language, Cobol	Any ASCII, DIF, Sylk file	[illegible]	[illegible]	Limited by disk space only	None	[illegible] (per copy)
Resolve Logic Systems (416) 927-0065 (in Canada) (412) 389-4900 (in U.S.)	Prevail Integrated Productivity Set (Opus board necessary to run on PCs)	Unix System V.2, V.3, 4.2	IBM PC, XT, AT and compatibles	1M byte	Hard disk 40M bytes and up	Yes	Yes	Yes	Yes	Cobol	Any ASCII file	Limited by disk space only	Limited by disk space only	Limited by disk space only	Password protection	$2,200 (for PC version with Opus card)
[illegible] Corp. [illegible]	[illegible]	[illegible]	IBM PC, XT, AT and compatibles	[illegible]	2 floppies or 1 floppy, 1 hard disk	No	No	Yes	Yes	None	Any ASCII, DIF file	—	[illegible]	Limited by disk space only	Password protection	[illegible] (per copy)
Santa Cruz Operation (408) 425-7222	SCO Foxbase Plus	Xenix	IBM PC, AT and compatibles, Vectra, AT&T 6300 PC, 80386-based systems	1.5M	10M-byte hard disk	Yes	Yes	No	Yes	None	Dbase III plus	256	128	1 billion	Record and file locking	Contact vendor
	SCO Foxbase	Xenix	IBM PC, AT and compatibles, Vectra, AT&T 6300 PC, 80386-based systems	—	—	Yes	Yes	No	Yes	None	Dbase II	256	48	65,535	Record and file locking	Contact vendor
[illegible] Software, Inc. [illegible]	[illegible]	MS-DOS, PC-DOS	IBM PC, XT, AT and compatibles	[illegible]	1 floppy	[illegible]	[illegible]	[illegible]	[illegible]	Proprietary	Any ASCII, Dbase file	[illegible]	Limited by disk space only	Limited by disk space only	Password protection, encryption	[illegible] (per copy)
Seed Software Corp. (800) 445-DBMS	Seed DBMS, Proseed	MS-DOS	IBM PC, XT, AT and compatibles, IBM 370 series, Microvax II	640K	10M-byte hard disk	No	No	No	Yes	Fortran, C language	None	32,767	1,000 per schema	100 per schema	Password protection	Contact vendor
[illegible], Inc. [illegible]	[illegible] Software Data Manager	[illegible]	IBM PC, XT, AT and compatibles, Victor [illegible], Rainbow 100	[illegible]	1 floppy	Yes	Yes	Yes	No	None	Dbase, 1-2-3, any DIF file	[illegible]	[illegible]	Limited by disk space only	None	[illegible] (per copy for data base), [illegible] (for integrated package)
Software Connections, Inc. (distributed by Lanquest Group) (408) 727-9448	Datastore	MS-DOS	IBM PC, XT, AT and compatibles	237K	1 hard disk	Yes	Yes	Yes	Yes	None	1-2-3, Wordstar, Dbase	80	512	Limited by disk space only	Audit trails, password protection, field masking	$495 (per copy), $1,195 (LAN version)
The Software Group [illegible]	[illegible]	MS-DOS	IBM PC, XT, AT and compatibles	[illegible]	[illegible] or hard disk	Yes	Yes	Yes	Yes	Basic, Pascal, C language	Dbase II, Dbase III Plus, Condor 3X, ASCII files	[illegible]+	[illegible]	[illegible]+	Record and file locking, password protection	[illegible] (per copy), From [illegible] (for LAN version)
Software Products International, Inc. (619) 450-1526	Open Access II	PC-DOS, MS-DOS	IBM PC, XT, AT, PS/2 and compatibles	256K	2 floppies	Yes	Yes	Yes	Yes	Proprietary	Dbase, any ASCII, DIF file	78	100	2.2 billion	Record locking, password protection	$395 (per copy), $245 (per node for LAN version)
Software Publishing Corp. [illegible]	PFS:Professional File	MS-DOS	IBM PC, XT, AT and compatibles	[illegible]	1 floppy, 1 hard disk or 2 floppies	Yes	Yes	Yes	No	None	1-2-3, any ASCII file	[illegible]	[illegible]	[illegible]	None	[illegible] (per copy)
Star Software, Inc. (800) 242-7827	DB Partner	MS-DOS	IBM PC, XT, AT and compatibles	256K	2 floppy drives	Yes	Yes	Yes	No	None	Dbase II, Dbase III, Rbase, Multiplan, any ASCII file	35	999	1 million	None	$195 (per copy)
Symantec Corp. [illegible]	Q&A	PC-DOS, MS-DOS	IBM PC, XT, AT, PS/2 and compatibles	512K	Minimum 2 double-sided floppies	Yes	Yes	Yes	Yes	C language	Any ASCII file	[illegible]	[illegible]	Limited by disk space only	None	$349 (per copy)
Thoroughbred Software (800) 524-0430 (201) 722-9565 (in N.J.)	Idol-II	Proprietary, Unix, Xenix, VAX/VMS	IBM PC, XT, AT and compatibles, PS/2, any machine supporting Unix, all DEC machines, HP 9000 series	256	Varies according to hardware	Yes	No	Yes	No	Basic, proprietary	ASCII files	—	Limited by disk space only	Limited by disk space only	Password protection	$795-$3,895

COMPANY	PRODUCT	OPERATING SYSTEMS SUPPORTED	HARDWARE SUPPORTED	MINIMUM MEMORY REQUIRED (IN BYTES)	NUMBER AND KIND OF DISKS REQUIRED	MULTIUSER CAPABILITY	SUPPORTS LAN USAGE	MENU DRIVEN	QUERY LANGUAGE INCLUDED	PROGRAMMING LANGUAGES SUPPORTED	FULL DATA TRANSFER WITH OTHER SOFTWARE	MAXIMUM FIELD SIZE (IN CHARACTERS)	MAXIMUM NUMBER OF FIELDS PER RECORD	MAXIMUM NUMBER OF RECORDS PER FILE	SECURITY PROVISIONS	PRICE
Traveling Software, Inc. (800) 343-8080	T-base	Kyocera	Tandy Models 100, 102, 200, NEC 8201, 8300	8K	NA	No	No	No	No	None	Any ASCII file	60	—	Limited by disk space only	None	[illegible] (per copy)
Unify Corp. (916) 920-9092	Unify	MS-DOS, Unix, Xenix	IBM PC, XT, AT and compatibles	512K	1 10M-byte hard disk	Yes	Yes	Yes	Yes	Cobol, C language	1-2-3, Dbase, Microsoft Word	256	2,000	2 billion per data base	Password protection	$995 (per copy)
Unisys Corp. [illegible]	Personal Mapper System	MS-DOS, PC-DOS	Unisys, PC/IT, PC/Micro IT, IBM PC, XT, AT and compatibles	[illegible]	1 floppy	Yes	Yes	No	Yes	Proprietary	Any DIF, PRN file	[illegible]	Varies	Varies	Password protection	Contact vendor
Unlimited Processing, Inc. (800) 874-8555	Team-Up	MS-DOS	IBM PC, XT, AT and compatibles	256K	Hard disk required	Yes	Yes	Yes	Yes	Proprietary	Any DIF, ASCII file, 1-2-3	1,900	8,000	4 billion	—	$795 (per copy), $1,795 (LAN version)
Venturcom, Inc. (617) 661-1230	The Portable Data Base	Unix	AT&T 3B2, [illegible], PC 6300, IBM PC, XT, AT and compatibles	[illegible]	1 or 2 floppies	Yes	Yes	No	No	C language	Any ASCII file	[illegible]	[illegible]	Limited by disk space only	Password, restricted shells, user group and global permissions	Contact vendor
Wang Laboratories, Inc. (800) 522-9264	PC Data Base	MS-DOS	Wang PC, Wang Advanced PC	384K	Dual disk or single disk, hard disk	No	Yes	Yes	No	—	Any Sylk file, proprietary	50	15,000	4 billion	—	$495 (per copy)
Wordtech Systems, Inc. [illegible]	DBXL	PC-DOS, MS-DOS	IBM PC, XT, AT and compatibles, Apricot, Wang, Tandy, Rainbow, Zenith	[illegible]	—	No	No	Yes	No	Dbase	Dbase III, [illegible]	254	128	2 billion	None	[illegible] (per copy)
Zanthe Information, Inc. (800) 267-9972	ZIM	MS-DOS, PC-DOS, QNX, Xenix, Unix, VAX/VMS, VM/CMS, Netware	IBM PC, XT, AT and compatibles	640K (recommended), 512K (minimum)	2 floppies	Yes	Yes	No	Yes	C language	Any ASCII or DIF file	8,000	Limited by disk space only	Limited by disk space only	None	Contact vendor

Solving Murder One on a micro

BY KENDRA BONNETT

During the first half of the decade, 15 to 17 Los Angeles prostitutes were murdered, and enough similarities existed among the deaths to lead police to suspect they were dealing with a serial murderer. In January 1986, the Los Angeles Police Department (LAPD) assigned several detectives, Metro officers and a couple of microcomputers to the Southside Serial Murder Task Force.

Putting police on a special task force is a proven tactic in solving serial murders; enlisting micros was, however, a new twist for the LAPD.

Using computers was already standard operating procedure for LAPD detectives. Enforcing law and order in Los Angeles, a city of almost three million inhabitants, requires a mainframe system with huge data bases recording crimes and other incidents that require a written report, as well as automobile and drivers' records. The LAPD's system, an IBM 3090, holds about five years' worth of field interview reports, which are taken at the scene of every accident or crime. Police can later access these via 3270 terminals.

The mainframe is primarily an administrative system, however, and is not designed to permit freewheeling inquiry. "There's no flexibility; you can't do any ad hoc querying," explains Richard Sullivan, manager of emerging technology with the Los Angeles Information Services Department. "There is no way to quickly run a few hunches through that system."

At the time of the Southside Serial Murder Task Force's creation, the LAPD was already interested in the possibilities of using microcomputers on special cases. So, with the help of Information Services, they used the task force as a test case. Information Services loaned the task force a couple of IBM Personal Computer ATs and Paradox, a relational data base and programming language from Ansa Software.

Sullivan spent four months with the task force, developing software applications and teaching detectives to use the program. In the process, both he and the police learned a lot about using micros in police work.

Usually, all case clues are taken by hand and then kept in notebooks. Each time someone reports information pertinent to a case, a form is filled out and added to the books. Detectives must then go through the books looking for information, similarities in clues, anything that might help them before going out into the field to follow up on a lead.

To lend some consistency to the procedure, one person is awarded the title "Clues King" and put in charge of organizing the many pieces of disconnected information coming in from all sides. This detective functions rather like a human computer, keeping a mass of information in his head, and is familiar enough with data to assign priority to clues.

When Sullivan and the task force first began working with Paradox, they borrowed heavily from these existing procedures. The ease of the Paradox application development language, combined with the advantage of having a noncomputerized model from which to draw, enabled Sullivan to get a working prototype running in just a couple of days and to complete a full application in about a week.

Sullivan admits a few mistakes were made in the process and says he is grateful for Paradox's prototyping and forgiving nature. "We ended up doing a lot of refining," he concedes.

The first mistake was building a record with fields for every conceivable type of clue. "We had about 250 fields divided into three categories — people clues, vehicle clues and crime-scene evidence," Sullivan explains. As it turned out, a number of the fields were extraneous. Even unfilled fields take up disk space and slow down searches, so in the end the record was narrowed to about 100 fields.

Using a micro and the Paradox package increased response time significantly. Police could check a new clue against others already entered into the data base or download files from the mainframe for analysis against the data base contents.

> PUTTING POLICE on a special task force is a proven tactic in solving serial murders; enlisting micros in such an effort was, however, a new twist for the LAPD.

For example, when given a license plate number of a car seen in the vicinity of a crime just before or after a prostitute was murdered, the LAPD could run not only that number but also several close variations against Department of Motor Vehicles records, using Paradox's Like selection criterion.

"There were between 10,000 and 12,000 clues involved in this case," Sullivan says, "so this ability to cross-reference data made it possible to weed out the important leads from the rest and gave the police high-priority leads to follow up."

The PC-based system also greatly enhanced the department's ability to analyze crime data for possibly significant patterns. In this particular case, no pattern was discerned, lending further weight to the suspicion that these murders had not been committed by the same person.

"It had always been one theory that these prostitute murders were not really the work of one person," Sullivan explains. "Our computer analysis tended to support that belief."

Over a period of several months, police arrested several suspects who appeared to be responsible for one or more of the murders. It has been close to a year since the last prostitute murder, and the task force is winding down.

Paradox seems, however, to have laid the foundation for a continuing career for itself in the LAPD. Sullivan says he has installed 155 copies of the software. It is not a replacement for the mainframe, he says, but it does provide invaluable assistance in identifying patterns in local crimes. ●

Bonnett is a free-lance writer based in Greenwich, Conn.

"We advertised in Computerworld, Computerworld's SPOTLIGHT section and Computerworld card decks. And the results from all three were excellent."

— Mark Potenzone
Westinghouse Management
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Mark Potenzone is National Sales Manager for Westinghouse Management Systems Software. This group within Westinghouse markets IBM mainframe productivity enhancement software and operating systems software.

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COMPUTERWORLD

IBM revs up 3090s — with a hitch

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INSIDE

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Sept. 28	Hardware Roundup: Small Scale Systems	Sept. 11
Oct. 5	Hardware Roundup: Micros	Sept. 18
Oct. 12	Leasing & Used Equipment	Sept. 25
Oct. 19	Capacity Planning/ Performance Monitoring Software	Oct. 2
Oct. 26	Unix	Oct. 9
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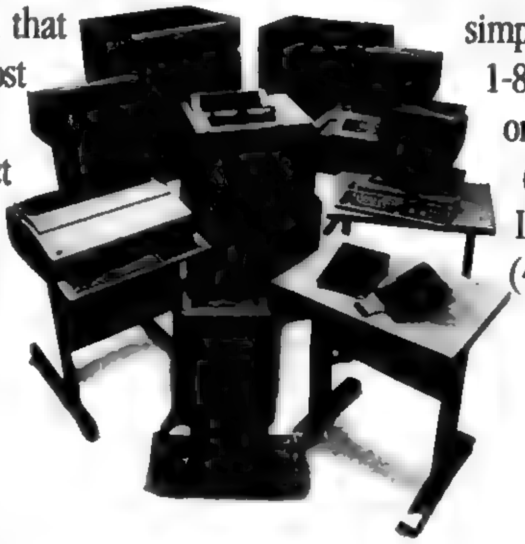

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SYSTEMS & PERIPHERALS

HARD TALK

James Connolly

The curse of hidden costs

The old saw about there being no such thing as a free lunch apparently can be applied to the computer industry.

Remember when the lunch was free but the beer cost a couple of bucks? Of course, if some computer companies ran taverns, a beer would cost $10 and the use of the plate and fork would be $5 per minute. Oh, you wanted a napkin, too?

Hidden costs are a curse for any consumer, whether the consumer is a peon looking for a quick, cheap lunch or an international megacorporation buying truckloads of computers.

For computer buyers, even a couple of hidden costs can mean the five-year cost of ownership is twice the up-front price of a system. That observation was made recently by industry analysts at The Sierra Group in connection with the firm's second annual cost-of-ownership study.

The firm found broad cost of ownership differences among various vendors providing systems for the same number of us-

Continued on page 52

IBM sets chips, wafers in play

Firm revs up high-tech production line for new breed of semiconductors

BY JAMES CONNOLLY
CW STAFF

ESSEX JUNCTION, Vt. — The computer industry's first 8-in. wafer-scale semiconductor fabrication line is expected to move from pilot testing to production by year's end as part of an ongoing reorganization and reorientation of IBM's chip facility in this suburb of Burlington, Vt.

At the same time that IBM is retooling and gearing up for 8-in. wafer production, the facility is preparing for production of 4M-bit memory chips — in the complex's first building designed for semiconductor production — and is completing an organizational move that melds its traditional development and manufacturing with new marketing roles.

The changes at the Essex Junction plant and the adjoining IBM laboratory in Williston, Vt., are occurring during the facility's 30th year of operation. During that time, the complex has grown from a 40,000-sq-ft facility with 500 employees to a 3-million-sq-ft facility with 8,000 workers, making it Vermont's largest employer.

IBM officials say the facility's orientation has changed drastically during the past five years. Five years ago, various groups acted as a relay team, "passing the baton from one to the other," according to plant manager Norbert R. Lavigne. A development group would pass a project to product qualification, which in turn would pass responsibility to manufacturing, all with little interaction among the groups.

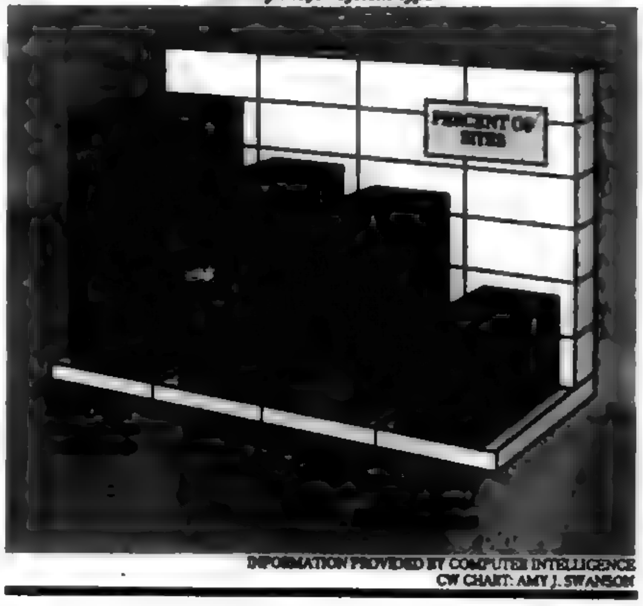
The organization now emphasizes an overlapping of the

Continued on page 53

Data View

Uninterruptible power supply installations

Sites by major system type



INFORMATION PROVIDED BY COMPUTER INTELLIGENCE
CW CHART: AMY J. SWANSON

Plexus adds departmental low-end CPU

Unix machine offers expansion options

SAN JOSE, Calif. — Plexus Computers, Inc. recently announced the Plexus P/90, an entry-level addition to its line of departmental processors.

Plexus said the Unix-based P/90 was designed to support up to 64 simultaneous users.

The computer is intended as a low-end system to fill out Plexus's Extended Data Processing (XDP) system, which was introduced in March. The XDP line is notable for its ability to manage

Continued on page 53

STC offers enhanced disk drives

LOUISVILLE, Colo. — Storage Technology Corp. last week claimed performance gains and space requirement reductions with the introduction of IBM-compatible single-capacity disk drives and reduced-footprint disk subsystems.

Storage Technology also enhanced its 6100 laser printer to support IBM's Advanced Function Printing (AFP) software.

The drive is the 2.5G-byte 8380P, which Storage Technology officials said provides an average access time improvement of 20% in comparison with IBM 3380D-class drives and 27% compared with IBM 3380E-class drives. The company said it will continue to market its existing 8380 single-capacity and 5G-byte dual-capacity drives and that the 8380P can be upgraded to a dual-capacity drive.

Jim Griffing, manager of worldwide on-line storage marketing for Storage Technology,

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Inside

- Project Software cuts price of turnkey Microvax II-based systems. Page 51.
- Seiko rolls out family of raster display systems. Page [illegible]
- HP releases high-performance disk controller cache. Page 54.

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Hidden costs

CONTINUED FROM PAGE 51

ers. The Tempe, Ariz., group examined the cost of owning four vendors' minicomputers in select configurations for one and five years. The configurations ranged from four- to 100-user systems. The gap between the least expensive and the most expensive systems reached $500,000 at the 100-user level.

In addition to the differences among vendors, The Sierra Group found there was little similarity between the price of a system and the cost of ownership because of costs such as maintenance. "In one case, the cost of software maintenance was almost four times the initial cost of the software. It's not unusual for overall hardware and software maintenance to double the cost of a system," Vice-President Marty Gruhn wrote in the group's report.

"It's clear that users need to educate themselves on both the product and the pricing strategies of the vendors whose products they are evaluating to avoid paying too much for the same results. Hardware prices alone are almost worthless as a basis for comparison," Gruhn wrote.

Connolly is Computerworld's senior editor, systems & peripherals.

STC drives

CONTINUED FROM PAGE 51

said the gains were achieved through a series of large-scale integrated circuit improvements.

The reduced-footprint subsystem, the 8380R, can be configured with the older single- and dual-capacity 8380s or the 8380P. Griffing said the subsystem uses 16 actuators and features capacities ranging from 10G to 20G bytes, with footprint savings of about 50% when compared with an equivalent 8380E subsystem.

Small shoe to fill

According to Griffing, the footprint allows greater configuration flexibility and allows a manager to increase storage capacity without having to expand the data center.

He said the 8380P and 8380R have cleared beta testing and that the 8380P will be available during the fourth quarter. He said the 8380R will be available during the first quarter of 1988.

A 20G-byte 8380R configuration costs $360,000, and an 8380P costs $65,000.

Printer enhancements

The enhancements to the 6100 printer include an all-points addressable controller with 5M bytes of memory that eases printing of complex pages. The all-points addressability feature is introduced through microcode and makes every point on the page individually definable to the printer.

The AFP software includes the IBM Print Services Facility, the Print Management Facility and the Overlay Generation Language.

Storage Technology also announced hardware options for the 6100, including a forms overlay buffer and an expanded matrix memory, which it said allows customers to increase the number of character sets from four sets of 64 characters to 64 sets of 255 characters.

Project Software cuts price on Microvax II-based systems

CAMBRIDGE, Mass. — Hoping to make its project management software more attractive to corporate departments, Project Software & Development, Inc. last week slashed the price of its turnkey Digital Equipment Corp. Microvax II-based systems by as much as 60%.

Project Software said the change is a result of a new user-based software pricing scheme.

Previously, the firm's packaged system for any number of users was priced at $260,000.

A system with a two-user license for the Project/2 scheduling and graphics software is now $99,200. The system includes 9M bytes of memory, a 318M-byte hard disk drive, a color and a monochrome terminal, a printer, Project/2 software with a relational data base manager based on Oracle Corp.'s Oracle, installation and training.

Licensing each additional user costs $10,240.

The company made similar reductions on its other mainframe and minicomputer packages.

Reductions across the board

For example, an unlimited license for high-end DEC VAX 8000 series machines was priced at $360,000 but will now be offered in a two-user version for $108,000.

Although the company sells its software for both IBM and VAX systems, sales director Dean Goodermote noted that interest in VAX products by the industry has skyrocketed lately.

Previously, he said about one customer in 10 asked for information about VAX products. That ratio has increased lately to two customers out of every three.

How to devise

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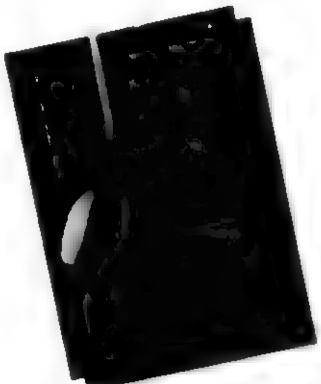

New product development is one way ARTEMIS Project is used to monitor time and costs.

Project management explores new territory

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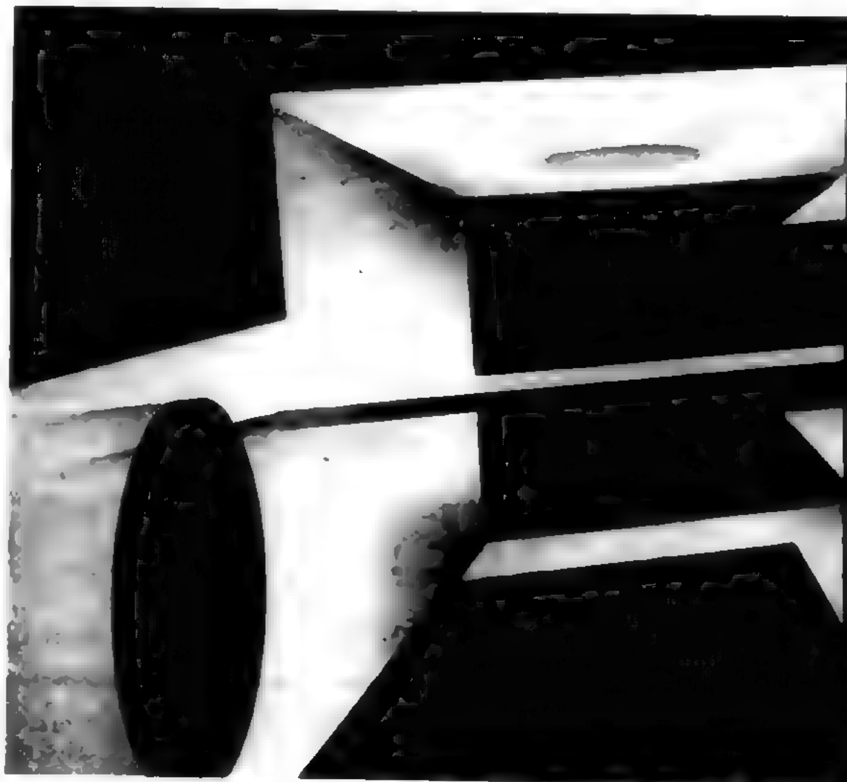

Nothing else compares

Compare ARTEMIS Project to more basic planning and scheduling software and you'll find all the standard features, improved.

For example, the calendars in ARTEMIS Project identify several work patterns including shift work, union rules and holidays for different countries. An interactive Calendar Editor then lets you compare those schedules to review workdays, make adjustments and defuse potential problems before they become real ones. Lesser systems just can't come close to this level of sophistication—or simplicity.

The interface makes it easy

Give ARTEMIS Project a screen test and you'll find the interface that's popular with users. Menus. Shortcut key operations. On-line, on-screen help that follows you along. Plus pull-down windows that build onto each other, tracing your steps and thinking ahead to your next move.

Watch networks develop

With the ARTEMIS Project interactive Network Editor, you can see your project network develop while you create it. Just like working with pencil and paper. The Network Editor gives you a more accurate and immediate view of

IBM chips

CONTINUED FROM PAGE 51

groups. "One of the ways we did that was to make sure that manufacturing was involved very, very early in the development cycle," Lavigne says. He notes that manufacturing groups have daily interaction with officials from the development laboratory, headed by laboratory director Luis M. Arzubi.

Lavigne says the reorientation came about, in part, because IBM freed the company's various systems groups from requirements that they use the company's own chips in all systems. Now, although most of the chips used in IBM systems are made by the company, the Vermont facility is competing with outside suppliers to a limited extent. A spokesman says the facility also is free to sell chips outside of IBM, although that has not yet been done. Emphasizing that the current way of doing things is better, Lavigne says, "We are much more aware of the importance of our products."

IBM in Burlington recently completed its latest chip fabrication line in a building. It is one of the few buildings in the world designed from the ground up as a semiconductor plant. Vibration that can cause chip flaws is minimized by a foundation that includes reinforced concrete slabs arranged in a cantilevered manner. The three-story design concentrates air conditioning and wiring on the third floor and piping on the first level, leaving the center level for chip making. That building processes both logic circuits and memory chips.

A spokesman says the design provides for an overall clean-room atmosphere of 150 0.5-micron particles per million parts of air. In work areas under protective glass hoods, particles measure less than one part per million.

Moving toward 200mm wafers

In another building, IBM is gearing up for the move to 8-in., or 200mm, wafers. Noting that most chip makers are committed to 6-in. wafer technology, Lavigne says, "We decided to go to the 8-in. wafer instead of the 6-in. wafer because we feel we need the productivity gains." The gains can mean a yield of 450 chips from an 8-in. wafer, compared with 150 chips from a 6-in. wafer, according to IBM.

The commitment to 8-in. technology required IBM to establish special relationships with semiconductor tool makers. "When we went looking for suppliers for 200mm equipment, we did not find the tools were available," Lavigne says.

The agreements involved changes ranging from minor upgrades of semiconductor machinery to fully customized processing equipment designed to handle larger wafers.

Meanwhile, the facility is preparing for the shift to 4M-bit memory chips. IBM researchers described those chips in a technical paper published in March. The Vermont plant, which produced the first experimental 1M-bit chips in 1984 and first-production 1M-bit chips in 1986, now supplies 1M-bit memory chips for all of IBM's major processors, ranging from the Personal System/2 microcomputers to the 3090 mainframe line.

Arzubi reports IBM is on a pace that could place 4M-bit chips into finished systems in January 1989. He says the implementation time is two-thirds what it was several chip generations ago because of improvements in the learning curve.

The quadrupling factor

Vermont researchers are working with IBM's Thomas J. Watson Research Center in Yorktown Heights, N.Y., to develop 16M- and 64M-bit chips. Arzubi says IBM's goal is to quadruple the number of bits on a memory chip every two years, which has been done since the 64K-bit chip was developed in 1978.

Arzubi says the 4M-bit chip, which was fabricated on existing production lines, will have an access time of 65 nsec, compared with 80 nsec for the second generation of 1M-bit chips. That second generation is used in the 3090E series and is CMOS-based. The first generation, installed in the original 3090s in April 1986, was based on silicon and aluminum metal oxide semiconductors with an access time of 150 nsec.

Arzubi says the use of a trenching technique, in which capacitors are placed several atoms below the chip surface, allows IBM to minimize the size of the 4M-bit chip and could help in the design of denser chips. "I feel very comfortable that we have at least three more generations to extract from CMOS technology," Arzubi adds. Those three generations include the 4M-, 16M- and 64M-bit chips.

Plexus

CONTINUED FROM PAGE 51

images, text and alphanumeric data, according to the vendor.

"The P/90 provides an excellent development platform for XDP and Unix applications," said Paul Klein, president and chief executive of Plexus, in a press release. The P/90 is based on the 32-bit Motorola, Inc. 68020 microprocessor, running at 24 MHz, which is capable of performing 3 million instructions per second, according to Plexus.

The new processor allows expansion from 2M to 16M bytes of main memory and up to 3.5G bytes of magnetic disk storage. It also offers a standard small computer systems interface for I/O.

The P/90 is available immediately through Plexus sales offices and distributors at a base price of $29,500.

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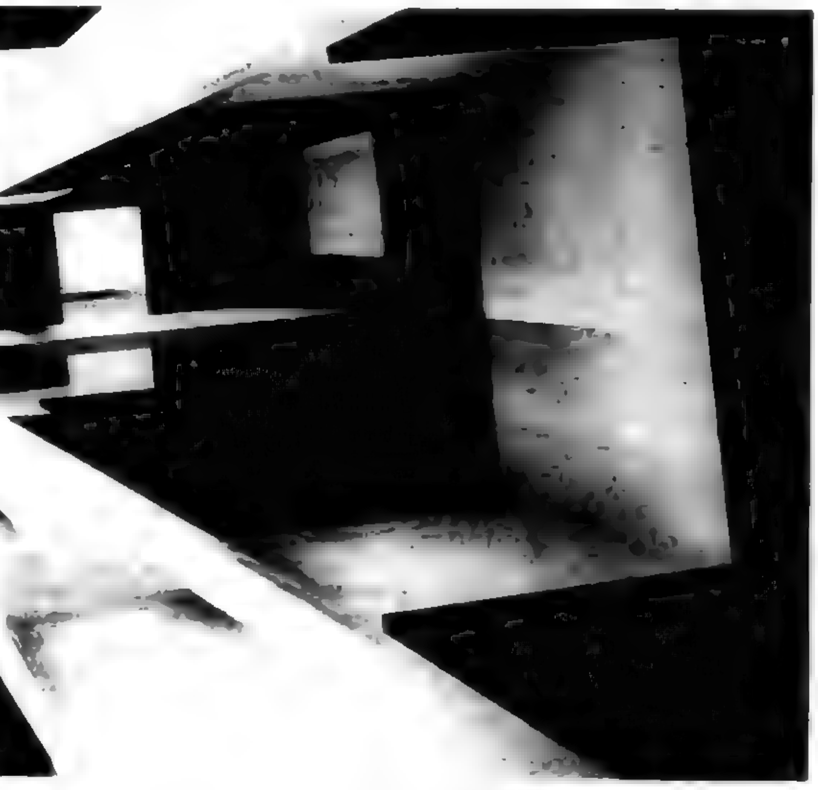

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NEW PRODUCTS

Processors

A quad-width backplane replacement assembly for the Digital Equipment Corp. Vaxstation II/RC has been introduced by **Zoltech Corp.**

According to the vendor, the **H9278-BP** provides usable connectors for all eight slots in the DEC BA23 chassis, thus giving the Vaxstation/RC model the same capacity as the standard DEC Vaxstation II.

The H9278-BP costs $269.

Zoltech, 7023 Valjean Ave., Van Nuys, Calif. 91406.

CAD/CAM/CAE

An integrated design system featuring the tools needed to design and test digital signal processing (DSP) systems has been announced by the Computer Aided Engineering Systems Division of **Tektronix, Inc.**

The **Signal Processing Worksystem** (SPW) uses Tektronix's Designer's Database Schematic Capture package, Functional Block Library and Instrument Interface Library. It also features a Signal Display Editor (SDE) and a Simulation Program Builder that automatically compiles the block diagram with attached input signals into a simulation program and executes it. The resultant output signals are examined and analyzed by the SDE to verify the DSP system design.

The SPW costs $49,500 including an Apollo Computer, Inc. DN3000 workstation or a Digital Equipment Corp. Vaxstation 2000 workstation.

Tektronix CAE Systems Division, P.O. Box 4600, Beaverton, Ore. 97076-4600.

Graphics systems

A family of raster display systems featuring dual-resolution color capability has been introduced by **Seiko Instruments U.S.A., Inc.'s** Graphic Devices & Systems Division.

The **GR-4400 Series Advanced Raster Display Systems** each include a monitor, a microprocessor-based controller unit and a keyboard. They offer a resolution of 1,280 by 1,024 pixels with 1,024 displayed colors in normal mode and 640- by 512-pixel resolution with 16 million displayed colors in full-color mode.

The GR-4406 performs two-dimensional wire-frame transformations at a rate of 300,000 vectors per second; the GR-4416 performs three-dimensional wire-frame transformations at 400,000 vectors per second.

Prices range from $20,950 to $52,000.

Seiko Instruments, 1130 Ingwood Court, San Jose, Calif. 95131.

Data storage

A **high-performance disk-controller cache** has been introduced by **Hewlett-Packard Co.** for its HP 7936H 307M-byte and HP 7937H 571M-byte disk drives.

According to the vendor, the controller cache was developed specifically for system performance improvements. It has 2M bytes of read cache and 4K bytes of nonvolatile write cache. A copy of frequently requested data is maintained in random-access memory. Another feature is simultaneous read during write.

The controller cache as an upgrade to the drives already in the field costs $3,250. Included with the drives, it costs $15,500 for the 307M-byte drive and $19,600 for the 571M-byte drive.

HP, 1820 Embarcadero Road, Palo Alto, Calif. 94303.

Terminals

A personal computer-based cash register system designed for point-of-sale applications has been announced by **POS Technology, Inc.**

The **POS Technology cash register** includes a 25-line by 80-col. 12-in. monochrome display, a 5¼-in. 360K-byte floppy drive, an 8-MHz Intel Corp. 8088-2 CPU, a cash drawer, a real-time clock, a 40-col. printer, a 150W power supply and a 640K-byte memory.

The base unit costs $1,995.

POS Technology, 103 E. Pierce, Tempe, Ariz. 85281.

Input devices

A family of document analyzers offering the capability to convert scanned raster data into industry-standard vector or compressed raster formats in real time has been announced by **Ana Tech Corp.**

The **Vana Document Analyzers** offer user-selectable vector output formats including Ana Tech VSOF and Autocad DXF. Raster output formats include CCITT Group 3 and 4 and Interleaf raster.

Five models are available: The Vana 1000 (raster) and the Vana 2000 (vector/raster) interface with Ana Tech's 16- to 64-in. Eagle document scanners. The Vana 2010 (vector/raster) and the Vana 1010 (raster) interface with other scanners. The Vana 3000 enables integrated workstations to process either raster or vector data without affecting the scanner workstation.

Prices start at $15,000.

Ana Tech, 10499 Bradford Road, Littleton, Colo. 80127.

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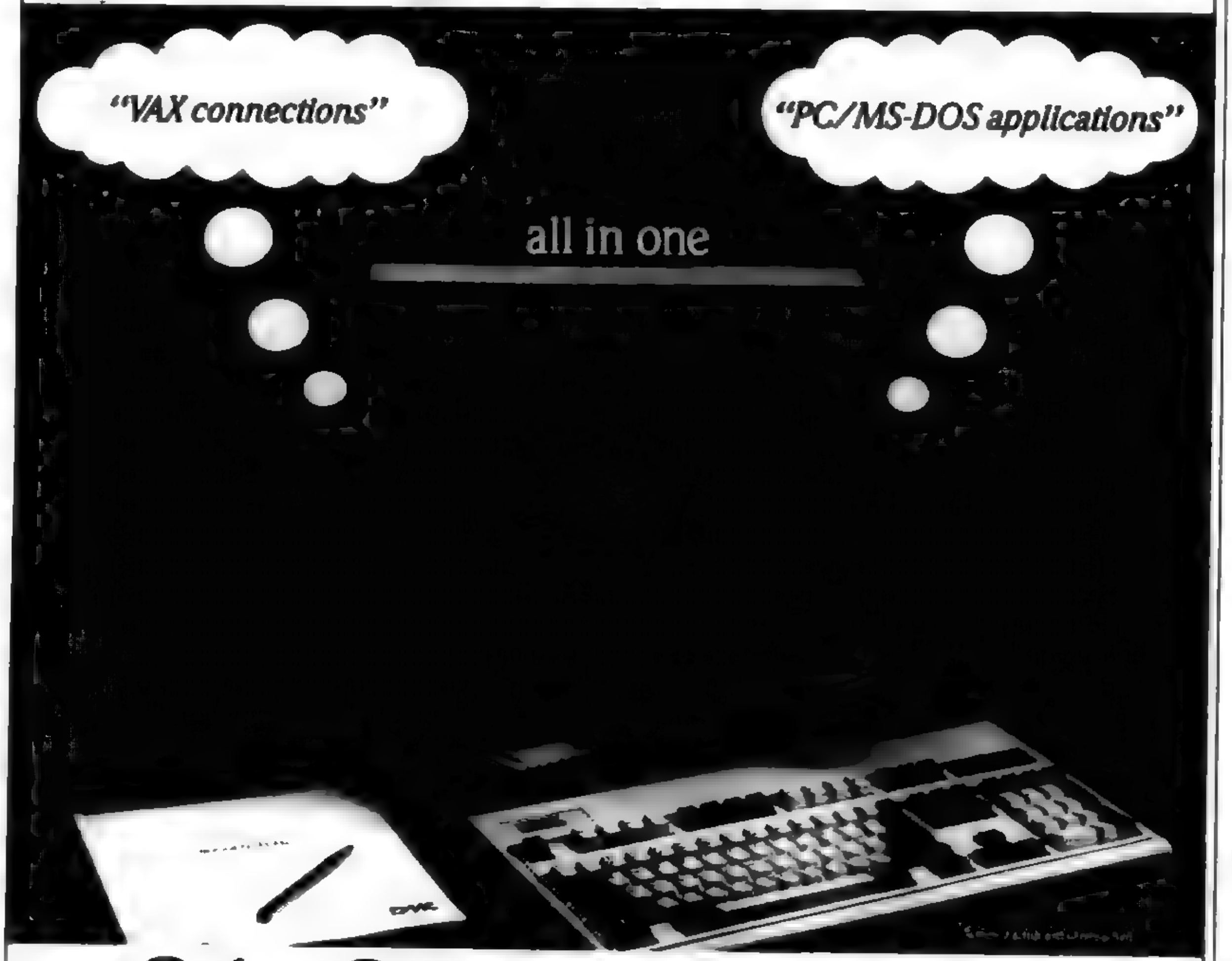

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IN DEPTH

Computer crime law: A capitalist tool?

The courts seem to be ignoring the rights of 'usees' — those who rely on computer operations

BY J. J. BUCK BLOOMBECKER

Whom does computer crime law protect? Despite the existence of computer crime laws in the federal system and in 48 states, almost no one has given this basic question much attention. Unfortunately, the first authoritative statement from an appellate court on the subject is a rather curious proof of the old legal maxim, "hard cases make bad law."

The May 22, 1987, opinion in *Mahru* v. *Superior Court* (No. B026004. Second Dist., Div. Two) suggests that only owners of computer systems are protected against malicious damage to computer systems under the language of the California Penal Code Section 502 (c). Since the language is similar to that of most of the computer crime laws in the U.S., it seems worthwhile to explore the paucity of reasoning that seems to underlie the court's conclusion.

In the opinion of the court, the following facts were presented:

Mahru, identified in the court's opinion as "an experienced computer programmer, . . . an employee, director, and 15% shareholder of BHI," referring to his employer, Bruce Hegardt, Inc., was charged with computer crime after a dispute between BHI and the Downey Schools Federal Credit Union in California. In 1983, the credit union bought a computer and software and then sold both to BHI on credit, retaining a security interest. BHI contracted to provide on-site data processing services to the credit union. The computer was located at the credit union, the space being leased to BHI.

The charge of computer crime arose out of a dispute between the credit union and BHI.

In February 1985, the credit union orally and unilaterally terminated its contract with BHI. A provision of the contract required a written notice of 182 days before termination could ensue.

The parties attempted to negotiate an agreement to cover the time period in which the credit union would convert from BHI to another DP service. The attempt was unsuccessful. Within two weeks of the contract termination, the negotiations had broken down.

Shortly thereafter, Mahru gave BHI's chief computer operator written instructions to make specified changes in the names of two files in the computer. The court found that "the effect of these changes was to make doubly certain that credit union employees, none of whom were computer experts, would be unable to run the credit union's programs without assistance from either BHI personnel or another expert computer software technician." The credit union was not able to use the computer system for five days as a result of the changes in the file names.

Based on these facts, Mahru was charged with violating a section of the California Penal Code, making "any person who maliciously accesses, alters, deletes, damages, destroys or disrupts the operation of any computer system, computer network, computer program, or data" guilty of computer crime.

The court of appeals found no legal basis for this charge:

"From the evidence, the magistrate had reasonable cause to suspect petitioner accessed, altered and disrupted the operation of the computer system and programs. . . . The facts also support a suspicion that petitioner desired to vex and annoy the credit union and to injure it by putting it to additional expense in retaliation for its termination of BHI's contract."

Normally, a court finding that the behavior of a defendant falls within the language of a criminal statute upholds a criminal charge against that defendant. This court, however, chose to be

KAREN STOLPER

BloomBecker is director of the National Center for Computer Crime Data, a nonprofit organization in Los Angeles.

- **Do laws protect only computer owners?**
- **Spite is not a criminal offense**
- **Legislation for the rich and powerful**

more creative. "The question presented, though," it explained, "is whether the court should blindly match the literal words of . . . [the California Penal Code] to the facts of this case. We think not." Using a rationale that finds support nowhere in the case law or in the voluminous records of hearings of the California and other computer crime laws, the court drafted a new requirement onto the law against computer crime.

In the language that makes this opinion most troublesome, the court said: "Section 502 (c) cannot properly be construed to make it a public offense for an employee, with his employer's approval, to operate the employer's computer in the course of the employer's business in a way that inconveniences or annoys or inflicts expense on another person."

Why in heaven's name not?

There seem to be two bases on which the court is relying to rule against Mahru's punishment, although his behavior fits within the literal meaning of the computer crime law. Neither, I suggest, is adequate.

- Does the computer crime law prohibit annoyance or spite?
- Can users do no wrong? Have "usees" no rights?

The court's first argument is a unique red herring. The California Penal Code defines "maliciously" as importing "a wish to vex, annoy or injure another person, or an intent to do a wrongful act." Spite appears nowhere in the definition.

Yet it is about spite that the court seems determined to speak: "The legislature could not have meant, by enacting Section 502, to bring the Penal Code into the computer age by making annoying or spiteful acts criminal offenses whenever a computer is used to accomplish them. Individuals and organizations use computers for typing and other routine tasks in the conduct of their affairs, and sometimes in the course of these affairs they do vexing, annoying, and injurious things. Such acts cannot all be criminal."

Granting the court's premise, one would hope the court would proceed to explain its conclusion by referencing the test case it used to determine whether the acts in question were criminal. No reasoning along this line follows the court's rather general comment.

I DOUBT that many readers of *Computerworld* would find a five-day stretch of computer inoperability a minor wrongdoing worth calling no more than spiteful or annoying.

One must assume that the court took upon itself the role of a fact finder and decided that, although some other acts might be criminal, Mahru's were not. I would suggest that, normally, and properly, such factual determinations are better reached after a trial. At the trial, evidence can be offered that would allow a judge or jury to determine whether the charges involved petty nastiness or serious damage. The appellate court is poorly placed to make such a determination, having a limited record before it.

One wonders what the justice who wrote this opinion would think if his work had to be done by hand for five days rather than on the word processor his secretary probably used to produce drafts of the opinion issued by the court. I doubt that many readers of *Computerworld* would find a five-day stretch of computer inoperability a minor wrongdoing worth calling no more than spiteful or annoying.

Wrongs and rights

Can users do no wrong? Have "usees" no rights? Though the appellate court seemed to rely on the idea that the law does not protect people against spite, implicit in its emphasis on Mahru's status as an employee of BHI is the idea that computer crime laws were passed to protect only computer owners and legitimate users.

Let's ignore the fact that the credit union paid for the computer. Let's ignore the fact that it

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ultimately got possession of the computer when BHI went bankrupt. Does the court really mean to say that the cloak of employment is a defense for any employee who goes into a computer system to "annoy, vex, or injure" anyone other than the employer?

Try this hypothetical scenario if you find the court's reasoning at all persuasive: I sue my bank. Counsel for the bank instructs the DP department to remove my account from its computer system. Is the fact that the bank owns the computer a complete defense for any employee who actually implements the instruction and removes my account? I suggest not.

DOES THE court really mean to say that the cloak of employment is a defense for any employee who goes into a computer system to "annoy, vex, or injure" anyone other than the employer?

The fundamental flaw in the court's reasoning lies in the fact that it has ignored the rights of "usees," or people who rely on the operation of computer systems. We are all usees of many computer systems. Perhaps the credit union terminated its agreement in bad faith. Does that mean it forfeited all rights to computer security just because the title was BHI's and not the credit union's?

If our computer crime laws are understood to protect only the owners of computer systems and not those who are also vulnerable to computer crimes, the laws are examples of legislation that protects only the rich and powerful, not the millions of others who are at risk without the resources to buy their own computer systems. I don't believe the computer crime laws were designed to be such capitalist tools.

Guilty or Innocent?

The question is, should Mahru be punished?

Having suggested that the court badly misunderstood the intent of the computer crime laws, let me conclude by noting that I'm not convinced Mahru should be convicted of any crime or even that he should have been charged.

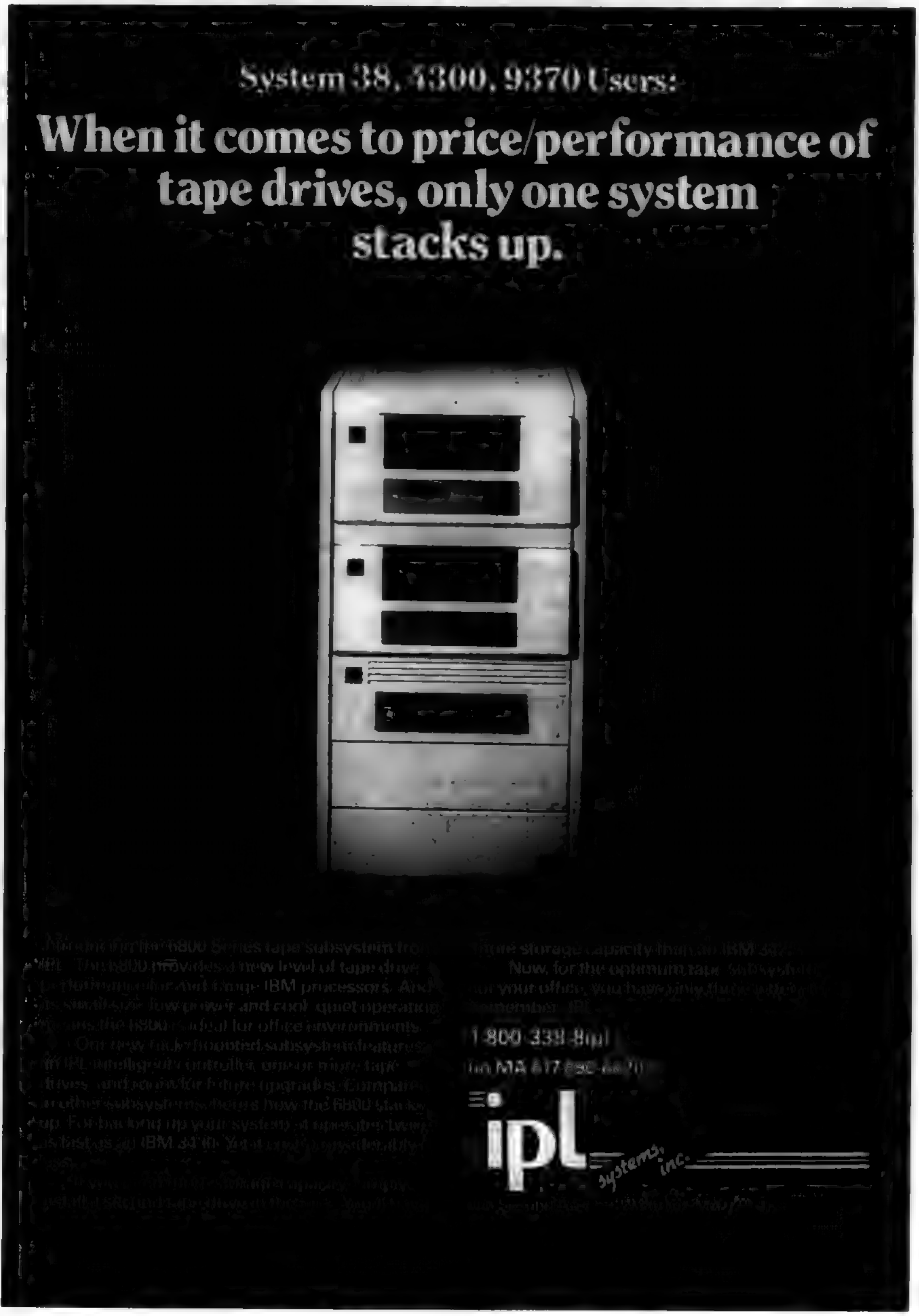
The court strenuously avoided looking at the rights of BHI and the credit union pursuant to its contract. I think this was a mistake. Perhaps BHI had a right to cease work altogether once the credit union breached its contract. Perhaps Mahru took reasonable steps to protect BHI's investment in the system software and data by doing what he did.

However, these are not the bases of the court's decision. They would more properly be decided at trial anyway. The sole point of this column is to warn computer users, and "usees," that the rights protecting these people against computer crime have been seriously limited by the language of this one case.

Despite *Computerworld's* announcement that the case had been revived [CW, Aug. 3], on July 23 the California Supreme Court had, in fact, turned down a request for a hearing from the Los Angeles District Attorney's Office — making this case as dead as a doornail.

The opinion of the court of appeals now stands as the law of California. Since there are almost no other cases interpreting computer crime laws, it may represent a significant case.

As such, it represents the most significant limitation on computer crime laws any court has ever written. Let the "usee" beware. ●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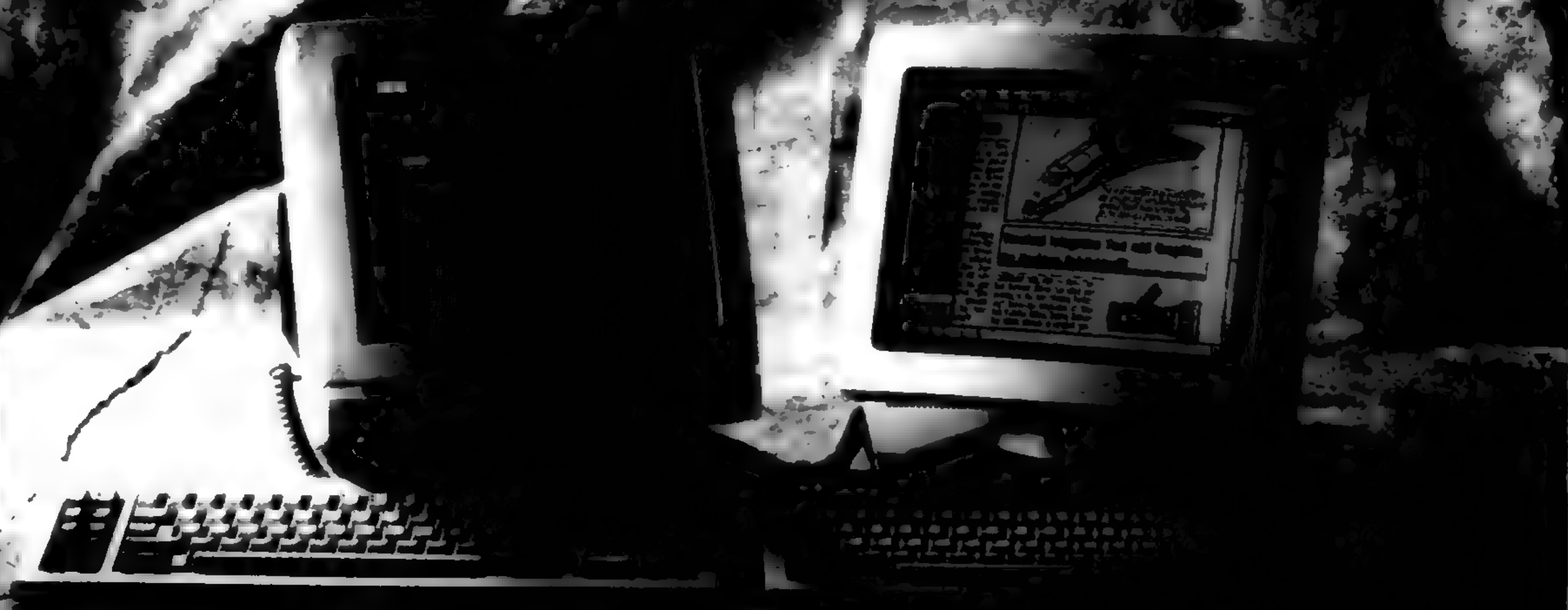

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MANAGEMENT

TAKING CHARGE

Efrem G. Mallach

Ask the right questions

"The biggest problem we have with computers," says Lou Fuchs, director of strategic products for Wang Laboratories, Inc., "is we don't know the questions to ask."

An MIS chief may disagree with Fuchs when the general ledger data base won't communicate with the new operating system release and the executive vice-president is breathing down his neck for the year-end figures and it's already Feb. 21.

But in the long run, Fuchs is right on target. If we can't figure out what questions we ought to ask, our chances of finding the right answers are near zero.

This does not mean that our MIS chief should turn to the executive vice-president and ask, "Are you sure you really need those year-end figures?" or "Wouldn't you rather have a distributor price list?" That way lie black eyes and hastily updated resumes. It does mean that, in the final analysis, somebody has to sit down and figure out what questions should be asked.

There are reams of data elements from internal and external sources that can be placed in a data base. Myriad reports, summaries, tabulations, graphs, analyses and breakdowns can be

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Bank tests recovery scheme

Personnel issues come to forefront in disaster recovery dry run

BY DAVID A. LUDLUM
CW STAFF

John Cronin

While it was a true disaster for several computer centers, for others, the torrential rainfall that inundated the Chicago area earlier this month pointed to the potential value of giving disaster recovery plans a dry run.

That lesson was not lost on managers of Horison Bancorp in Morristown, N.J. The facility conducted a mock disaster at one of its two data centers earlier this summer. Horison officials said that among American banks — which the U.S. comptroller of the currency requires to maintain disaster recovery plans — its mock disaster was one of the first during normal working hours without prior notification to employees.

Through the exercise, the data processing staff discovered some stumbling blocks in Horison's disaster recovery plan and raised the awareness of the recovery issue within other departments, according to John Cronin, the company's vice-president and director of computer operations.

"It's the only way that you really can evaluate the effectiveness of the plan. Just like developing a system, you can do all the testing you want, but until you put it in live production, you don't know how successful it will be," Cronin said.

Just talking to Horison's legal, personnel and transportation officials about their responsibilities under the plan was important, Cronin added. "It really was an education in getting people to realize that we do have something like this in place," he said.

Horison operates two data centers that provide partial backup for each other, the main one in Parsippany, N.J., and the other 100 miles away in Moorestown, N.J. Each has an IBM 4381 Model P13 operating under IBM's DOS/VSE and VM. The company also has a contract with Comdisco Disaster Recovery Services, Inc. for use of its Carlstadt, N.J., hot site, which is just 30 miles from Horison's Parsippany data center.

Cronin, who began Horison's disaster recovery planning with help from consulting firm Devlin Associates, Inc. several years ago, said he got the idea for a mock disaster at a Comdisco conference, where he was told that only 1% of organizations with a DP disaster recovery plan had conducted such an exercise.

Not quite the real thing

For Horison's drill, Cronin chose a "less than worst case" event and time: loss of the Parsippany mainframe because of an electrical fire, but no loss of facilities or peripheral equipment, at 10 p.m. on a Thursday. "We did not want to disrupt the normal processing of the bank. That would be expecting too much to attempt something like that," he said.

But the timing did require employees who had worked during the day to be called in; some reported to the Carlstadt hot site and some to the Moorestown center.

Horison holds announced disaster recovery tests three or four times a year and had identi-

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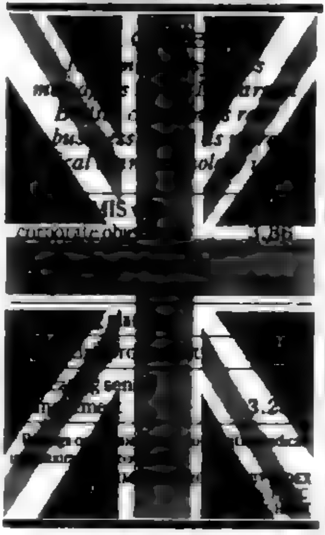
Data View



New Chase service group melds business with MIS

BY DAVID A. LUDLUM
CW STAFF

NEW YORK — The Chase Manhattan Bank NA recently organized a variety of services that depend on data processing into a profit center headed by the executive who previously led the firm's corporate operations and systems department.

In heading up the new Service Products Sector, Michael Urkowitz moves from direct responsibility for the bank's technological direction to a role dominated by business concerns. He will oversee services that provide 10% of the bank's revenue.

In a telephone interview, Urkowitz, 44, attributed the promotion to his combination of technology and business duties while he was in charge of corporate operations and systems.

Urkowitz dealt with technology issues such as establishing the architectural framework to integrate the bank's systems around the world. He also faced business concerns involving delivery of services, such as responding to increased competition and regulation.

"We recognize that the management disciplines needed to run these businesses include the disciplines needed to run operations and systems," he said. "You must be capable of driving the technology in order to be successful, to have the ability to put in place, on a large scale, the technologies needed to differentiate yourself in these businesses. You really can't separate the technology from the business for these activities."

This outlook has led to the creation of opportunities for systems managers at Chase to move into product development, marketing and even sales, Urkowitz

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MANAGERS ON THE MOVE

Blue Shield DP exec moves into administration

Daniel H. Thomas, former vice-president for systems and data processing at **Pennsylvania Blue Shield**, has been appointed the insurer's senior vice-president for administration and planning.

In addition to DP, telecommunications and office systems, his new position includes responsibility for strategic ventures, administration of corporate and interdepartmental projects and company buildings and property.

Thomas, 53, said the move from the systems realm to a broader, administrative role has been a natural, evolutionary one. Experience in planning DP lends itself to corporate planning, and the use of computer technology in building controls and other areas has provided him with significant involvement with building facilities, Thomas said.

He said his DP role now focuses on reviewing and approving an annual strategic systems direction and tying that path to corporate strategy and, "of course, the budget." Day-to-day managing is kept to a minimum, particularly fighting crises. "We try to avoid that," he said.

Thomas has set up a performance management reporting system that tracks the status of systems development, maintenance, hardware and other areas.

He studied education, math and science as an undergraduate and started his career with Burroughs Corp. in military field service. He said his interest shifted toward business, which he studied through an executive education program at the University of Pennsylvania's Wharton School.

Thomas has spent 15 years with Pennsylvania Blue Shield, which is the largest Blue Shield Plan in the U.S.

Daniel H. Thomas

Peter Kieran has been named director of MIS at **Lonza, Inc.** in Fairlawn, N.J., a manufacturer and marketer of specialty chemicals with plants in seven states.

In his new position, Kieran is responsible for development and operation of business information systems, reporting to R. Brian Cassidy, the company's vice-president for finance.

He had been director of MIS at Essex Chemical Corp. and manager of MIS at General Cable Co. He graduated from New York University with a bachelor's degree in computer science and from Rensselaer Polytechnic Institute with a master's degree in computer science.

Continued on page 68

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BOOK REVIEWS

Portrait brings CDC founder Norris into focus

BY STANLEY GIBSON
CW STAFF

William C. Norris: Portrait of a Maverick
By James C. Worthy

At a recent trade conference, I sat at lunch next to a couple from Minneapolis. Since we were all concerned with computers in our work, talk turned to a Minneapolis company, Control Data Corp. The couple expressed dismay at the firm's recent performance but optimism that with founder William C. Norris having left it, better times might be ahead.

Such is perhaps the common opinion that has surrounded Norris in the past several years; that he is an irascible, autocratic eccentric who overstayed his welcome and nearly ran a billion-dollar company into the ground.

Worthy's book sets out to correct that perception and succeeds in putting Norris in perspective. The book, while admiring, is not unduly flattering — even though the author is a long-time acquaintance of Norris and a CDC board member.

Indeed, a person who has been roundly criticized in recent years deserves also to have his achievements mentioned. The book reminds us that Norris was a pioneer in time-sharing, the third-party peripherals business, supercomputers and third-party maintenance.

But what caused CDC's problems? Was it Norris? The book paints a picture of a combination of factors, all feeding on one another: the timing of new products, production quality, personal computers and, to a certain extent, Norris's personality.

Norris's problem, one which caused him periodic difficulty throughout his career, was communication, an activity at which he concentrated little and hence never became skilled. The result was that Norris's purposes and methods were not always understood by subordinates.

One who could understand him, long-time lieutenant Norbert Berg, acted as a "human interface," translating Norris's wishes to those who hadn't a clue.

Indeed, Norris will never be remembered for any of the quotes attributed to him in this book; they are prosaic to the extreme. After finishing the volume, one is hard-pressed to recall any of Norris's statements.

However, the key to understanding Norris is not through words but through emotions. The book shows that he is first moved emotionally, as he was by the urban riots of the 1960s. Later, he found a way of translating that emotion into a path of action — usually a business venture, such as the factory built in the Northside ghetto of Minneapolis.

And public opinion could be swinging back to sympathy for Norris's values. A few years ago, aggressive dealing and the raw pursuit of wealth were glorified. Now, some Wall Street wizards have been exposed as criminals.

Although brief at 230 very readable pages of text, Worthy's book is not devoid of intriguing anecdotes, such as the way in which the settlement between IBM and CDC was reached as a result of CDC's lawsuit. Norris and then IBM President Thomas V. Learson flew secretly to Omaha, Neb., to begin negotiations, the book recounts. The talks continued, with Norris taking the code name Bird and Learson the name Link.

Norris, who does not seem a particularly mischievous or fun-loving sort, at least on the surface, told me in an interview that the most fun he had at CDC was in winning the IBM settlement, in which IBM ceded its service bureau to CDC.

For people not acquainted with Norris or the computer industry, this book is a good first look at Norris and his role. And the uninitiated will not be deterred by its length. But those who follow the industry closely could find the book somewhat unsatisfying. There is probably another book waiting to be written that could be titled *Control Data: The Inside Story.*

Hardcover, $19.95, 259 pages, ISBN 0-88730-087-1, by Ballinger Publishing Co., Cambridge, Mass.

Books in Brief

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Hardcover, $29.95, 260 pages, ISBN 0-672-46583-3, by Hayden Books, Indianapolis, Ind.

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Questions

FROM PAGE 59

derived from even the simplest data base. Which data elements are worth the trouble to enter and store? Which outputs are worth having? These are the two basic questions that every MIS shop must answer.

Some answers are obvious. Paychecks must go out to avoid a riot. IRS forms must go out to avoid other problems. Invoices must go out or checks won't come in.

The basics are cut-and-dried in 1987. You can cart them to the local Accounting Corporation of America office and kiss them good-bye. If you keep them, they should occupy only a small fraction of your staff, your mind and your CPU cycles.

Management reports are not that simple. Here, there are no givens, no absolutes, no government regulations to guide you gently along the paths of righteousness. Here, people are left to their own devices. Here, heeding one executive's "Spare me this detail" begets another's "Where are the facts I need?" Here, the cries of "Useless" and "Too much" or "Too little" and "I can't understand this report" or "Could you just change this one teensy thing?" are heard the loudest. And here, Fuchs hits the bull's-eye.

Take aim

Fortunately, heads of MIS need not shoot from the hip. There is a concept through which they and top management, working together, can jointly define their information needs for the purposes of management control. This concept is called Critical Success Factors (CSF).

It was first publicized in an MIS context by MIT's John Rockart in a 1979 *Harvard Business Review* article, although in a general management context, the concept goes back to 1961 and the term to 1972.

Rockart defines CSFs as "the limited number of areas in which results, if they are satisfactory, will ensure successful competitive performance for the organization." The CSFs for a supermarket might include inventory; for a hospital, cost accounting.

How does one define the CSFs for a firm's executives? Through discussion, critical questioning and refinement.

Rockart points out the following things to expect:

- Some CSFs depend on the industry, some on a firm's position in its industry.
- Some CSFs are relatively permanent, some are temporary.
- Many CSFs cannot be monitored via traditional financial accounting systems. Many cannot be monitored via any single existing data base. Some cannot even be monitored solely via an organization's internal information.
- Some CSFs are objective, some — though fewer than it may at first appear — require subjective measures. This may make MIS managers uncomfortable, but not top executives.

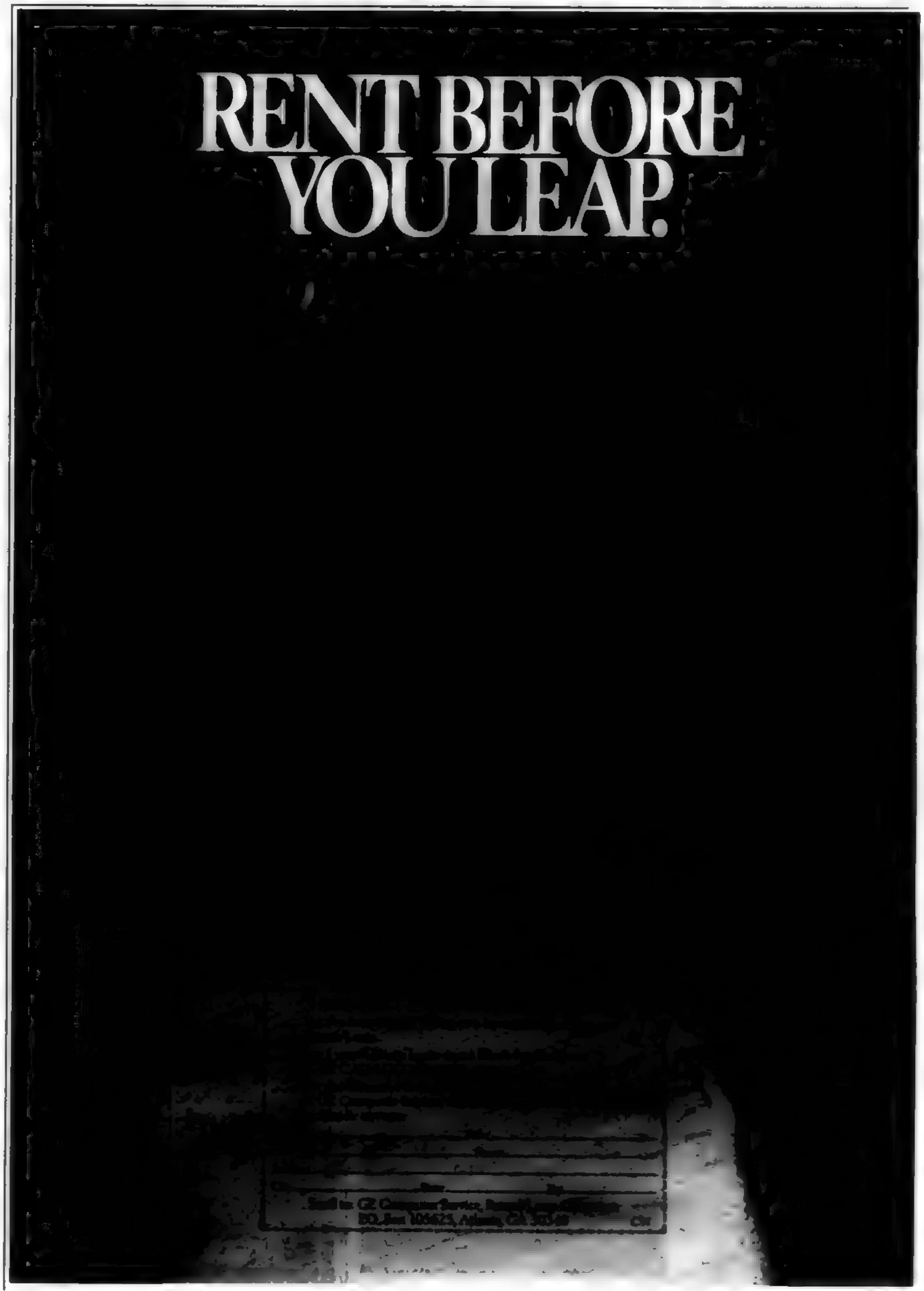
Once the CSFs are defined, MIS managers and senior executives work jointly to determine how they will be measured and what the corresponding reports will look like.

MANAGEMENT reports are not simple. There are no givens, no absolutes, no government regulations.

The result is that executives get the information they need to manage their organizations effectively. But there is more than that.

The process gives executives more insight into their real information needs and gives MIS managers more insight into how their organization really functions in its environment. These shared insights, in the final analysis, can be the most valuable benefit of all.

Mallach teaches at the Boston College School of Management and is a consultant to user and vendor executives.



Chase

FROM PAGE 59

said. "We're already in the habit of involving DP executives on sales calls. That's been effective," he said.

Business background

As an example of the business issues he faced, Urkowitz cited the handling of large payments between corporations and other banks.

This activity, he said, involved both increased competition and greater regulation as the Federal Reserve Board tightened controls on the short-term overdrafts banks can maintain with the board.

Urkowitz said Chase adopted a strategy of "reautomation" to meet the challenges by improving efficiency, boosting capacity and providing systems that generate additional information on the overdraft positions of the bank and its customers.

Urkowitz's new sector brings together wholesale services provided to corporations and other banks. These include relatively innovative services, such as electronic banking and delivery of financial information, as well as more conventional bank functions, such as check processing and transfer of payments.

The sector, which was formed Aug. 20, is aimed at making the services' contribution to the bank more visible and at bolstering efforts to enhance that contribution, according to Urkowitz. "There is substantial growth potential that can be derived by a strong focus on these businesses," he said.

Urkowitz, who remains an executive vice-president, is succeeded as chief of corporate operations and systems by John Scicutella, who has been appointed executive vice-president.

Michael Urkowitz

Scicutella was previously Trading & Treasury Services Group executive. He joined Chase as an operations trainee in 1970, then managed account information and loan operations.

Urkowitz started with Chase in 1974 in the controller's department. He then joined operations, working in check processing. Later, he managed a money transfer group, an international bank services group, product and production risk management, international operations and corporate operations and systems.

Technology background

Urkowitz earned bachelor's and master's degrees in mechanical engineering from the City College of New York and worked for Grumman Corp. as a project engineer. He also worked for the city of New York, both on the mayor's project management staff and as assistant to the deputy commissioner for New York's Housing and Development Administration.

Urkowitz said he has carefully studied technology and business issues at Chase through courses, seminars and contacts. "I drove myself to understand the underlying business we were doing," he said. "I struggled to see the whole of it, with regard to customers. I found the opportunities boundless and limited only by my own energy and willingness to learn."

CALENDAR

SEPT. 6-12

Banque '87 — The 6th European Trade Fair for Techniques and Organization in Banking. Copenhagen, Sept. 7-9 — Contact: Bella Center A/S, Center Blvd., 2300 København S, Denmark.

SIBOS: SWIFT's International Banking Operations Seminar. Montreal, Sept. 7-11 — Contact: Society for Worldwide Interbank Financial Telecommunication S.C., Ave. Ernest Solvay 81, B-1310 La Hulpe, Belgium.

12th Annual National FSI User Conference. Dallas, Sept. 8-11 — Contact: Forum '87, Suite 700, 2777 Stemmons Freeway, Dallas, Texas 75207.

Decworld '87. Boston, Sept. 8-18 — Contact: Digital Equipment Corp., 200 Baker Ave., Concord, Mass. 01742.

OSI Meeting for Government Users. Gaithersburg, Md., Sept. 9-10 — Contact: Joan Wywra, Room B218, Building 325, National Bureau of Standards, Gaithersburg, Md. 20899.

Financial Investment Management Exposition and Conference. New York, Sept. 9-10 — Contact: Flagg Management, Inc., P.O. Box 4440, New York, N.Y. 10163.

1987 Capital Microcomputer Users Forum. Washington, D.C., Sept. 9-10 — Contact: National Trade Productions, Inc., Suite 400, 2111 Eisenhower Ave., Alexandria, Va. 22314.

The Desktop Publishing Conference. Santa Clara, Calif., Sept. 9-12 — Contact: Seybold Seminars, 6922 Wildlife Road, Malibu, Calif. 90265.

Distribution/Computer Fall Expo '87. New Brunswick, N.J., Sept. 10-11 — Contact: C. S. Report, Inc., P.O. Box 453, Exton, Pa. 19341.

SEPT. 13-19

Atre Annual Forum on Data Base. New York, Sept. 14-16 — Contact: Atre International Consultants, Inc., P.O. Box 727, 16 Elm Place, Rye, N.Y. 10580.

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Compaq still

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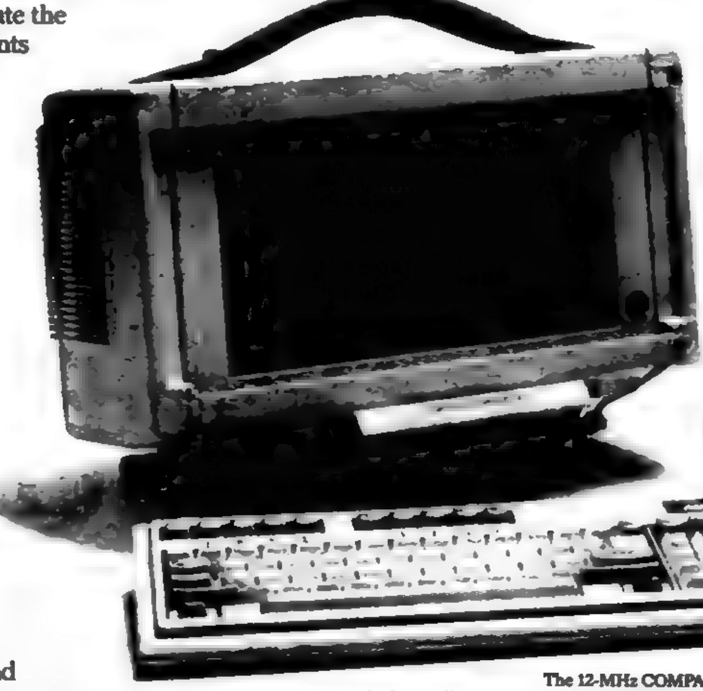

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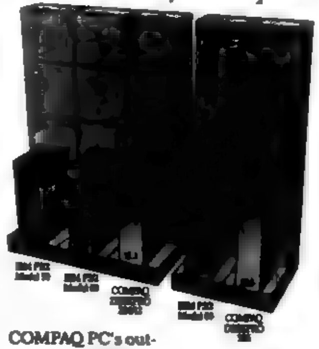

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*Index based on a scale that rates the original IBM PC as 1.00.

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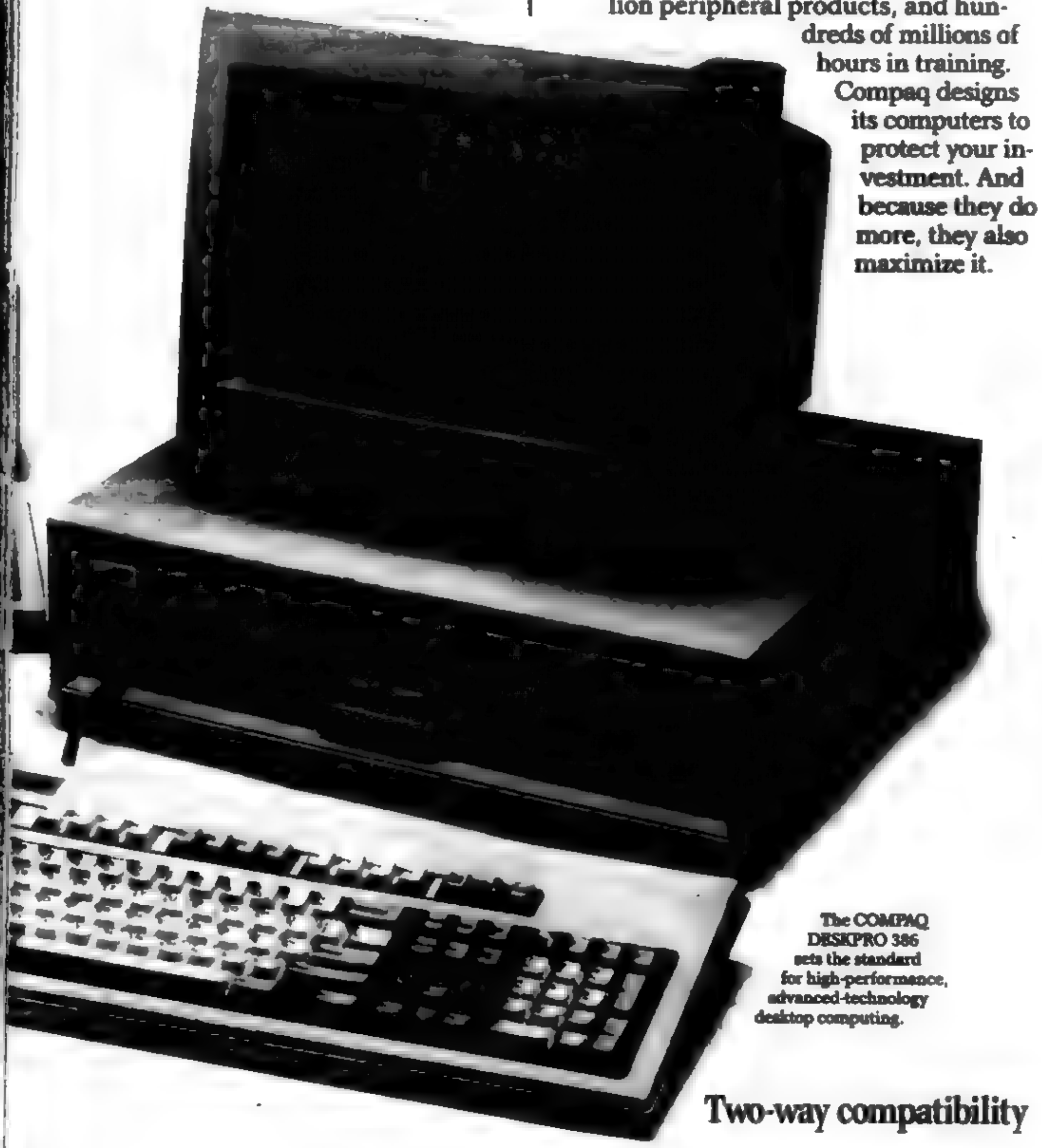
works better.



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Recovery

CONTINUED FROM PAGE 59

fied an unannounced test as an objective, so some employees were prepared for it, according to Cronin. "Some were not tremendously surprised when they got the call, because they felt it was imminent," Cronin said.

Horizon ran its targeted high-priority and supporting applications at the hot site. These applications included demand deposit, savings, on-line trust accounting, customer information, customer service, returned checks and general ledger. Checks were processed and statements were printed at the Moorestown center.

One of the hitches that arose was a lack of personnel. The supervisor of check processing for the day shift was on vacation, and the supervisor for the evening shift had left eariler because his wife was ill. Designated backups were able to assume their responsibilities, however.

Most processing ran smoothly, although two applications at the hot site had to be modified to reflect recent changes to the Parsippany systems, even though Horizon updates its disaster recovery plan quarterly. "That's why we have a need for continuous testing at the recovery center," Cronin said.

These problems were corrected within 24 hours, as required in the recovery plan. Communication with Comdisco suggested that a replacement processor could have been en route the day after the disaster was declared and installed within three days, also according to the plan, Cronin said.

The problems that arose were inevitable, he said. "In the event of a real disaster, those things are going to surface. We recognize that we're never going to have everything work perfectly, and we're never going test everything perfectly."

Employees the key element

Legal concerns and issues of employee relations constitute a major part of the Horizon recovery plan and accounted for much of the managerial effort during the mock disaster.

The personnel department was required to send a representative to the Comdisco hot site to monitor employees' hours and working conditions, assure them of adequate relief and contact their families when necessary.

Although salaried employees received no additional pay for the recovery work, no one complained about the extra duty; rather, many welcomed the challenge, Cronin said.

"From a morale perspective, it could not have been better. Some of the people we even had to tell to go home because they had worked enough. I think some were as anxious to do this as I was." Cronin said he does not know excactly how much the mock disaster cost, but he called the expense minimal, in part because the affected data center is only 30 miles from the Comdisco hot site and because hotel rooms that Horizon reserved were not used.

In a curious coincidence, a few hours after the mock disaster was declared an air conditioner in the data center involved began leaking water that, if unnoticed, might have caused the sort of fire that the mock disaster simulated.

Managers

CONTINUED FROM PAGE 59

Jack Foley has been appointed to the newly created position of information systems manager at **Crazy Shirts, Inc.** in Honolulu.

Foley will oversee the development and organization of Crazy Shirts' data processing environment, focusing on the use of personal computers, office automation, telecommunications, computer-aided design, graphic arts and point-of-sale systems for retail stores.

With 18 years of experience in the DP field, Foley has been owner of Information Management Consultants, a project manager at The Hertz Corp., a division MIS manager at General Instrument Corp. and a user support manager for the Kamehameha Schools/Bernice P. Bishop Estate.

McGovern funds MIS chair at MIT

Computerworld founder Patrick J. McGovern has donated $1.5 million to MIT to fund a professorship in management information systems at MIT's Sloane School of Management.

McGovern, 50, is a 1959 graduate of MIT, where he majored in biophysics and studied artificial intelligence and the application of computers to the life sciences. He also was active with the school newspaper, *The Tech*.

McGovern said he hopes the chair will go to someone with an interest in the effective use of information systems in organizations and in the impact of computer-based systems on the management of corporations and institutions. A search committee will recommend candidates for the occupant to the school's dean.

McGovern lauched market research firm International Data Corp. in 1964 and CW in 1967. The newspaper is part of IDG Communications, Inc., publisher of more than 80 computer publications around the world. Both firms are units of International Data Group in Framingham, Mass., of which McGovern is chairman.

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COMPUTER INDUSTRY

INDUSTRY INSIGHT

Clinton Wilder

Intimidation by litigation

IBM may soon be unveiling its most powerful machine to the rest of the computer industry. The machine that Big Blue is readying isn't really new, but rather is the latest embodiment of a long-held corporate strategy with a few new wrinkles that the company hopes will enhance its market success.

But the machine is not a mainframe, a mid-range system or a microcomputer. It's not a computer at all. It is IBM's legendary legal machinery, which may be cranking up for action on the battleground of the Personal System/2 market.

Ever since IBM started losing personal computer market share to the clones and speculation about the PS/2 (PC/2 in the rumors of those days) began, a big part of the equation was the question of how proprietary the new microcomputer generation would be. Developers of everything from operating systems to microcode to expansion slots asked, "How easy will it be to clone?"

But for those executives who take the developers' technology to market, the more pertinent question was, "How easy will it be to clone without being sued?"

As if the intricacies of IBM's Micro Channel and OS/2 Extended Edition weren't tough enough, the answer to the latter question lies in the much more uncertain netherworld of anticipating IBM's mind-set. No one has to be reminded what the "U" in FUD stands for.

In recent weeks, IBM has launched the first salvo from its new machine. In federal court in California, Big Blue has filed trademark infringement lawsuits against micro board makers AST Research, Inc. and Orchid Technology, Inc. IBM claims that two AST add-on boards for the PS/2 — the Rampage/2 and the Advantage/2 — violate the PS/2 trademark. It alleges that Orchid cited the PS/2 in its advertising without acknowledging

Continued on page 75

Western Digital back in the saddle

Chips and peripherals maker finds diversification a successful formula

BY JAMES A. MARTIN
CW STAFF

Western's Johnson

IRVINE, Calif. — Fifteen years ago, Western Digital Corp. started manufacturing memory chips for calculators. Today, after years of on-the-edge existence that climaxed with a mid-1970s filing under Chapter 11 of the Federal Bankruptcy Code, the company is showing new promise as a diversified supplier of semiconductors and microcomputer peripherals.

"Western Digital has become highly successful at developing a broader range of products," said Andrew Neff, who follows the company for Montgomery Securities in San Francisco.

Western Digital recently added a new angle to its strategy through a joint manufacturing and marketing deal with Tandon Corp. Funded by a $12 million loan from Western Digital, the two firms will make 3½-in. Winchester hard disk drives for microcomputers made by Tandon and other vendors [CW, Aug. 24].

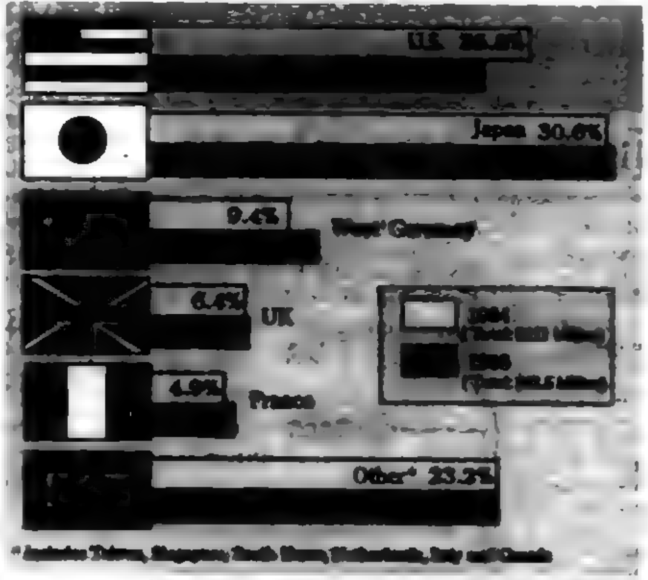
"They've acquired someone to make graphics controllers, they've acquired a company that

Continued on page 74

Data View

U.S. electronics exports slip

U.S. share of 11-country export totals declined 3.1% from 1984 to the first six months of 1986



* Includes Taiwan, Singapore, South Korea, Netherlands, Italy and Canada

INFORMATION PROVIDED BY AMERICAN ELECTRONICS ASSOCIATION
CW CHART

Export rules to be lifted

Proposed exemption to cover 16-bit micros

BY MITCH BETTS
CW STAFF

WASHINGTON, D.C. — The Reagan administration is preparing to lift U.S. export controls on microcomputers using Intel Corp.'s 8088 and 8086 chips and similar-generation microprocessors from Motorola, Inc. and Zilog, Inc., according to industry sources.

The practical effect of the move would be to remove the licensing delays involved in exporting microcomputers such as the original IBM Personal Computer and 8086-based IBM compatibles to U.S. allies and trading partners.

Continued on page 74

Apple joins Sybase investors

BY JULIE PITTA
CW STAFF

CUPERTINO, Calif. — Apple Computer, Inc. last week said it has made a minority investment in data base software company Sybase, Inc. in Berkeley, Calif.

According to an Apple spokeswoman, Apple is participating in a $3.3 million equity investment with a number of venture capital firms, all current investors in Sybase.

Plans call for Sybase to create a relational data base system for Apple's Macintosh.

Sybase's product plans are expected to aid Apple in its efforts to sell Macintosh computers to large corporations, the spokeswoman added.

A Sybase spokesman declined to offer details regarding the proposed product except to say it will be ready within a year.

Officials from both Apple and Sybase declined to quantify Apple's stake in Sybase. Among the other venture capital firms investing in this round of Sybase financing are Hambrecht & Quist, Inc.; TRW, Inc.; Kleiner Perkins

Continued on page 70

Inside

- Merger discussions between Televideo and Zentec collapse. Page 70.
- 3Com agrees to pay license royalties for U.S. and foreign patents for token-ring technology. Page 70.

Bank experience valuable asset for Hogan CEO

BY ROSEMARY HAMILTON
CW STAFF

DALLAS — When Gary Fiedler recently stepped in as chairman and chief executive officer of Hogan Systems, Inc., users and industry analysts applauded his appointment, even though he had never worked for a software company before. One thing Fiedler has to offer is considered a critical success factor in Hogan's industry: nearly 20 years of experience as a banker.

"Understanding the industry is probably the most important aspect of being successful in a vertical market," said Terence Quinn, a software industry analyst at E. F. Hutton & Co.

Fiedler was recently named to replace George L. McTavish. McTavish, who left Hogan earlier this summer, is often credited with pulling the firm out of financial disaster a few years ago. He departed because of "philosophical differences," on which Hogan would not elaborate.

"I don't have any experience selling software, but I have bought an awful lot of it over the course of my career," Fiedler said. "I have been involved in operations and DP management where software was acquired. I know how it's sold."

Fiedler's most recent position was as chairman and CEO at First Interstate Bank of Nevada NA, which he joined in 1982.

Hogan's Fiedler

His resume also includes various positions at two banks that are among the nation's largest and most prominent in banking MIS trends: Mellon Bank NA in Pittsburgh and Wells Fargo Bank NA in San Francisco. His last position at Wells Fargo was as chief of the cash management services division.

Fiedler said that, as a former banker, he expects to work well with customers. "I think they'll view me as a known quantity, and I think I can reassure them about the direction of the company," he said. "I think I can display an understanding of their problems, and I would think if they know I'm aware of what their needs are, that they should feel fairly comfortable."

Continued on page 75

3Com licenses Soderblom token-ring patent

BY STANLEY GIBSON
CW STAFF

SANTA CLARA, Calif. — 3Com Corp. announced last week that it has agreed to pay license royalties for the U.S. and foreign patents for token-ring technology held by Willemijn Holding BV, the Netherlands-based firm that holds token-ring patents granted to Swedish inventor Olof Soderblom and AT&T.

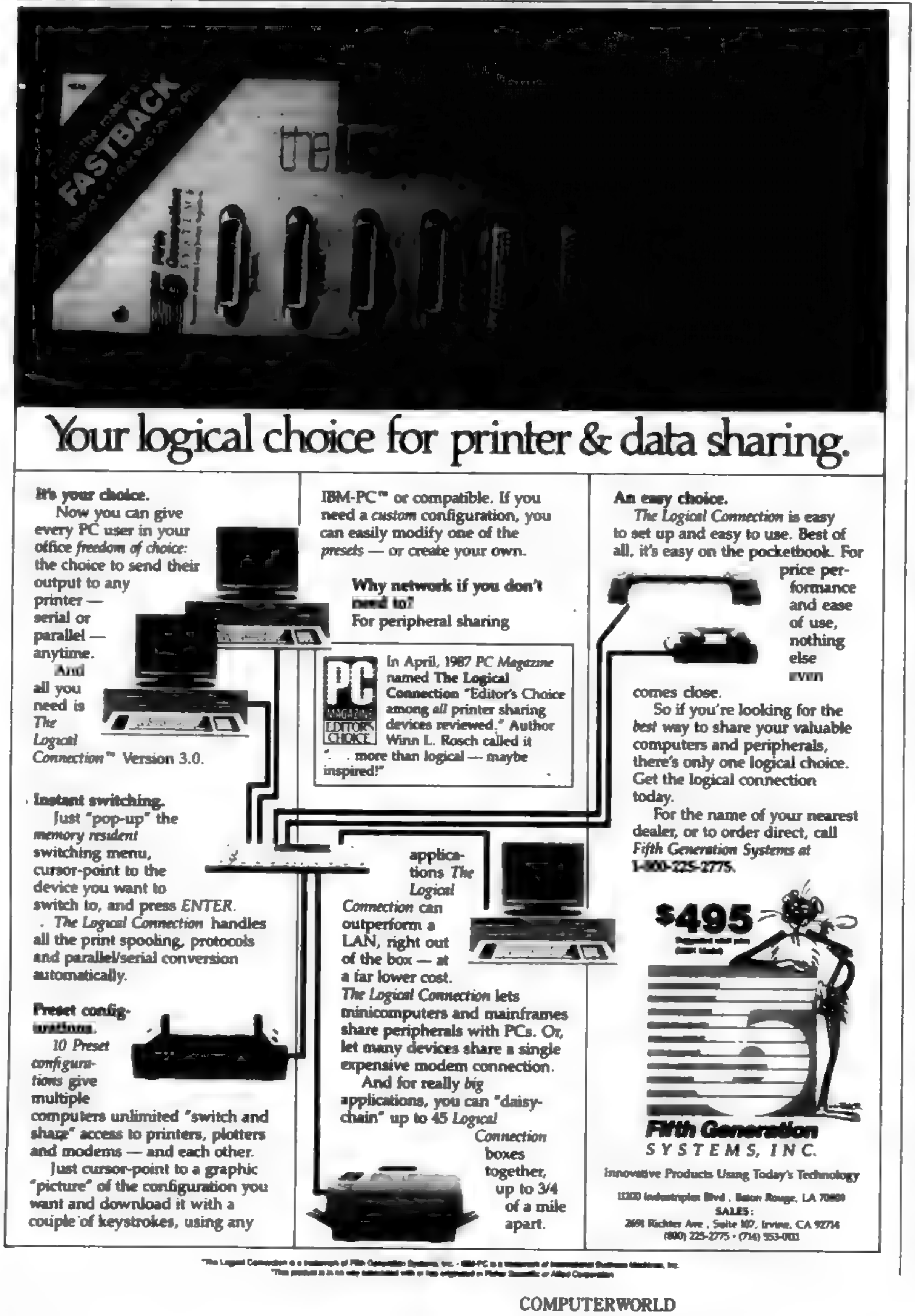
The licenses will allow 3Com to produce, market and distribute token-ring products without restriction and applies retroactively to 3Com's existing products based on the IEEE 802.5 token-ring standard, according to a prepared statement issued by 3Com.

Under the terms of the agreement, which remains in effect for the life of the patents, 3Com will pay Willemijn a royalty for all token-ring products purchased by 3Com customers. Soderblom's patent is effective until 1998; the AT&T patents expire next year.

The amount of the royalties was not disclosed, although the standard royalty rate on the Soderblom patent is 2.75% of the purchase price of token-ring products, a rate that decreases as the number of products increases. 3Com is also liable to pay 0.25% of a product's purchase price for the right to use technology covered by the AT&T patents.

Willemijn earlier this year acquired the AT&T patents, also known as the Farmer Newhall and Kerr patents, which are different from Soderblom's but similar enough to cause confusion among licensees, according to George Vande Sande, Willemijn's attorney.

Some 25 other companies, including Ungermann-Bass, Inc., NCR Corp., Hitachi, Ltd., Fujitsu, Ltd. and IBM have reached agreements with Willemijn. Willemijn is continuing to seek royalties from other vendors using the token-ring concept in their networking hardware.



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Televideo, Zentec abandon merger

BY JULIE PITTA
CW STAFF

SUNNYVALE, Calif. — Merger discussions between terminal makers Televideo Systems, Inc. and Zentec Corp. collapsed last week, less than one month after an initial letter of intent was signed.

Officials at both companies indicated that the proposed merger was dropped by mutual agreement. However, both parties were reticent to offer reasons why negotiations stalled.

In a prepared statement, Televideo said the merger would not be in the company's "best interests."

Zentec President and Chief Executive Officer William D. Parker was also reluctant to offer specifics. "It was the consolidated opinion of both the management team and the board of directors that we didn't feel it was appropriate or within the best interests of the company to continue with the merger," Parker said. "There were issues that needed to be resolved."

Both companies have previously encountered difficulty in finalizing corporate alliances. Last year Televideo dropped plans to acquire Alpha Microsystems, Inc. after a letter of intent was signed.

Zentec last year announced plans to acquire keyboard manufacturer Stackpole, Inc. and Qume Corp.'s graphics terminals business. Zentec successfully purchased Lear Siegler, Inc.'s display terminals division last year, and Televideo recently acquired Delta Data Systems Corp.

The merger would have brought Televideo a number of OEM accounts for its terminals business. More than two-thirds of Zentec's terminals sales were to OEMs

Sybase

CONTINUED FROM PAGE 69

Caufield & Byers; Charles River Ventures; and Oak Investment Partners.

Founded in November 1984, privately held Sybase markets a relational data base management system targeted at corporate and government users that is also sold through OEMs and value-added resellers. Currently, the Sybase product runs on Digital Equipment Corp. VAX systems and Sun Microsystems, Inc. workstations.

Richard Finkelstein, vice-president of the Codd and Date Consulting Group, said the Sybase and Apple alliance represents a good match. "Over the last two years, Apple has shown a better understanding of the corporate market and what they need to do to integrate their systems into the corporate environment," Finkelstein said. "An essential aspect of that is a full data base system that works well with mainframes and local-area networks."

Apple's investment was made through its Strategic Investment Group, established in May 1986. That group was responsible for the formation of Claris Corp., Apple's new software subsidiary. Claris reportedly will eventually spin off as a separate company.

Additionally, Apple has made equity investments in Forethought, Inc. in Sunnyvale, Calif., Touch Communications, Inc. in Scotts Valley, Calif., and others.

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Western

FROM PAGE 69

makes the logic chips that are placed with microprocessors, and they're getting into printer controllers," Neff said. "Western Digital is now in a position to make everything an OEM vendor needs for a microcomputer with the exception of the microprocessor."

Western Digital's revenue reflects the success of its diversification strategy. Sales in fiscal 1987, which ended in June, were $462 million, compared with $300 million in fiscal 1986. Net income was $48 million, more than twice the $23 million for the previous year. The company has projected sales of $550 million in fiscal 1988.

"Our acquisition strategy in accomplishing this goal has come about rather coincidentally," said Roger W. Johnson, chairman of the board, president and chief executive officer. "We found it best, in some cases, to acquire a company that had executed the strategies we were already pursuing."

For example, Western Digital was investigating the area of processor logic and found that Faraday Electronics in Sunnyvale, Calif., already had the products Western Digital was striving for. The situation was much the same with Paradise Systems, Inc. in South San Francisco, which is now Western Digital's video and graphics division and accounts for 10% of its current revenue. "We broadened the product range but minimized the dependency on any one large customer or segment," Johnson said. "Our customers can be anyone who makes something that computes."

Come a long way

Western Digital's current status is a far cry from the mid-1970s, when, beleaguered by Japanese companies aggressively entering the calculator market, the company was forced to seek bankruptcy protection. In 1978, Western Digital emerged from Chapter 11 stronger but apparently not wiser.

From the late 1970s until 1982, Western Digital suffered from delusions of grandeur and a lack of focus. "It was a $30 million company that thought it was a $1 billion company," Johnson said.

In 1982, the year Johnson took over the Western Digital helm, the company reported a net loss of $7 million. "It was my intent to make Western Digital profitable again by getting rid of all the things that were not central to our strategy — to stop those diversionary products and invest in some strong core businesses," he said. With the exception of fiscal 1985, when losses totaled $4.6 million, Western Digital has turned a profit every year since 1982.

In addition to supplying OEM contracts, Western Digital has been moving into direct marketing of microcomputer enhancements. The company recently announced the Filecard PS-30, a hard disk drive controller and 3½-in. hard disk on one card designed to compete with Plus Development Corp.'s Hardcard for the IBM Personal System/2 Model 30 market.

Western Digital sells products to practically every major microcomputer OEM concern, which removes the company from the performance highs and lows of particular vendors. "We don't really have to worry about who's winning," Johnson said. "We're the Delco battery company of the computer industry — we ship to everyone."

Three years ago, IBM was responsible for about 30% of Western Digital's annual sales and at one point had contributed as much as 50%. Today, however, some 30 OEM contracts constitute 60% of sales.

Export

FROM PAGE 69

The decontrol measure is not expected to cover Intel's more powerful 80286 chip. Although the move technically covers microcomputers using 16-bit chips, it is generally limited to less powerful computers using an 8-bit bus.

"Too little, too late"

William Chastka, vice-president of Washington Resources International, a computer export consulting firm in Washington, D.C., called the move "much too little and too late." He suggested that the effort was designed to derail industry-backed trade legislation that would decontrol 16- and 32-bit computers [CW, July 27].

Export controls are intended to prevent Soviet bloc countries from obtaining sensitive U.S. technology, but the controls can be lifted on grounds of "foreign availability" if the technology is widely available from other sources, such as Pacific Rim nations.

"About 12 months ago, the government decontrolled 8-bit computers, and now they're considering 16-bit computers because the market is going to 32 bits," said Charlotte LeGates, spokeswoman for the Computer and Business Equipment Manufacturers Association.

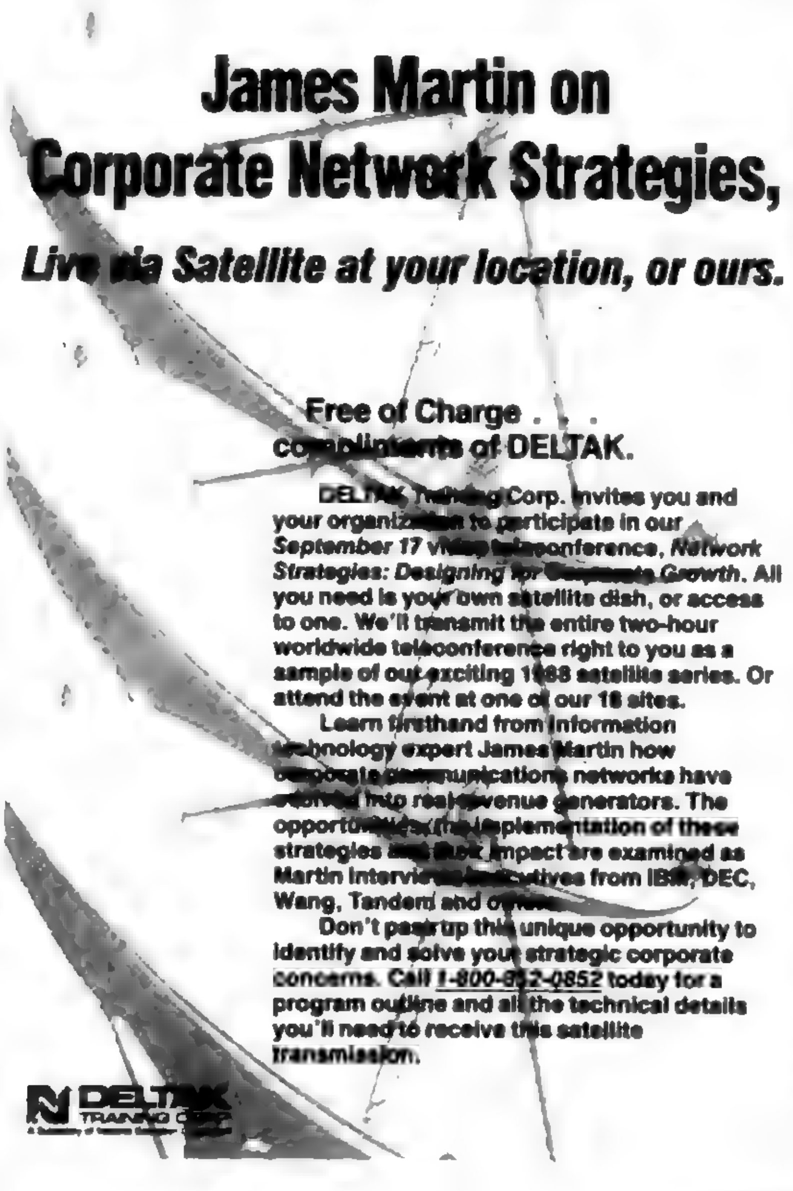
"There's not much fear the Russians will be guiding their missiles on a 16-bit computer," she added.

An announcement on removing export controls for 16-bit micros will be published in the "Federal Register," a daily bulletin published by the government, early next month, according to a spokeswoman for the Department of Commerce.

In a related move, the Reagan administration is expected to ask the Paris-based Coordinating Committee on Multilateral Export Controls (Cocom) to reduce Cocom restrictions on exports of low-end computers to Soviet bloc countries.

A U.S. interagency committee agreed to ask Cocom to remove controls on computers with the Commerce Department's processing data rate of 6.5 or less, such as micros based on the Intel 8088 chip, for export to Soviet bloc countries.

The current threshold is a processing data rate of 2. The Commerce Department's processing data rate is a formula to rate computer performance and is used to define products subject to export control regulations.



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Intimidation

CONTINUED FROM PAGE 69

it as a registered trademark.

Are these trivial matters? Maybe. Does the idea of a patent on "/2" merit a chuckle? Perhaps. But these suits could also be seen as a serious warning shot across the bows of the clone makers and the firms we'll call "vendors of IBM compatibility," such as Chips and Technologies, Inc. and Phoenix Technologies Ltd.

It wouldn't be the first time that a vendor, and not just IBM, launched a proprietary-protection lawsuit with the ancillary benefit of market intimidation.

But the situation is much more complicated than just IBM waiting to pounce. There are many other factors to be weighed, including one even more powerful than IBM's attorneys: the power of the marketplace.

IBM could be running a substantial risk if its potential legal moves polarize the market in ways that could be detrimental to users. If IBM were to pick an expensive legal fight with Compaq Computer Corp., for example, one would be hard pressed to see how IBM or its users would benefit. The open architecture, IBM Personal Computer-compatible standard is well established and thriving.

In addition, with some exceptions, the cloners have become experts in finding ways to duplicate the IBM standard without "copying" it.

Phoenix Technologies uses what is known as the "legal clean room" technique. That is, the software developers who actually write Phoenix's IBM-compatible BIOS are not given access to IBM's source code, only to the specifications of the necessary BIOS functions. Phoenix thus believes it is on firm legal ground. Even though its BIOS does what IBM's BIOS does, it does so using a different software path.

Most vendors working on PS/2-compatible products would express confidence that their technology can stand the test of a patent infringement challenge. It is not the legal issue per se that is muddying the market waters right now but the question of whether a vendor wants to risk an expensive and attention-consuming lawyers' battle with IBM.

What parts of the PS/2 does IBM think are worth patenting? And which of those would be worth a court fight? Those are the questions that the microcomputer industry is trying to answer.

Until they are answered, there will be confusion, frustration and the specter of intimidation. Wyse Technology President Phillip White said in a recent *Computerworld* interview that his company would let someone else test the legal waters on a potential Micro Channel product.

Rest assured that Big Blue is more than happy to let those types of sentiments flourish.

Wilder is *Computerworld's* senior editor, computer industry.

Experience

CONTINUED FROM PAGE 69

This management strategy is welcomed by observers, who have long held the criticism that most banking software vendors do not have a good enough understanding of the business they are intended to serve.

Marketplace knowledge key

"Conceptually, [the appointment of Fiedler] sounds good. I would assume that this person has knowledge of the marketplace," said Daniel Doyle, executive vice-president at Peoples National Bank of Washington in Seattle. "That really is the key."

As CEO at Hogan, Fiedler said he plans to devote his time to improving customer relations and leave managing the software business to President and Chief Operating Officer Richard Aldridge and others.

"Rick Aldridge runs our domestic sales force and the general management of the company very well. I don't expect to meddle in that," Fiedler said. "Similarly, on the technology side, I don't expect to be making day-to-day operating decisions."

Had share of fiascoes

Both Hogan and the banking software industry in general have had their share of fiascoes. Hogan had a major setback in the early 1980s, when it delivered an integrated software package to nearly 50 customers without having beta-tested it. The vendor was subsequently overwhelmed by the customer support it needed to provide.

Then the Dallas company fell on hard financial times. It dropped from a $7 million profit on revenue of $36.4 million in 1984 to a $13 million loss on revenue of $28.2 million in 1985.

By 1986, however, Hogan was rebuilding. The company signed a major deal with IBM, which now has exclusive rights to market most of Hogan's software in the U.S.

In fiscal 1986, Hogan reported a net loss of $6.8 million on revenue of $27 million. In fiscal 1987, the company reported net income of $9.5 million on revenue of $44 million.

"McTavish was the turnaround specialist, and that's what Hogan needed," E. F. Hutton's Quinn said of the former chairman. "But it appears that Hogan has made that turnaround. Fiedler has a working knowledge of banks, and that understanding is more important that product knowledge."

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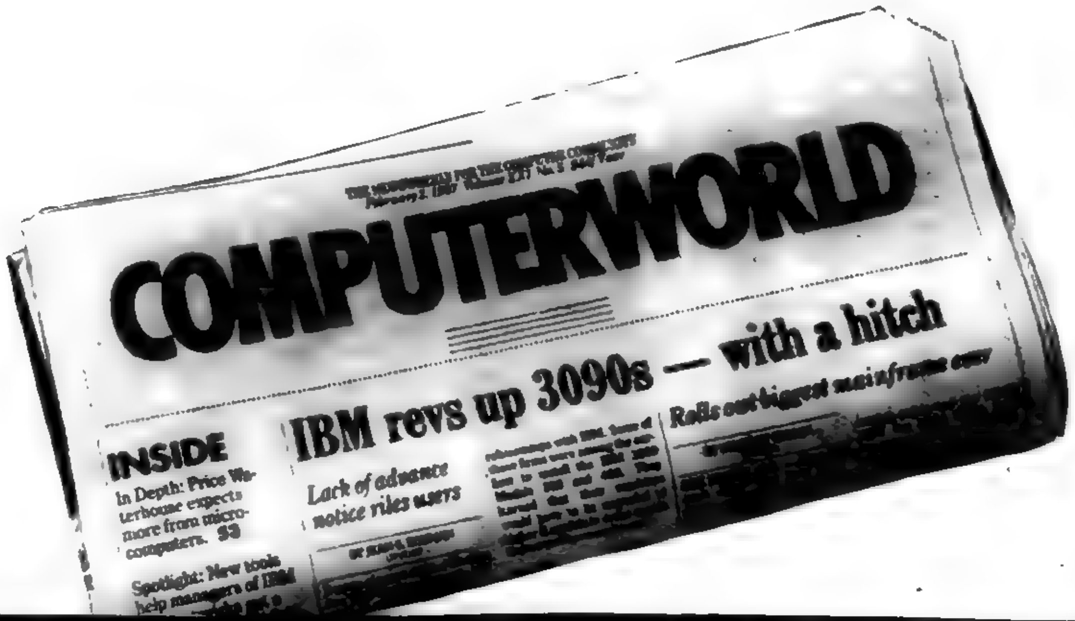

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EMPLOYMENT TODAY

MIS pros moving toward LANs

Companies seek managers with planning, analytical expertise

BY MICHAEL BALL
SPECIAL TO CW

At first glance, the burgeoning local-area network (LAN) field looks promising only for the most technically proficient hardware and software engineers. But someone must plan and manage those networks, and observers see this need as a good opportunity for MIS pros.

"You don't have to be an electrical engineer," says Bob LoPresto at Korn/Ferry International in Palo Alto, Calif. "You don't have to know how to design a LAN. You only have to know how to utilize all this hardware."

There is a steady and growing demand for managers, particularly at this early stage in the LAN market, according to recruiters. "In general, telecommunications offers broader career growth than traditional MIS growth paths," LoPresto says.

Complementary functions

While MIS managers may not possess a detailed understanding of communications, they can bring their knowledge of strategic planning and effective equipment usage to LAN management positions.

Jerome King with General Electric Co. in Bridgeport, Conn., says he is looking for such a crossover manager. As the company's telecommunications technology manager, he says, he needs more than just another LAN technician.

"The majority of these jobs are pretty technical," King says. "The issues are protocols and performances. But for this slot, I'm tempted to look for a good information systems person.

"We're trying to define the strategy and architecture and where we're going," he says, adding that many people with LAN expertise "are problem solvers and not planners."

An MIS manager moving into communications must know something about the technology, but the depth of knowledge is not as important as the breadth. "He needs enough technical knowledge to separate the smoke from the reality," King says. "He needs to be able to figure out the reality of a LAN vendor's offerings amid the confusion."

This task requires more analytical and planning expertise than network knowledge. At GE, perhaps only one out of 10 jobs related to LANs will be suitable for MIS professionals. However, the openings requiring an MIS person will be the more senior positions, King says.

"Many companies are willing to take a chance right now and put good MIS people on LAN projects," says Jack Erdlin, president of Management Dimensions, Inc. in Wellesley, Mass. "The area continues to expand. Temporarily, MIS people have a good chance before the supply of experienced LAN managers and planners grows."

It will be anywhere from six months to two years before companies demand specific LAN experience, Erdlin predicts. "It's not a case of companies not wanting to grow their own," he says, "but of what is more expedient" in the meantime.

Companies are paying premiums for telecommunications staffers of all types, and an MIS person switching jobs could expect a 12% to 15% salary increase, says Roger O'Conner of Perlin Associates in New York.

Telecommunications managerial positions tend to start in the $50,000 to $70,000 range. For that amount, many companies expect candidates to possess some LAN experience, but they know they are paying for a manager, not an engineer.

Many companies that formerly hired consultants for such telecommunications-related jobs are now staffing up instead to make sure someone is permanently running the operation, O'Conner says.

A recent survey of 1,059 MIS executives conducted by Perlin Associates shows that managers with telecommunications skills received an 18% increase in base pay from last year. The greatest salary increases went to those who planned networks and software.

Thirty-eight percent of 32,000 DP/MIS managers and directors who responded to recent Data Processing Managers Association surveys said that they already count telecommunications as part of their responsibilities. Similarly, 35% of the respondents said they rely on a separate telecommunications manager. Of those, 60% said this manager reports to the director of information resources.

Also, 45% said their company uses at least one LAN; 57% said they use communications software for microcomputers; 95% predicted that telecommunications and networks will play a greater role in their company in the future.

Today and tomorrow

Eventually, there will be a body of MIS/LAN experts to fill the needs of many companies. In the meantime, the field offers considerable promise for interested DP professionals, according to LoPresto and others. "The field has certainly grown," he says, "and many companies are looking for telecommunications managers, even if it is just to link PCs together."

Further, LoPresto predicts that "managers cannot avoid this area and be successful in MIS. Every good MIS professional today should read as much as possible and even take short courses in LAN [technology]."

Good MIS managers will make good candidates for LAN planning and administration and be able to see through all the product confusion, King says. "A good, technically qualified person in MIS should be able to pick up the LAN buzzwords quickly," he says, "but he better have a crackerjack assistant, who understands the technology, behind him."

> "THE AREA continues to expand. Temporarily, MIS people have a good chance before the supply of experienced LAN managers and planners grows."
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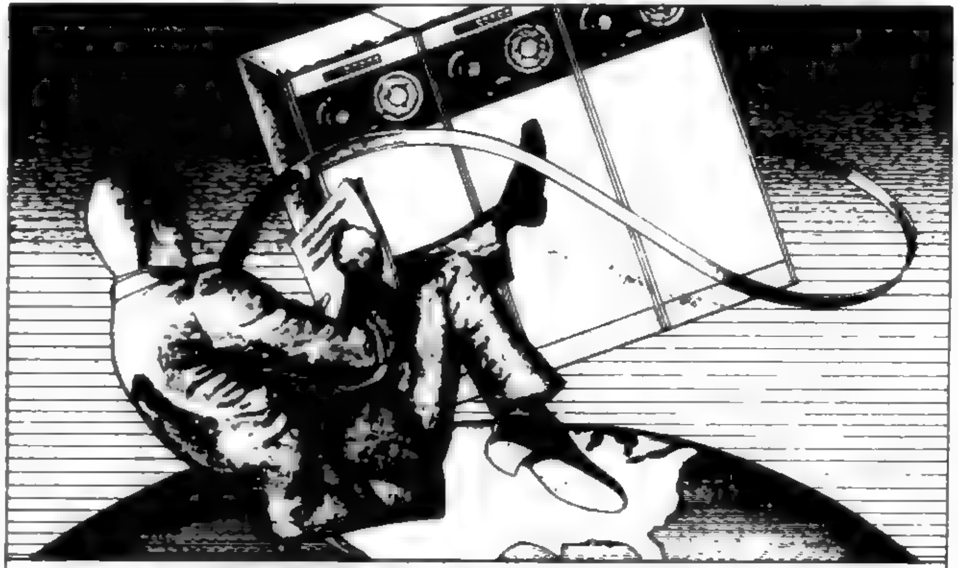

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Programmer Analyst - Analysis of procedures and prblms, determine output reqs, eval system effectiveness, dvlp, implement and upgrade systems and programs; prblm analysis & system correction. B.A. deg in comp sci, management engineering or operations research + 2 yrs in job offered or 2 yrs related programming and systems design experience. Exp must include wk w/ IBM 30XX mainframes using COBOL, DL/1, IMS/VS DB/DC, JCL, TSO/ISPF, OS/VS & MVS. 40 hrs/wk, $32,000/yr. Mail resume to New York State Job Service, JO# 8002445, 97-45 Queens Blvd., Rego Park, NY 11374

Programmer Analyst: analyze customer's needs for office computerization. Determine whether to design, implement or customize applications software packages to establish integrated multi-user networking systems that are compatible with IBM PC systems. Utilize database and XENIX Shell Scripts. Bachelor of Science Degree in Computer Science or Computer Information Systems and Management. Salary $2,650 per month. Place of employment Monterey Park, CA. Send resume to:

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You will be responsible for the logical and physical design, implementation and tuning of large IDMS databases as well as for consulting with applications development teams on the effective use of Cullinet products. You will participate in design reviews of applications developed under IDMS to ensure software efficiency and conformance to standards and also in the planning and installation of these applications. Positions exist for all levels of expertise for candidates who possess a minimum of 4 years' experience using Cullinet database products under MVS, including IDMS/DB COBOL, ADSO, OLM, IDD and Schema/Subschema compilers. Previous applications development experience with knowledge of JCL, VSAM and CICS is a plus

Data Analyst

Organization responsible for end user analysis has an opening for an individual to participate in data analysis, functional analysis and logical model definition. Qualified candidates should have a minimum of 1 year's experience in data analysis and 2 years of strong structured systems analysis, financial business analysis or data administration experience. This position involves heavy interface with the user and applications development communities, strong communication and organization skills are required, with project management experience a plus

LRF Applications Support Specialists

Join this growing support function where your responsibilities will include interfacing with our Applications Analysts to determine data access requirements, then using practical LRF and physical design expertise, you will specify detailed I/O routines to satisfy these requirements. You will also interface with Technical Specialists to ensure that I/O routines are consistent with our multi-CPU, multi-site systems architecture. Position requires a minimum of 2 years' LRF experience from both the technical and data administration viewpoints. Strong communications skills and problem solving abilities are essential

For the above positions, please send your resume to Ray Duvall.

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Our organization is responsible for applications development for Discount Brokerage, Marketing, Mutual Funds and Shareholder Applications.

Systems Managers
Project Managers
Sr. Programmer/Analysts
Programmer/Analysts
Programmers

Several positions exist at all levels for individuals with either batch and/or on-line experience. IBM OS/JCL and COBOL are required. A number of positions exist for individuals with CICS and/or data base experience (IDMS or DB2 preferred). Several positions also exist for batch programmers. Successful candidates will possess strong data gathering, systems analysis and problem-solving skills or aptitude. A good understanding of project life cycle and knowledge of multiple file access method technology is helpful. Excellent interpersonal and communication skills are essential. A background or strong interest in the financial services industry is important.

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Software Engineer, to design and develop diagnostic and application software for data communication system. Minimum Masters Degree in Computer Engineering and one year experience in software design. Demonstrated knowledge of hardware circuit design, operating systems, data structures, data communication theory, real time systems, "C", and Assembly computer languages. $33,000/yr. Job site and interview: San Diego, CA. Send this ad and your resume to job #AW6578, PO Box 9560, Sacramento, CA 95823-0560, not later than 9/15/87.

PROGRAMMER ANALYST: Support design and development of IBM System 36 computer systems. Require Bachelor's or equivalent (9 mos exp = 1 yr educ) in Computer Science or related and 3 yrs exp including IBM System 36, hardware installation and configuration, and migration structured design methodology, RPGII, and on-line screen programming in a financial environment. Salary: $36,000 per annum. Job location, Los Angeles, CA. Resume to John Williamson, 5801 E Slauson Avenue, #220, Los Angeles, CA 90040.

PROGRAMMER/ANALYST: Analyze, re-design, maintain & document a Trust Cash System for a major bank. Also, design, develop & implement a Trust Cash Management Syst. Provide back-up & recovery procedures & user training. Maintain documentation of program applications. 2 yrs exp req'd. Bachelor's in Computer Sci or Math. Must know the hardware: IBM Mainframes, S/4381, S/4341, S/4331 & software: TSO/ISPF, COBOL, VSAM, SCRIPT, OS JCL & Utilities, ADABAS/NATURAL, DOS/VSE, CMS, dBASE II plus, STAIRS, ICCF, DMS, EASYTRIEVE, SAS. $30,000/yr. 40 hrs/wk. Pinkerton Computer Consultants, Inc. 20 Broad St. Suite 1302, NYC 10005. Send resumes. Att: AJ#073.

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Art Wesek
Human Resources Director
St. Luke's Healthcare
Corporation
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Saginaw, MI 48602
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Professor John Slimick, Computer Science Search Committee, University of Pittsburgh at Bradford, Campus Drive, Bradford, PA 16701

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The successful candidate should have:

- 3 years experience in large-scale IBM OS VS1 or MVS environment
- Proficiency in COBOL, VSAM, CICS and OS/JCL

Qualified candidates will have a Bachelor's in Computer Science or related field, or possess equivalent work experience in programming/analysis. In addition, individuals must have proven experience in the MVS operating system

Moore Financial Group offers excellent salaries, benefits and career growth potential. For consideration, please submit resume, in confidence, to Cindy L. Peterson, AVP & Manager, Employee Relations and Staffing, P.O. Box 8247, Boise, ID 83733. An equal opportunity employer m/f/h. Principals only, please.

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MSU System Services, Inc., the technical service subsidiary of the Middle South Utilities System, offers excellent data processing opportunities at its New Orleans location.

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MSU System Services, Inc. offers an exceptional relocation package including a relocation allowance (one month's salary). . . paid moving expenses . . . paid house hunting trip . . . Mortgage Interest Differential, plus Interim Living. For more information, call our toll-free number below or send resume to: **Priscilla R. Crane, MSU System Services, Inc., P.O. Box 61000, New Orleans, LA 70161.**

1-800-231-4431
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Qualified candidates are invited to write: Bob Webben, Senior Staffing Representative, E-Systems, Inc., Garland Division, Department 41, Post Office Box 660023, Dallas, Texas 75266-0023.

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TEST ENGINEER. Provide technical support to production in area of data communication at system level; validate and introduce new data communication systems into production; develop diagnostic procedures; assist in preparing documentation to support products; specify test equipment for new product evaluation and production testing. Minimum of MS or equivalent CS. Applicants must have background in programming systems and development and systems development and design; knowledge of data communications and computer networks (ISO OSI reference model, SNA X.25, TCP/IP IEEE 802 standard (relational and hierarchical, distributed) knowledge of "UNIX®", VAX 11/780, HP 3000, IBM PC, Macintosh, C, Pascal, Assembly Fortran and LISP $2,580/month. Job site/interviews: Mt. View CA. Applicants please clip ad and send to Pyramid Technology, 1295 Charleston Rd., Mt. View, CA 94039-7295. Attention: Human Resources Department MC/CW "UNIX®" is a registered trademark of AT&T

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Opportunities at our Minneapolis based headquarters currently exist for the following positions:

SUPPORT PROGRAMMER ANALYST

Our support group handles maintenance, enhancements and small new development on systems in all areas of the business. The position involves significant user contact and requires proven COBOL expertise in an IMS DB or related database environment.

DATA ADMINISTRATION ANALYST

Responsibilities of this position include logical design and review, as well as data dictionary support. Candidates should be degreed with at least one year of data administration experience and a background in entity relationship modeling.

DATABASE ADMINISTRATOR

Position involves data administration for all IMS and DB2 databases. Candidates should be degreed with 3+ years of IMS database administration experience, including database recovery, database tuning and physical database design. DB2 experience a plus.

Dayton Hudson Department Store Company operates a large, multiple IBM mainframe environment, and has a strong commitment to MIS. We offer a competitive salary, excellent benefits including relocation and a work environment conducive to your personal growth and development.

Qualified applicants should send a resume, including salary history, to: **Michael Tracy, Executive Placement/962, Dayton Hudson Department Store Company, 700 Nicollet Mall, Minneapolis, MN 55402.** An Equal Opportunity Employer. Please, no agencies.

DAYTON HUDSON
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COMPANY

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This position requires significant CICS programming, MVS JCL and utilities experience. A background using SMP is essential. A knowledge of CPIPO, CBDPO and 370 Assembler programming is highly desirable. Experience in CICS applications development using structured design methods is preferred. The ability to work in a team environment and excellent communication skills are also required.

Please forward your resume with salary history to: Chuck Pacheco, MS P280, Personnel Services Division 70290-AD, Los Alamos National Laboratory, Los Alamos NM 87545.

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SYSTEMS ANALYST

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Analyst/Programmer to handle on-line programming and systems analysis in customer information control operating systems (CICS) using COBOL. Designs, tests and codes software programs for [illegible] package. Handles data base creation using IMS and operative interface. Provides technical assistance. Evaluates, debugs and modifies aspects of operating system and software packages. Prepares reports of all modifications. Must have min. B.S degree in Computer Science or related field plus 2 yrs exp same job or 3 yrs exp same or related job if no degree, technical writing ability, excellent problem solving/analytical skills using models and flow charts, excellent oral and written communication skills, knowledge of data base creation and systems interface techniques. Hrs: Mon-Fri, 8am-5pm. Salary: $2,300/mo. Send resume only to Job Service of Florida, 701 SW 27th Avenue, Room 15, Miami, FL 33135. REF: Job Order # FL[illegible].

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Computer Systems Analyst wanted to design, develop and implement computer software for business and financial applications using Fourth Generation Languages and XGEN languages, and DMS II and GEMCOS software for use on large UNISYS/A12 and UNISYS/B20 BTOS version information processors; Requires B.S. degree in Computer Science and Bachelor's degree level courses, one each in: Artificial Languages, Automata Theory, Systems Programming, and Non-Arithmetic Programming; $27,000 per year; 40 hours per week. Send resume to 7310 Woodward Ave., Room 415, Detroit, MI 48202. Ref. #47687. "Employer Paid Ad"

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Prog/Ana III in Registrar's Office. Analyze current functions, pgms, & rpt requests. Prepare flowcharts & pgm spec. Code & modify existing pgms. Propose enhancements or new dev & identify impacts on user req'ts, organization, policies & procedures, resources, & syst interfaces. Write technical & user docs. Requirements: B.S. in Computer Science, plus a minimum of 2 yrs of exp as programer of systems or M.S. in Computer Science in lieu of exp. Working exp in writing programs in COBOL, PL/I, FOCUS, & IBM Assembler. Working exp & in depth knowledge of ISAM/VSAM file structures & applications. Working exp & in depth knowledge of IBM JCL/PROC & TSO commands in OS/MVS environment. Demonstrated ability in req'l analysis, design & dev of systs to perform user & syst support tasks. Job Location: Los Angeles. $3,0[illegible]/mo. Send this ad and resume to JOB #ML[illegible], P.O. Box 9560, Sacramento, CA 95823-0560, no later than 9/14/87

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Full-time, tenure track position in Computer Science. Masters degree in Computer Science or Computer Information Science required. Doctorate desirable. Responsibilities include teaching a variety of undergraduate Computer and Information Science courses, curricular development, student advisement, and committee assignments. Knowledge of business application and/or AI/Expert Systems essential. Teaching experience at an institution of higher learning desirable. Computer experience in commerce or industry preferred. Competitive salary with excellent fringe benefits. Position available January 2, 1988; application deadline October 15, 1987. Send letter of intent, resume, transcripts, and three current letters of recommendation to:

Mr. Clarence L. [illegible], Chairman
Computer Science Search Committee
Mansfield University - [illegible] Bldg.
Mansfield, PA 16933

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Please direct your resumes to Ms. Joan Sundstrom, Battelle Ocean Sciences, 397 Washington Street, Duxbury, MA 02332.

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SYSTEMS PROGRAMMER

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Submit two (2) copies of resume, academic credentials and three (3) letters of reference to: Personnel Services, 11011 S.W. 104 St., Miami, FL 33176. MUST be received by September 18, 1987.

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P/A VM, CMS, REXX, Model 204	[illegible]
P/A Series I, EDX, EDL	$40K
P/A MSA Payroll Honey to IBM	[illegible]
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Systems Analyst - Design and develop the specifications and lead the implementation of information management and training management systems. Modify programs to meet client special requirements. Debug, troubleshoot and provide client support and programmer training. Knowledge of or training with Data Base and File Management systems and information processing. Familiarity with microcomputer architecture software and systems, knowledge of image processing technology and computer graphics. M.S. or B.S. and two years experience in Computer Science. Salary $2,720 per month. Job site: Walnut Creek, CA. Please send this ad and a resume to Job #NCF 747, P.O. Box 9560, Sacramento, CA 95823-0560 no later than September 15, 1987.

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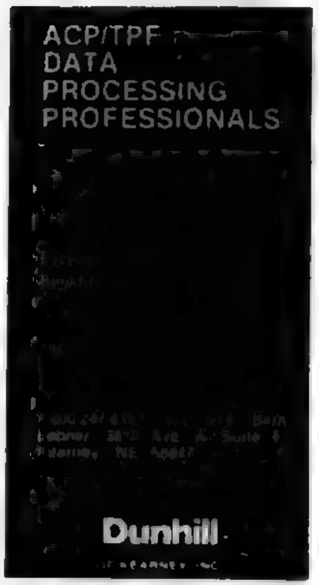

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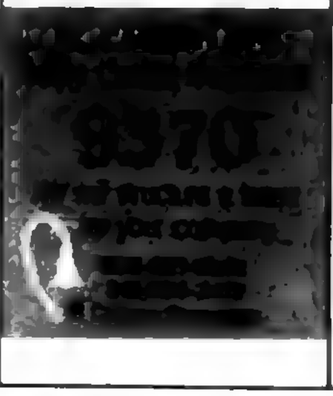

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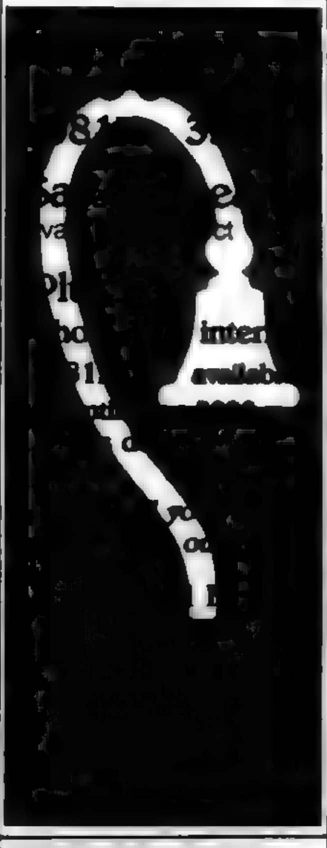

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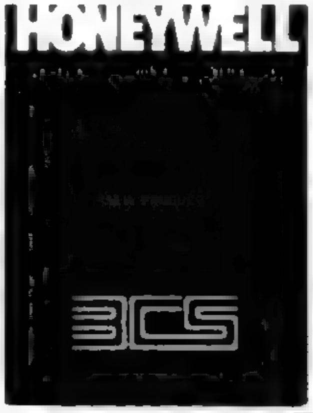

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Pursuant to the Illinois Uniform Commercial Code, and the terms of agreements between Business Computer Systems, Inc. (debtor) and MDS Qantel, Inc. (secured party) dated February 25, 1986 and March 20, 1986, MDS Qantel will sell Business Computer Systems Inc.'s customer lists, in which it holds a collateral security interest, at public auction at the offices of Barack, Ferrazzano, Kirschbaum & Perlman, 333 West Wacker Drive, Chicago, Illinois on September 8, 1987 at 10:00 a.m.

The sale will be subject to the following restrictions:

1. The above-described property will be sold to the highest bidder. There will be required a 25% deposit with each bid, with the balance of the bid price to be paid no later than the second (2nd) day after acceptance of any bid. All funds shall be paid in cash, certified check or cashier's checks payable to the order of MDS Qantel. MDS Qantel reserves the right to bid at the sale without cash, certified check or cashier's check deposit as required for other bidders. MDS Qantel reserves the right within twenty four (24) hours after the completion of bidding to reject all bids.
2. If the successful bidder defaults on the balance, bidder's initial deposit shall be forfeited to MDS Qantel, and MDS Qantel may sell to the next highest bidder.
3. The debtor has the right to redeem the collateral at any time up to the time the sale is held by tendering monies sufficient to satisfy all of its obligations due MDS Qantel.
4. MDS Qantel reserves the right to and intends to seek and enforce judgments against the debtor and guarantors for any deficiency remaining due on the underlying indebtedness after the public sale.

To the best knowledge of MDS Qantel, Business Computer Systems, Inc. has been engaged in the business of selling MDS Qantel hardware and providing software and support service for that hardware to commercial and industrial end-users in the United States. MDS Qantel has limited information regarding the business of Business Computer Systems, Inc. which it cannot and does not warrant to be accurate, current or complete. To gain access to such information, contact Mr. Ray Larson (312) 954-2252. Parties planning to attend the public sale are encouraged to notify Mr. Mark Weinberg at the offices of Barack, Ferrazzano, Kirschbaum & Perlman, attorneys for MDS Qantel at (312) 781-6800.

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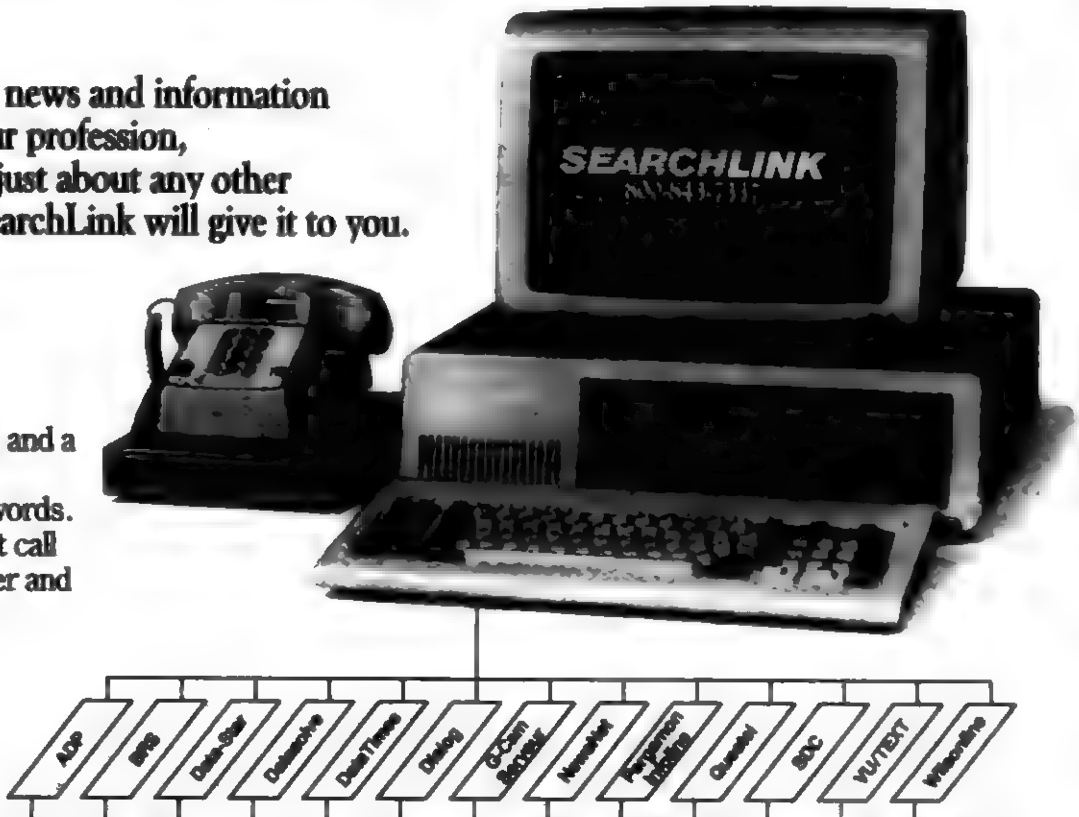

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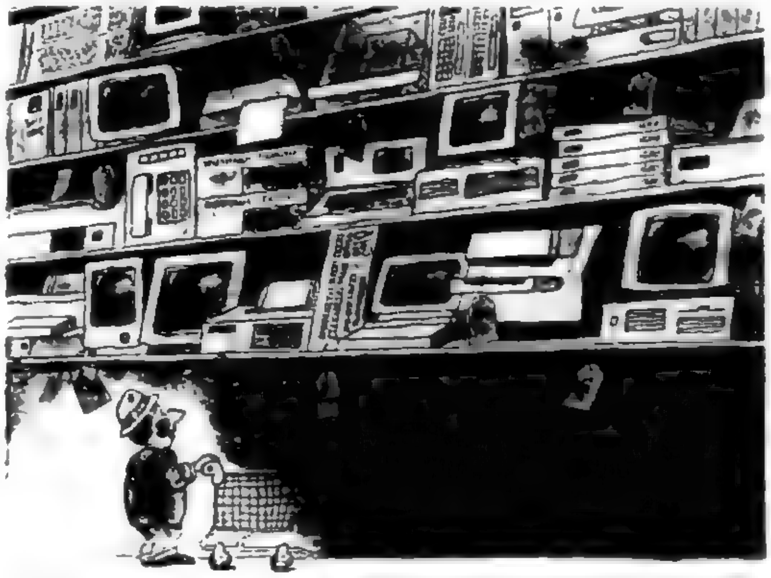

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Sept. 28	Hardware Roundup: Small Scale Systems	Sept. 11
Oct. 5	Hardware Roundup: Micros	Sept. 18
Oct. 12	Leasing & Used Equipment	Sept. 25
Oct. 19	Capacity Planning/ Performance Monitoring Software	Oct. 2

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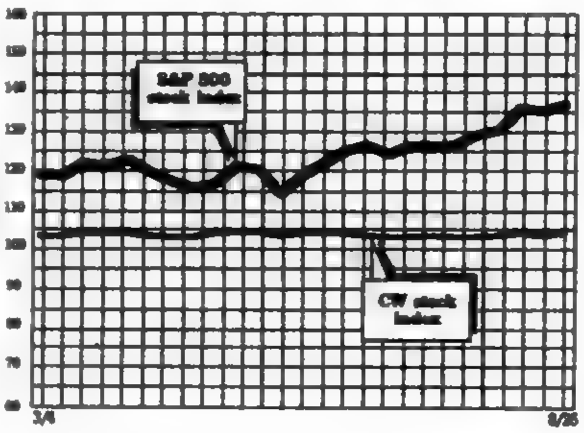

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Semiconductors	113.5	**122.2**
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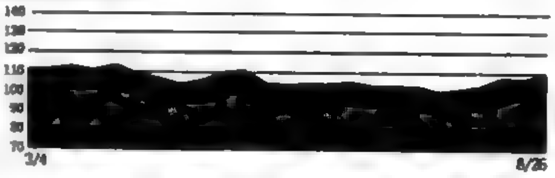
Leasing Companies	118.8	**121.1**
Composite Index	103.7	**104.2**
S&P 500 Index	135.2	**137.2**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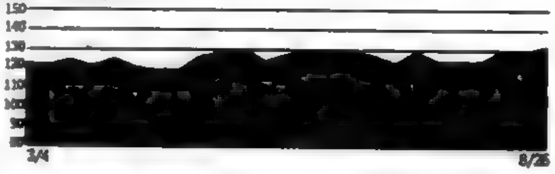
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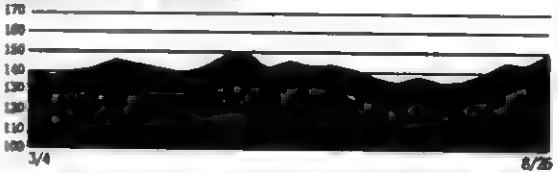
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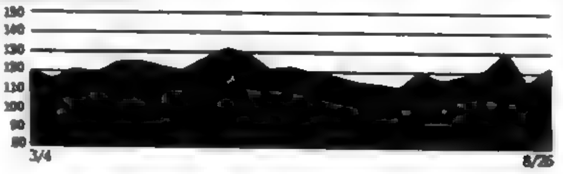
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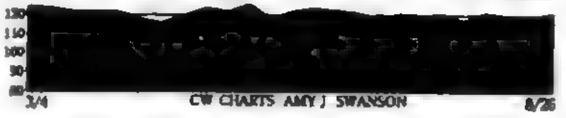
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CLOSING PRICES WEDNESDAY, AUG. 26, 1987

Communications and Network Services

EXCH		52-WEEK RANGE (1)		PRICE CLOSE AUG. 26 1987	WEEK NET CHNGE	WEEK PCT CHNGE
N	AMERICAN INFO TECHS CORP	101	77	97.63	+3.1	+3.3
Q	ANDREW CORP	19	14	17.00	+0.0	+0.0
Q	ARTEL COMM CORP	5	2	2.63	-0.3	-8.7
N	AT&T	36	22	34.38	+0.1	+0.4
Q	AVANT GARDE COMP INC	7	3	5.25	+1.0	+23.5
Q	AVANTEK INC	19	13	14.63	+0.0	+0.0
N	AYDIN CORP	38	18	34.13	+2.3	+7.1
N	BELL ATLANTIC CORP	77	62	76.75	+1.9	+2.5
N	BELLSOUTH CORP	46	35	42.63	+0.0	+0.0
Q	BRIDGE COMMUNICATION	27	11	23.25	+0.5	+2.2
Q	COMPRESSION LABS INC	12	4	5.50	+1.0	+22.2
O	COMPUTER NETWORK TECH	6	3	3.63	-0.1	-1.7
O	CONTEL CORP	40	27	37.88	+0.4	+1.0
Q	DATA SWITCH CORP	9	5	7.50	+1.3	+20.0
Q	DIGITAL COMM ASSOC	49	18	38.50	+1.4	+3.7
Q	DYNATECH CORP	44	27	32.00	+1.0	+3.2
Q	EQUATORIAL COMM CO	6	2	3.13	-0.1	-3.8
Q	GANDALF TECHNOLOGIES	11	5	7.38	+0.1	+1.7
Q	GENERAL DATACOMM INDS	14	8	8.00	+0.0	+0.0
N	GTE CORP	45	34	42.50	-0.3	-0.6
Q	INFOTRON SYS CORP	12	7	9.25	+0.0	+0.0
N	ITT CORP	66	47	63.88	+0.5	+0.8
N	M A COM INC	16	12	15.00	-0.1	-0.8
Q	MCI COMMUNICATIONS CORP	10	5	9.50	+0.4	+4.1
Q	MICOM SYS INC	18	10	12.00	+0.0	+0.0
Q	NETWORK SYS CORP	19	9	11.50	+0.1	+1.1
N	NORTHERN TELECOM LTD	24	14	22.50	-0.4	1.6
Q	NOVELL INC	27	10	23.25	+1.0	+4.5
N	NYNEX CORP	77	59	75.75	+1.5	+2.0
N	PACIFIC TELESIS GROUP	32	23	31.00	+0.5	+1.6
N	PARADYNE CORP	9	4	8.25	+0.1	+1.5
A	PENRIL CORP	6	4	4.63	+0.3	+5.7
N	PLESSEY PLC	41	24	30.50	+1.0	+3.4
N	SCIENTIFIC ATLANTA INC	20	9	18.50	-0.8	-3.9
N	SOUTHWESTERN BELL CORP	42	33	41.63	+0.8	+1.8
Q	3COM CORP	24	9	17.25	+0.4	+2.2
N	TIMEPLEX INC	41	15	30.25	-1.5	-4.7
Q	UNGERMANN BASS INC	10	7	9.75	-0.4	-3.7
N	U S WEST INC	62	45	58.50	+2.0	+3.5

Computer Systems

EXCH		52-WEEK RANGE (1)		PRICE CLOSE AUG. 26 1987	WEEK NET CHNGE	WEEK PCT CHNGE
Q	ALLIANT COMPUTER SYS	37	15	18.00	+1.8	+10.8
Q	ALPHA MICROSYSTEMS	7	3	4.88	-0.1	-2.5
Q	ALTOS COMPUTER SYS	17	10	13.38	-0.1	-0.9
A	AMDAHL CORP	44	18	42.25	+1.5	+3.7
Q	APOLLO COMPUTER INC	25	11	21.00	-0.1	-0.8
Q	APPLE COMPUTER INC	54	16	52.00	+2.0	+4.0
N	BOLT BERANEK & NEWMAN	30	19	22.38	+1.3	+5.9
Q	BRITTON LEE INC	5	3	3.25	+0.0	+0.0
N	COMPAQ COMPUTER CORP	58	14	56.13	+1.9	+3.5
Q	COMPUTER AUTOMATION INC	17	2	12.75	-0.3	-1.9
A	COMPUTER CONSOLES INC	12	7	7.00	-0.5	-6.7
Q	CONCURRENT COMP CORP	22	13	21.25	+2.0	+10.4
N	CONTROL DATA CORP DEL	36	24	33.38	-1.4	-4.0
Q	CONVERGENT TECH	12	4	8.13	+0.4	+4.8
Q	CONVEX COMPUTER CORP	22	8	14.88	-0.1	-0.8
N	CRAY RESH INC	136	69	117.50	+7.0	+6.3
Q	DAISY SYS CORP	13	7	7.25	-0.4	-4.9
N	DATA GEN CORP	38	25	34.00	+0.8	+2.3
N	DATAPOINT CORP	9	4	8.25	+0.5	+6.5
N	DIGITAL EQUIP CORP	198	89	190.00	+10.5	+5.8
N	FLOATING POINT SYS INC	17	8	10.38	-0.1	-1.2
N	GOULD INC	25	16	23.88	+1.0	+4.4
N	HARRIS CORP	43	27	38.75	+1.3	+3.3
N	HEWLETT PACKARD CO	69	37	67.13	+2.1	+3.3
N	HONEYWELL INC	91	58	87.00	+0.1	+0.1
N	IBM	176	116	167.88	-4.8	2.8
Q	INFORMATION INTL INC	17	13	13.50	-0.4	-2.7
Q	IPL SYS INC	3	2	2.75	+0.0	+0.0
Q	MASS COMPUTER CORP	12	5	11.50	+2.0	+21.1
Q	MATSUSHITA ELEC INDL LTD	178	93	170.00	+1.0	+0.6
Q	MEGADATA CORP	7	2	5.25	+0.5	+10.5
Q	MENTOR GRAPHICS CORP	35	13	35.00	+4.1	+13.4
N	NBI INC	14	8	12.13	+0.3	+2.1
N	NCR CORP	87	42	85.25	+2.9	+3.5
N	PRIME COMPUTER INC	31	16	29.38	+1.8	+6.3
Q	PYRAMID TECHNOLOGY	12	4	8.00	+0.3	+3.2
Q	STRATUS COMPUTER	41	18	29.75	-0.3	-0.8
Q	SUN MICROSYSTEM INC	46	13	34.63	1.0	-2.8
Q	SYMBOLICS INC	7	4	4.00	-0.1	-3.0
N	TANDEM COMPUTERS INC	38	16	32.63	+2.4	+7.9
N	TANDY CORP	56	31	48.75	+0.0	+0.0
N	ULTIMATE CORP	33	13	32.13	+0.6	+2.0
N	UNISYS CORP	48	22	44.75	+0.0	+0.0
A	WANG LABS INC	19	11	17.75	+0.0	+0.0

Software & DP Services

EXCH		52-WEEK RANGE (1)		PRICE CLOSE AUG. 26 1987	WEEK NET CHNGE	WEEK PCT CHNGE
Q	ADVANCED COMP TECH	5	3	3.63	+0.0	+0.0
N	ADVANCED SYS INC	28	12	27.38	+1.4	+5.3
N	AGS COMPUTERS INC	22	8	19.38	+0.1	+0.6
Q	AMERICAN MGMT SYS INC	19	7	17.38	+0.1	+0.7
Q	AMERICAN SOFTWARE INC	22	8	17.50	+0.3	+1.4
N	ANACOMP INC	11	3	9.75	-0.1	1.3
Q	ANALYSTS INTL CORP	9	3	8.25	-0.1	-1.5
Q	ASHTON TATE	30	12	23.38	-0.6	2.6
Q	ASK COMPUTER SYS INC	17	10	14.75	+0.5	+3.5
Q	AUTODESK INC	34	10	28.50	+1.0	+3.6
N	AUTO DATA PROCESSING	55	30	52.75	+0.0	+0.0
Q	BOOLE & BABBAGE INC	12	4	10.50	+0.0	+0.0
N	COMPUTER ASSOC INTL INC	32	10	31.25	+2.4	+8.2
Q	COMPUTER HORIZONS CORP	15	10	12.38	-0.1	1.0
N	COMPUTER SCIENCES CORP	66	30	64.38	+5.6	+9.6
N	COMPUTER TASK GROUP INC	18	11	13.25	+0.1	+1.0
Q	COMSHARE INC	28	11	25.25	+0.0	+0.0
N	CULLINET SOFTWARE INC	13	6	12.88	+0.0	+0.0
Q	CYCARE SYS INC	12	7	9.75	+0.5	+5.4
Q	DUQUESNE SYS INC	33	12	17.50	+0.3	+1.4
Q	ENDATA INC	15	5	14.00	+4.0	+40.0
N	GENERAL MTRS (CLS E)	49	24	48.13	+0.8	+1.6
Q	HOGAN SYS INC	17	9	11.13	1.3	-10.1
Q	INFORMIX CORP	23	7	21.75	+2.0	+10.1
Q	INTELLICORP INC	11	4	7.75	+0.8	+10.7
Q	KEANE INC	10	5	7.00	-0.1	1.8
Q	LOTUS DEV CORP	37	11	33.50	+0.0	+0.0
Q	MANAGEMENT SCI AMER	21	11	12.63	+0.3	+2.0
Q	MICRO PRO INTL CORP	8	2	5.81	+0.2	+3.3
Q	MICROSOFT CORP	128	26	115.50	+13.0	+12.7
Q	NATIONAL DATA CORP	34	17	33.13	+1.3	+3.9
Q	ON LINE SOFTWARE INTL INC	22	6	19.63	0.3	1.3
Q	ORACLE SYS CORP	30	7	24.75	+0.5	+2.1
N	PANSOPHIC SYS INC	23	12	21.75	+3.0	+16.0
Q	POLICY MGMT SYS CORP	30	15	24.75	+1.5	+6.5
Q	PROGRAMMING & SYS INC	13	8	12.63	+0.0	+0.0
Q	REYNOLDS & REYNOLDS CO	39	27	37.00	+0.8	+2.1
Q	SEI CORP	18	8	16.75	+0.3	+1.5
Q	SHARED MED SYS CORP	53	23	28.63	+3.0	+11.7
Q	SOFTWARE AG SYSTEMS INC	20	10	13.25	+0.6	+5.0
Q	SOFTWARE PUBG CORP	17	5	10.13	+0.0	+0.0
A	STERLING SOFTWARE INC	18	9	9.63	-0.1	1.3
Q	SUNGARD DATA SYS INC	21	10	19.00	+0.8	+4.1
Q	SYSTEMATICS INC	30	14	28.50	+0.5	+1.8
N	UCCEL CORP	52	20	48.75	+0.0	+0.0
N	URS CORP	20	12	19.88	-0.9	+4.6
Q	VM SOFTWARE INC	45	15	18.50	1.0	5.1

Semiconductors

EXCH		52-WEEK RANGE (1)		PRICE CLOSE AUG. 26 1987	WEEK NET CHNGE	WEEK PCT CHNGE
N	ADV MICRO DEVICES INC	25	13	22.50	+2.1	+10.4
N	ANALOG DEVICES INC	24	14	21.63	+0.9	+4.2
Q	ANALOGIC CORP	13	10	12.50	+0.3	+2.0
Q	INTEL CORP	55	18	55.00	+4.8	+9.5
Q	LSI LOGIC CORP	17	8	12.75	+1.6	+14.6
Q	MONOLITHIC MEMORIES INC	19	10	10	+0.0	+0.0
N	MOTOROLA INC	72	34	71.38	+8.5	+13.5
N	NATL SEMICONDUCTOR	17	8	15.63	+1.3	+8.7
N	TEXAS INSTRS INC	78	35	76.63	+7.6	+11.1
A	WESTERN DIGITAL CORP	33	13	28.00	+0.6	+2.3

Peripherals

EXCH		52-WEEK RANGE (1)		PRICE CLOSE AUG. 26 1987	WEEK NET CHNGE	WEEK PCT CHNGE
N	AM INTL INC	9	5	7.75	-0.5	-6.1
Q	AST RESH INC	23	11	16.38	-0.5	-3.0
Q	AUTO TROL TECH CORP	9	3	6.00	+0.0	+0.0
Q	BANCTEC INC	16	6	12.63	+0.4	+3.1
Q	CIPHER DATA PRODS INC	18	9	10.13	-0.3	2.4
A	COGNITRONICS CORP	5	2	4.25	-0.1	-2.9
N	COMPUGRAPHIC CORP	26	16	25.00	+0.3	+1.0
N	COMPUTERVISION CORP	23	12	14.25	-0.5	3.4
N	CONRAC CORP	30	12	0.00	+0.0	+0.0
A	DATAPRODUCTS CORP	16	10	11.63	+0.0	+0.0
A	DATARAM CORP	9	7	7.50	+0.1	+1.7
N	DECISION INDS CORP	13	7	11.75	+0.9	+8.0
N	EASTMAN KODAK CO	104	52	102.00	+1.9	+1.9
Q	E M C CORP MASS	40	11	39.75	+3.8	+10.4
Q	EMULEX CORP	10	6	7.63	+0.1	+1.7
Q	EVANS & SUTHERLAND	40	20	33.25	+0.0	+0.0
Q	ICOT CORP	13	5	6.50	+0.3	+4.0
Q	INTERLEAF INC	20	8	16.13	-0.6	3.7
Q	IOMEGA CORP	11	2	2.88	+0.1	+4.5
Q	LEE DATA CORP	10	5	5.25	+0.4	+7.7
Q	MASSTOR SYS CORP	6	3	4.88	+0.0	+0.0
Q	MAXTOR CORP	34	12	13.63	-0.4	-2.7
Q	MICROPOLIS CORP	44	14	33.63	-0.1	-0.4
Q	MINISCRIBE CORP	18	5	14.00	+0.3	+1.8
N	MINNESOTA MNG & MFG CO	84	50	82.50	+3.1	+3.9
A	MSI DATA CORP	23	10	22.00	+3.8	+20.5
Q	PRIAM CORP	6	2	3.50	-0.1	-3.4
Q	PRINTRONIX INC	14	10	11.00	-0.3	2.2
N	QMS INC	25	11	23.50	+1.5	+6.8
Q	QUANTUM CORP	35	15	17.50	+0.3	+1.4
Q	RAMTEK CORP	6	4	5.88	+0.3	+4.4
N	RECOGNITION EQUIP INC	27	12	17.00	-2.4	-12.3
Q	REXON INC	14	5	9.13	-0.9	-8.8
Q	SCAN TRON CORP	17	11	13.00	+0.5	+4.0
Q	SEAGATE TECHNOLOGY	46	13	28.38	1.8	5.8
N	STORAGE TECH CORP	5	2	3.00	-0.1	-4.0
Q	TANDON CORP	7	2	4.00	-0.1	-3.0
A	TEC INC	7	3	4.63	+0.1	+2.8
N	TEKTRONIX INC	43	30	39.50	-0.4	-0.9
Q	TELEVIDEO SYS INC	3	2	2.63	-0.3	-10.7
N	TELEX CORP	102	56	71.50	+8.0	+12.6
Q	WYSE TECH	36	13	33.13	+1.1	+3.5
N	XEROX CORP	85	51	81.75	+1.8	+2.2
Q	XIDEX CORP	19	11	12.38	-0.3	2.0

Leasing Companies

EXCH		52-WEEK RANGE (1)		PRICE CLOSE AUG. 26 1987	WEEK NET CHNGE	WEEK PCT CHNGE
N	COMDISCO INC	35	15	34.13	+3.5	+11.4
N	CONTINENTAL INFO SYS	14	7	11.25	+0.1	+1.1
Q	PHOENIX AMERN INC	8	3	4.50	+0.1	+2.9
Q	SELECTERM INC	7	5	5.00	-0.3	4.6
N	US LEASING INTL	55	40	52.63	-0.6	1.2

EXCH: N = NEW YORK; A = AMERICAN; Q = NATIONAL;
O = OVER-THE-COUNTER; S = SPLIT

O-T-C PRICES ARE BID PRICES AS OF 3 P.M. OR LAST BID
(1) TO NEAREST DOLLAR

Wild ride

IBM peaks, then falls sharply; market down after giddy high

A wild market week in which IBM's recent stock surge collapsed demonstrated the extreme sensitivity of the current bull market to the slightest hint of bad news.

After paralleling the rise of the Dow Jones industrial average and hitting a new high of 175¼ during trading on Friday, Aug. 21, IBM sparked an overall market decline by falling fast last week. In generally heavy trading, Big Blue tumbled 2⅝ points Tuesday, 4⅛ points Wednesday and another 1⅝ Thursday, closing at 166¼.

Although reduced 1987 earnings estimates by influential IBM analysts at Kidder Peabody & Co. and Salomon Brothers, Inc. catalyzed the selloff, market observers suggested that IBM's stock was the scapegoat for jittery investors waiting for a bailout signal. After the Dow crested over 2720 on Tuesday, the bubble burst, and many analysts felt the long-awaited market "correction" was underway. An advertisement for a leading brokerage firm last week posed the question, "Has the market moved too far too fast?" Investors last week answered a resounding "yes," and IBM's stock bore the brunt of their resulting actions.

CLINTON WILDER

DEC, C. Itoh end patent clash

Japanese firm submits; halts some terminal sales, changes screen format

BY CLINTON WILDER
CW STAFF

MAYNARD, Mass. — Digital Equipment Corp. announced last week a settlement of a VT220 terminal patent and copyright infringement lawsuit that it said sends a signal to makers of DEC-compatible products.

DEC settled its 4-year-old litigation with Japan-based C. Itoh & Co., which agreed to stop selling, on a worldwide basis, its CIT-220+ terminals and to change the setup screen formats on its CIT-224 terminals.

Both monitors are sold in the U.S. through C. Itoh's Irvine, Calif.-based subsidiary, CIE Terminals, Inc.

CIE Terminals has sold only nominal numbers of the CIT-220+ since introducing the CIT-224 two years ago. But DEC spokesman Jef Gibson said the settlement is more significant from the larger perspective of DEC's relationship with the third-party DEC-compatible market.

Recognized rights

"The significance is C. Itoh's recognition of our intellectual property rights," Gibson said. "It sends a signal to the world that we intend to protect those."

According to a C. Itoh spokesman, changing the CIT-224 screens involves firmware changes that will not be expensive or time-consuming for the vendor.

DEC originally filed its patent infringement suit in December 1984, 15 months after C. Itoh introduced the CIT-220+. C. Itoh noted that its product was introduced before the DEC patent was issued. The patent covers the wedge-shaped design of the terminal.

Neither company would comment on whether financial terms were involved in the settlement.

According to Dataquest, Inc., a San Jose, Calif.-based research firm, CIE Terminals is the second largest vendor of VT220-compatible terminals in the U.S., with 8.9% of the market.

Wyse Technology holds a 13.6% market share, and DEC accounts for 49.8% of the market.

Ramis/PC eyes PC/Focus

NEW YORK — To counter competition from Information Builders, Inc.'s PC/Focus, On-Line Software International, Inc. is set this week to enhance its Ramis/PC Workstation program with improved data base capabilities and support of Lotus Development Corp. 1-2-3 Release 2 work sheets.

The $495 stand-alone fourth-generation language information management system, to be announced tomorrow at PC Expo in New York, is aimed at both personal computer end users and expert applications developers, the firm said.

Like the PC/Focus package, Ramis/PC was developed to allow fourth-generation language applications development, which often occurs on mainframes and minicomputers, to take place on less expensive microcomputers.

Applications can also run on microcomputers and can reportedly simply pull data from the fourth-generation language running on host computers.

Enhancements to the Ramis/PC relational data base include complete relational file manipulation, multiple field linkage and an expanded screen editing capability. These additions are meant to bring Ramis/PC closer to the level of the company's Ramis Information Management, which runs on mainframe computers.

The updated package can also convert data to a variety of PC file formats, including 1-2-3 WKS and WK1 files and the Ashton-Tate Dbase III file format.

Ramis/PC now includes a menu-based transaction processing feature based on the Data Maintenance Facility found in the mainframe version, according to the company.

This feature can use files from 1-2-3, Dbase and other personal computer packages while maintaining the original file structure and programming syntax, the firm claimed.

Banyan secures Vines

BY PATRICIA KEEFE
CW STAFF

WESTBORO, Mass. — Banyan Systems, Inc. this week will demonstrate Vanguard, an extension of its virtual network software (Vines) operating system said to bring mainframe-like security to local-area networks (LAN).

Vanguard is positioned as a fully integrated service of Vines Release 3.0, which is slated to be released in November, according to the company.

> VANGUARD offers features similar to those found in mainframe security packages like IBM's RACF, Uccel Corp.'s ACF2 and Computer Associates International, Inc.'s CA-Top Secret.

Support for IBM's LU6.2 is a key feature of Vines Release 3.0, the company said.

Similarities

Vanguard, to be announced at PC Expo this week, offers features similar to those found in mainframe security packages like IBM's RACF and Uccel Corp.'s ACF2 as well as Computer Associates International, Inc.'s CA-Top Secret, Banyan claimed.

Features include audit trails and reporting tools, password encryption, protection from unauthorized logon or access to network traffic and other capabilities that significantly increase an administrator's ability to control access to networks running Vines, according to the company.

A wide range of group and individual security features will be offered, the vendor said, including user identification expiration dates, limitations on users' ability to change passwords and physical location as well as time/date logon restrictions and dial-in limitations.

Security highlights

Banyan is highlighting the following two major security benefits:

- The ability for LAN administrators to select the level of protection and combination of security options they want for their organizations.
- The ability to centrally control access to network resources.

Similar capabilities have been announced for Release 2.1 of Novell, Inc.'s Netware, which has a fourth-quarter delivery date.

Because Vanguard is fully integrated in Banyan's Street Talk networkwide naming service, implementing Vanguard features will be a familiar step for Vines administrators, Banyan said.

Upgrades available

Vanguard will be included with the base price of Vines Release 3.0, which is priced at $1,895, the company said.

Current Vines users who have purchased Banyan's support contract will be able to upgrade to Vanguard free of charge, according to a spokeswoman.

Customers who do not purchase support will pay a fee not yet determined, according to the company.

CXI card ties PS/2s, nets to IBM hosts

MOUNTAIN VIEW, Calif. — CXI, Inc., the data communications division of Novell, Inc., introduced a micro-to-mainframe communications board last week for Models 50 and above of IBM's Personal System/2 family.

The Pcox/Coax-P coaxial board reportedly works with the PS/2 Micro Channel bus. In addition, it is said to provide connectivity to IBM or IBM-compatible mainframes for individual PS/2 computers as well as for PS/2s on Novell's Netware-based local-area networks (LAN). Netware is a network operating system.

The new board can function as a gateway to a Netware-based LAN. When the board is installed in one PS/2 on the network along with Pcox/GW-3270 gateway software, each personal computer on the network that has Pcox LAN workstation software can gain access to mainframe resources through the gateway, CXI said.

The Pcox/Coax-P also features compatibility with existing coaxial versions of CXI's Pcox software. Pcox/Coax-P provides PS/2 users with a connection to an IBM cluster controller over coaxial cable and can provide the following features: single and multiple host sessions, support for windowing and file transfer and emulation of expensive mainframe printers by PC printers.

Scheduled for availability in October for $545, Pcox/Coax-P will be demonstrated at PC Expo in New York this week.

The Ultimate Pick: Deal clears way for Tandem

BY ROSEMARY HAMILTON
CW STAFF

IRVINE, Calif. — The lawsuit between Pick Systems and a small Houston-based company over a Pick look-alike operating system called Epic was resolved recently when The Ultimate Corp. acquired Epic and agreed to pay royalties to Pick Systems for it.

Pick Systems announced its $100,000 settlement last week from Ever-On Corp., maker of the Epic operating system.

Ever-On officials were not available for comment.

According to an Ultimate official, the operating system was acquired this month and will be officially announced under a new name in the middle of next month.

The introduction will coincide with Ultimate's announcement of an OEM deal with Tandem Computers, Inc. the week of Sept. 14.

Epic was designed as a Pick-like operating system for Tandem hardware. Ultimate said Epic will run under the Tandem Guardian operating system, allowing applications written for Pick to run on Tandem hardware.

Exclusive rights

The $100,000 settlement was not a license fee from Ever-On but rather constituted "additional considerations" beyond the undisclosed amount Ever-On paid for Pick Systems' legal fees, said William Mitchell, general counsel at Pick Systems.

Ultimate, which already licenses the Pick operating system from Pick Systems, now has exclusive rights to Epic.

"Ultimate rolled Epic into an existing licensing agreement with us," Mitchell said. "Epic is not considered a separate operating system."

> "ULTIMATE rolled Epic into an existing licensing agreement with us. Epic is not considered a separate operating system."
>
> WILLIAM MITCHELL
> PICK SYSTEMS

Pick Systems filed suit against Ever-On in October 1986 to prevent the company from licensing Epic to customers without having paid Pick Systems a licensing fee.

The Epic operating system is said to look enough like Pick that it violates Pick Systems' proprietary rights to the operating system, Mitchell said.

According to Mitchell, Ever-On has licensed the product to about two customers.

"The problem was solved when Ultimate stepped in," Mitchell added. "It was really a three-party agreement."

Symbolics reels under $25M loss

BY CLINTON WILDER
CW STAFF

CAMBRIDGE, Mass. — Ending a fiscal year that the company would probably like to forget, Symbolics, Inc. last week reported a $25.5 million loss for the 12 months ended June 30.

The maker of artificial intelligence platforms reported that revenue dropped 9% from the previous year to $103.8 million. In fiscal 1986, Symbolics concluded a stellar growth year with a profit of $10.7 million, or 41 cents per share, on sales of $114.2 million.

The 1987 loss included $14.9 million in one-time charges. A $13.7 million charge was announced in September 1986 to cover a 17% work force reduction, management reorganization and consolidation of office and manufacturing space.

Symbolics added a $1.2 million charge in the fourth quarter because of unsuccessful attempts to lease some of its office space. Symbolics recently moved back to Cambridge from what had been planned as its new corporate headquarters in suburban Concord, Mass.

Symbolics' financial slowdown typifies a trend among AI vendors. Analysts have attributed the downturn to the saturation of demand for specialized AI systems in markets such as education and to vendors' failure to succeed in the commercial mainstream because of a lack of industry-standard platforms.

Symbolics executives, however, claimed that the company has turned the corner. Noting that the firm increased revenue by 18% between the third and fourth quarters and reduced its quarterly loss by 25%, they predicted that Symbolics will return to profitability in fiscal 1988.

The firm reported a fourth-quarter loss of $1.5 million, or 6 cents per share, on revenue of $29.2 million.

Tandem builds SNA link

Multiple lines replaced by single channel tie-in

BY KATHY CHIN LEONG
CW STAFF

CUPERTINO, Calif. — Tandem Computers, Inc. this week is expected to announce an IBM Systems Network Architecture (SNA) offering that locally attaches Tandem computers directly to IBM mainframes.

The Snaxlink product is the latest device in Tandem's SNA war chest. It is scheduled to ship in the fourth quarter.

Customers currently link Tandem computers to IBM systems via multiple communications lines to a front-end communications controller. With Snaxlink, users reportedly will be able to attach a single fiber-optic link to an I/O channel of an IBM host running VTAM.

Fast times

The key advantage for corporate users will be a significant improvement in transaction speeds, said Tom Anderson, a Tandem product manager. Instead of using multiple lines running at 56K bit/sec., users can achieve speeds of up to 1M bit/sec. with a direct connection to the mainframe.

With prices starting at $49,550, Snaxlink consists of a communications interface unit for Tandem's Nonstop TXP, EXT and VLX models; a channel unit for IBM hosts; and a fiber-optic link that allows attached systems to be physically apart by up to 1,640 ft. The product has been tested with IBM 4381, 3083 and 3090 computers.

Anderson said Snaxlink will use standard SNA interfaces to the hosts, eliminating the need to modify existing applications. To use the new offering, users are required to install Snax, Tandem's SNA access software.

Experts watching the SNA market gave Snaxlink a thumbs up. Steve Randesi, vice-president of Gen2 Ventures in Saratoga, Calif., said, "Whenever you connect directly to the channel, you obtain higher speeds. It is beneficial to users who have had to use front-end processor lines to get to the host."

While other third-party vendors have developed similar connections that allow Digital Equipment Corp. computers to tap into the SNA environment, no one has introduced such a product for Tandem machines.

NCR

FROM PAGE 1

application or special-purpose processors, also scored poorly in the May benchmark tests by Neal Nelson & Associates in Chicago. The firm said the original 32/800 scored no better than the older and less expensive Tower 32/600.

Aggelakos said NCR worked with the testing firm and the complaining customers and accelerated a planned file processor upgrade. That upgrade, which had been planned for 1988, will be tested by select customers soon and will be phased into general availability during the fourth quarter, he said.

The upgrade involves replacing a 10-MHz 68010 with a 16.7-MHz 68020 and enhancing NCR's Unix implementation to support the 68020 and general optimization of the operating system code.

Aggelakos added that the multiprocessor design of the 32/800 machine makes it easier to provide such a retrofit than a monolithic architecture would permit.

He also said many customers may not want the retrofit because they have experienced no problems with the file processor, which handles much of the system's I/O and other tasks.

Meanwhile, Neal Nelson, president of the Chicago-based testing firm, said a recent retesting of the 32/800 with the enhanced file processor indicated that performance gains in the pertinent disk-intensive areas were generally eight- to tenfold.

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INSIDE LINES

A change of heart. IBM last week moved to within one step of terminating its equity investment in semiconductor maker Intel. IBM announced it sold 5.9 million shares in a block transaction that, based on the closing price of Intel stock Thursday, was valued at about $327.4 million. Once holder of a 20% stake in Intel as the two companies enjoyed the mutual benefits from sales of the Intel microprocessor-based Personal Computer family, IBM has been gradually reducing its stake and now holds only 7.8 million shares, which it previously said will be exchanged for IBM Eurobonds. In a statement, IBM affirmed its commitment to Intel products and technological exchange agreements.

Prepare to repel boarders! Despite the crush of curious visitors that could besiege the famed Queen Elizabeth II, which will be docked in Boston Harbor during Decworld next week, city officials are relying on DEC and QE2 personnel to limit embarking tourists. "It's a bedroom, not an exhibition hall," said a Boston Fire Department spokesman, debunking reports that fire marshals had told DEC to limit attendees. Meanwhile, sources said, the third-generation Microvaxes will be unveiled Sept. 9, along with two Vaxstations and three Vaxservers, during a briefing at splashy harborside restaurant Anthony's Pier 4.

Squirrel behind the wall. Cullinet may have a surprise in store for its users group meeting next month — the announcement of IBM-compatible versions of the firm's IDMS/SQL, a relational data base product the company had previously indicated was being readied for the VAX. The products are said to address both the IMS and IDMS/R product lines. Although IDMS/SQL was developed by the recently acquired Esvel, Cullinet engineers have been working hard to port the code to IBM systems. The pressure was great to get the job done quickly, since industry consultants have refused to label Cullinet's own IDMS/R as fully relational.

International incident. NCR last week agreed to pay a $381,000 fine to the U.S. Department of Commerce after an investigation concluded that several of NCR's overseas subsidiaries violated U.S. policy by helping Arab nations in their boycott of Israel. The foreign units were charged with giving Arab nations information about their business partners and allegedly agreeing not to do business with certain companies boycotted by the Arabs. The fine was the largest assessed under the 10-year-old U.S. policy but only half of what NCR could have paid; the Commerce Department recognized NCR's cooperation in the investigation.

Ada, hold that plane. Boeing has long planned to develop a newfangled jetliner, called the 7J7, using a variety of advanced technologies, including a "propjet" engine and the Ada programming language for avionics. But last week, word came that Boeing will postpone the start of development for at least a year because airlines aren't interested in buying the high-tech plane yet. Another case of technology in search of customers.

Doubling up Unix. With eyes on huge contracts for government and big business manufacturing operations, fault-tolerant system giant Tandem is believed to be developing a version of Unix for its systems. The effort would be a step up from the Unix-based Altos microprocessor systems that Tandem resells, and it has been termed merely a stopgap measure. Since Tandem "still regards Unix as a necessary evil," the company will probably take the quickest route to Unix by not bothering to rework it to take full advantage of Tandem's multiprocessor machines, according to one analyst. Omri Serlin, president of market research firm Itom International, warns that Tandem must make it clear to customers that its Unix incarnation will not be a replacement for the company's proprietary operating system.

Max Headroom, move aside. American Airlines and Trintex, the videotex company formed by IBM and Sears, are teaming up to link Trintex users with the airline's Easy Sabre reservation system. Max Hopper, senior vice-president of information systems at American, played a key role in the deal and predicts it will be a boon for leisure travel.

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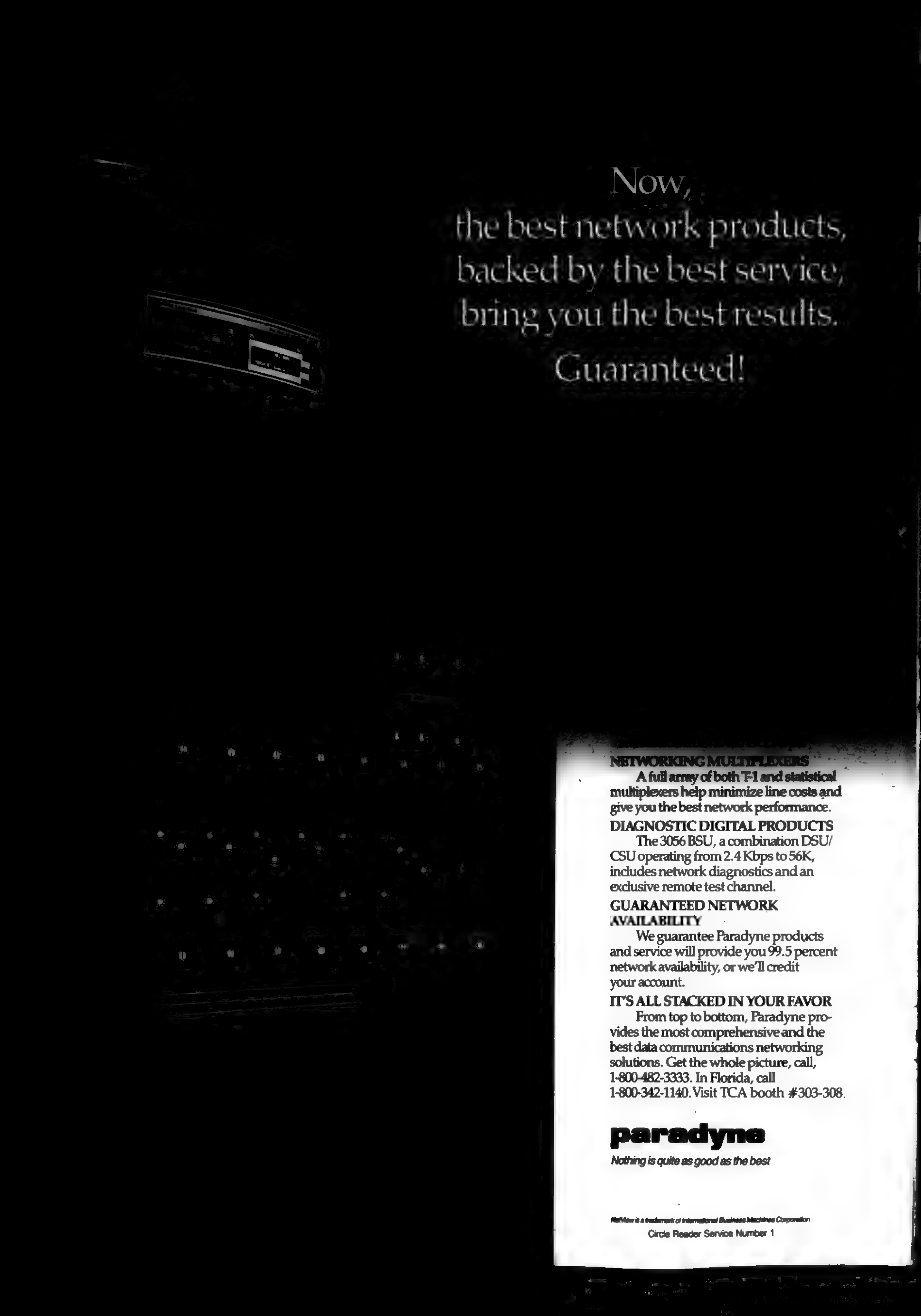
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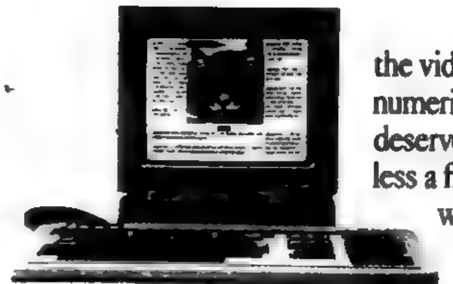

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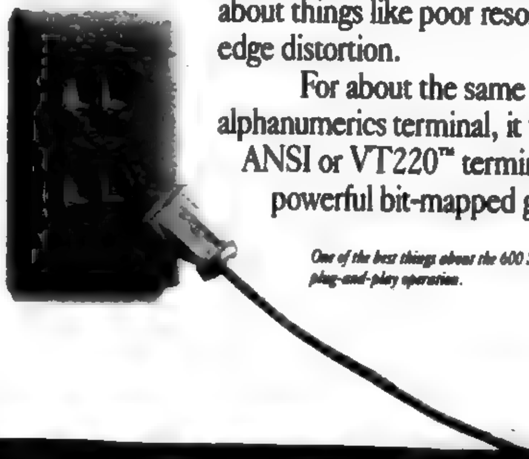

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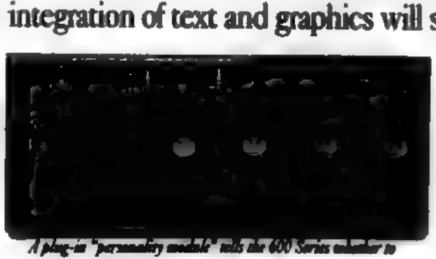

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COMMENT

WHOSE YEAR IS IT, ANYWAY?

BY AMY WOHL

A year ago, *Computerworld Extra* proclaimed 1986 the "Year of DEC." The label turned out to be appropriate, based on Digital Equipment Corp.'s 38% increase in profits in a slump-ridden year for the computer industry. Given an 84% increase in profits for this fiscal year, an argument could be made that 1987 is yet another "Year of DEC."

But for IBM, 1987 is the "Year to Get DEC." Cracks *can* be found in DEC's one-architecture strategy — weaknesses that IBM can exploit.

Still, DEC pushes ahead. Wherever you look, another customer of previously pure vendor leanings has just converted to a VAX. IBM has been forced to mention DEC often in press and consultant briefings. New products are referred to (often with more hope than success) as "VAX killers."

Only a few years ago, it was possible for a consultant to sum up DEC's marketing prowess as "in a paper bag" — in other words, what they couldn't market their way out of — and get a knowing laugh. Nowadays, DEC's aggressive, knowledgeable marketing of mid-range systems and departmental processors has become the game to match.

The turning point may have been Decworld '86. For a week, Boston became a world filled with DEC equipment, DEC salesmen, DEC software and 27,000 DEC customers. The effect on customers was astounding. Suddenly, it was respectable to talk about "multivendor solutions" (especially if the multiple vendors were IBM and DEC), "optimizing systems at every level" (read: DEC makes better mid-range solutions for my application) and "departmental-level choice" (that is, my MIS director may be solid IBM, but I'm not).

Today, DEC is no longer an outside-the-mainstream decision. It has become an entirely respectable alternative to other vendors' mid-range processors or departmental systems, especially to products from IBM.

DEC has a fully realized product line, designed around a single operating system, with a rich set of tools and office software plus a huge variety of third-party applications software. The single operating system pleases both software vendors, which get to do less work *and* get more customers, and software users, who get a larger selection of packages and more flexibility in configuring and expanding systems.

CHRIS DEMAREST

Building blocks of a reputation

But there is no magic here. Other minicomputer vendors offer operating systems across a broad range of products, sell nice office software and inspire lots of third-party vendors. So why is DEC clearly outstanding in customers' eyes?

Size is obviously a reason. DEC is reassuringly the No. 2 or No. 3 computer vendor. Also, the structure is in place: All those pinstripe-suited salesmen (many of them former IBMers), all that systems engineering know-how and all that good, reliable service. Customers feel there is little or no risk here.

There is even, occasionally, a hint of the arrogance computer customers like their vendors to display. You *must* be a big-time vendor if you can portray delivery delays as "our temporary inability to meet an unanticipatedly strong customer demand," as one client heard recently from his DEC representative.

Of course, IBM is scarcely taking DEC's success lying down. IBM has sounded a loud, clear call to both its customers and to industry observers that if Digital has it now, IBM had it a long time ago. IBM has rounded up its architectural experts to point out the fallacies of thinking that a single operating system can do everything (it probably can't) or that DEC can actually deliver everything a big customer needs to do computing (it definitely can't — and DEC's willingness to front-end IBM mainframes and attach IBM Personal Computers gracefully, if not gratefully, shows DEC knows all about this).

Meanwhile, IBM is counting on three strategies to keep customers happy and guide straying sheep back to the fold:

- The 9370, which is a highly attractive solution to the mid-range processor dilemma for IBM shops that want to write their own solutions or bring down VM-based (and perhaps occasionally MVS-based) solutions to smaller systems and applications. With the advent of 9370-based software, which will take some time, this product could be very competitive in IBM vs. DEC situations.
- Openly discussing a follow-on to its System/36 and 38. This mid-range solution, admittedly coming no sooner than 1988, would extend IBM's popular System/36 and 38 onto a single architecture, able to run all existing System/32, 34, 36 and 38 software as well as new software written especially for its greater capabilities.

Like the System/38, the follow-on would be based on IBM's Future Systems architecture and, it is hoped, could vastly increase IBM's market potential among existing System/32, 34, 36 and 38 customers (of which there are now about 240,000). The follow-on would have to appeal to office users and software developers to openly compete with DEC. IBM believes, of course, that it will do just that.

- IBM's Systems Application Architecture (SAA) was designed to permit IBM customers to see a single interface across software running on a variety of IBM architectures, specifically 370s, 3080s, 3090s, the 4300 series, 9370s, Personal System/2 and the anticipated follow-on to the System/36.

SAA will also ease the task of third-party software developers that would like their products to run across the various IBM operating environments. However, the rules for doing so are just being published, and the software to exploit this strategy is probably a few years away.

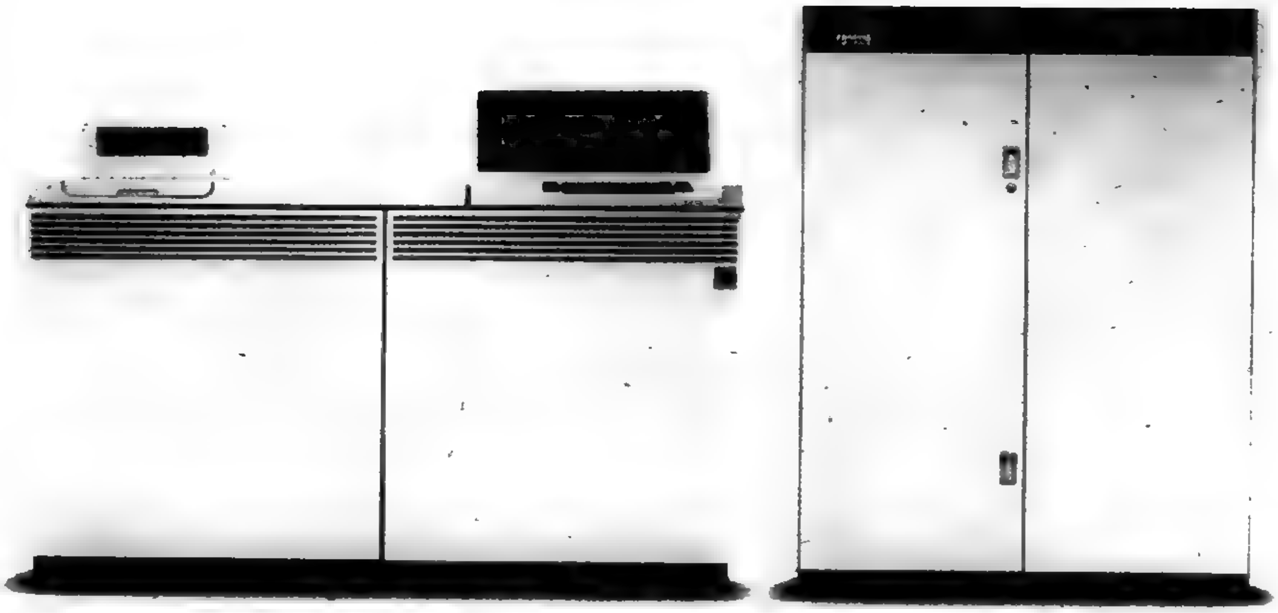
Battle not easily fought

Customers who want to continue to do business with IBM can find reassurance in these announcements, but customers who have moved to DEC will probably wait for more software before considering a return. This window will give DEC time and room to work on even spiffier hardware, better price/performance and even more software.

DEC, pursuing a path of consistent aggression, is leaving nothing to chance. Next week at Decworld '87 in Boston, for example, the firm

Continued on page 7

Wohl is president of Wohl Associates, located in Bala Cynwyd, Pa., and editor of "The Wohl Report on End-User Computing" newsletter.



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Circle Reader Service Number 6

WHOSE YEAR?

CONTINUED FROM PAGE 5

will unveil its Microvax 3000 series, the CMOS-based third generation of the phenomenally successful Microvax II. This powerful new workstation is likely to have a heavy impact on the minicomputer market competition, most particularly at the low end of IBM's 9370 line.

The battle for customers' hearts (and minds), however, will not be easily fought or easily won.

Who pays for technical advice?

IBM, of course, is pumping up the Big Blue Marketing Machine. If DEC is fielding more marketing-savvy salesmen, IBM is increasing its sales force. A major battle may center on who pays for presale and postsale technical advice. IBM gives away more and more free (reminding old-timers of the pre-unbundling days), while DEC is trying to get paid for more of its consulting expertise. Customers will no doubt point out to DEC that IBM's policies represent big dollar differentials; DEC can, of course, move to a more generous policy if it needs to.

Where, in all this discussion, are the old-style DEC customers? Do scientists, engineers and computer techies feel left out? Do blue pin-striped suits make them nervous? Fear not — DEC has not deserted its old friends. A trip to any scientifically oriented show will turn up dozens of DEC solutions to traditional problems.

DEC is still a strong force in the Unix community and a popular university computer sciences department solution, although IBM is giving it a better run for the money here these days.

Can anyone stay atop the pedestal forever? Probably not. DEC will eventually do something wrong, however minor, and fall from its state of grace into some more realistic and stable position as a major vendor of alternative environments.

This fall would be to IBM's benefit, especially if DEC's stubbed toe coincides with the arrival in the marketplace of 9370 software or the System/36 and 38 follow-on hardware and software. Or it could simply mean that a more sophisticated market will make more sophisticated judgments and discover that no one can be the best at everything forever.

A healthy market is one in which several robust players goad each other into better product offerings at more competitive prices. If this outcome results from DEC's success and IBM's replies, there will be much to applaud as this really does become the year of the customer.

WHAT IS DEC'S REAL PRESENCE IN IBM ACCOUNTS?

Base: 432 IBM mainframe accounts

	DEC	IBM
Departmental systems	14.9%	[illegible]
Personal computers	0.8%	85.4%
Local-area networks	3%	22.3%
File servers	0.8%	6.4%
Integrated office systems	[illegible]	[illegible]

Based on companies in the finance/banking, insurance, government (federal, state and local), manufacturing and medical markets; date of surveys first and second quarters of 1987

INFORMATION PROVIDED BY THE SIERRA GROUP
CW CHART

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Circle Reader Service Number 7

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Circle Reader Service Number 8

ASK DEC

QUESTION MARKS FROM USERS

The following questions were solicited from users by *Computerworld Extra* and conveyed to DEC for responses.

In the area of networking, DEC is clearly the industry leader and has superior products in a very difficult technological discipline, and DEC customers embrace the technology like a religion. But in the areas of on-line transaction processing (OLTP) and high-performance data base systems, DEC does not have strong entries.

Why hasn't DEC introduced the same quality strategic products in OLTP and high-performance data base systems as it has in networking? Either the will or skill isn't there. What is missing?

STANLEY ROSE
VICE-PRESIDENT
DISTRIBUTED PROCESSING TECHNICAL SUPPORT
BANKER'S TRUST CO., NEW YORK

Naturally, Digital recognizes that the time is right for becoming a major player in the commercial computing environment, and we are devoting considerable resources to developing high-performance transaction processing and data base systems as well as support capabilities.

Although Digital is working aggressively on these high-performance deliverables, we are not ready at this time to fully reveal our strategies in these key areas. However, nondisclosure presentations will shortly be made available to selected accounts. Customers can anticipate a significant announcement later this fall.

BOB GLORIOSO
VICE-PRESIDENT
HIGH-PERFORMANCE SYSTEMS

•

Is DEC any longer interested in pursuing the small-business time-sharing market? The pricing on nonnetworked, low-end Microvax configurations is now in the mid-$20,000 range, while entry-level Unix-based systems sell for half that price. Does this mismatched pricing mean that DEC is no longer interested in this market?

JEFF KILLEEN
PRESIDENT
INFORMATION DESIGN & MANAGEMENT CO.
HOPEDALE, MASS.

Digital continues to be committed to supporting the multiuser computing needs of small businesses with powerful, competitively priced systems. The mid-$20,000 price mentioned is inaccurate. Digital's Microvax family of small computer systems embraces a wide range of prices and user-support requirements.

Prices for the four-user Microvax 2000 begin at less than $10,000, making the entry-level Microvax offering a highly competitive, aggressively priced system powerful enough to handle the management needs of many small businesses. Furthermore, the value of all Digital systems is enhanced at no extra cost by the new one-year, on-site hardware warranty.

While the question specifies "nonnetworked" configurations, the potential of networking and software compatibility with larger systems should not be ignored or underestimated, even by small businesses that are primarily concerned with the needs of today.

To facilitate future growth and changing strategies, Digital's Microvax and MicroPDP-11 systems offer networking capabilities unequaled elsewhere in either scope or functionality, and the software compatibility of the VMS and MicroVMS operating systems extends uniformly across the entire VAX family, from the Microvax 2000 through the VAX 8000 series.

JACK MACKEEN
VICE-PRESIDENT
CHANNELS MARKETING

•

What are the plan and timetable for bringing the Ada language on par with other languages in relation to DEC's layered products? There is great demand from the government to use Ada on Department of Defense contracts, but there is little from DEC that incorporates Ada into its systems.

JUNE BAKER
EXECUTIVE STAFF MEMBER
COMPUTER SCIENCES CORP., FALLS CHURCH, VA.

VAX Ada is very much on par with other languages from Digital. VAX Ada supports the complete set of VAX language standards, such as the Common Calling Standard and the VAX Debugger.

Furthermore, VAX Ada is completely integrated with Digital's VAX/VMS programming support environment (that is, the VAX Language Sensitive Editor, the Source Code Analyzer, the Code Management System and the DEC/Test Manager), as are other Digital language products, such as VAX Fortran and VAX Cobol.

From a software incorporation perspective, the VAX Ada product is an integral and integrated software product in the VAX/VMS software development environment.

BILL HEFFNER
VICE-PRESIDENT
SYSTEMS SOFTWARE GROUP

•

When is DEC going to allow low-end clusters of Microvaxes and other workstations to connect to a traditional Vaxcluster?

EMILY KITCHEN
MANAGER OF TECHNICAL SERVICES
FOR RESEARCH AND DEVELOPMENT
A. H. ROBBINS & CO., RICHMOND, VA.

Digital has heard this request from many customers and recognises that this configuration would provide an excellent environment for both software development and software production systems. Digital is, therefore, aggressively working to meet its customers' needs in this area.

BILL HEFFNER

•

From a Digital point of view, what effect will networking standards have in the industry in the next three to five years? What role will IBM's Systems Network Architecture [SNA] play?

BILL BRINDLEY
DIRECTOR OF COMPUTER SYSTEMS TECHNOLOGY
HQ NAVAL SECURITY GROUP COMMAND, STERLING, VA.

International standards, as they become more widely adopted and implemented by many vendors, will make it easier for users to operate and manage networks in a multivendor environment. As connections become standardised, the cost of networking will further decrease, making multivendor networks more affordable.

Ultimately, Digital believes that the overall network marketplace will expand due to the proliferation of cost-effective, reliable, worldwide multivendor networking capabilities.

As the need for business communications increases and the trend toward international standards continues, users will become more aggressive in their demands for various levels of interoperability from all vendors. Digital has already committed to fully implementing approved international standards into its networking architecture.

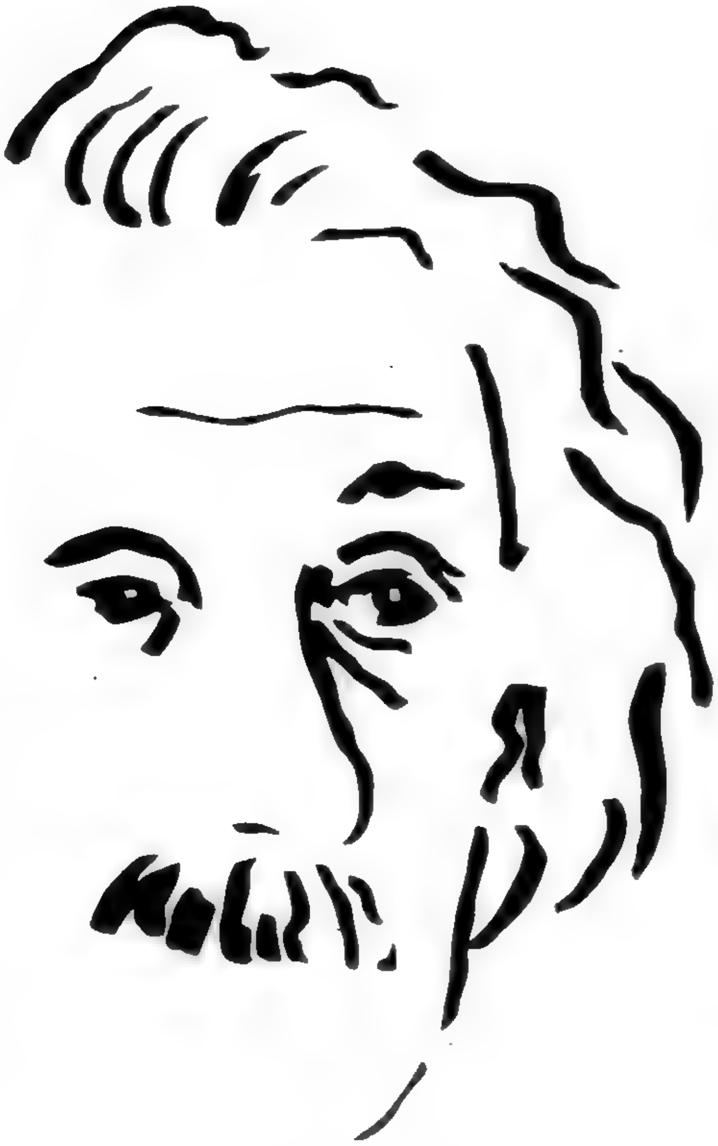
Naturally, SNA, like other vendors' proprietary architectures, will have an important role in providing its large installed base with a migration path to Open Systems Interconnect.

BILL JOHNSON
VICE-PRESIDENT
DISTRIBUTED SYSTEMS ENGINEERING

•

What is DEC going to do about testing its own layered products in upgrades to VMS and finding a way to provide

Continued on page 10



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Circle Reader Service Number 9

QUESTION MARKS

CONTINUED FROM PAGE 8

that information to its customers without the customers contacting a representative of each separate product line? There should be one contact point to get that information.

RALPH BRADSHAW
DIRECTOR OF RESEARCH
AND SCIENTIFIC SERVICES
JOHNSON & JOHNSON
MANAGEMENT INFORMATION CENTER
RARITAN, N.J.

Several engineering and quality assurance groups make sure that all layered products are strenuously tested with new VMS releases. When testing and certification are complete, an announcement is made throughout the corporation to alert our sales and services organizations that the product is ready for release. Our sales teams can then communicate this information to customers.

Sales and Software Service are prepared to answer questions on product features, capabilities, application usage, pricing and availability date. Customers can also work through these organizations — that is, their local account team — when they need additional information.

BILL HEFFNER

•

What's going to happen to the PDP-11? Can Digital explain its views on the future of the product so I can match it to my own?

RALPH STAMERJOHN
PRINCIPAL ENGINEER
MERIDIAN TECHNOLOGIES CORP.
ST. LOUIS

The PDP-11s will continue to be an important part of Digital's product offerings because our customers still want and need PDP-11s. The PDP-11 effectively and competitively provides extremely reliable and cost-effective systems to customers requiring 16-bit solutions. We are going to continue into the future with the same approach as we have in the past — employing state-of-the-art peripherals, new packaging and new software releases as well as system improvements.

For example, the MicroPDP-11/53 has been given a significant performance boost in the MicroPDP-11/53 Plus by utilizing technology advances not available when it was first introduced. The MicroPDP/11-83 has been reintroduced with new packaging and storage products that have reduced our costs and thus allow us to offer lower priced products.

Additionally, we have just introduced a very flexible and expanded offering of the PDP-11/84, which utilizes a whole new package technology that provides increased system functionality and performance in drastically smaller environments.

We will be in the PDP-11 business for a long time.

DOM LACAVA
LOW END SYSTEMS AND
TECHNOLOGY GROUP MANAGER

Circle Reader Service Number 10

DEC's software licensing policies at both the low-end workstation level and the high-end 8700 level are inflexible and extremely costly. The licensing problem keeps DEC from being competitive and keeps people from purchasing software they would otherwise buy.

What is DEC going to do to address the problems that currently exist with licensing to allow you to be competitive with such vendors as Sun Microsystems — to create greater flexibility and more realistic pricing for software licensing?

LESLIE MALTZ
DIRECTOR OF COMPUTING AND
COMMUNICATIONS RESOURCES
STEVENS INSTITUTE OF TECHNOLOGY
HOBOKEN, N.J.

The VAX/VMS architecture provides an industry-leading strategy to help customers preserve their software investments whether they choose to purchase a workstation or a high-end VAX 8700 processor. Digital provides software investment protection for customers migrating from one VAX family member to another.

The recently announced upgrade policy now permits customers to trade in their software licenses on smaller VAX processors and apply the full paid value against the license purchase for a larger VAX processor.

For new customers, Digital offers competitive software prices within each system's market. At the high end of Digital's VAX family, software prices are significantly lower than the major competition's. For low-end software offerings, Digital is delivering a unique licensing solution to meet customers' needs for workstations and Microvax processors.

This past spring, Digital announced software license "portfolios" for its low-end VAX processors. Our license now grants the rights to use a portfolio of software products. Currently, Digital offers three such portfolios, including two Programmer Development Portfolios and a Runtime Only Portfolio.

The Base Programmer Development Portfolio includes 29 software products, including technical and commercial languages, data base products and a wide variety of development utilities. This portfolio includes the necessary "tools" for either the professional programmer or department-level end user.

On Vaxstations, the Base Programmer Development portfolio is currently available for only $145 per month on a month-to-month Periodic Payment License. The portfolio program assures that our customers have unlimited access to all of these products without incurring the budgetary restrictions that often limit software usage.

BILL HEFFNER

•

Is DEC serious about getting back into the real-time (process control, data acquisition) business? At one time, DEC was at the forefront; now it is losing out. Are you trying to move back into it, and are you putting resources behind it?

THOMAS PROVOST
COMPUTER GROUP LEADER
BATES LINEAR ACCELERATOR CENTER
MIDDLETON, MASS.

Digital never left the real-time business. Our strategy has been to concentrate on real-time applications that complement and extend DEC's general-purpose computing products and networks and not to develop point or niche solutions.

We have continued to develop PDP-11 products and Q-bus real-time I/O products, introduced VAX products, added VAXBI real-time I/O products and recently introduced more integrated solutions for both manufacturing and science applications.

Specifically, we have introduced the RTVAX family of products for real-time applications. We have enhanced and improved documentation for our complementary VAX operating systems for real time — VAXELN and VMS.

We have continued support for current technologies, such as PDP-11 and Q-bus, while expanding to new technologies, such as VAXBI and industry buses such as Bitbus.

We provide a very wide range of real-time hardware and software products, from single-board computers to high-performance packaged systems. These complement Digital's general-purpose system products and allow for a continuum of distributed real-time computing, integrated into a corporate computing network.

DOM LACAVA

•

What, if anything, is DEC doing to reduce the cost of software packages that are run on large VAX installations but used by very few users?

For example, if you have a large Vaxcluster for technical computing and a couple of scientists want Pascal, it costs a prohibitive amount to use it; too much just for this short usage. When will we be able to run these limited user software packages for a more reasonable price?

CHARLES HAM
COMPUTER SPECIALIST
DUPONT CO.
SABINE RIVER WORKS
ORANGE, TEXAS

Each member of the VAX family is supported by the same VMS software products, each of which is priced according to the relative system capability of the VAX family member.

Customers may choose to license the processor that best corresponds to their needs at a cost proportional to the system's capability.

For Vaxclusters, customers may choose to license an individual processor, a group of processors or the full cluster. The decision is based on the specific customer requirements for availability, expected usage and system management objectives.

Many of the VAX processors now offer Digital's Periodic Payment Licensing (PPL) plan, whereby customers may rent software on a month-to-month basis. Many customers find the PPL plan an attractive alternative to fully paid-up licenses, to reduce initial capital commitments or to support short-term development projects.

BILL HEFFNER

ON THE STREET

BEING A TOUGH CUSTOMER

BY PAUL MCALLISTER

A sweltering night in Maynard, Mass., hard by DEC world headquarters. On assignment since noon, with no companionship but an empty pocket flask and a dog-eared copy of the *VAX OEM Sourcebook.*

The story: To find out for all those would-be DEC customers what it's like — what it's *really* like — to shop DEC these days. There's only one problem. Out here in Ken Olsen's converted mill, there's no showroom. No place to walk in and kick the tires.

No salesmen at all. Just a toll-free number with operators who work like human answering machines: "We'll answer your call as soon as we can." And that makes it hard to find out what you like, much less how to buy it.

It's like the big chief with the KO monogram says: Of engineers, by engineers and for engineers. Sure, the company is flirting these days with marketing applications instead of specifications. But DEC's impulse to reform reminds you of a wino pacing outside the Salvation Army headquarters — he's unwilling to put down his bottle and go inside.

Still, you won't find out what it's like to buy DEC by hanging around the watercoolers here. Instead, you've got to talk to some people who've already signed up. You've got to knock on a few doors.

The Fortune 500 customer

At the end of a long, hushed corridor sits an MIS director. This is one happy guy. There's a Vaxcluster next door, another down the road, 2,200 people being served on miles and miles of Decnet, more applications than you can shake a slide rule at and more coming up all the time. His life *should* be one constant headache. So what gives?

"We always get everything we want," the MIS man says, like he's surprised it could be any other way. When you call up with a gripe, the DEC diagnostics people show up within an hour. Servicemen replace defective boards that afternoon. They return defective machines within days. They even throw in free cable. Free cable.

And that's just for starters on how clout counts. There's a hefty discount on new equipment purchases. There are training sessions, software advisories and systems analyses with visiting eggheads on loan from Maynard. And there are regular briefings on product developments to clue the MIS staff in on what's coming up. That way, they don't, for example, buy 3270 Personal Computers from IBM the week before DEC announces a new graphics environment.

"No sir, no problems at all," the systems manager says. "Just called the lead rep the other day to talk about ways to access the mainframe, and he was here in a half hour."

PETER KUPER

Which was not such a big deal, considering DEC had just opened a field-service office not a mile away to serve his installation alone.

Smaller corporate customer

From the "Hey, buddy" security desk to the combination loading dock/visitor center, you can tell this outfit isn't one of those corporations with annual revenue larger than the budgets of most Third World countries.

Still, it's a good-size DEC shop, with a modest Vaxcluster of its own, three dozen workstations and even an antique PDP-11 in the lab. The data czar here, looking up from several dozen reams of printouts, isn't complaining, either.

"My only problem with DEC is this: They don't give me a scorecard to keep track of who my rep is this month," he says. DEC's sales group, his story goes, has been so badly scrambled by the last wave of reorganizations that he's had four sales reps so far this year.

The result: None of the reps has had the time to learn how his installation works. That means he gets little advice from his DEC rep on how he could save time by, say, installing a line printer in the billing department. And he never gets any warning about upcoming new products. "I do better reading the trade press," he says.

But the nuts and bolts are all in place. The repairman comes on time. All the manuals are updated regularly. The toll-free service lines get answered by real people with real answers — no "Decspeak." With all these things going for him, system downtime is minimal.

The best part is knowing he can actually get the stuff he wants. "It isn't like *some* companies," he says. In the computer business, he continues, there are certain vendors that promise solutions that somehow never seem to be available. Then he tells the joke about the IBM salesman and his wife with the punch line that goes: "All he does is tell me how great it's going to be."

The large DEC OEM

Fat city here. It may look like some weed-ringed warehouse in the part of town where cabs don't stop, but to its owner it looks like the mines of Solomon. Who's to thank? The high rollers in Maynard.

DEC's strategy of going after huge companies as customers, the man says, has left a lot of the smaller end users in the lurch. There's nowhere to turn for applications advice, connections to the right OEMs or a walk through the product line. Sometimes, he says, customers can't even get a salesman to show up unless DEC thinks they're so big the Hoover Dam shudders when they fire up their system.

"They left the smaller markets wide open for us," the director says, all but rubbing his hands together in delight. He has been around long enough so that all the DEC people know him, and they gladly toss him all the non-Fortune business they can.

What's more, he says, the company gives him everything he needs to handle these customers. "Wall Street may demand the big-user strategy, but a lot of people in the home office know which side of their bread the butter's on."

He gets the complete six-volume set of product literature, with up-to-the-minute prices and specs, updates every few weeks, his own hot line to the product people if he needs to know more, a sizable discount because he moves so much iron — and his own rep.

The small vertical-market OEM

"They don't want me. They flat don't want me." This guy doesn't mince words. And why should he? To hear him tell it, he had a nice steady little business in a big converted garage

Continued on page 75

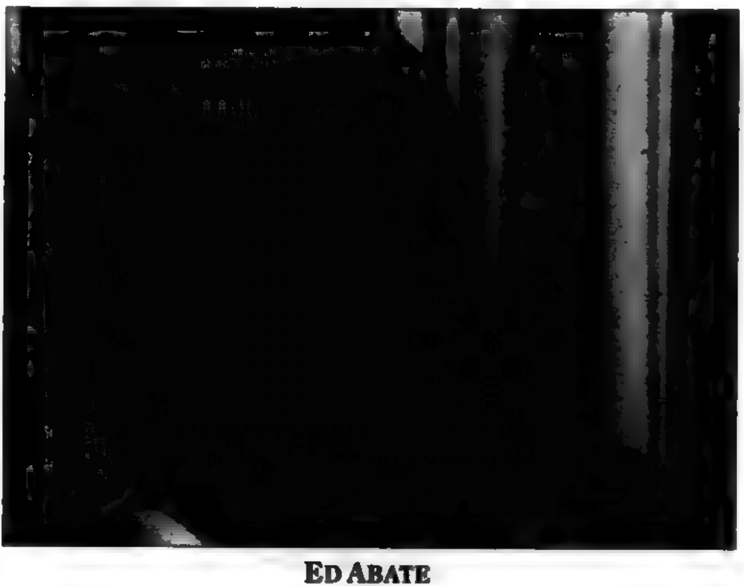
McAllister is a Boston journalist who has covered the DEC marketplace extensively.

DEC USERS

Record earnings and press attention aside, users remain the barometer by which DEC can be measured. On a muggy summer afternoon in Philadelphia, four executives of user companies gathered to discuss doing business with DEC with Computerworld *Senior Editor Glenn Rifkin and* Extra *Editor George Harrar.*

The participants represented large and diverse organizations — the University of Pennsylvania, ARA Services, Inc., Sun Refining and Marketing Co. and Smith Kline & French Laboratories — and directed many questions and suggestions to the Maynard, Mass., computer maker. Why is DEC dragging its heels in the peripherals area? Is DEC really the software company President Ken Olsen claims it to be? How can users wade through inflexible and confusing licensing policies?

W. FORD CALHOUN
Smith Kline & French Laboratories



ED ABATE
Sun Refining and Marketing Co.

PHOTOS BY STEVEN M. FALK/GAMMA LIAISON

SPEAK OUT

What is the single most important reason for becoming a DEC customer?

ABATE: Our major reason for going with DEC was its scientific applications. Our research and development organization has a lot of scientific requirements, such as data analysis, and we thought DEC was the best supplier of hardware at the time we ordered it — and we still feel that way. Also, we selected Ethernet in order to support 200 users with minimal response time.

CALHOUN: Before 1983, R&D at Smith Kline was a small DEC user with a PDP-11/70. We probably got into DEC as much because of price as anything. We went from a relatively small investment in DEC to a substantial, relatively monolithic investment in regard to processors, simply because the software was there and DEC brought out machines that had sufficient power.

More recently, interconnectivity has really been the key. With the cluster, you could add more processing with no real additional effort. With Decnet and their communications structure, attaching nodes to the network was no big deal. So the energy for growing in DEC was minimal. The energy for doing anything different would have been substantial.

DITAMORE: The key for ARA was the flexibility DEC offered. In the corporate offices, when we first went looking for a hub for our office automation project, we really looked around. In DEC's All-In-1, we saw that we had a lot of flexibility as far as customization, and we could change the things we didn't like. Plus, the interconnectivity allows you to communicate between VAXs and other processors.

DEC offered the best way to go into a distributed processing situation through the VAXs and Decnet.

ADLER: It's a little more difficult to reconstruct the long history of computing at Penn. Here, the world is divided into three parts. One is laboratory computing, which is the province of individual faculty. There is a real desire for autonomy, and DEC with its PDP line and the VAXs provided that opportunity on reasonably safe grounds for people in laboratories.

The other part is time-sharing. The time-sharing system on the Decsystem-10 was perceived as friendly. And they were able to support programming languages that people were using on other systems like Fortran and APL. And when that [Decsystem-10] line left, VAXs automatically took its place.

Networking is the third reason why DEC made its presence felt with VAXs, particularly in the engineering school. Even though we think we are more adventurous in our networking strategies than most commercial places, we really got our feet wet with DEC and their networking software. That was a good way for us to begin and a reason why DEC is as omnipresent as it is in the engineering school.

Is there anything in the DEC product line or strategies that could discourage you from staying major DEC customers?

CALHOUN: If you take the processors themselves, right now the horizon looks fairly good. But, for example, DEC has been talking about optical disk for three or four years now. We're just getting tired of listening. We want something, and the conversation has gone on too long.

Clearly, DEC's magnetic disks don't have sufficient capacity or speed. Can the disk keep up with the processor? If DEC doesn't do something and a third party has something interesting, we'd certainly pay lots of attention.

DEC's not our choice for laser printers. And a lot of people are doing interesting things with terminals — DEC's not necessarily our first choice.

DEC's trying to do some interesting things with workstations. But if you look at the competition from Sun

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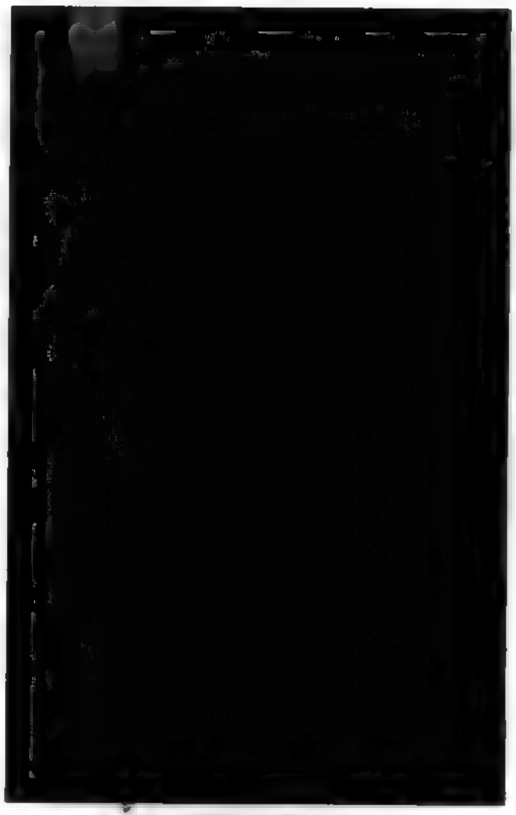
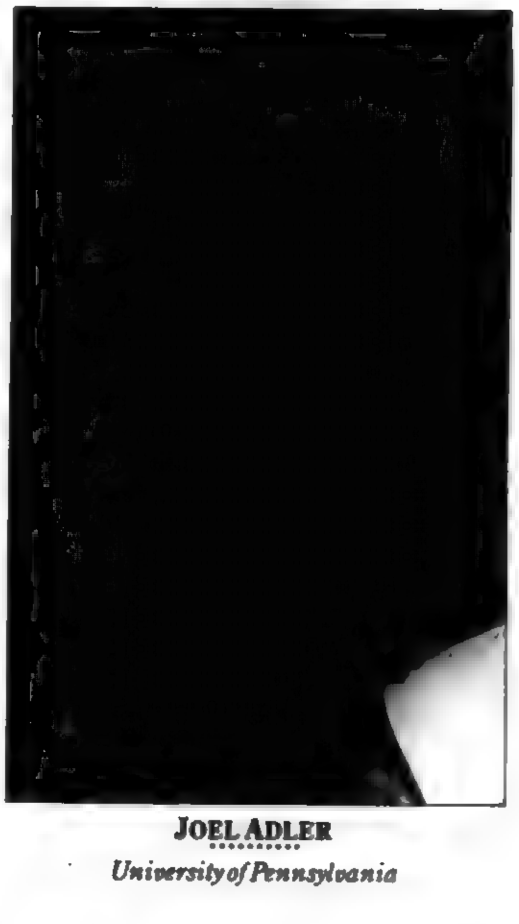


E. CATHERINE DITAMORE

ARA Services, Inc.



JOEL ADLER

University of Pennsylvania

DEC USERS

FROM PREVIOUS PAGE

[Microsystems], it's not clear that DEC is the vendor of choice there. So, once you get outside the central processors, it's an open field.

ABATE: I agree with Ford [Calhoun]. DEC is very strong as far as mainframes and miniframes are concerned, and VMS is probably the easiest operating system to learn and to use. But DEC is lacking in peripherals support. We are looking at third parties all the time. We are considering getting the EMC memory for upgrades. EMC is coming out with an optical disk now. And DEC hasn't said much about optical disks yet.

DITAMORE: We have to make the choice: Do we want to stay a pure DEC shop, or do we want to mix our vendors within the computer room itself? I've chosen thus far to stay with the pure DEC computer room, with the exception of my communications, because it simplifies my maintenance efforts. But it's the workstation area that produces the greatest challenge.

When DEC announced the Vaxmate, it looked like a reasonable product. But they are not really trying to share with the user community what their strategy with that product is. And given their past history with the Professionals and Rainbows, ARA can't really set direction with the Vaxmate without knowing that strategy, especially in light of IBM's recent PS/2 announcement.

Have you bought Vaxmates?

DITAMORE: No. We have no reason to. We have all the varieties of IBM Personal Computers, PC XTs, ATs, and we've got some new PS/2s now. We put terminal emulators on them, and we can do whatever we need to do.

CALHOUN: We're in the same situation with the Vaxmate. At first blush, you look at the literature, and it should be an exciting product. And it may be for some people. But the Vaxmate offers no advantage to us over the IBM AT class and the clones, which is where most of the software came out in the micro world.

It's the generic workstation for the office. The Vaxmate doesn't fit into a migration path — you want the file server and print server capacity of the network.

Ken Olsen said, "The network is the computer." I believe that's the right concept. But how do you get these generic PCs plugged into this distributed computer? The Vaxmate kind of offers that if you are willing to disinvest in your current infrastructure and training and everything else.

Is software a problem with the Vaxmate, or is it the advent of the PS/2 that is throwing you off?

CALHOUN: With the PS/2, it's not clear where this will evolve. As for the Vaxmate, we just spent $200 million plus for a new building for R&D. Part of this building is a broadband network. There are Decservers in every communications closet, and there is twisted-pair running to every desk.

Now, are we supposed to rip out all the twisted-pair and put in thin-wire Ethernet so we can take advantage of this probably interim solution at the low end of the market?

DITAMORE: We have the same problem regarding Ethernet. We moved into our new facility just over a year ago, and prior to moving in, we wired our entire facility with AT&T's Information System Network. There's an ISN connection in every office. I run those into Xyplex cluster controllers in my computer room. With that already in place, I can't pull all that out to put in Ethernet.

Price is another issue. Pricing of the Vaxmate, with all the software you need to bundle with it, is more than it is going to cost me to buy an IBM XT.

ABATE: Since both of your installations are relatively new, why didn't you put Ethernet through the building in the first place?

DITAMORE: We have a need for people to access not only the VAXs but also the IBM mainframe. We also have a Honeywell system there and some

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ABATE: But you could have used an SNA [Systems Network Architecture] gateway through the VAX to access the mainframe.

DITAMORE: From a single terminal on a desk through AT&T's ISN, a user can select which CPU he wants to go through, and part of the communications mandate is to provide any protocol conversion so that a PC or a terminal can look like a terminal to whatever processor he happens to have access to.

CALHOUN: We do have Ethernet. A broadband network runs Ethernet subchannels, and, until fairly recently, DEC's communications answer was twisted-pair from the Decserver. So we put the Decserver in a closet, and we run twisted-pair to the desk. It's since those things were built that DEC has decided on a thin-wire Ethernet. It's a more recent phenomenon.

ABATE: We installed Ethernet in late 1984.

CALHOUN: Our building was being constructed then. From the Decserver, twisted-pair was DEC's strategy at the time this facility was being designed. Thin-wire Ethernet is a wrinkle, a change in the technology. It's not a criticism of DEC. You have to look at technology on any given day and make a decision.

DEC's licensing policies are said to be inflexible and overpriced. Is that a concern to you?

ABATE: Before the Decus meeting last year, DEC was considering instituting a policy that said, "If you are upgrading from a VAX-11/785 to a VAX 8500, which is a different class of machine, you have to buy all new licenses, and you will not get any credit for licenses purchased on a lower grade machine." DEC had always given that credit. It created such a furor in the DEC community that they retracted it. We were very upset about that.

CALHOUN: We have a generic problem with cluster licenses. I don't think DEC has a policy that is clear in practice with cluster licenses.

ADLER: I've discussed licensing with DEC at various times, and it is a real dilemma for them, because they certainly want to keep their revenue maximized, but they also want to penetrate workstations as quickly as they can at the end of their networks. And they really don't know how to handle that.

Do you buy one license for a piece of software that you keep on the cluster and then download it actively and dynamically whenever anybody wants it on a workstation? Or do they automatically charge you for every potential workstation that could use a piece of software?

We are seeing the symptoms that they are not sure how to do that, because arbitrary or onerous pricing at the workstation level is going to cut back at precisely what they want to see happen, which is to have a penetration of workstations.

CALHOUN: Take something like Vaxnotes, a product that a few people in R&D use. Clearly, horsepowerwise, we could run it on a Microvax. But you'd like for those few people to use it in some seamless way on the cluster. Now, does this mean that if you are running a cluster with two 8700s and two 8650s that you have to have licenses of that class for Vaxnotes to satisfy five users?

With some vendors, you can make deals. Some vendors will understand that this is an awkward situation, that you can't pay $200,000 for five people to use something that you could run on a Microvax for $5,000. It's a very difficult situation that the industry, as a whole, hasn't been able to face in a productive way.

For us, it's a major concern. Software is expensive if you are running large clusters and want to take advantage of all the good things about clusters. What we do is take all the things a few people use and put them on one machine. We lose many of the advantages of clustering.

DEC recently lowered the price of the Vaxstation 2000 to make it more competitive. Does that price reduction make the workstation more appealing to you?

ABATE: We were going to get the 2000 anyway. We ordered it when it was $13,000 for the color. Now, it's under $5,000 for the monochrome. But we had decided back in March that we were going to go with the 2000 for two workstations that were used to do system maintenance and monitoring.

DITAMORE: It has no application in the commercial world.

CALHOUN: It has tremendous applications. But you look at the competition and say: Is DEC more aggressive than Sun or other vendors? You do lose something with the other vendors, and you don't have to run the Unix operating system.

But those are complexities we are going to have to face anyway. Too much software is coming out running under Unix. Somehow, we're going to have to accommodate that. Again, in a research environment, you generally don't do one application a lot; you don't do production runs. We have biological scientists, chemists — all needing the most power and best graphics. We have every sort of discipline you can imagine in science, and each is moving at a fast pace. So the software dictates.

The software dictates over the advantage of being able to plug and play a Vaxstation in the network?

CALHOUN: Yes.

Ken Olsen likes to describe DEC now as a software company.

(General laughter.)

How do you react to that?

CALHOUN: We just did.

DITAMORE: DEC is still a hardware company. I don't think they are doing anything in the area of software to compare with what they are doing in hardware. I look at some of their office products. All-In-1 comes out with a release once a year, which says to me that they are not spending an awful lot of time trying to beef up the software.

Also, they are not doing anything at all with some of the major third-party commercial software companies to try and put together comarketing arrangements so that they can really try to get people to migrate from the large IBM shops to VAXs.

CALHOUN: When you ask us to react to DEC as a software company, maybe I'm cynical, but I don't believe DEC is a software company. I don't know of any hardware company that I consider a good software vendor. It seems to be impossible to play in both camps.

So, I don't expect it, and I don't react negatively to the fact that it isn't there.

The advantage of late to those of us with a lot invested in DEC is that a lot of third parties have migrated to DEC. SAS is an example. In the research environment, SAS is a dominant force, and the fact that they've seen fit to rewrite all of their software to optimise it for DEC makes DEC a more attractive vendor. The third parties moving to DEC make DEC more viable from the point of view of software.

DEC has recently released products very quickly. How do you keep up and assimilate? What role does the DEC sales representative play in keeping you up to date with products and strategies?

ADLER: The people from DEC that we have at Penn certainly keep us advised as to what is available. But I tend to find that the software offerings are quite greedy, in terms of the hardware resources they'll consume. So I tend to look at those a little bit askew. Generally, what they do in hardware has some meaning, and they do keep us advised.

Have the announcements come too fast?

ADLER: Well, we're pretty tuned in technically. Generally, because we're the engineering school, we tend to have a pretty open dialogue about where DEC is going. I find most key customers also know where DEC is going. Our situation is somewhat complicated because I have an announced policy of a multivendor environment, using Unix. And that really puts the DEC salespeople in a bind, because they recognize they don't have a province entirely on their own.

CALHOUN: We're so plugged in to all the channels; we probably don't get very much initial information directly from sales. People go to Decus, Decworld, to occasional

Continued on next page

THE PARTICIPANTS

ED ABATE is manager of the computer department in the Applied Research and Development group of Sun Refining and Marketing Co. in Marcus Hook, Pa. Abate has been with the Sun computer group since 1964 and took over his current position in 1985. He holds a master's degree in chemical engineering from Villanova University. Prior to 1984, Sun, a major oil company, was an IBM shop — from its corporate computer center in Dallas to the research and development facility in Marcus Hook. Today, Sun operates a DEC VAX 8500 in addition to three Microvaxes and two Vaxstations. The R&D group plans to install a VAX 8530 by next May. The four-story R&D facility is wired with Ethernet.

W. FORD CALHOUN is vice-president of information sciences in R&D at Smith Kline & French Laboratories in Upper Merion, Pa. Calhoun uses DEC clusters for his company's shared computing. His shop currently runs two VAX 8700s, two VAX 8650s and four VAX-11/785s, which provide a total power of 30 million instructions per second. Calhoun, with a Ph.D. in microbiology from the University of Georgia, has been with the giant pharmaceutical firm for three years. Previously, he was director of research computing at Mount Sinai School of Medicine in New York.

E. CATHERINE DITAMORE, manager of technical support for corporate MIS at ARA Services, Inc. in Philadelphia, is a longtime DEC user and an active Decus member. She is responsible for the planning, operation and support of the technical DP/communications and office automation environments at ARA's corporate headquarters. Prior to bringing two VAX-11/785s into a cluster at headquarters four years ago, the company was a totally IBM shop. Today, the national food service supplier has installed more than 80 VAXs around the country for service support. All are networked to corporate headquarters, which runs a VAX 8650, two VAX-11/785s and a VAX-11/750. The cluster is connected to other systems via Decnet.

JOEL ADLER is director of computing at the School of Engineering and Applied Science at the University of Pennsylvania. IBM and DEC dominate the multivendor environment of the university as a whole. In 1983, DEC signed an agreement to sell more than $22 million worth of equipment to the university. The engineering school alone uses four VAX-11/785s and four VAX-11/750s in a cluster, along with a VAX 8650 running Ultrix. Adler, who obtained a Ph.D. in operations research from the school, has held senior positions in MIS at several Fortune 500 companies.

PHOTOS BY STEVEN M. [illegible]

DEC USERS

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nondisclosures. And my people go to various DEC functional groups to discuss issues with them. We don't depend on salesmen as being the first source of information.

Have you had the same sales agent for a number of years?

DITAMORE: No. For about the last year and a half, I've been dealing with one account rep. Prior to that, we had maybe three or four and found them to be deficient in one way or another.

And finally, DEC recognized that they weren't doing the job for us. A lot of that came from me bashing them over the head, saying, "You're not helping me." If I read about something in the trade press, I should be able to call my account rep and say, "Get me literature on this," and they would at least know what I'm talking about.

You find that you often know more than the sales rep?

DITAMORE: Sure. But I think that has really turned around. I don't know if that has to do with the reorganization of the DEC Philadelphia office and the new district manager we've got, but I have seen a definite change, and it's all for the better.

ABATE: So have I. The biggest problem I've had is that we have two or three very sharp technical people in the organization supporting the system. And when we'd ask questions about a piece of hardware and how it would fit into our system, usually the salesman didn't have an answer, and it required a follow-up meeting. The sales rep we have now is a technical person who came up through DEC software, and that's worked out a lot better.

DITAMORE: I've been with ARA for three years; prior to that I worked with an OEM and prior to that as a user. And my expectation is that, as a user, I would always get better sales support than as an OEM. And when I first came to ARA, that was not true. ARA, at that point, didn't know they should be getting better service than they were.

DEC reorganized during that period — three or four years ago. So you've seen an improvement?

DITAMORE: Oh, absolutely.

CALHOUN: It's probably that the sales organization has better technical support.

DITAMORE: Another area of concern about the relationship between companies and the sales organization is that when a DEC customer has sites scattered across the U.S., DEC still doesn't seem to see the need to assign an account rep to that customer who has a great deal of expertise and has been with DEC a long time. They don't give one of their senior people to a company like that, which is unfortunate.

ABATE: Didn't they assign a corporate account manager to you?

DITAMORE: Not yet.

We've been told that is their policy.

CALHOUN: We have one.

ABATE: So do we.

DITAMORE: We're working toward that.

Are there other areas in which DEC's growth has affected you — either negatively or positively?

ADLER: I've seen an erosion of what I would call deep support over time for all vendors. And I take IBM as the benchmark. Fifteen or 20 years ago, when the salesman came to talk to you, he was generally somebody with a good technical background. And you usually had a systems engineer on-site who understood everything there was to know about the operating system. I don't think that exists anymore, having an engineer on-site who can integrate all the products and the services and functions [the system] can provide.

CALHOUN: In my view, DEC has moved positively in that direction. We have a field service engineer on-site. He's primarily a hardware person, not a software person. But he acts, for all purposes, as if he reported to our R&D group. He worries about the system. He stays late when things aren't working. I don't know to what extent this occurs elsewhere, but this guy sweats and worries about those machines being up just like other people on the staff do.

He's there every day?

CALHOUN: Yes, he reports every day. It's a big installation. There's probably about a $15 million investment on the floor. That's not a trivial installation. But the motivation is something you can't pay for, and this person brings it.

ADLER: In the commercial accounts I come across, there is a sense of ownership by DEC, certainly at the hardware level. We've been so conditioned at the engineering school to take care of ourselves — plus, we have a certain sense that we can't impose too much on DEC because we have a multivendor environment — that we've become pretty much self-sufficient.

We honestly feel that we know more about the products, especially in the software end, than they do.

I'm not talking about maintenance. We have DEC contracts for maintenance. But in terms of intricacies — how do things work and what one can and cannot do — especially in the Ultrix world, there, it is very hard to find expertise within DEC, and we really don't expect it.

Is the level of sales, service and support different with other vendors?

ADLER: I don't think so. The engineering school's perspective is that we are pretty much on our own when it comes to figuring out new ways to do things.

CALHOUN: IBM used to claim they knew your business. They knew all the players, all the kinds of systems they were selling. They worried as much about what your next configuration should be as you did. And it always cost you extra.

DEC traditionally didn't do business that way. They came from a department-level, barebones, "you need a machine, here's a machine" point of view. DEC has moved toward more integrated support but not to the extent that IBM is said to have once had.

ADLER: I wouldn't expect it, and I'm not sure I would really want it.

CALHOUN: We wouldn't particularly welcome it. We do believe we understand our business and our site. All vendors are going to have a conflict of interest, and we really have to be on top of it.

DITAMORE: I would like to see more leaning toward the way IBM used to do it. I would like my account rep to understand the business we are in so that when products are announced by DEC, he would have enough of an understanding of what we are doing to be able to help us determine which of those products we need to be bothered with. I have other things to do than sit and read brochures all day.

Your account rep doesn't have that ability?

DITAMORE: I think he has learned it over the past year and a half. We've worked with him and helped him understand what is going on in the organization. But that's time I've invested because I felt it would benefit me.

Do you expect that sales rep will stay there?

DITAMORE: Oh God, I hope so.

ADLER: Do you invite contacts between your salesperson and your clientele, namely the end users who would be served by the equipment?

DITAMORE: The account rep does not talk to any of my end users. I have not seen a need for that. Outside of corporate MIS, nobody knows anything about the VAX.

ADLER: All the more reason for an in-house technical person to accompany the salesman.

DITAMORE: Because of my involvement with Decus, I've got some people coming down from DEC to talk to some end users who are evaluating their current mail product. They want some input from people who don't know anything about MIS, who are just pure vanilla users of the product, to find out how they use it and don't use it. That's productive because those people are from the engineering group. I don't think it's productive for a sales or account rep to talk to my end users.

But you want the DEC rep to know the business better. Perhaps that access would help him learn it.

DITAMORE: In our corporate MIS group, we have someone with the title of manager of systems development, and he's the one responsible for developing all the programs for our users groups. He does the interviews with the users groups. He has that knowledge. He's the liaison.

ADLER: The salesman's presence on-site has to be managed in some way. You can get a lot of miscommunications and misperceptions on the part of end users, who, in joint enthusiasm with a salesman, would propose solutions that are either infeasible or uneconomical or impractical.

ABATE: I'm the only one that talks to the salesman. I represent all the end users, and he doesn't talk to them.

The area DEC is still lacking in is administration — dealing with invoices and paying the bills.

For example, in Marcus Hook, we have three sites. In those sites, we have three different systems managed by three different organizations, yet DEC continues to send us one invoice, and we have to divvy up the cost. We have told them repeatedly we'd like separate invoices, and they just fail to do it.

DITAMORE: They can't deal with it.

ABATE: You want the discount for having three sites represented, then you have to take one invoice.

CALHOUN: But the salespeople generally find ways to deal with that.

ABATE: It depends how big a client you are.

ADLER: Maybe what you are saying is that DEC doesn't have good MIS systems for managing their accounts.

DITAMORE: I'd like to go back to

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service for a minute. Everybody has been talking about their wonderful experiences with field service. I have not had such wonderful experiences since I've been at ARA. And two years ago, I chose to leave DEC field service and go to a third-party maintenance house.

DEC's attitude was, "Your system doesn't need to be up as much as you say because you are only doing office automation." Of course, my response to that has to be, "I contract for service, and if I want my system up, I want it up, and you don't tell me what I want."

Despite that, at this point in time, I am considering going back to DEC for field service.

What would make you go back?
DITAMORE: Primarily, for political reasons within the corporation. When new groups begin to look at DEC products, they have concern because they know I have left DEC field service. That's taken as a negative sign. Two years ago, field service was just beginning its reorganization, and that is now complete. I've heard very positive things about field service now.

Have you run into other administrative problems: turnaround on product delivery, billing cycles?
ABATE: Yes. We lease all our equipment, and we recently upgraded from a VAX-11/785 to an 8500. That occurred Jan. 23 of this year. DEC is still billing me [as of July 8] on the maintenance of the old equipment, despite three or four confrontations with my sales rep to straighten it out.

What does he say?
ABATE: They are working on it. I'm sure I'll eventually get credit for everything, but it seems strange to have to wait three or four months before they straighten out a bill.

DITAMORE: It sometimes seems that 14 people are working on the same problem and that no one person can carry it through and actually find out what is going on.

ABATE: When I upgraded my system, I figured my salesman would handle the billing, but he didn't.

CALHOUN: We have, from time to time, invoices that have to be cleaned up. But I would say, in our experience, DEC has been quite good — not worse than any other vendor we deal with.

Is Decus your most effective voice for communicating with DEC, or do you have other ways to make your opinions known?
DITAMORE: For ARA, Decus is the primary vehicle. I became very involved with Decus three years ago and now have contact with the people I need to talk to.

ABATE: There's always strength in numbers. I see the same situation occurring even within our company. We have several different users of DEC equipment, and we haven't really established a consistent pricing policy on new hardware. We have X percent corporate discount. But there always will be special deals. I have received two special deals in the two upgrades I've done.

Now, we also recently upgraded two VAX-11/785s to 8250s for our trading company. When they got their quote, they got their standard corporate discount. The response was, "Ed Abate in R&D got X plus Y percent discount, how come I'm only getting X?" DEC went back, rethought it and said, "OK, we'll give you the same deal." Those kinds of things bother me. Our corporate people think there should be a more consistent pricing policy.

John Buckley, manager of business operations at DEC, told us that the company simply doesn't do that.
ABATE: Maybe I'm just a good negotiator.

DITAMORE: I've been in similar situations, and I think a lot of it has to do with how much the district manager can do, because there are corporatewide discounts and some other things you can do.

So there's always room for a little horse trading?
DITAMORE: I think so. At least I've seen more of it in the last few years than before. I've been working with DEC products since 1973. In the old days, you couldn't do anything. I think it's because DEC is expanding its marketplace and has seen that much more competition.

ABATE: It's the corporate philosophy of DEC. They know that most large corporations are IBM shops, and they want to make inroads into that market. They are doing that by whatever way they can to get their equipment in there.

What other problems occur in doing business with DEC?
CALHOUN: We're a distributed company, and it's not clear to us that DEC knows how to deal with a decentralized organization. Corporate takes primary responsibility in negotiating contracts with DEC, even though we at R&D are the primary customer. And sometimes we don't see those proceedings until quite late in the game. Whether that's our fault or theirs, I don't know.

ADLER: In universities and colleges, DEC is more generous in their discounts than with their commercial customers.

CALHOUN: I'm an adviser to a group at Georgetown, and their complaint about DEC is that they get no extra discounts. They are treated as any independent customer would be.

ADLER: That's not what I've heard from DEC. In our case, maybe it's volume-related, but generally, they do make accommodations to educational institutions.

CALHOUN: When I was at Mount Sinai School of Medicine, I know it wasn't the case. We did not get any special arrangements from DEC.

Have you seen IBM using the 9370 to try to get your business away from DEC?
ADLER: I haven't seen it. My opinion is that, at least in the engineering and scientific market, IBM is going to have tough going, unless a client is already a VM user, which is a very clearly segmented portion of the scientific population. Now, IBM is making noises about Unix on the 9370. And if that offering would be acceptable to engineers the way Unix on the Sun [workstation] or VAX is, I think they've got a good shot.

Because IBM still does have an aura about it, people still look to them for reliable equipment and service. If they can accommodate scientific standards, namely Unix and TCP/IP, they could get back into that market very quickly with the 9370.

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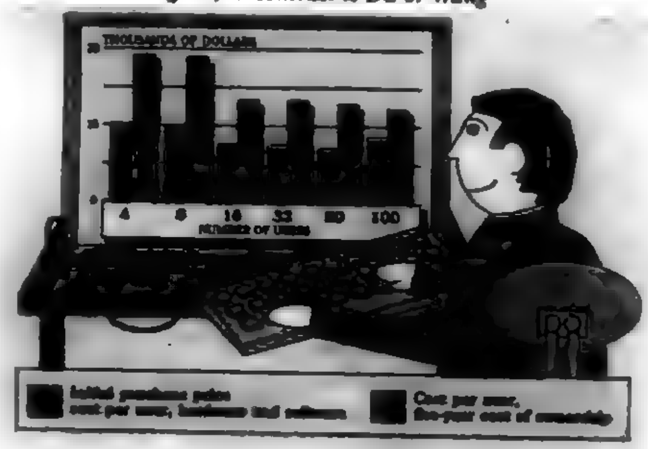

INFORMATION PROVIDED BY THE SIERRA GROUP
CW CHART: MITCHELL J. HAYES

DITAMORE: I believe that the 9300 series is going to be direct competition with VAXs. That's really clear. If a shop already has an IBM bias, there is no way they are going to switch over to DEC. If a shop has a DEC bias — there are few around, but if they do — they'll go with VAXs. I don't see any reason why a shop would switch to VAX if the 9300 is there.

So you think DEC's growth into IBM accounts is going to be stopped by the 9370?
DITAMORE: It's certainly going to be stalled a lot.

ABATE: I believe that in most corporations, the philosophy is still IBM first, DEC second. For the scientific community, it's been DEC. Even though IBM didn't have something comparable to DEC when we made our decision, we had a lot of pressure to go with an IBM system.

Is that because corporate is IBM?
ABATE: Yes. But now there are two vendors.

ADLER: What do you believe DEC is going to be able to run on the corporate side?

Continued on next page

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DEC USERS

FROM PREVIOUS PAGE

ABATE: Transaction processing.

ADLER: Existing applications or new applications?

ABATE: I don't know, but that's a concern the corporation has.

In the future, can DEC create the applications that will run on IBM mainframes?

CALHOUN: Whether the 9370 is the "VAX killer" or not is unknowable. It seems, more and more, software is dominating people's decisions. We don't use All-In-1. But All-In-1 has probably sold a lot of VAXs, because it offered a solution people needed.

With IBM, unless this hardware brings on functionality that doesn't exist, it's hard for me to believe that people are going to rush to substitute. People follow the functionality.

Look at Stellar [Computer]. Supposedly within a few months, they're coming out with a 20 MIPS workstation for molecular modeling. The whole world is changing. I don't think DEC or IBM can dictate the terms anymore.

I don't think the vendors necessarily understand that, for the most part, we put up with them because we have to, whether it's IBM or DEC.

If you could deliver personally to Ken Olsen one suggestion for improving DEC, what would it be?

DITAMORE: As far as networking hardware goes, DEC hasn't been willing to take a position so far on what they consider the best: point-to-point, multipoint or multidrop.

And any customer who is trying to make a decision is concerned about how upgradable each one is going to be.

With the communications costs being what they are and links to the network and packet-switching networks being what they are, you don't want to make the wrong decision now.

On the software side, Decnet is a wonderful way to communicate and gives a lot of flexibility. But DEC has not kept it current with technologies that have come along.

ABATE: From a corporate point of view, we'd like to see a more consistent pricing philosophy from DEC in all areas of products and services.

CALHOUN: I'd tell Olsen to pay attention to what is weak in the product line, such as optical disk, general disk capacity, the problems evolving in how to support twisted-pair. The way I see the computing world evolving is in terms of the Andrew project at Carnegie-Mellon and the Athena project at MIT.

But to the extent that DEC can help that agenda, DEC will position itself well and help all of us satisfy our functional needs.

ADLER: Our strategy at the engineering school is one that views hardware more and more as a commodity. Because we are more resource-constrained, we must have the ability to have true interconnectivity among the variety of hardware vendors.

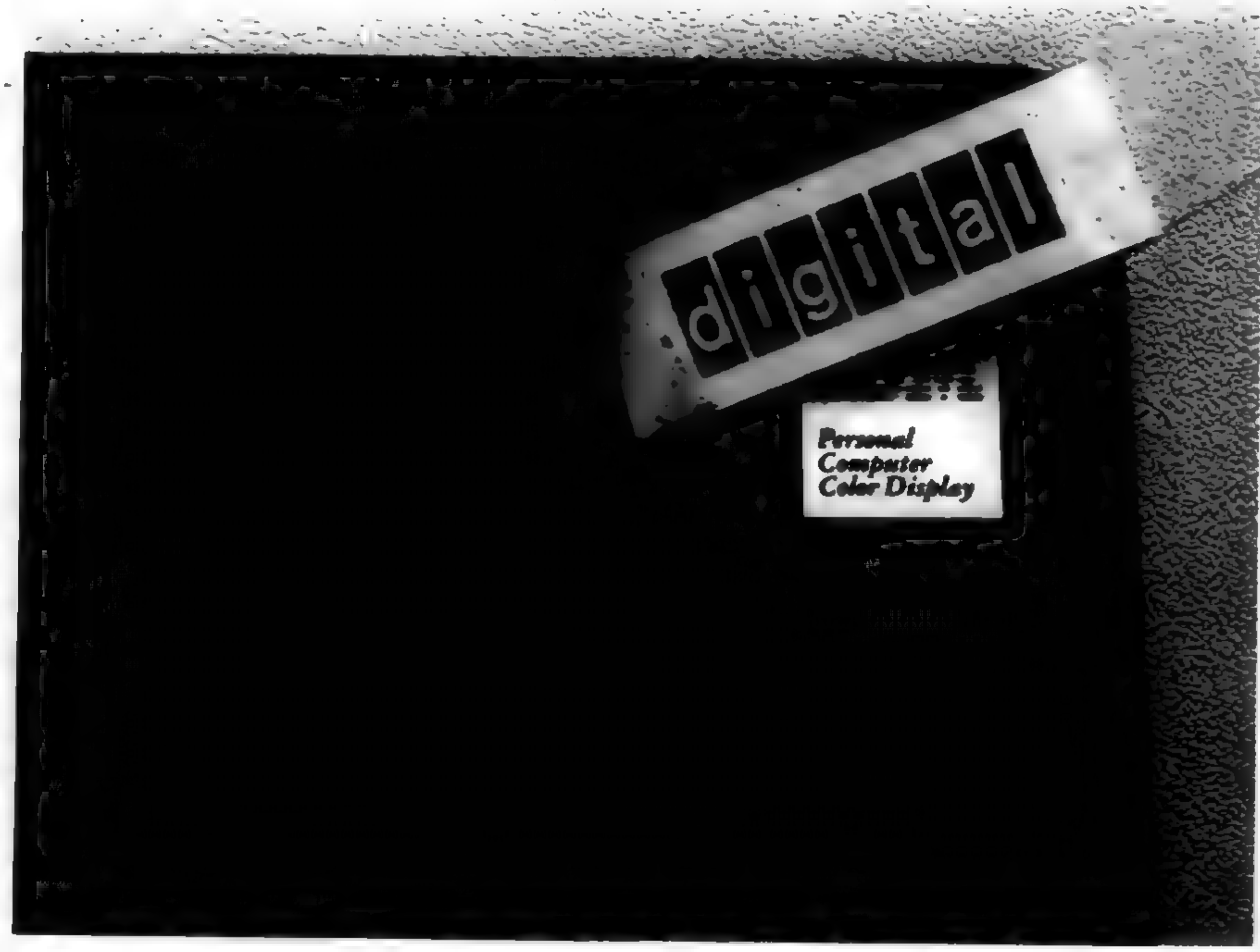
Given that, our preference is to always go with the strongest vendors. Clearly, DEC is now one of the big two.

So my hope is that DEC sees the opportunity to deal with the hardware and operating system and networking world in a nonproprietary manner.

If they make up their mind that that's what they can do, they really will be able to continue their growth, because people do want to have homogeneous hardware environments where workstations come from the same places that mainframes come from. That's really been Ken Olsen's philosophy — that the network makes the system. I would like to see that in a nonproprietary mode rather than a proprietary mode. I think DEC can manage it.

CALHOUN: But this is a dilemma all companies face. Do you lose more by providing an open architecture, or do you gain more? Is what is good for DEC good for the world? No company has all the solutions to all the world's needs — not IBM, not anybody. The world will be a multivendor world.

ADLER: DEC is probably in the best position to survive in the long haul in that type of nonproprietary environment.



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Circle Reader Service Number 15

STEPPING OUT INTO DEC TERRITORY

IBM was once the only safe choice for MIS; now DEC is winning converts

……………………

BY STANLEY GIBSON

Despite IBM's widely perceived image as the safe computing vendor, some users have rejected the Big Blue security blanket and struck out on their own with Digital Equipment Corp.

In a search for cradle-to-grave computing, these users are deciding that DEC can do a better job of extending the life of their software and protecting their hardware investments.

The cutting of IBM apron strings caused such alarm to the industry giant, known as "mother" to many users, that she was shocked into action, offering mid-range incentives to her sales force and unveiling last year the 9370 departmental computer — the so-called VAX killer.

Most IBM users who leave home do so because they reach a crossroad in their computing needs. Typically, they have been running System/36 and System/38 mid-range machines; 8100 processors and 4341, 4361 and 4381 systems. Having outgrown one IBM system, they often face a costly conversion to another. Bloodied in previous IBM-to-IBM conversions,

Continued on next page

ALEXA GRACE

Gibson is a *Computerworld* senior writer.

STEPPING OUT

FROM PREVIOUS PAGE

some veterans are finding that it is simpler and cheaper to choose one final conversion — to DEC.

DEC spotted these areas of vulnerability in the IBM world and has been making hay at IBM's expense. DEC set up a plethora of migration organizations that stand ready to assist customers in making the switch (see story page 23).

Once DEC establishes itself in an account, it seems there to stay. "Once you've been 'VAX-inated,' it's pretty much a done deal. I've never seen anyone who has gone the other way" [converted from DEC to IBM], says Charles Riegel, a spokesman for Software AG of North America, Inc.

Former 4381 user

One user who has flown the IBM coop is Perdue Farms, Inc. The well-known poultry company, led by Chief Executive Officer Frank Perdue, wanted to construct a new billing and order-entry system. Perdue had been using IBM 4381 mainframes.

"This is intended to be the last conversion," says George Reiswig, senior director of management information services. Previously, Reiswig converted from IBM's DOS VSE to VM and later switched to MVS/XA.

"We had a bad taste left over," he says of the change to MVS/XA. "Software conversions don't add anything to the bottom line. They are very risky projects." In addition, he says, senior management seldom understands the nature of the undertaking but holds information services accountable just the same.

"We're in the chicken business. We're not into technical development," Reiswig says.

Perdue began its decision process by choosing Software AG's Adabas Natural. Reiswig then found that the software ran better on a VAX than it did on IBM equipment, even though, Reiswig points out, Adabas was originally written for IBM and was only later rewritten for DEC.

"DEC teamed up with Software AG and demonstrated a much better capability," he says. In addition, the software costs less to run on DEC — by a significant margin.

Perdue also wanted 100% uptime, and to accomplish this goal required that two computers each contain the same data base. If one site were to go down, another with an identical data base would have to come up within five minutes. In addition to providing data base backup, the second site was to perform general-purpose computing.

IBM proposed running a 4381 host with another 4381 at a second location. Periodically, the principal computer would update the data base of the second. But the updating was not frequent enough to satisfy Reiswig. DEC was able to propose data base updating between two remote VAXs that was almost instantaneous, he says. "It came down to a decentralized vs. a centralized solution," Reiswig says.

In the future, Perdue plans to install DEC Microvax IIs at its feed mills and other scattered locations. In all, the poultry firm may add a dozen more VAXs, Reiswig says. "With one operating system, it is possible to grow in a granular fashion."

Now that it has lost the bid, IBM has been trying to regain Perdue's business. "IBM has been very positive about getting back into position," Reiswig says.

The move to distributed processing was also key in the decision by Canada Cement LaFarge Ltd. to purchase a number of VAXs for several locations. The Toronto company, a subsidiary of LaFarge Corp. in Dallas, had used a service bureau running IBM 370-architecture mainframes. Remote job entry was accomplished on DEC PDP minicomputers at Canada Cement's various locations. On the remote mainframes at the service bureau, Canada Cement ran its Cobol programs under MVS.

"We wanted to go to a more remote aproach. We wanted to move away from the service bureau," says Warren White, manager of MIS at Canada Cement. Under this scheme, each location would handle, on a minicomputer or small mainframe, its own computing needs, including inventory, statistics and accounts payable. In 1982, the company began to request proposals from a number of vendors.

Because the firm's plants in different parts of the country are of different sizes, its computing needs covered a large scale. Also, it would be necessary to rewrite the mainframe applications for whichever smaller machines were chosen for the distributed sites. In addition, the smaller computers would have to be able to grow as the business at each site grew.

IBM proposed a combination of the

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> *"ONCE you've been 'VAX-inated,' it's pretty much a done deal. I've never seen anyone who has gone the other way."*
>
> CHARLES RIEGEL
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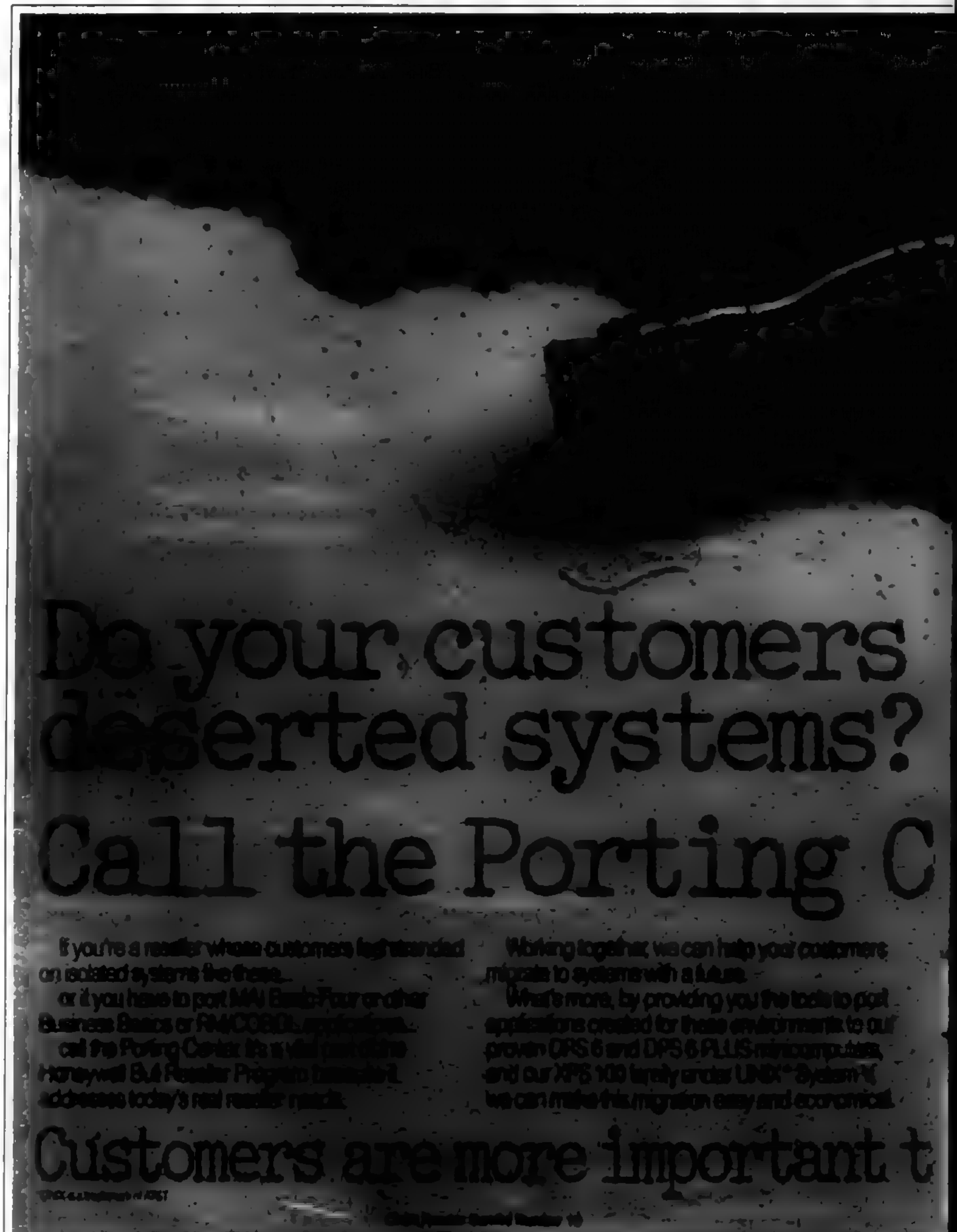

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System/34, 38 and 4300 series processors. But none of these components was ideal, according to White. The System/34 was too small; the System/38, although a good development machine, was likewise too small for some regional offices; and the 4300 was too large.

By contrast, even in 1982, DEC offered "the longest, deepest product line," according to White. Consequently, Canada Cement could upgrade the system at any site as business increased while still running the same software.

Canada Cement's original order, placed in June 1983, called for a single VAX. Over the four years since, 17 VAXs have been installed, including VAX-11/730s, 11/750s and Microvax IIs.

Inventory and statistics programs, written in Basic for the PDPs, were rewritten for the VAXs. The mainframe Cobol program, McCormack & Dodge Corp.'s General Ledger, was purchased in a VAX version. According to White, Canada Cement was the first site to use that software on VAXs. Canada Cement also bought M&D's fixed assets program and wrote many other applications itself.

'We had an open mind'

Faced with the need to completely redo its computing system, Foothill-De Anza Community College in Los Altos Hills, Calif., approached the question of computing with a tabula rasa.

"We had an open mind. The district was floundering. We asked, 'What do we want out of computing, period?,' " says William McDonald, manager of data services at the school. An IBM customer since 1970, Foothill-De Anza most recently ran a 4341 processor for such administrative tasks as payroll, finance and academic records.

The college sent out a request for proposal in June 1986 for which there were only two bidders — DEC and IBM. McDonald sums up the difference between the two as connectibility. "IBM was more directed to saying 'a piece of hardware will do it for you.' "

IBM bid a 4381 Model 13. "But that didn't solve the connectivity problem," McDonald says. Also, moving from the 4341 to the 4381 would have entailed going from VSE to MVS/XA, according to IBM's proposal. But McDonald says, "This wasn't any quick solution."

DEC won the bid, which carried a price tag of $1.2 million. Faced with a user moving to DEC, IBM requested and was granted a meeting with McDonald's boss, the director of business services at the college. McDonald was not allowed to attend. But IBM's entreaties did not sway the decision.

A veteran of several IBM-to-IBM conversions, McDonald says the IBM-to-DEC conversion has "taken a lot of hours but was not difficult."

Now, Foothill-De Anza has a VAX 8650 running VMS, supported by 20 disk drives and four tape drives. Connected to the VAX 8650 are 160 DEC VT 220 terminals. The VAX is ready for future clustering with a Hierarchical Storage Controller (an HSC 50) and a star coupler already installed so that other processors can be added easily. Clustering is scheduled to come in 1988, with the addition of a VAX 8600.

The future also promises the addition of distributed Microvaxes. Currently, three Microvaxes are installed, one each at the DeAnza campus, the Foothill campus and the district office. The processors are connected to each other by 56K bit/sec. leased lines. The college still runs a 4341 system but is phasing it out, according to McDonald.

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THE IBM-to-DEC conversion has "taken a lot of hours but was not difficult."

WILLIAM MCDONALD
MANAGER OF DATA SERVICES,
FOOTHILL-DE ANZA
COMMUNITY COLLEGE

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Foothill-De Anza is only one of 105 community colleges in California and the first to convert to DEC. McDonald says others are watching his experience closely, and it is very likely that some will follow Foothill-De Anza's lead.

Cost half as much

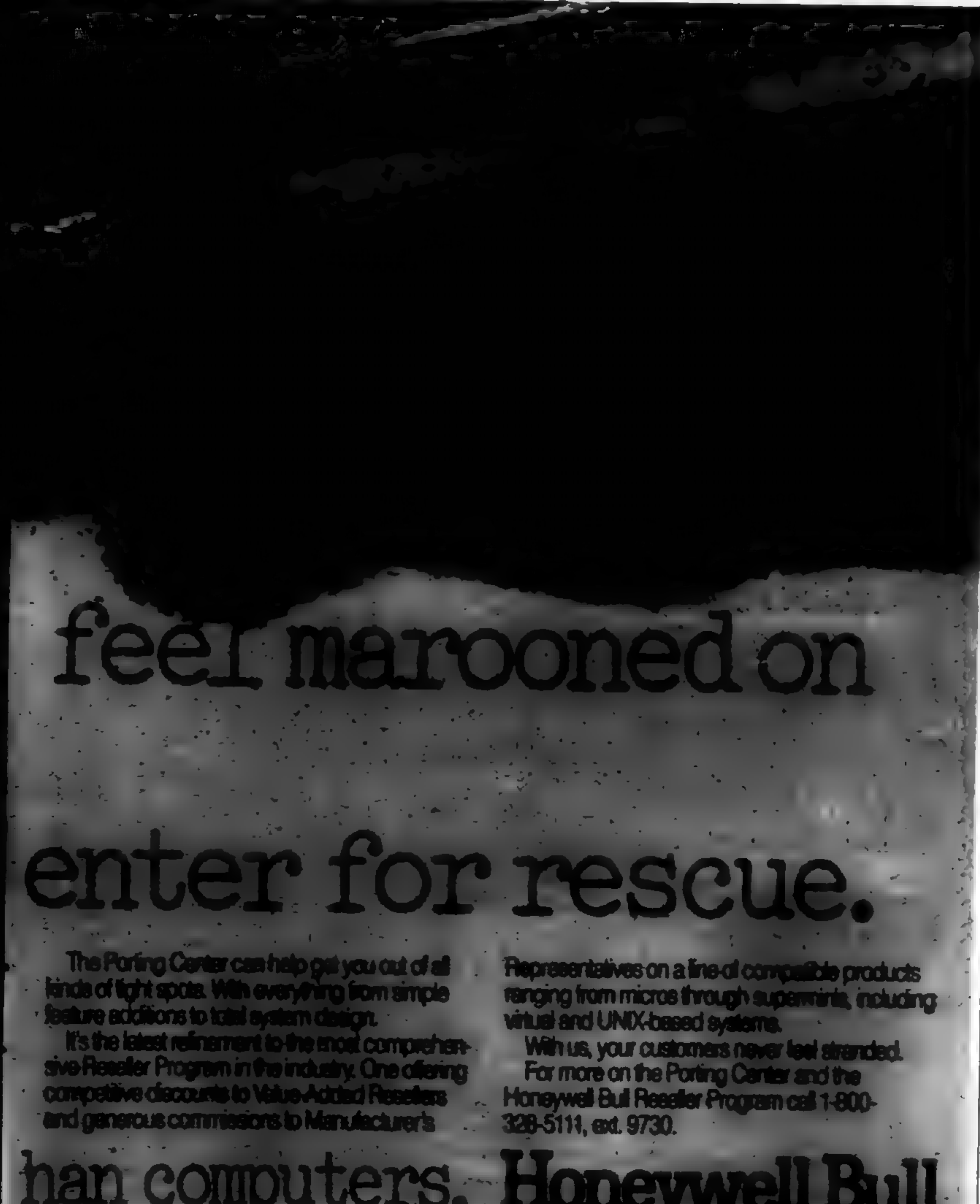
Despite hardware offers from DEC and IBM that were priced about the same, Atlas Powder Co., a subsidiary of Dallas-based Tyler Corp., found that the same software would cost $700,000 less to run on DEC equipment. That clinched the decision. "It cost about half as much to run software for DEC as it did with IBM," says Darwin Wolfe, director of information services for the maker of explosives. The software is a Cincom Systems, Inc. package for controlling manufacturing and finances.

Wolfe recalls that Cincom officials told him the software is easier to develop and maintain on DEC than on IBM equipment. "We told IBM about this, but they couldn't say much of anything," Wolfe says.

A 4381 Model 12 user for five years, Atlas Powder had been looking at modernizing for two years, according to Wolfe. IBM proposed a 4381 and a 9370 Model 20. However, Wolfe says, he did not want to be a guinea pig on the 9370 and suspected the 4381 was near the end of its life.

In May, the decision to go with DEC was made. As is its frequent practice,

Continued on page 23



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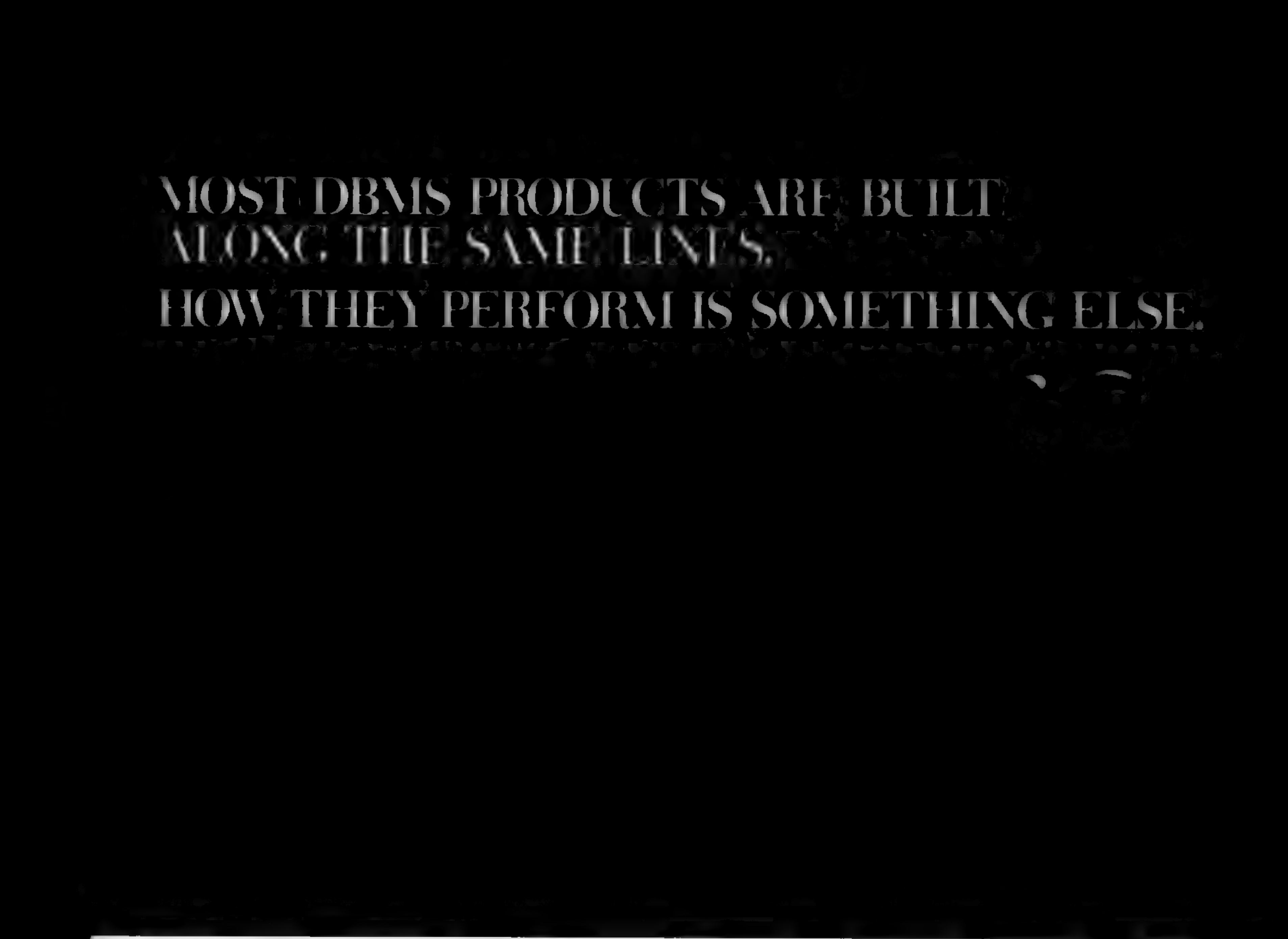
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Circle Reader Service Number 17

MIGRATION PATHS

Knowing the points at which IBM users often must migrate to other systems, DEC has developed programs to assist changeovers to its processors. The firm offers software conversion tools designed to translate data files, procedures and programs written for IBM System/36 and 38, 8100 and 370 architecture systems into code that is usable in the DEC VAX world.

"It's a one-time conversion; that's what we sell," says Patricia Patterson, unit manager of DEC's support services in Westboro, Mass. Patterson is in charge of DEC's RPG migration program, which assists customers in moving to VAX processors from systems that use the RPG language, such as the System/36 and 38. The group is not limited to IBM migration, she points out, and will assist users of other RPG-based computers, such as some made by Wang Laboratories, Inc. and Hewlett-Packard Co.

A key component of DEC's migration assistance is a language compiler called Migration RPG, which automatically converts most System/36 and 38 RPG code into an RPG that is usable by a VAX. Migration RPG was developed by Native Software, Inc. in Richmond, Va., and is sold by that company as well as by DEC.

"You can load IBM software on a VAX," claims Bruce Claremont, who is in charge of migration products at Native Software. The compiler normally converts all but a small percentage of code, which must be ported manually, he says. Claremont points out that while Native Software charges fixed prices for Migration RPG and software tools that work with it, DEC uses a tiered pricing structure, which increases the program's price with the processor it is sold to run on.

DEC's on-site help comes in many combinations, ranging from a few hours of instruction to days and months of service from a full-time software resident, Patterson says.

Those who want to perform the conversion themselves may partake of DEC's Migration Assistance Service, which provides the user with migration tools, documentation and access to a 24-hour, seven-day-a-week hot line for support.

During a migration, seemingly minor details can take on great importance, especially if a ready answer cannot be found. You might key in "Catalog" — an IBM term — when you need to key in "Directory" in the DEC world. "Often, it's just terminology. You just need to have someone there who knows the terms," says Don House of DEC's migration program.

STANLEY GIBSON

STEPPING OUT

CONTINUED FROM PAGE 21

IBM discussed the decision with Wolfe's boss. However, Wolfe says he and his boss were in harmony. "They [IBM] were not nasty, but they couldn't believe we would seriously consider anyone besides them," he says.

In July, Atlas Powder put in a VAX 8700 and three Microvaxes, with plans to add a VAX 8350 at a later date. In addition, the firm will use some 150 VT 220 terminals and Vaxmate personal computers. The entire conversion process will take one year to complete, according to Wolfe.

Changing needs

Valassis Inserts, Inc. in Livonia Hills, Mich., was a "real high-growth company," according to Vice-President of MIS Jerry Rode. A maker of glossy advertising inserts for 400 newspapers in the U.S., the company's growth and changing needs had forced three conversions in the four years preceding 1984.

Rode was hired at that time to point data processing in a single direction. "They didn't want to keep spending money on operating systems and applications," Rode says.

Now 15 years old, Valassis Inserts has grown at an average annual rate of 35% to become the largest advertising insert company in the U.S., Rode says. Earlier this year, the firm was acquired by Consolidated Press Holdings in Sydney, Australia.

Valassis Inserts was using a System/38, which it had been running for two years but was no longer large enough to handle the business. Previously, the company had used a System/34 and, before that, Honeywell, Inc. equipment. Having already converted from RPG II to RPG III, the firm was facing a move to the 4300 world if it stayed with IBM. "It would have been a waste of time; conversions are nonproductive," Rode says.

Rode determined that the existing software, like the hardware, was inadequate and would need to be rewritten. The software for the System/38 limited the number of pages that could be included in an insert. Now, the total can theoretically reach 999 pages, Rode says, although it is unlikely that quantity will ever be exceeded.

The hardware conversion started with one 11/780 in early 1984. Later, the machine was upgraded to an 11/785. Now, a Vaxcluster, consisting of an 8650, an 8550, the 11/785 and an 11/750, is located at Valassis Inserts' Livonia Hills headquarters.

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"DEC used to be a little harder to sell to management than it is now. So MIS with DEC equipment had to defend its decision."

WARREN WHITE
MIS MANAGER, CANADA CEMENT
LA FARGE LTD.

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"The best thing about the clustering was that the system did not have to be taken down in order to add a processor," Rode says. The same is true of adding storage devices.

The cluster is used to keep track of all aspects of the business, including printing press operation and inventory of such supplies as ink and paper. It is also used for company accounting and coordinating advertiser bookings with available ad space.

In addition, the company uses several Chromatics, Inc. 19-in. color graphics terminals for creating the glossy ads. The terminals are connected to the VAXs, which provide the necessary processing power.

Valassis Inserts also uses 52 IBM Personal Computers, half of which are connected to Ethernet, Rode says. But the PCs are being phased out. "They have served their purpose. We now have the bulk of our information on the Vaxcluster," Rode says. "All spreadsheets are to be done on a VAX," he adds.

The plan is to make increasing use of a package called 20/20, a program for VAXs similar to Lotus Development Corp.'s 1-2-3, sold by Access Technology, Inc. in Natick, Mass.

The growth of Valassis Inserts and its consequent move to DEC computers have also caused a change in DP staffing. Previously, the company used contractors and consultants exclusively; the firm now employs an in-house staff of 34.

Valassis Inserts recently bought another company in the same line of business, Connecticut Insert Co. The plan is to sell the Connecticut firm's Wang Laboratories, Inc. VS 100 and combine data processing operations by connecting the new company to the cluster at Michigan headquarters.

No turning back

While DEC users who have left IBM set out on their new path with optimism, they are, in many cases, just setting out: Their long-term satisfaction will not be known until a few years from now. But others who have been with DEC for several years show no inclination to turn back, having, in many cases, worked hard to sell their decision to a skeptical management that had grown accustomed to IBM.

"DEC used to be a little harder to sell to management than it is now. So MIS with DEC equipment had to defend its decision," says Canada Cement's White, explaining why he believes DEC converts are often among the most firmly committed users.

But there is no question that DEC will increasingly be a target of IBM and that Big Blue's sales representatives will cling with increased tenacity to customers who appear to sway toward DEC. The result for the customer is ideal: greater choice, with vendors doing their utmost to win them over.

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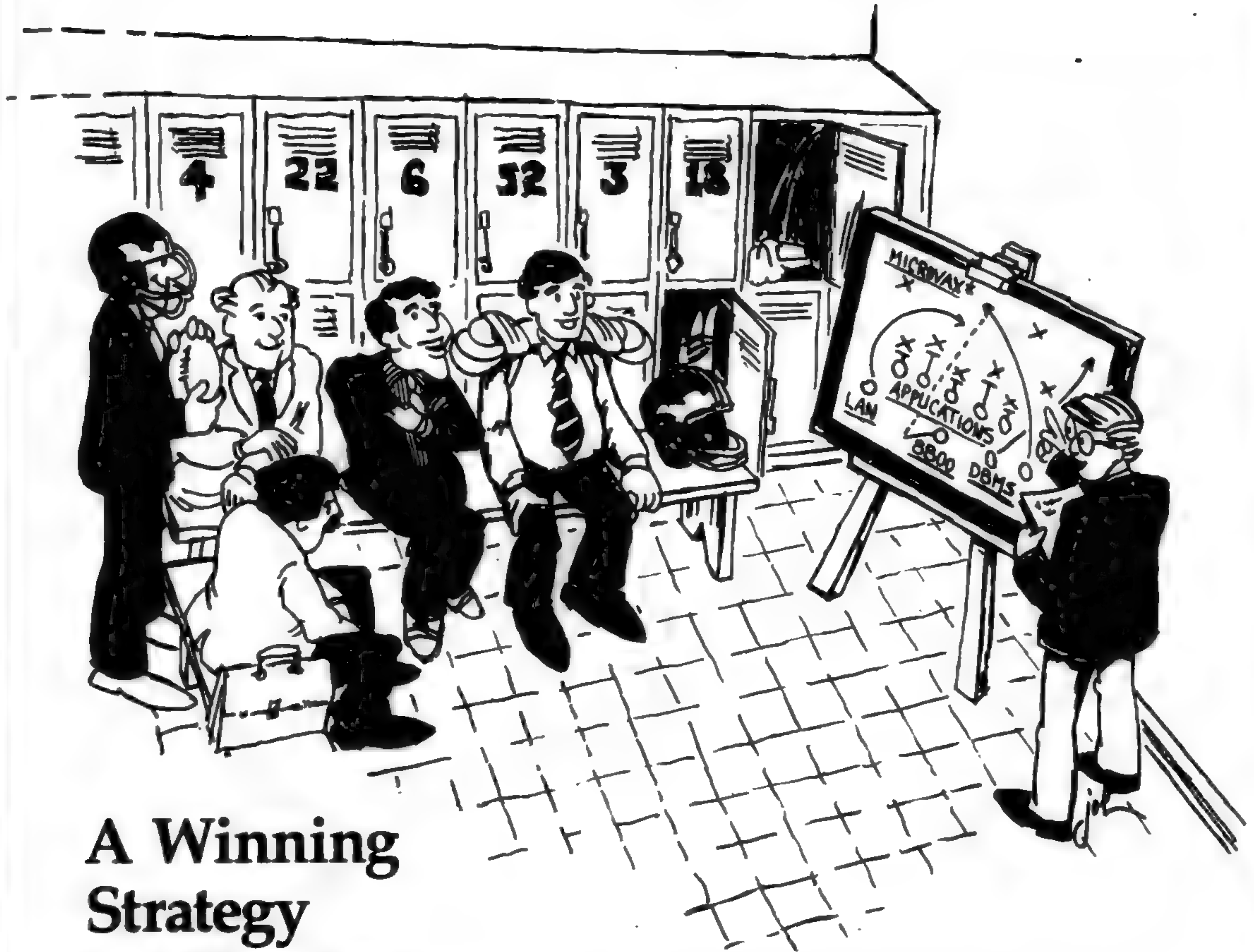

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11	31	51	71	91	111	131	151	171	191
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FLYING HIGH IN THIRD-PARTY SOFTWARE

More than a hundred vendors drawn to DEC's cooperative marketing program

BY BOB RANDOLPH

"The warrior, in accordance with his aims, maintains various weapons and knows their characteristics and uses them well." This quote, from *The Book of Five Rings* by Miyamoto Musashi, is an excellent summary of DEC's deployment of application software as a strategic weapon in the continuing marketing warfare raging in the medium-scale computer market.

DEC has taken a strong position by making the availability of application software a key facet of its marketing thrust. Having decided that vertical markets are the high ground, DEC laid out a strategic course that maps the needed applications into the firm's chosen vertical market spaces.

Unwilling to depend solely on the limited set of horizontal applications that it has developed and will be developing over time, DEC has launched a major offensive to provide the needed applications using an array of alliances with independent software suppliers.

The following connections illustrate DEC's desire to expand its software base.

The simplest form of these third-party pacts is the reference agreement. In this, DEC publishes the application vendor's name and contact information in an applications catalog that it gives to prospective customers to let them choose an application vendor. This connection is strictly arm's length.

The other types of

Continued on next page

BART GOLDMAN

Randolph is director of the DEC Advisory Service at International Data Corp., a market research firm in Framingham, Mass.

FLYING HIGH

FROM PREVIOUS PAGE

agreements for third-party software involve a contractual agreement between DEC and the application vendor. These can range from a simple agreement to buy and resell DEC hardware (OEM connections) to much more complex joint marketing schemes.

In the OEM arena, the application supplier buys hardware from DEC, packages his solution software with the hardware and resells the complete system to an end user. This approach has been DEC's preferred way of doing business, particularly in vertical markets that require the special expertise of an application vendor.

DEC is credited with starting the OEM business and has an advantage over most other computer suppliers that are trying to extract OEM-developed applications from a smaller OEM base than DEC's.

The OEM's contractual agreement with DEC involves only the hardware. The OEM is thus free to compete with DEC for certain sales or to focus his energies on vertical markets where DEC has little or no involvement.

'Channel conflict'

As OEMs grew larger and the vertical markets became more attractive to DEC, the freedom to compete became a two-edged sword called "channel conflict." Competing for the same customer became increasingly distasteful to both DEC and its OEMs.

As recently as last year, DEC's major OEMs were up in arms over what they perceived as poaching of their markets. Many established relationships with other computer vendors that had some solution to the channel conflict problem. Partially because of this threatened wholesale -defection and partly because of the clarification of its marketing strategy, DEC decided to join them rather than fight them. Thus the Systems Cooperative Marketing Program (SCMP) was born.

The SCMP agreement is really an extension of the OEM agreement with a built-in way of alleviating channel conflict. The SCMP becomes a partner with DEC in the joint-marketing, joint-selling sense. Like the OEM, the SCMP packages hardware and application software together. In this relationship, the SCMP's sales force works with DEC's sales force in qualifying potential customers and providing detailed technical information on the SCMP's product. Channel conflict is a nonissue in this relationship because DEC's sales force is given partial credit (as much as 90%) for the hardware sale.

This sharing of credit provides added incentive for the DEC sales representative to help close the sale. DEC is actively turning OEMs into SCMPs, and so far there are approximately 30 SCMPs providing solutions across the array of DEC's targeted vertical markets such as health care, banking and manufacturing.

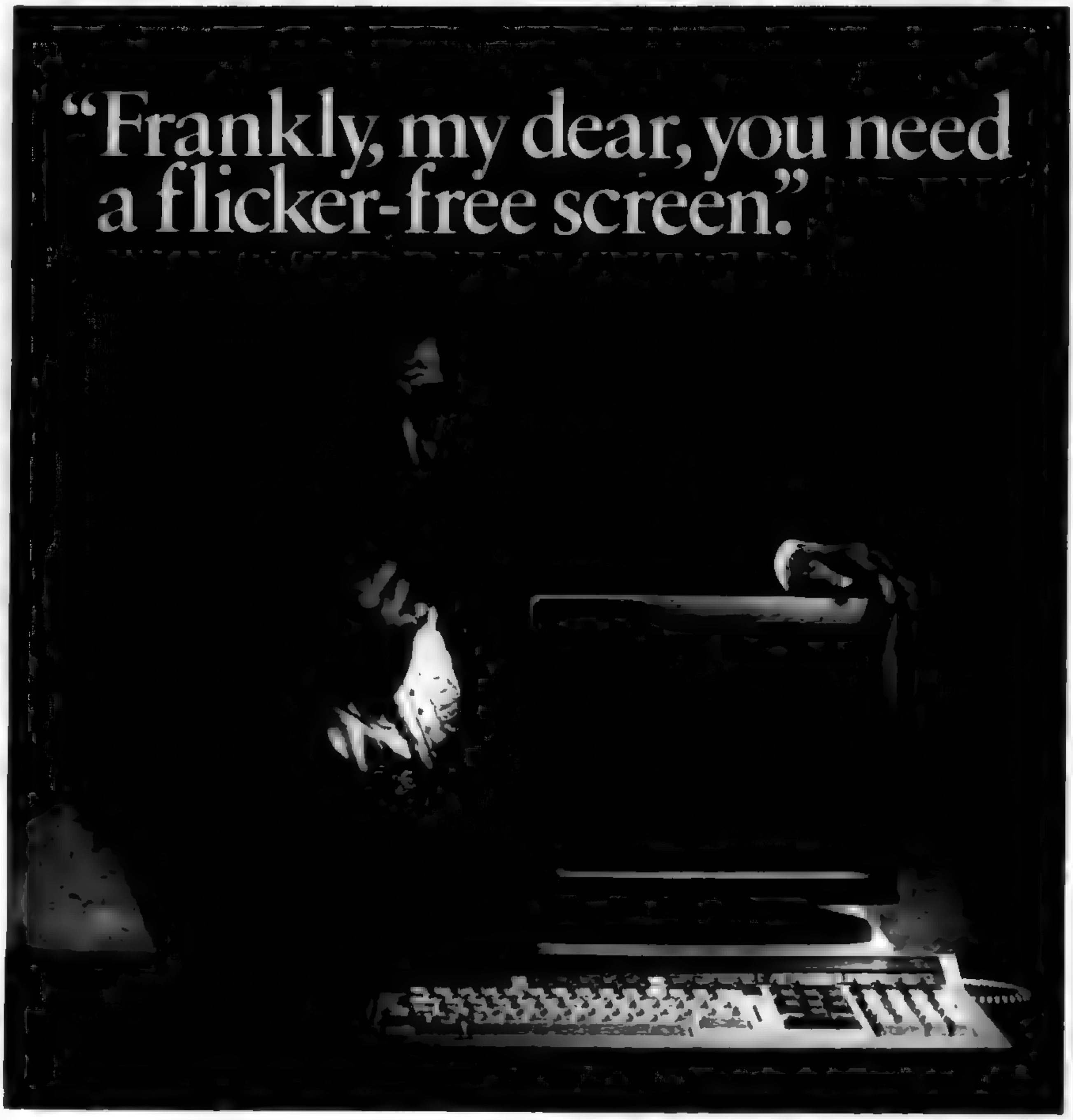
The CMP relationship

The Cooperative Marketing Program (CMP) is another joint marketing scheme. Unlike the OEM or SCMP, the CMPs do not package hardware with their solution. They are strictly software providers. Joint selling of the application is also a fundamental part of this form of agreement. There are about 100 CMPs providing applications across DEC's targeted vertical markets.

The key benefits of the CMP relationship with DEC include:

- The prequalification. If a vendor is a certified CMP, it will be called in by DEC sales reps at the front end of the selling cycle, especially in the Fortune 1,000

Continued on page 29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FLYING HIGH

CONTINUED FROM PAGE 26

accounts where DEC is active.

- Preannouncement on a nondisclosure basis of upcoming DEC hardware changes and future directions of the product line.
- Application software tested on DEC machines before the official customer ship dates to insure that the application will run.
- The ability to use DEC's Application Centers for Technology (ACT) as a demonstration site for many of the applications.

How does a company become an SCMP or a CMP? The consensus of the application vendors seems to be, "It ain't easy."

Establishing an SCMP or a CMP agreement can take nine to 18 months, depending on whether DEC is the initiator, and thus presents a clear path to the necessary approvals, or the application vendor is the initiator, and the contact points and the path to approval may not be so clear.

DEC, which selectively looks for the most marketable and applicable products for a particular industry, takes the prospective SCMP or CMP through a series of evaluation steps that assess the applicant's business, the marketing success of the application product and the technical merits of the product.

> *HOW does a company become an SCMP or a CMP? The consensus of the application vendors seems to be, "It ain't easy."*

The business review includes an evaluation of the financial strength of the application vendor as well as their business plans. The marketing audit looks at how well the product has sold and what the customers think of the product.

Cast fate with DEC

Cincom Systems, Inc., a Cincinnati-based software company, decided two years ago to cast its fate with DEC by signing a CMP agreement. With $101 million in revenue, Cincom is one the largest privately held software companies in the U.S.

According to Peter Burris, an analyst at International Data Corp. in Framingham, Mass., "Cincom was one of the few independent mainframe data base management system vendors that wisely foresaw the emergence of the mid-range system as an application-delivery vehicle."

Cincom signed an agreement with DEC that brings Cincom's application-development environment software Mantis and Ultra as well Control Manufacturing and Control Financial — a manufacturing resource planning (MRP) system — under DEC's CMP umbrella. Bill Dorece, Cincom's vice-president of strategic alliances, says "the relationship has been extremely successful."

One example of this success was the joint effort between Cincom and DEC that resulted in the replacement of an IBM 4300-class system at a large company in the Dallas area. The DEC-Cincom solution consisted of a VAX 8700 and some Microvax IIs networked together to provide the customer with the horsepower to use Cincom's MRP system, Control Manufacturing. The sale for DEC meant $2 million, $500,000 of which went to Cincom.

Access to DEC's ACTs provided the CMP with a very powerful showcase for his application software. According to French, "the best sales occur when the customer works with the ACT." DEC has opened 17 of these special "mini-Decworlds" in strategic areas across the country (see story page 57).

The key to the success of the CMP effort is that DEC's corporate management understands the criticality of applications software to the firm's success. As other computer systems vendors go out to the independent software vendors to form alliances with third-party application suppliers, they will have to compete with the de facto standards that DEC has set in dealing with its application suppliers.

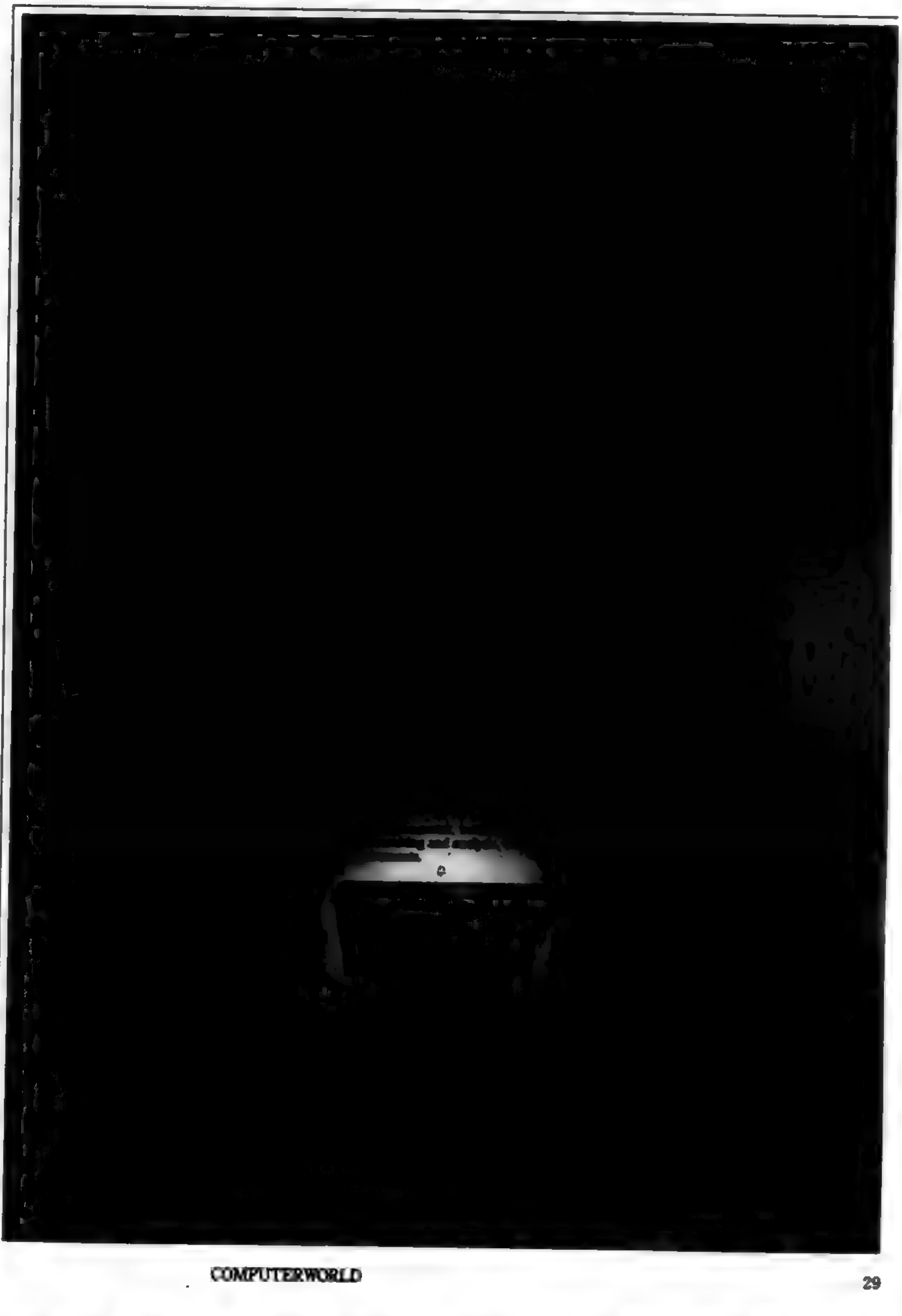
A commanding lead

DEC's all-out effort to win the hearts and minds of the independent software vendors seems to be paying off. At this juncture, the firm has a commanding lead over other hardware vendors that are beating the bushes to find applications software.

So far, DEC's evaluation process for becoming an SCMP or a CMP appears to favor the entrenched, well-established software firms. Certainly, exceptions will be made, but the perception in the independent software community is what DEC must be concerned about.

In the future, DEC must also position itself as the champion of the smaller, less established firms or give up the innovation that these folks usually bring to the party.

This move will be especially important for DEC as IBM launches its applications juggernaut. Given the recognized strategic criticality of applications software, DEC will have to run very hard and very fast to stay ahead of the competitive pack. In addition, some fine-tuning of the SCMP and CMP programs will have to be done. This could perhaps take the form of training or other incentives to have the sales force uniformly embracing the SCMP and CMP programs.



DEC
OF ALL
TRADES

In order to double its size, DEC is trying to be all things to all vertical markets

The 2-year-old strategy to sell its products along vertical-market lines was supposed to double DEC's market share, according to Robert Hughes, vice-president of industry services marketing. Having saturated the scientific and engineering communities, DEC turned to the vertical approach as a way to familiarize other industries with its architecture and its way of thinking — and to win new converts.

DEC is finding that the vertical-market strategy helps the firm sell at higher levels within an organization, instead of just peddling the technical solution to MIS. As Ken Olsen says, "MIS is not the group that knows the most about how a company runs. . . . The MIS director does not know anything about manufacturing or laboratories or engineering or the office."

DEC divided all businesses into 60 industries and broke them into three sectors — government, services and basic industries. Sectors are subdivided into groups such as media, financial services or utilities, with staff members associated with a specific group. The more prominent industries are reflected in many of DEC's most visible marketing efforts: the Application Centers for Technology, the Decworld conference and exhibits at vertical-market trade shows, to name a few.

The industry structure is not the only way marketing is organized. DEC also sells according to applications, geography, product lines and distribution channels. But the approach is one that DEC hopes will raise prospects' awareness of its strengths in networking, departmental computing and distributed processing.

DEC's market penetration and software portfolio are clearly much stronger in some markets than others. Engineering, manufacturing, finance and health care all boast healthy support. Utilities, transportation, food processing, agriculture and construction are all much more sparsely represented.

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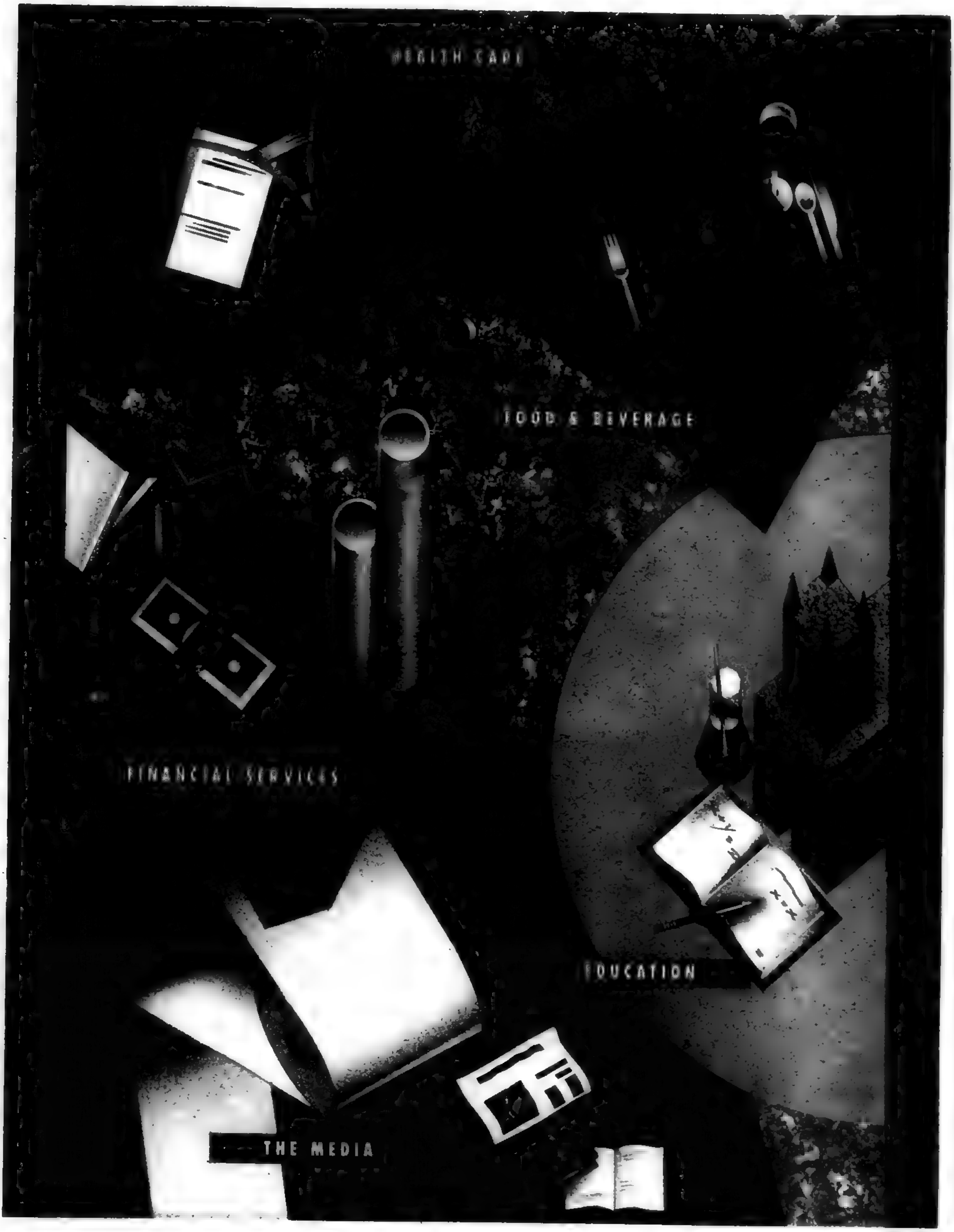

STEVE LYONS

Here's the most reliable DEC-compatible terminal ever built. The TeleVideo 9220.

"What do [illegible] thousands of [illegible] terminals? [illegible]

Susan Kennedy is a product manager at Leasametric, a company that rents, sells, and services DP equipment all over the country. Including thousands of terminals. And if reliability is important to the average user, it's critical to Leasametric. Because everything they offer not only has to stand up to the rigors of shipping, but the extra wear and tear that rental equipment always takes. And if a Leasametric machine breaks down, so does the cash flow it generates.

So before Leasametric approves one unit, they tear it apart piece by piece. And give it an evaluation that makes an MIT exam seem easy by comparison. We talked to Susan recently, and these are just a few of the things she said:

"Too many terminals just don't measure up... I've seen machines with questionable ergonomics... keyboards that flex in the middle when you type... even cheap little diodes that could drop off... all these factors combine to make a product you either want or don't want in your product line...

"But with TeleVideo, the whole product is well designed. They start with solid engineering, and follow through with every detail, down to the steel bracket in the keyboard. Overall they've built the same quality into the 9220 that's made all their other terminals last so long. Obviously, we want to make sure that, two years from now, our equipment will still be working for us. That's why we feel so good about TeleVideo."

9220 [illegible]			
[illegible]	✓	[illegible]	✓
[illegible]	✓	[illegible]	✓
[illegible]	✓	[illegible]	✓
[illegible]	✓	[illegible]	✓

Of course, Susan is talking about quality and reliability. When you check the features you get for the money, we look just as good.

As you can see from the chart the 9220 gives you full VT 220 compatibility. A 14" amber screen. And the best thought-out ergonomics around. All for only $[illegible].

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Circle Reader Service Number 25

HALE AND HEARTY IN MEDICAL FIELD

HEALTH CARE

BY ROBERT MOSKOWITZ

DEC has been involved in the health care market for most of the company's life — 25-plus years. Early efforts concentrated on selling processors to medical equipment manufacturers, which embedded them as controllers in their specialized medical equipment. This penetration helped DEC build a very large installed base within the clinical imaging areas, such as radiology, computerized tomography scanners and magnetic resonance imaging.

"DEC is the No. 2 company in health, a very important market and a growth area for them," says Sheldon Dorenfest, president of Sheldon I. Dorenfest & Associates Ltd., a Northbrook, Ill., health care management consulting firm. "Their processors support some of the leading software vendors, such as Shared Medical Systems, Inc., Cerner Corp. and McDonnell Douglas Physician Systems Co."

Dorenfest's surveys of 3,100 U.S. hospitals reveal that DEC computers make up about 14% of the current installed base in hospitals with more than 100 beds and that DEC is strongly represented in these institutions' acquisition plans.

Dorenfest further estimates that DEC's annual hardware sales are about $175 million in the nonfederal market of 5,800 short-term acute care hospitals alone, which together spend about $1.7 billion annually on hardware. Thus, DEC sales work out to more than 10% of the market's hardware purchases and about 5% of the overall health care market.

According to Ava Schutzman, manager of strategic planning for DEC's Healthcare Group, the company is the largest supplier of processors in the clinical area and second largest in the overall health care market; IBM is the largest.

Schutzman says DEC is actively expanding on its base of OEMs and working with them to develop filmless X-rays and other advanced medical technologies. DEC is also pushing into the health care information systems area, which she says is now receiving at least equal concentration in the company's marketing efforts.

As a result, DEC processors are becoming a significant force in the health maintenance organization and hospital management market. Some very large organizations, such as Maxicare Health Plans, Inc. in Hawthorne, Calif., have chosen to develop their administrative and information systems on DEC processors.

Market broadening

Major reasons for DEC's growth in this market include the premium now placed on networking and flexibility in this rapidly changing business environment. Many health care providers are no longer just hospitals: They maintain sites in many cities and offer a variety of services, with specific departments like laboratory, pharmacy and radiology that need local processing as well as wide-area links to headquarters and other institutions.

……

MAJOR reasons for DEC's growth in the health care market include the premium now placed on networking and flexibility in this rapidly changing business environment.

……

The industry is also labor-intensive, with three shifts a day monitoring patients' changing conditions. Good coordination requires good communication between these workers and their management.

In addition, hospitals and other institutions with processors from many different vendors are experiencing communications problems that DEC claims it can simplify with its multivendor communications capabilities.

DEC's strategy is not only to provide products that can link the entire enterprise but also to automate individual departments. Some of the software for these departmental solutions comes from DEC, such as All-In-1, electronic mail and Decrad, DEC's radiology system. Others come from OEMs, such as the laboratory management systems from Sunquest Information Systems, Inc. in Tucson, Ariz., and Cerner, located in Kansas City, Mo.

Computer analysis of EKGs

One company with a creative joint solution is Telemed, a Chicago-based service bureau division of LDG Capital Corp. that reads and reports on electrocardiograms, or EKGs, to the hospitals where they originated. While most EKGs are read by doctors, the Telemed system provides computer analysis of 40,000 EKGs a month and supplies a printed analysis of each one within 10 minutes.

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The innovative technology includes a transmitting cart made by Telemed, to which the patient is hooked up at a hospital or clinic. The cart provides a traditional three-channel, 12-lead EKG tape. But the data is also transmitted over telephone lines to the firm's DEC computers.

According to Jerry Toussaint, Telemed's operations manager, the company's seven DEC PDP-11/34s and two KL-10s — CPU units from the Decsystem/10 — are connected over a Decnet system. The PDP-11s receive the data over dial-up telephone lines, converting the analog signals to digital as they arrive. The digitized data goes to a concentrator that moves the information along to one of the KL-10s for processing.

When the report on an EKG is ready, another PDP-11/34 sends it back over telephone lines to the originating hospital. Throughout the process, EKG data and its location information must always stay together. One PDP-11/34 is used primarily for development work and backup for the others.

Another common application for DEC processors can be found at the Community Hospital of Indianapolis, a 798-bed, nonprofit health care complex. According to Martha Roth, assistant director of laboratory services, the hospital's two clustered 11/785s are central to the laboratory's wide spectrum of cultures, blood counts, urinalyses, blood gas counts, chemical measurements, pathology and other testing and reporting operations.

The DEC systems run Clinical Laboratory Software from Cerner. The package manages every test from the time it is ordered until results are printed out. Many of the laboratory's instruments are completely automated and interface directly with the computers, so results are reported with no human intervention.

The automated laboratory management process begins when a nurse orders a patient test from a Tandem Computers, Inc. machine at a nursing station. The order goes, along with patient information from the Tandem's data base, to the DEC computers at the lab, which then schedule the necessary tests and later accept keyboard or automated input on their results.

Test results and laboratory charges are communicated back to the Tandem computer at the nurses' station, where the results are printed out and the charges are sent on to the hospital's Hewlett-Packard Co. billing system.

According to Roth, DEC processors were picked because they are capable of far more volume than the only other hardware running the desired laboratory management software: Texas Instruments, Inc.'s. "Cerner selected DEC for its applications back in 1984," she says, "when we expressed interest in their software but wanted more powerful computers. We were actually the first site where the Cerner software was installed on DEC systems."

World's largest

At Baptist Memorial Hospital in Memphis, dozens of VAXs and other DEC processors support the world's largest private hospital, which boasts 2,068 beds. Owned by the Southern Baptist Conventions of Arkansas, Tennessee and Mississippi, the enterprise includes 10 corporate hospitals within 150 miles of the hub, numerous affiliated hospitals and dozens of other ventures, including a home health care service, a foundation, minor medical centers, a surgical supply company, a private duty nursing service, pathology labs and a helicopter service.

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> *"THE DEC system has allowed us to add computers incrementally. You just can't go out and buy or write all the packages in a system like ours. It has to be built a step at a time over 10 years."*
>
> JOHN BEDINGFIELD
> DIRECTOR OF INFORMATION SYSTEMS, BAPTIST MEMORIAL HOSPITAL

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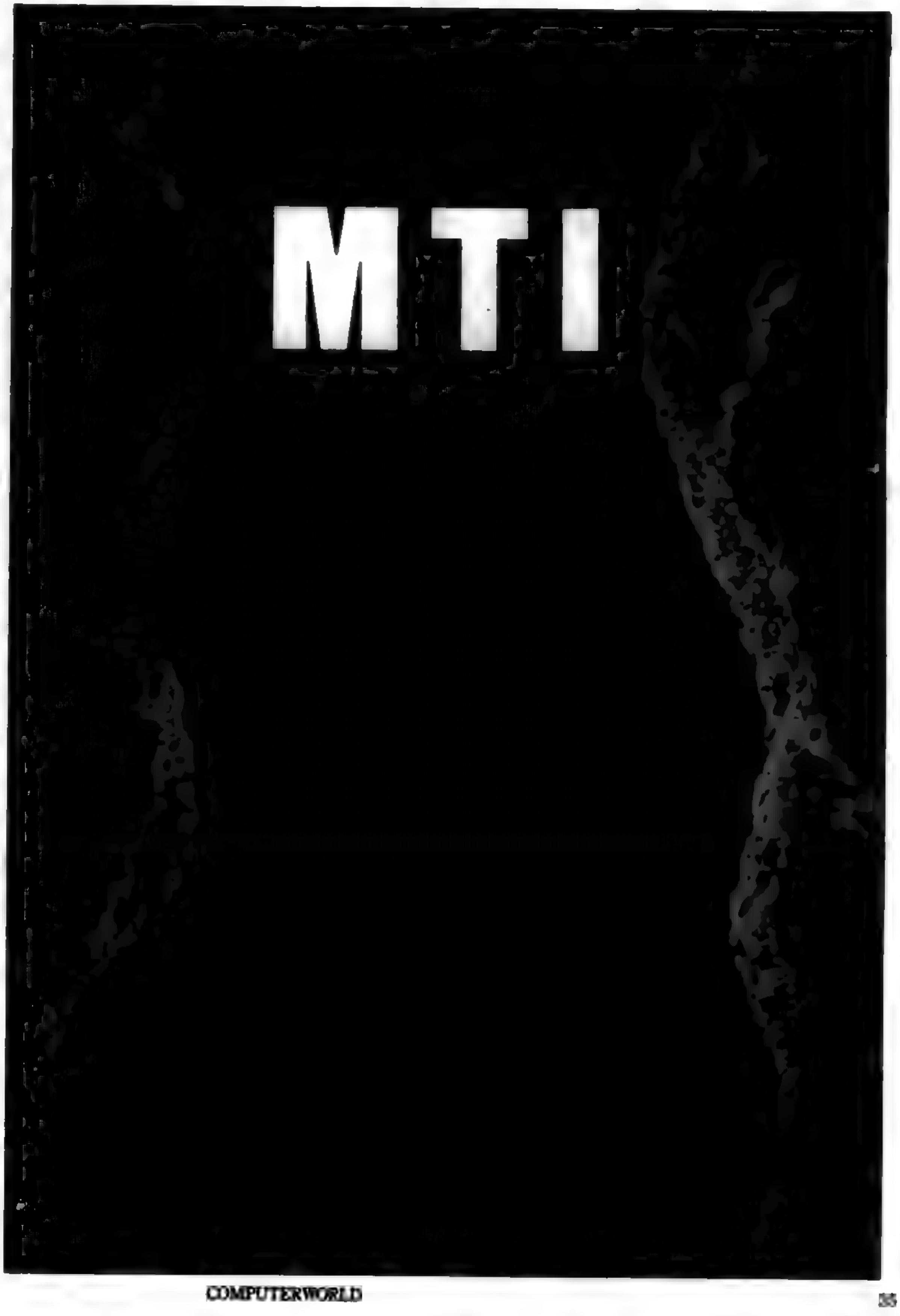
"The computers at the main hospital are a systemwide resource," says John Bedingfield, director of information systems. "Every one of the organizations uses them to some extent, and most get all their data processing from them."

Baptist Memorial's 28 PDP-11/70s, six PDP-11/44s, one VAX 8600, one 8650 and three 8700s run a variety of applications written in-house for the different hospital departments, including patient registration, payroll, pharmacy, radiology, laboratory and others.

Baptist, an IBM shop about 12 years ago, was one of the first hospitals to computerize. The hospital decided on a minicomputer strategy and chose the PDP-11/70s. Although the organization experimented with vendor-written applications, system administrators were not satisfied and began to develop applications in-house.

"The DEC system has allowed us to add computers incrementally," Bedingfield says. "You just can't go out and buy or write all the packages in a system like ours. It has to be built a step at a time over 10 years, the way we have done it."

Moskowitz is a business consultant based in Woodland Hills, Calif.



HELPING MAKE THE WORLD GO 'ROUND

FINANCIAL SERVICES

BY ALAN RADDING

Typically, financial institutions run some of the most high-powered and sophisticated mainframe-based DP applications in the country. So moving ahead means automating other areas of the organization — field offices, customer-service departments, account representatives and so on.

Computer industry analyst Stephen Smith of Paine Webber in New York says, "The new direction in the financial services industry is automating traders and line people" — to the benefit of companies like DEC.

In fact, DEC is staking out a major position in this market by emphasizing what it calls mission-critical systems, which it defines as systems that actually do the work rather than simply account for it after the fact.

Mountain comes to Muhammed

DEC is not "doing anything unique," Smith says, but he adds that the changes occurring in the financial-services industry are "playing into DEC's strengths" — mid-range systems, the single VAX architecture, effective networking capability and links with computers from other manufacturers, particularly computers from IBM.

"It's not practical to think we will displace the [IBM] mainframe" at customers' sites, says Claude "Sandy" Thomas, director of DEC's Financial Industry Marketing Group and a former financial services industry executive.

Instead, DEC's strategy is to leverage the customer's existing equipment by providing systems that fill in the gaps in automation and expand the functions of all the systems.

Peer-to-peer networking is the heart of DEC's approach to the financial services industry. This approach best capitalizes on DEC's networking and connectivity offerings. For example, Baltimore-based Commercial Credit Co. recently decided to replace its wide-ranging collection of stand-alone office machines with an integrated DEC system.

"The connectivity sold us," says Ed Hickle, Commercial Credit's director of operations. "We have hubs in several cities and a mainframe. DEC says they can tie it all together, and we're confident they can produce."

All-channel strategy

To penetrate the financial industry and inspire confidence, DEC established Thomas's Financial Industry Marketing Group. The company brought in people like Thomas, "who have sat in the same chair" that the prospects sit in and so understand potential customers' business. To further bolster its efforts, DEC increased its direct sales force to this vertical market by 30%.

With experienced marketers in place, DEC is pursuing not only the top players in the industry but also the rank and file industry. It is doing this through an all-channel strategy that includes selling direct to large accounts and turning to value-added resellers to handle the smaller accounts.

DEC's strategy is to leverage the customer's existing equipment by providing systems that fill in the gaps in automation and expand the functions of all the systems.

DEC is not relying on third parties, however, to carry the DEC message on their own. Instead, Thomas has initiated joint selling with third-party vendors. "Instead of just DEC or the third party going in to sell the prospect, we go in jointly," he says.

The company's biggest success to date has been at Citicorp, which is automating its line management and service operations with a DEC system.

At many other financial industries, DEC has merely gotten its foot in the door, usually through office automation. One such customer is the Chicago Mercantile Exchange, the second largest futures-trading exchange in the world. It uses computer systems in three major areas.

Its trading floor setup uses an IBM system, although the organization is converting to a Tandem Computers, Inc. system this fall. For clearing trades, the organization relies on an IBM system.

Finally, there is the organization's office automation area, where the Exchange decided to test the DEC concept, explains Patrick Hynes, director of clearing division planning.

The pilot project was designed to replace the profusion of stand-alone

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Circle Reader Service Number 28

machines — IBM Displaywriters, Harris/Lanier machines and IBM Personal Computers — in the offices of the Exchange's departments. An electronic mail system would replace the "sneaker-net" messenger system already being used.

In the end, proposals came down to DEC or Wang Laboratories, Inc., and DEC won on the basis of connectivity issues and the Exchange's confidence in the company. Hardware for the pilot program consists of two DEC Microvax IIs in a local-area Vaxcluster and 23 workstations attached to an Ethernet local-area network.

"If we need lots of horsepower, we can add a high-end VAX," Hynes says.

The pilot program concluded successfully this summer, and Hynes says he is confident that everything works as promised, despite sitting precariously on "the bleeding edge of technology" with the peer-to-peer networking.

Second wave of PCs

DEC's communications capabilities are getting another test at Provident Mutual Life Insurance Co. of Philadelphia. A pilot office automation project is under way involving Provident Mutual's human resources and financial-control departments. "We wanted [to run the pilot in] departments with high communications needs," says JoAnn Miller, assistant director of information services planning.

Provident Mutual runs a large IBM mainframe and approximately 120 standalone personal computers in the home office. About 70% of the PCs are already equipped with emulator boards to allow them to interface with the mainframe. "We had come off the first wave of PCs. We had all the heavy-duty desktop power we needed," Miller says.

The company was experiencing a second wave of PCs that were being used for casual work, such as light word processing and light data base or spreadsheet work, when it came to the conclusion that by using a minicomputer-based system, it could provide workstations to handle the light PC use and provide access to the mainframe at a lower cost than installing increasing numbers of full-blown PCs, Miller reports. The heavy PC users would have a choice to continue on their own or join the system.

Miller looked to IBM, Data General Corp. and DEC for proposals. IBM was eliminated because Provident Mutual did not consider the System/36 a long-term option and did not want a VM-based system like IBM's Professional Office System.

Miller says she believed the DG CEO system was as good as DEC's All-In-1, but she was more comfortable with DEC's experience in networking and was concerned about DG's long-term prospects.

Provident Mutual decided on the VAX 8200, approximately 40 DEC VT220 and VT240 terminals, an IBM Systems Network Architecture gateway and three laser printers. IBM, however, is not accepting defeat. "They are constantly working on us, dangling the 9370 in front of us and questioning our wisdom of going with DEC," Miller says.

Target systems

But can these office automation systems — albeit integrated — be described as mission-critical?

"The more complex services and the broader array of products there are, the more information [is needed by] the person representing them to a customer," DEC's Thomas says.

The key, according to this line of thinking, is the delivery of information to the point of the company's contact with its customers. Anything that speeds or enhances that delivery contributes to the organization's mission.

……………

> ***"THEY are constantly working on us, dangling the 9370 in front of us and questioning our wisdom of going with DEC."***
>
> JOANN MILLER
> ASSISTANT DIRECTOR OF INFORMATION SERVICES PLANNING
> PROVIDENT MUTUAL LIFE INSURANCE CO.

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According to Thomas, sales of these kinds of mission-critical systems to the financial services industry will grow by 20% or more a year during the next few years, while sales of corporate computing systems to the same industry will grow by only 6%.

"And those figures are probably conservative," Smith says.

Stephen Barry, financial industry specialist at Price Waterhouse in Baltimore, agrees that the ratio of approximately 4-to-1 is right on target. "The rate of growth will be substantially higher than for host processors," he notes.

Among the developments DEC has targeted for the financial services industry are a variation of compact disk/read-only memory with the ability to write, read and modify; image-transfer technology; and expert systems applied throughout the industry, from customer sales to the capital markets for applications such as hedging strategies.

Radding is a Boston-based author specializing in business and technology.

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Circle Reader Service Number 29

EXCELLING IN THE ACADEMIC WORLD

EDUCATION

BY ROBERT MOSKOWITZ

The educational market is probably DEC's strongest. Universities and other research-oriented institutions use DEC processors and networking systems extensively for data gathering, statistical analysis, computer science department projects and student support systems, as well as for elements of a backbone network reaching from local campuses all the way to the nation's publicly funded supercomputer centers.

"Based on their track record — their ability to deliver facilities to meet university demands — DEC has a very good reputation in this market," says Shawn Hernandez, assistant vice-president for computer services at California State University in Hayward.

One reason for the widespread acceptance may be that DEC computers were among the first sold aggressively into this market, according to Sheila Osmundsen, editor of "Monosson on DEC," a Boston-based newsletter.

Osmundsen points out that more than a decade ago, the DEC VAX was already considered an advanced 32-bit system and that during the mid-1970s, the University of California at Berkeley's Unix 4.2 operating system was invented almost exclusively for the VAX by researchers at the school.

Unix 4.2 gave the VAX virtual memory and demand-paging — two memory-management techniques that were required for the large research processing jobs of the day — as well as the Transmission Control Protocol/Internet Protocol (TCP/IP) networking protocol suite, which is used for communications between dissimilar processors.

DEC leveraged its early popularity among users in this market by making investment grants that placed DEC hardware in dozens of prominent and well-respected universities and research institutions.

Through the years, researchers were often unwilling — unable to work with the batch-oriented IBM systems used by university administrators, so they were eager to obtain the more flexible and easier-to-network DEC systems for their projects.

Five-to-one edge

Bob Trocchi, DEC's group manager for educational and state and local government marketing in Marlboro, Mass., cites an annual directory of major computing facilities at every level of campus that is published by Charles Wallach at the University of Texas. Trocchi says the publication shows that 68% of the systems now installed are from DEC, which represents nearly a 5-1 edge over IBM, DEC's biggest rival in this market.

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"WE tried IBMs, but found people wouldn't use them."

ALEX RAMIREZ
USER SERVICES MANAGER
UNIVERSITY OF CALIFORNIA
AT RIVERSIDE

....

"Since 1978-1979," Trocchi says, "when Wallach's studies showed we were clearly behind IBM, we have moved clearly ahead, and the trend continues in our favor." About seven new Decnet nodes go on-line every day of the year at U.S. campuses, Trocchi claims.

This penetration has been significant for the company, according to Sandy Gant, director of the Small Systems Service at market research firm Infocorp in Cupertino, Calif. She says DEC's focus appears to be feeding technology into the universities in order to get sales in other markets later.

"The use of DEC computers in these settings has been instrumental in helping the company make sales to students after they graduate and find jobs in industry," Gant says.

One snag for universities can be DEC's fairly inflexible pricing. According to Hernandez, "There's a lot of potential to use the DEC systems in educational organizations. But the bid process in this state is very specific."

He says that in his state university system — as in many others — the contract goes to the lowest bidder that meets the requirements — no ifs, ands or buts.

In many cases, even if the systems department prefers DEC equipment, other vendors can underbid the company. "We did a procurement about 2½ years ago, but DEC was not the low bidder," Hernandez says.

Two dozen DEC hosts

At the Information Center of the University of California at Riverside, use of DEC machines began by the late 1970s, according to Werner Schmidt, manager of systems.

Today, there are more than two dozen DEC hosts, including a Vaxcluster 8700, a VAX-11/785, two VAX-11/780s, four

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"THE networking clusters are also very good for me, the network manager. They permit one copy of the operating system to be used by many computers, greatly simplifying updates and maintenance."

WERNER SCHMIDT
MANAGER OF SYSTEMS, UNIVERSITY OF CALIFORNIA AT RIVERSIDE

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VAX-11/750s, 15 or 20 Microvax IIs and three new Vaxstation 2000s, which will be used in a local cluster to administer the network. The DEC equipment is used for academic purposes, such as faculty and student research, as well as for class-related accounts.

The DEC systems communicate over Ethernet using Decnet and TCP/IP protocols. TCP/IP is necessary because four of the processors use the Unix operating system.

"We love the DEC hardware because of the connectivity, the networking solutions and the ability to run the same DEC VMS applications on every processor from the small ones to high end," Schmidt says. "Users can easily share data over the network, and even if one machine goes down, they can just walk to another and still access their data.

"The networking clusters are also very good for me, the network manager," he continues. "They permit one copy of the operating system to be used by many computers, greatly simplifying updates and maintenance."

Scientists taxing resources

According to Alex Ramirez, user services manager at the Riverside campus, the computers are most heavily used by social scientists for statistical analysis of research data and for graphics routines. The school also maintains historical data bases, including various political and personnel data bases.

Until recently, Riverside's biochemistry researchers made heavy demands on the network's resources for their molecular modeling routines. A single computer run could absorb 10 to 15 days of computer time to optimize the design of just one molecule. Today, most of the research of this nature is sent to a supercomputer center in San Diego over a 56K bit/sec. line.

A member of the consortium that supports the supercomputer center, Riverside could not afford to build a standard remote users access center, which requires a dedicated VAX and other hardware.

Instead, Ramirez says the campus decided to install the relatively low-cost cabling and software necessary to become a node on an existing Decnet network — a solution made possible by the VAX's support for Cray Research, Inc. supercomputers.

Operating a small campus with just 5,000 to 6,000 students, administrators at Riverside say they like DEC processors because the machines provide the faculty with a lot of computer power.

"We tried IBMs, but found people wouldn't use them," Ramirez says. "There is also a lot more software for the VAX, including SAS Institute, Inc.'s SAS 5.16," the latest version of this popular statistical package, not yet available for IBM.

Distributed system plans

A showcase installation is the new administrative computing system at the University of Houston, which already runs 28 mainframes, more than 2,400 personal computers and several DEC networks that are used for research and experimentation.

The new distributed information system, which is planned for completion in 1990, is intended to provide interactive computers to university administrators located at all four campuses of the 40,000-student institution.

One day, the information system will support more than 600 on-line users for both decentralized decision making and centralized coordination. The university says it plans to spend $13.5 million for the system hardware, software, training and development, while DEC is contributing grants for additional hardware.

"We decided that our new system should have advanced data base management capabilities, fourth-generation language, distributed processing and information and great hardware flexibility," says James W. Johnson, vice-president for computing at the university. "On balance, DEC was the clear choice for our needs, particularly with our comfort and familiarity with Digital."

Once installed, the VAX-based network will offer considerable remote-access capabilities, among them allowing professors to review student records from their offices and students to register for classes using any Touch-Tone telephone. In addition, it will allow authorised administrators to review virtually any university budget or office account information, which will be as current as the latest keyboard entry.

Moskowitz is a business consultant based in Woodland Hills, Calif.

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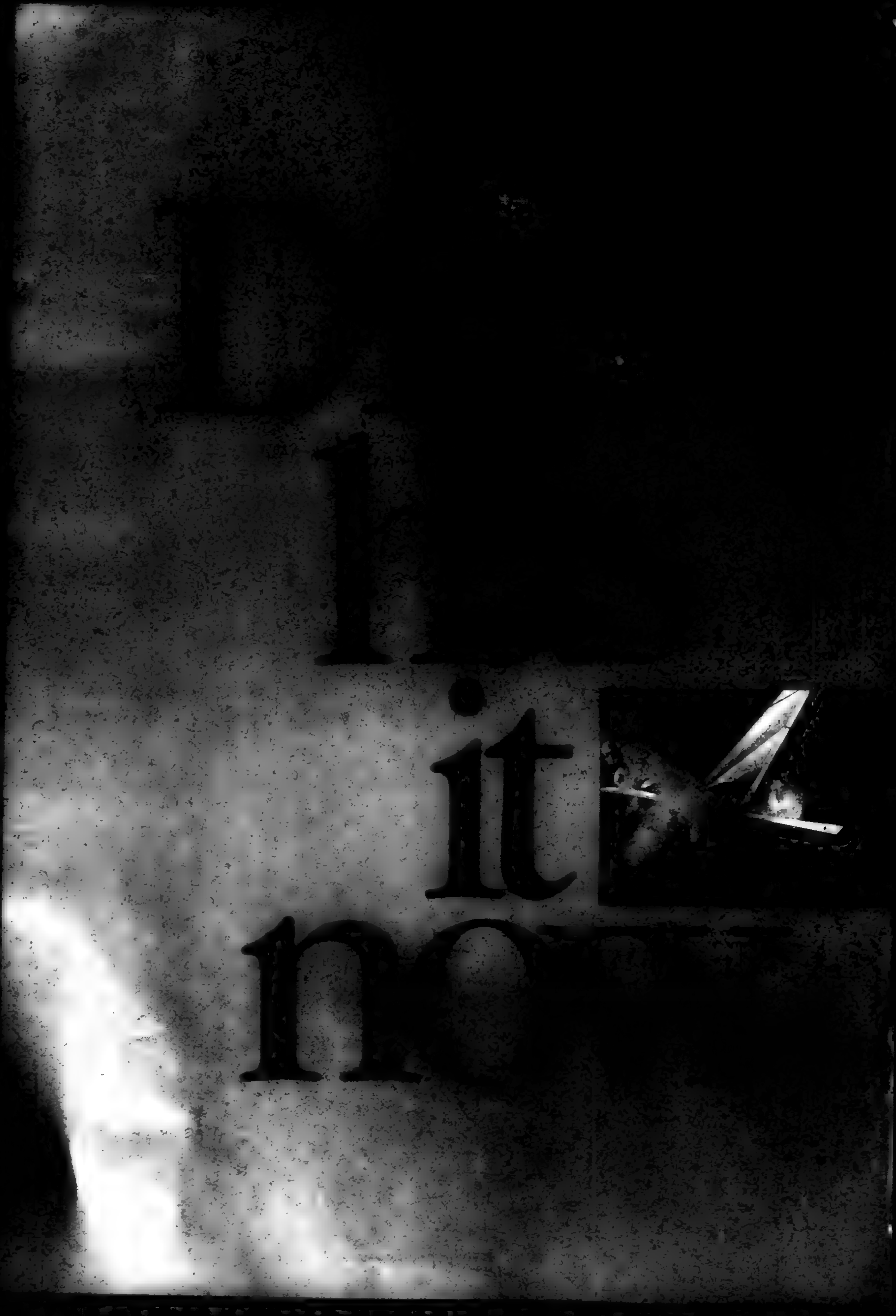
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CRACKERS AND CHABLIS LOOK GOOD

FOOD & BEVERAGE

BY MICHAEL BALL

The subtlety of DEC's announced assault on the food and beverage industry may be wasted on its target customers. Only the vendor seems to know that this market has been strategic for nearly two years.

On the other hand, by their accounts and DEC's, food and drink processing companies are doing just what the strategy calls for: They are increasing equipment purchases in established departments and expanding VAX systems into other departments and even into corporate data processing.

"The food industry is heating up as a technical field," says John Gmitro, director of engineering for research and development at Kraft, Inc. in Glenview, Ill. "We've competed via marketing for a long time, and now more and more, we're doing it in technology."

Hopes and dreams

Armed with some history, some hunches and an initial study, DEC saw this area as an important growth market, according to Larry Greene, DEC's marketing director for food and beverage process industries. Not only was the market huge, but "we like the industry," Greene says. "It is less cyclical than most, and it doesn't move offshore."

Although DEC equipment has been installed in many large food processing operations for a decade or even longer, its presence has often been limited to the laboratories. Greene admits that being loved in engineering or manufacturing does not often translate into corporate or departmental acceptance.

Greene is quite optimistic about the market for a variety of reasons. First, DEC can influence new customers by pointing to a solid history with food and beverage competitors. In addition, the industry is automating its DP at a fast rate, with many companies looking toward networking and distributed processing. "Our strengths match those of the industry," Greene says. "At the same time, many food companies are decentralizing, which fits well into our concept."

Beyond R&D

None of DEC's customers, not even those following the expansion plan, seem aware they have been targeted. "It's news to me," says Ken Jendryka, director of applications at Kellogg Co. in Battle Creek, Mich.

A little more than a year ago, his development group expanded from a limited number of DEC PDPs to a VAX environment. He uses VAX 8600s and 8650s. "We have VAXs in all five cereal plants and the corporate office," Jendryka says. The production side uses VAX 8700s.

Kellogg is relatively decentralized and recently implemented a nationwide network to link its VAXs. Plants not only exchange data but also can access massive corporate maintenance and accounting programs too large to reside on their systems.

....

MANY food and beverage companies pioneer their DP methods. As a result, many departments still have their own favorite vendors, even in this age of companywide computing.

....

Similarly, at Andres Wines Ltd. in Winona, Ontario, DP manager Hugh Barclay says his company has been a DEC user for about seven years and, without knowing it, has been following the new marketing strategy. Andres Wines recently upgraded by adding a VAX 8200 to its original Decsystem 2020.

Also typical of the target companies in this industry, the wine producer writes much of its own software and chose DEC over IBM and Tandem Computers, Inc. for the much-advertised reasons. "We stay with the network," Barclay says. He adds that key selling points were modular expansion and easy portability within DEC's VMS environment.

Another, smaller company that exemplifies what DEC would like to see its bigger customers do is Bridge Brand Food Services in Calgary, Alberta. There, programmer Frank Ye says, "We converted to VAXs from a PDP about a year ago, and everything is now on a VAX — all invoices, all accounting."

As with many of the large companies, Bridge Brand has been a longtime DEC customer — for about 10 years. It also grew from a single PDP-family computer and now uses a Vaxcluster.

Playing favorites

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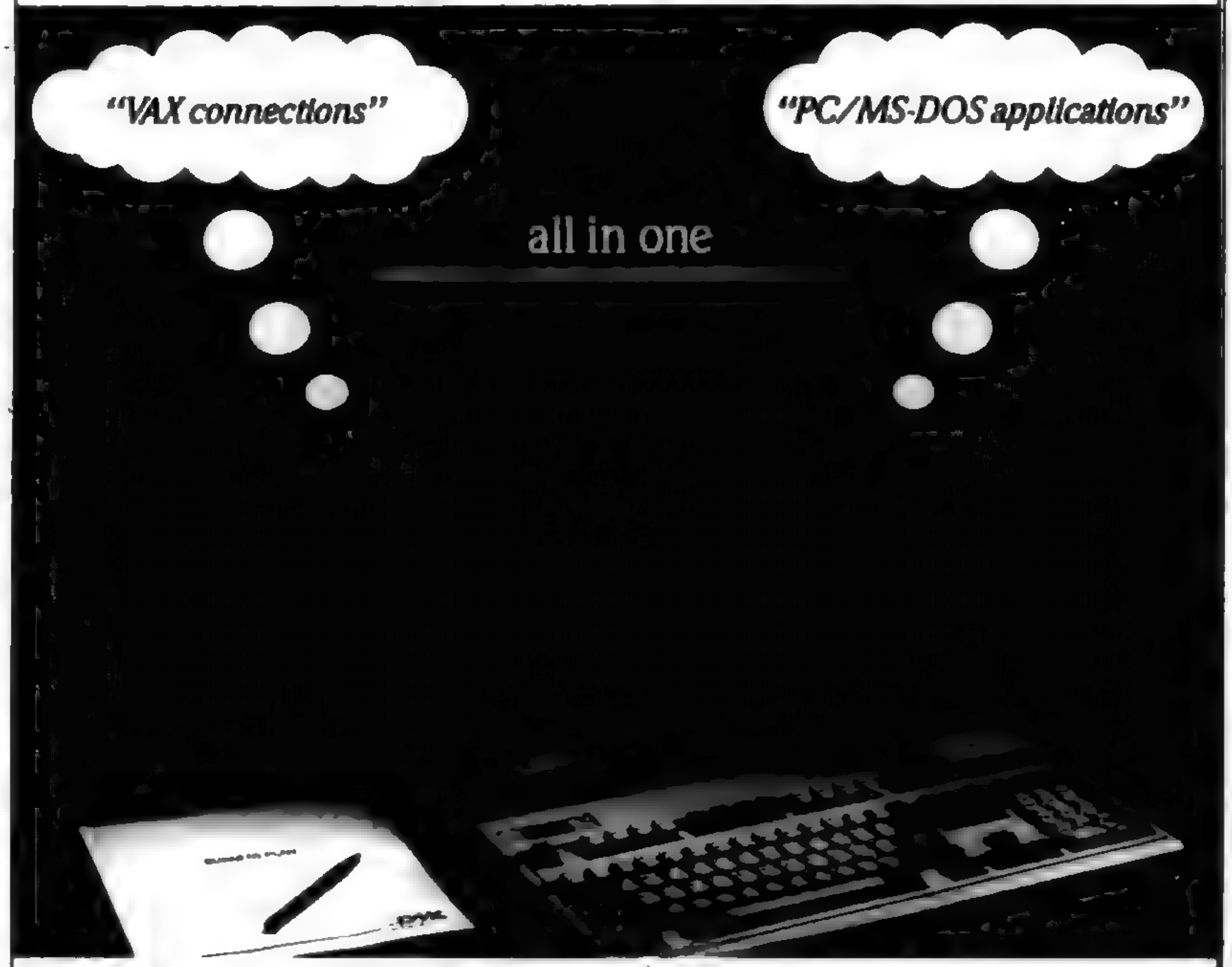

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Circle Reader Service Number 32

methods. While they may use the same production and computing hardware, the software is often their own blend of canned and custom. As a result, many departments still have their own favorite vendors, even in this age of companywide computing.

Kraft, for example, is a DEC target because of its mixed environment. Although the labs have been DEC shops for about 15 years, "We are widely known as an IBM corporate culture," Gmitro says. He quips that when a DEC vice-president hates a sales representative, he assigns him the Kraft account.

In Gmitro's domain, however, a cluster of three VAXs serves 250 people with DEC VT240-class terminals and a dozen personal computers "all over the facility" via Ethernet, he says. These are used for new product testing but not for production plants. About one-third of data acquisition is automatic from the testing instrumentation.

About three years ago, the labs began integrating their various functions and added a third VAX to the cluster for the task. Different types of users see menus peculiar to their business, allowing them instant access to the pertinent parts of the data base.

Likewise, "about 50% of our software is internally developed," Gmitro says, "and our users don't know when they are using it or others."

No. 1 fans

Whether Kraft as a company, or its individual departments, switches to VAXs remains to be seen. Meanwhile, Gmitro's labs are a devoted microcosm of the DEC user community. They have used DEC hardware "from the very beginning," he says, largely because it was considered the only equipment that would meet lab demands.

Specifically, the labs use many instruments from such vendors as Hewlett-Packard Co. and IBM. "These come with their own CPUs and embedded hardware and software," Gmitro says. "It is extremely difficult to interface with them in an IBM environment and easy to do so with DEC."

Kraft's R&D labs "have recently expanded activities in corporate applications considerably," Gmitro says. "We've gone from the technical function into a full-blown project management system." Using DEC's All-in-1 office automation software as a base, they kept the scientific programs and wrote a data base and project management set over it.

Getting in the door

Gmitro and the other customers all note that DEC initially faced strong competition during their purchase-decision processes. They also say DEC will be up against similar hard sells even in areas in which the vendor is well established in the labs.

For example, at Kellogg, "We always consider other vendors," Jendryka says. However, he adds, DEC's strengths in certain applications quickly become apparent during vendor selection. "For the plant environment in our industry, DEC was a natural."

Kraft had a similar experience, but Gmitro admits that his people were extremely demanding up front. "All purchases have to be approved by the corporate DP department, and DEC had to do a lot of selling," he says.

On one side, the company was using a Data General Corp. Comprehensive Electronic Office automation system. And on another, "There was strong internal pressure to throw out all DEC equipment and go with IBM," Gmitro says. "DEC had to show what they could do."

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"THE FOOD industry is heating up as a technical field. We've competed via marketing for a long time, and now, more and more, we're doing it in technology."

JOHN GMITRO
DIRECTOR OF ENGINEERING FOR R&D
KRAFT, INC.

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While Kraft now depends on 14 full-time employees for technical aid on DEC systems, it got a lot of help from DEC during the evaluation and selling period. Besides the predictable demonstrations to all concerned, DEC provided a leased line and terminal, allowing engineers to use a wide variety of applicable hardware.

As a result of the nature of the products and the response, Kraft's R&D labs have gone from a few PDP-8s and PDP-11s to a wide variety of VAXs and terminals.

"We came to them with what we wanted to do, and they responded very quickly," Gmitro says. "Since then, they've really given us support whenever we've asked for it."

After a brief reflection, he adds that being such a huge company — and an IBM company at that — probably has something to do with the excellent response.

Ball is a free-lance writer based in Boston.

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ON THE AIR: NEW MEDIA MARKETS

THE MEDIA

BY ROSE MULA

DEC established a foothold in the newspaper marketplace 20 years ago with the Typeset 8 paper-tape system, which drove a hot-metal linotype machine.

In the past five to 10 years, the company has been making significant inroads into the commercial printing market, offering editorial production systems to book and magazine publishers, many of which had already been longtime users of DEC business systems for their office applications.

Last year, DEC became a triple threat in the media marketplace by adding systems for radio and television broadcasting stations to its communications industry armada.

In keeping with its objective of supplying complete systems, DEC supplies the media marketplace with not only hardware but software also, some of which it develops internally and some of which it selects from third-party suppliers.

In the newspaper area, however, DEC is often a third-party hardware supplier itself, since many of its customers in this market come to the company through the back door — via Atex, Inc., a software vendor specializing in newspaper applications. Atex offers turnkey systems, many of which include DEC hardware, sometimes modified by Atex to suit a particular application.

DEC steps in at *The Globe*

For example, *The Boston Globe*, a daily newspaper that boasts one of the largest DEC Vaxclusters in Boston, uses DEC computers almost exclusively for all of its business applications. But until now, DEC itself has not played a role in the production of the newspaper. Instead, that function has been automated by a variety of Atex subsystems, running on hardware from several other suppliers.

This fall, DEC will become involved in automated production processes. The *Globe* has signed an agreement with Atex to serve as the test site for a VAX-based publication and production network. The VAX will serve as the central data base engine that will connect the various Atex systems, resulting in a network linking approximately 600 Atex terminals with more than 300 VAX terminals.

The *Globe* has said it anticipates completing its tests and entering a full VAX production mode by spring 1988.

Value-added problems

Current publishing customers who use DEC equipment for production applications report a variety of experiences when it comes to DEC's service record.

The *Bergen Record*, northern New Jersey's largest evening paper, has been using a variety of DEC hardware for eight years: PDP-11/70s and PDP-11/84s to run its Crossfield classified advertisement software and PDP-11/34s as the foundation for its Atex editorial applications. In addition, the newspaper installed a Vaxcluster four years ago to handle its business functions and then upgraded it significantly last year.

"Any problems we've had with these systems have been minor," says Mel Kestenbaum, the newspaper's MIS director. "And, as a rule, they have been caused by the value-added features rather than the original DEC equipment."

The only time Kestenbaum deals directly with DEC is when his VAXs need service.

"Their response time wasn't very satisfactory at first," he says. "I think the trouble was that when DEC started out, most of their customers were engineering companies doing development work. If a problem wasn't fixed today, tomorrow was OK."

Kestenbaum notes that recently DEC has branched out to customers in other industries in which deadlines are more crucial — such as payrolls or invoices that must get out that day.

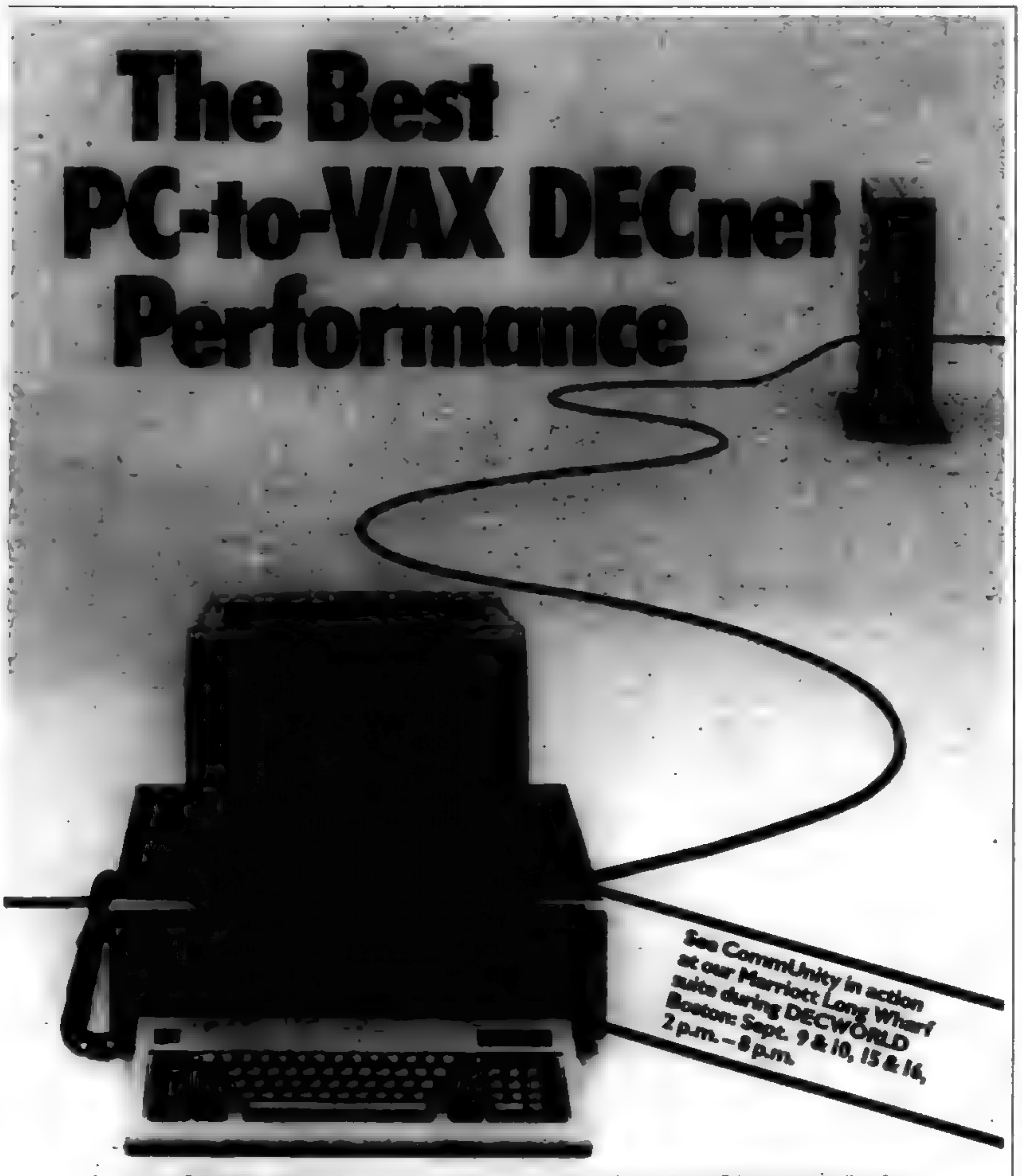
"DEC has been trying to emulate Big Blue, and they're beginning to realize that they can't enter the major leagues using minor league procedures. They have to learn to prioritize their service requests and respond accordingly," he says.

Top-notch service

By contrast, Walter Antonell, vice-president of operations for Bantam Doubleday Dell Publications Group, Inc., reports a healthy service record. A 12-year DEC customer, Bantam recently upgraded to VAX 8850s — three in Chicago, three in New York — linked by a T1 line. The system handles all financial functions, including accounts payable and general ledger, but its major duty is on-line order processing in volumes of 200,000-plus orders per month.

"The best feature is the service we get from DEC," Antonell says. "If I have a real problem, I can go directly to Ken Olsen and get immediate results."

Does everyone have direct access to the man at the top? "I'm not sure," Antonell says. "I know him quite well because we had a prior business relationship when I used to be a vice-president for Citibank NA." Antonell says other reasons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Olsen is so accessible to him are that DEC is very interested in the publishing industry and Bantam is a leader in that industry and a long-time DEC customer.

'Very appropriate'

Many media customers report that DEC's systems are particularly well-suited to their applications.

Thanos Triantathyllou, Standard & Poor Corp.'s vice-president of systems planning and technology, is pleased with his company's recent VAX installation, which replaced some PDP-11/70s that dated back to the mid-1970s.

"It's very appropriate for editorial-type applications such as ours, involving small to medium-size data files where users keyboard information and then redistribute it in real time," Triantathyllou says.

Standard & Poor's new system, composed of two VAX 8200s and an 8530, is used to produce the camera-ready copy for the firm's "Blue List," a daily market information publication. The software for this application was developed by an outside consulting firm, he reports. "The VAX also has the necessary upgrade potential," he adds.

United Press International, Inc. (UPI) is a brand-new DEC customer. According to Associate Editor Jeff Field, UPI recently signed a five-year, $4.75 million contract under which DEC will replace UPI's four current systems: A 600-user Sperry Univac 9080 news system with a central data base that transmits 27 million words of news daily worldwide; a system that provides daily stock listings to newspapers; a Hewlett-Packard Co. HP 3000 that handles UPI's data processing applications; and an Altos Computer Systems system used for customer orders and internal record keeping.

UPI issued a request for proposal about a year ago, to which several major vendors responded, What gave DEC the edge? "Thorough preparation," Field answers.

DEC showed "a real understanding of our requirements. A big plus is their software logics — the ability to combine the big, the small and the in-between and have it all work on the same operating system," Field adds. The hardware foundation of the system is a VAX/VMS cluster configuration.

DEC on TV

DEC is also well represented in the broadcasting segment of the media marketplace. One of its major users in that area is British Columbia Television (BCTV) in Vancouver.

In his search for the right broadcast news system, News Director Cameron Bell went to several trade shows and consulted with several vendors that "were very polite but weren't in a big hurry to explore the possibilities," he reports. Eventually, Bell's search led him to Jim Leedham, chief of software at DEC's Vancouver office.

"Finally, here was someone who understood our problem," Bell says. Leedham steered BCTV to Syscom, Inc. — software developers in Boulder, Colo., that had written a DEC-based program for UPI, which Leedham felt could be adapted to BCTV's needs.

"This was January 1986," Bell says. "I told them, 'Great! Can you deliver it by May 1 so we can use it at the World Expo?' "

They laughed, he says, but somehow they met his deadline. "It wasn't a completed system, but it was enough to get us started. And DEC helped us get it up and running at Expo," Bell says. "I have great respect for anyone who can move a functioning newsroom with a staff of 90 into a fishbowl. They were extremely helpful."

……………

> *"I THINK the trouble was that when DEC started out, most of their customers were engineering companies doing development work. If a problem wasn't fixed today, tomorrow was OK."*
>
> MEL KESTENBAUM
> MIS DIRECTOR, THE *BERGEN RECORD*

……………

One of the most critical dimensions of television programming, Bell says, is to plan how many seconds will be devoted to what items and the order in which they will be run.

"Just as magazine items are laid out according to space, our elements must conform to strict time limits," he says. "The program Syscom is developing for us will keep track of all these elements — give us an automatic line-up or rundown."

In addition, the system will serve as a data base for each story, providing the source of the information, who the reporter is and whether it will require any artwork.

Bell anticipates that over the next 10 years, BCTV will dream up some profound applications.

Will the television station's VAX system be able to handle those as well? "Hell, yes," he says. "We don't even have it breathing hard yet."

Mula is a free-lance writer based in Waltham, Mass.

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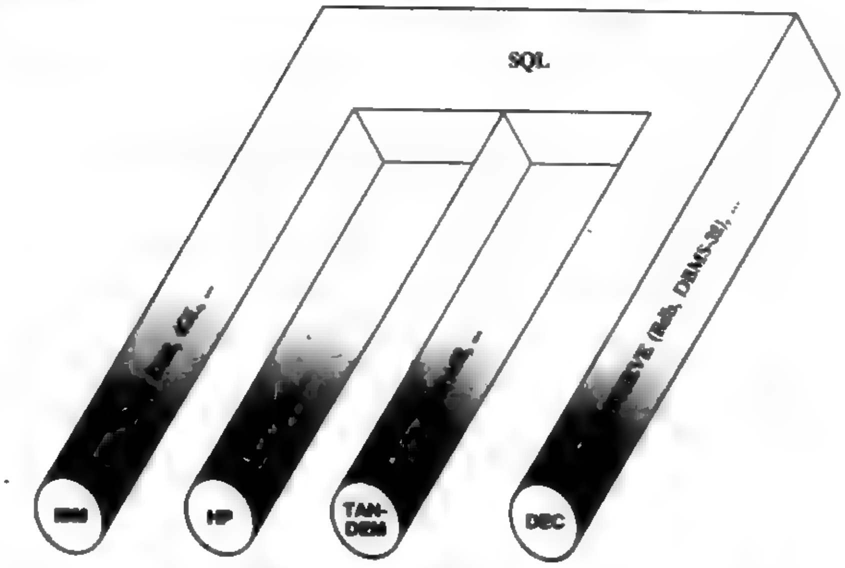

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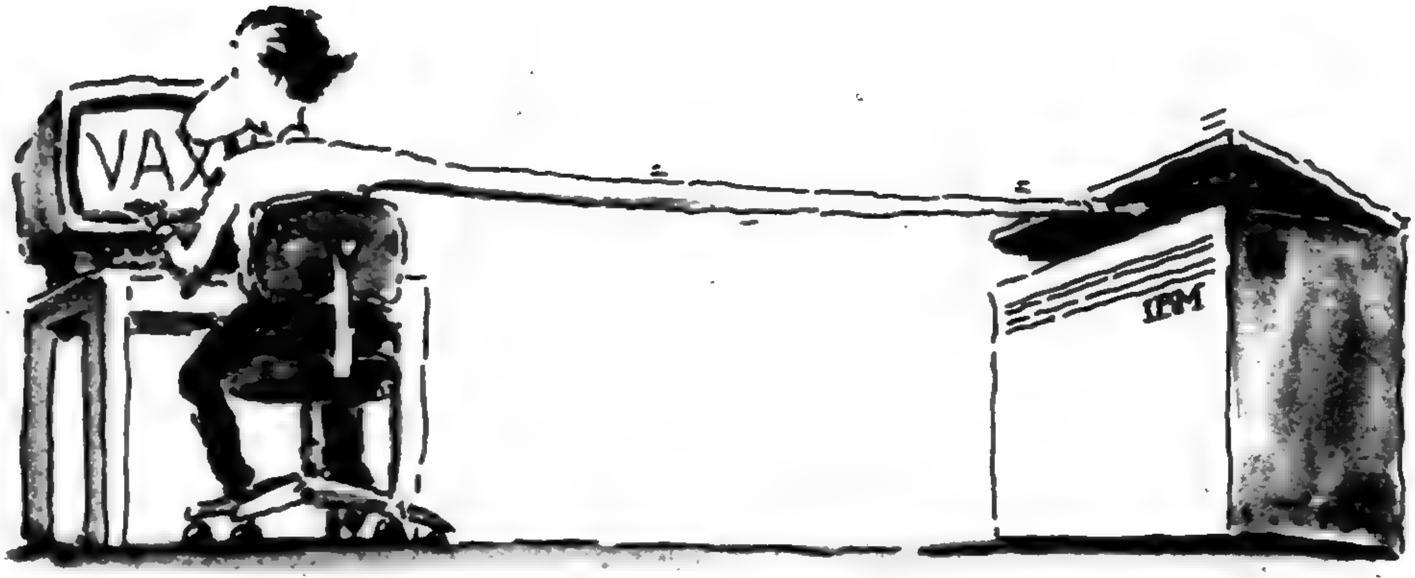

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WHAT COULD BRING DEC DOWN?

Trouble may come in on-line transaction processing, Unix and data management

BY MICHAEL MILLIKIN

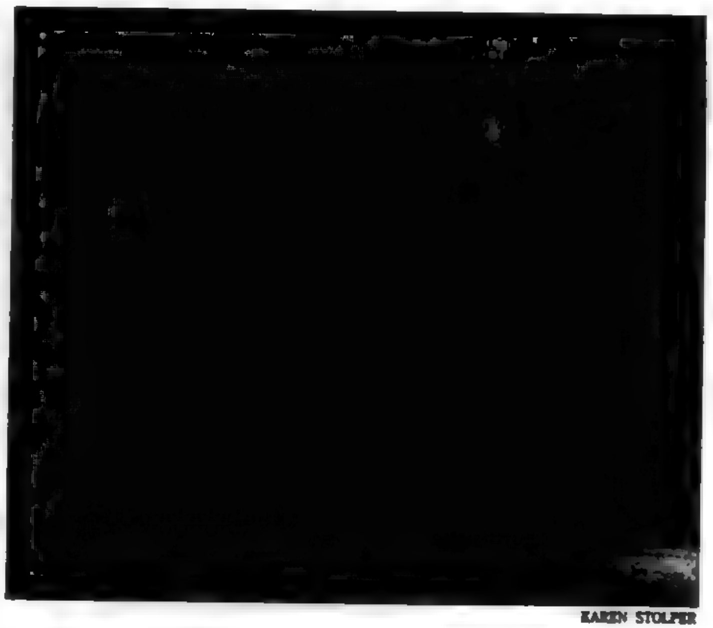
DEC believes that it now is in a position to go toe to toe with IBM and begin to win control of the corporate network and data bases. IBM's hegemony, established with mainframes, is by no means unassailable, especially in a market beginning to place much greater value on distributed, networked, peer-to-peer architectures.

But DEC has gaps and weaknesses in its product line as well as in its operating assumptions. Currently, DEC's strengths are in control. The company is winning a great deal.

Some areas, however, if left unaddressed, could trouble DEC in years to come.

Strategic assumptions. DEC currently operates under the following four strategic business assumptions:

- Only DEC and IBM are capable of full-line design, manufacture and supply of complete information processing systems.
- DEC has superiority in networking, distributed computing, ease of development and ease of use.
- A multivendor environment is now a fact of business life.
- DEC should be the No. 1 or No. 2 vendor, in most cases, on buyers' shortlists.



KAREN STOLPER

There shouldn't be much doubt about the validity of the last two assumptions. Some would dispute the first contention: that only DEC and IBM can offer a complete solution. Leaving aside the bickering that trying to define a "complete solution" can catalyze, one might question the wisdom of any company seeking to manufacture a complete product line by itself.

But it is the second contention, about

Continued on page 49

Millikin is senior editor for Patricia Seybold's Office Computing Group in Boston.

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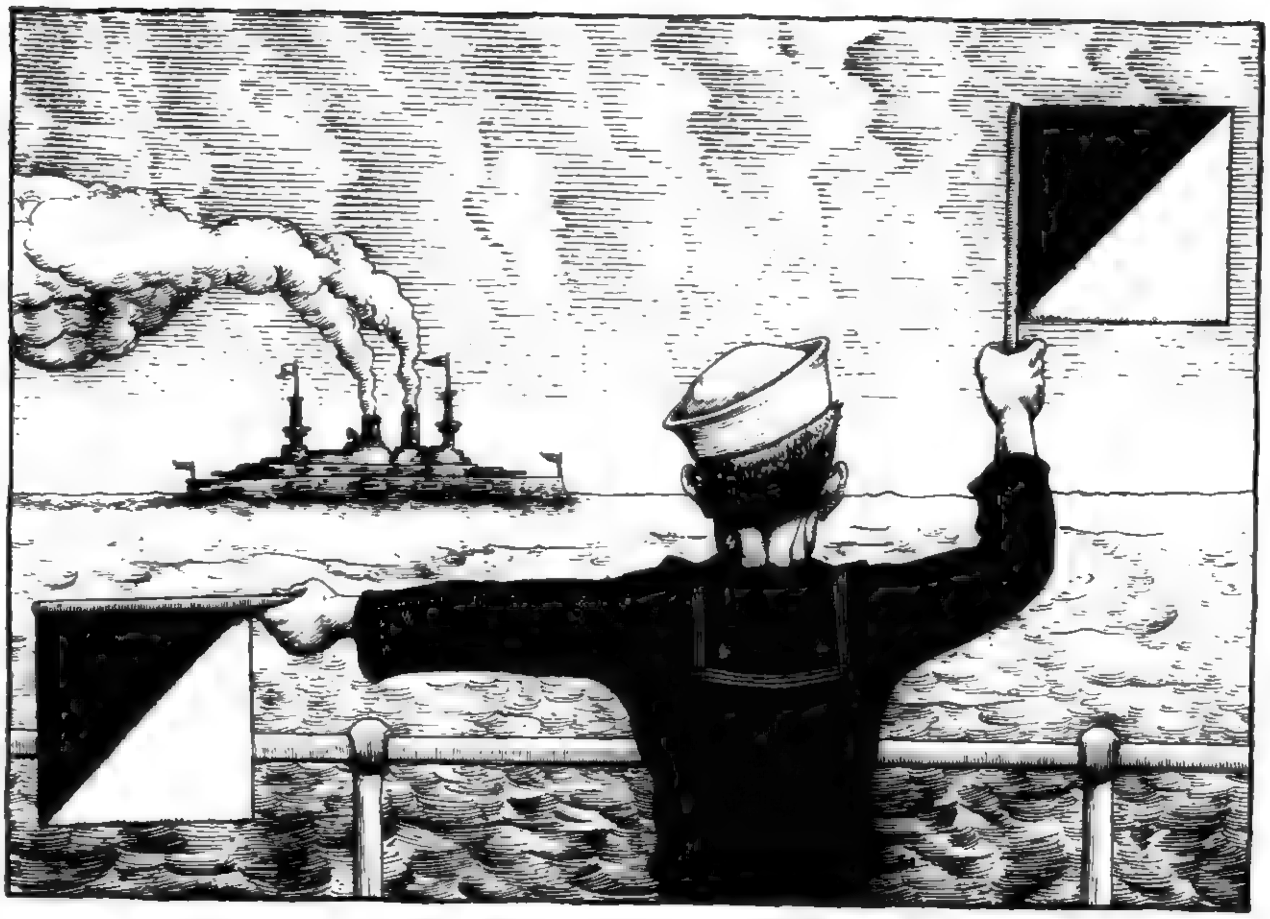

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Circle Reader Service Number 37

DEC DOWN?

FROM PAGE 47

the nature of DEC's superiority, that leads to questions of its possible weaknesses.

That DEC is very strong in networked systems is clear. That such superiority is sufficient to guarantee the company a leading spot in the industry is not. DEC can claim a solid architectural foundation on which it is building hard and fast. No matter how good the foundation, however, the superstructure has to hold together.

The corporate network. When it comes to networking, DEC has declared itself ready to eat not only IBM's lunch but its dinner as well. When possible, DEC plans to compete with IBM for ownership of the corporate network.

DEC's main advantage comes from having an established peer-to-peer network architecture, while IBM is still releasing products that will provide comparable capabilities. DEC's potential weakness comes from underestimating IBM.

Upcoming IBM products are extremely slick. The company is committed to providing a distributed, peer-to-peer Systems Network Architecture that is easy to install, maintain and use. Unless a buyer immediately needs Decnet, the taste given by IBM of things to come should defer massive defection from one vendor to the other.

Transaction processing. To "own" a corporation, DEC must be able to offer high-performance, highly reliable on-line transaction processing (OLTP). DEC executives contend that their firm's VMS is very tweakable — that by setting the dials correctly, a customer can run an excellent OLTP system.

Accordingly, DEC plans to stress its OLTP capabilities in products to come. Until now, DEC has been making its greatest headway where IBM has been weakest. But by pushing OLTP capabilities, DEC is moving out of its area of strength into an area in which IBM is very strong.

DEC must prove itself with OLTP, an application area in which it is not so evident that, as the company slogan says, "Digital has it now."

Data management. Of the major office-system vendors, DEC is perhaps the weakest in offering its own data management systems.

Wang Laboratories, Inc. offers a solid foundation for its integrated systems through its Professional Application Creation Environment (PACE). Hewlett-Packard Co. ships its Image with every HP 3000. IBM is incorporating its DB2 into Systems Application Architecture (SAA).

Yet according to some estimates, only about one quarter of the installed VAXs use DEC's relational data base, RDB, although this percentage definitely is climbing.

DEC recognizes that it must leap ahead with data management. Accordingly, it is devoting a great deal of research and development effort to building up RDB.

IBM, as vendors such as Cullinet Software, Inc. know, plays hard when it comes to data bases. DB2, which started out a bit threadbare in places, quickly became a very robust offering — one that plays a key role in SAA. Also, the fabled 3X, a follow-on to the System/34, 36 and 38 line that would combine the 64-bit CPU and data base prowess of the System/38 with the ease of use and installation of the System/36, apparently is further along than some think.

IBM will be very strong in a distributed data base environment. DEC may have the current edge with peer-to-peer networking, but IBM leads in data base experience.

End-user programming. DEC works hard to provide a good environment for corporate programmers and, clearly, is seeking to steal them away from IBM. But on the other hand, DEC spends little time producing tools to support end users creating their own applications.

Should DEC decide not to address this critical issue in a meaningful way (macros in a spreadsheet don't count), it could end up as Wang did a few years ago — scratching its head

Continued on page 51

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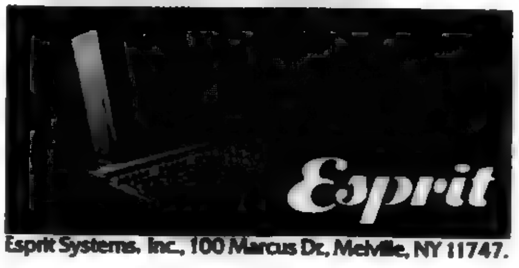

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Circle Reader Service Number 39

DEC DOWN?

FROM PAGE 49

and wondering where all the customers had gone.

Workstations. DEC entered the workstation wars late and on top of the Microvax platform. Vaxstations are completely outclassed in terms of processing power by the competition. Apollo Computer, Inc. has just rolled out a desktop workstation rated at four million instructions per second (MIPS), while Sun Microsystems, Inc. has introduced a 10-MIPS workstation.

DEC counters that its sophisticated Local-Area Vaxcluster solves the processing problem by providing distributed computing power when needed. Nevertheless, the competition is going to be offering distributed processing as well, most likely through Apollo's Network Computing System. And DEC's solution is a hardware-intensive one. Need more power? Buy another Microvax.

DEC needs to bolster the power of its Microvax chip set. The long-awaited follow-on to the Microvax II should help, but other vendors are also pushing ahead. And although DEC may have aggressively chopped the entry-level price of a diskless Vaxstation 2000, users are still faced with the prospect of buying a $65,000 Vaxserver 100, which is basically a Microvax with a big disk.

OS/2. Only grudgingly did DEC embrace the standard IBM PC- and Microsoft Corp. MS-DOS into its product family. Now, with another de facto standard looming, DEC once again is going to play cute. "OS/2?" says Henry Ancona, vice-president of DEC's Business and Office Information Systems. "It doesn't exist yet."

Granted, OS/2, which was jointly developed by IBM and Microsoft, is not on the street yet, but developers are madly writing for it. Does anyone truly believe that a product with the weight of IBM and Microsoft, not to mention the support of vendors such as Wang and Compaq Computer Corp., behind it will not become an important factor?

A forward-thinking DEC would recognize that embracing OS/2 now and creating a DEC extended version to integrate Intel Corp. platforms into the network would put the company in the strongest position possible.

But OS/2 support is potentially threatening for DEC. An Intel 80386-based server running OS/2 and Microsoft's LAN Manager, along with a DEC-specific extension for integration, could displace Microvax servers and DEC's VMS Services for MS-DOS. Nonetheless, it is better for DEC to offer the option itself rather than see customers once again start complaining about lack of support for standards.

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DEC is very capable of falling behind its competition in the quality of its interface and of the applications themselves. Interestingly, IBM's model, for so long vilified as the embodiment of a bad user interface, may end up as a pacesetter in this area.

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Development environments. Given DEC's current attitude, a proactive approach to OS/2 is very unlikely. DEC stresses, quite naturally, VMS as its platform for innovation. But it relegates the other platforms — Unix (in its own version, Ultrix) and MS-DOS — to their own external development processes. In other words, DEC innovates with VMS but merely supports with the other two.

The result is a clear imbalance in functionality across the architectures. The Local-Area Vaxcluster, a very nice piece of work, is for VMS alone.

In the Unix area, for example, DEC has said all the right things. The latest release of Ultrix, Version 2, adds the needed support for the AT&T Unix System V interface definition, Network File System and University of California at Berkeley's Unix 4.2 and 4.3. DEC also has said it will support the Posix effort and has introduced a new C compiler for Ultrix.

But these efforts are something all vendors are doing or will have to do. DEC's Unix workstations are hobbled by the power of their processor. Without access to the shared computing MIPS of a Local-Area Vaxcluster, Ultrix workstations are relatively puny and certainly not a match for the robust offerings from Sun and Apollo. DEC needs more vigorous development work on the Ultrix side if it expects its Unix solutions to hold their own in the market.

Core applications strategy. DEC, like other vendors, offers a set of integrated personal productivity tools to the end user. Today's offerings include editors, mail, videotex and Deccalc under the umbrella of All-In-1. Tomorrow's offerings will add applications such as electronic publishing and query modeling beneath a windowing version of All-In-1.

While such an approach is sufficient to keep up with the pack, it is certainly not leading edge. Although DEC has successfully poured a great deal of energy into networking, the energy it has expended on core applications does not seem to have kept pace with the enormous efforts the company has lavished — and rightfully so — on networking. A version of DEC's WPS-Plus that runs in a windowing environment is not particularly enticing.

DEC is very capable of falling behind its competition in the quality of its interface and of the applications themselves. Interestingly, IBM's model, for so long vilified as the embodiment of a bad user interface, may end up as a pacesetter in this area.

IBM integration. The high-water mark of DEC self-satisfaction was its statement — and a very successful marketing ploy — that DEC connected to IBM better than IBM did. Such is no longer the case, however, since other vendors have gone beyond DEC in the range of IBM support. DEC lacks, for example, the PU2.1 support necessary for IBM's Systems Network Architecture Distributed Services.

Even more interesting is what the entire issue of SAA connection will mean to other vendors. DEC has chosen to slap its knee and guffaw at IBM's SAA. In essence, however, both companies are driving toward the same goals: interoperability and distributed computing.

IBM's rigorous standards for SAA, right down to the look and feel of the interface, will create some interesting problems for other vendors. How fully should they connect to SAA? How complete should the interface adherence be? Toe the line too closely, and there is not much area for value-added features or differentiation. Stray too far away, and you lose transparency.

If DEC's ultimate strategy of parity with or displacement of IBM succeeds, then it won't have to worry too much about not offering as complete an IBM connectivity lineup as other vendors do.

Pricing. DEC characteristically uses only IBM products and pricing as benchmarks against which to display its own wares. Other vendors, however, claim to have a much better price/performance story to tell than either of those two.

Although PC All-In-1 is a good idea, it suffers from too high a price. The Vaxserver 100, designed to support the low-cost, diskless Vaxstation 2000 workstations, costs a whopping $65,000.

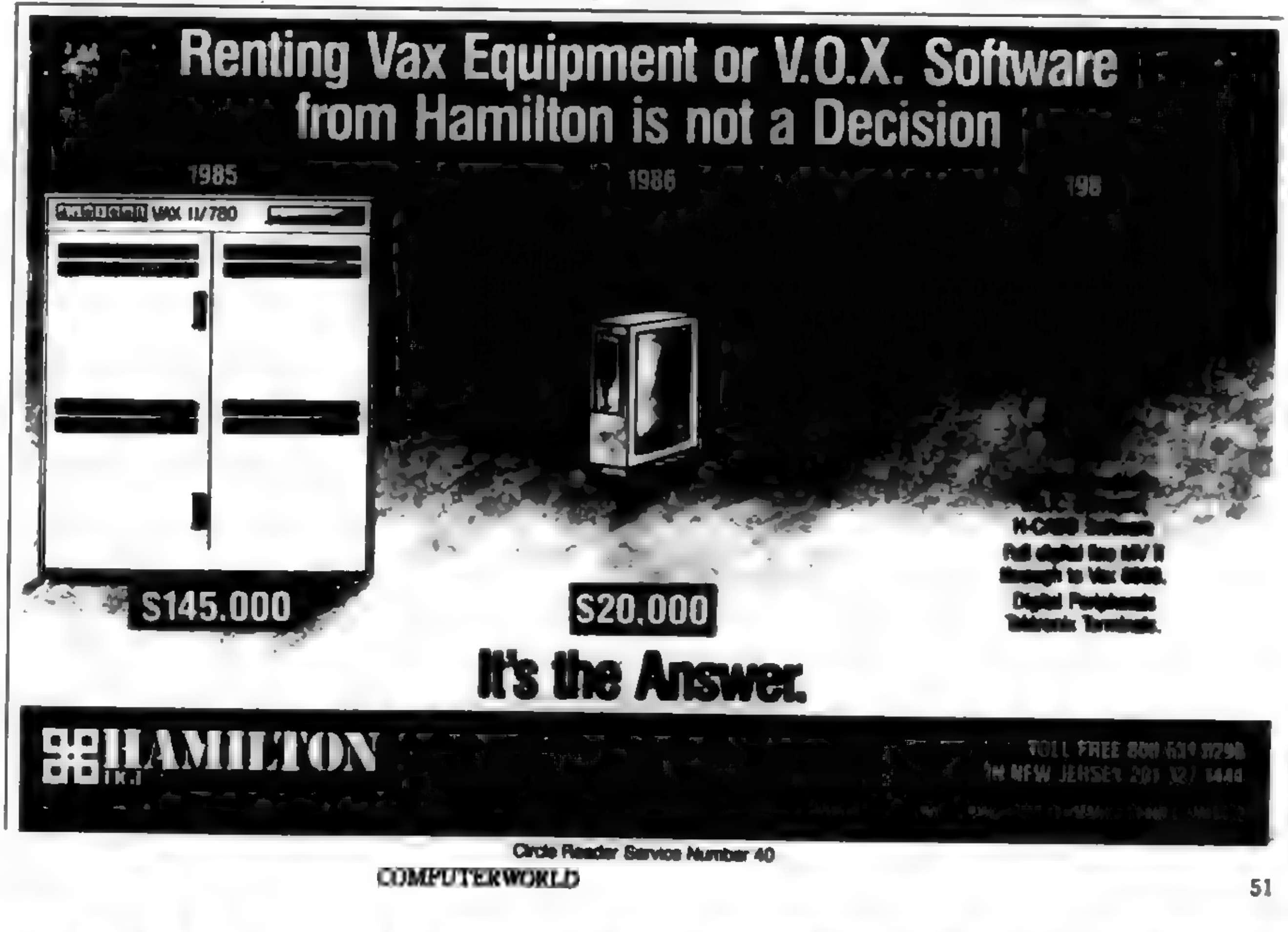
With products from the MS-DOS, Unix and OS/2 worlds providing equivalent or better performance at a lower price, DEC will need to change its approach to pricing.

Attitude. DEC's attitude is another weakness. Certainly, the company should be proud of itself. From the gloomy period right before the introduction of the VAX 8600, it has done an incredible job of barraging the marketplace with next-generation VAX processors, sophisticated distributed networking and more.

But DEC is beginning to suffer from a case of hubris. Its high-handedness toward the Manufacturing Automation Protocol group is just one example. DEC has discovered that it has weight, and it's beginning to heave that bulk around.

Such an attitude is very similar to the one that IBM suffered several years ago. IBM has since "got religion." It is listening very hard to its customers, paying attention to the competition and making the right changes.

The most disastrous move DEC could make now would be to dismiss IBM as a stumbling buffoon, a fat old giant whose time has come and gone.



Circle Reader Service Number 40

USERS LACK VAXCLUSTER TUNING TOOLS

Six thousand customers worldwide push to know more about who is using the system and when

BY JEAN S. BOZMAN

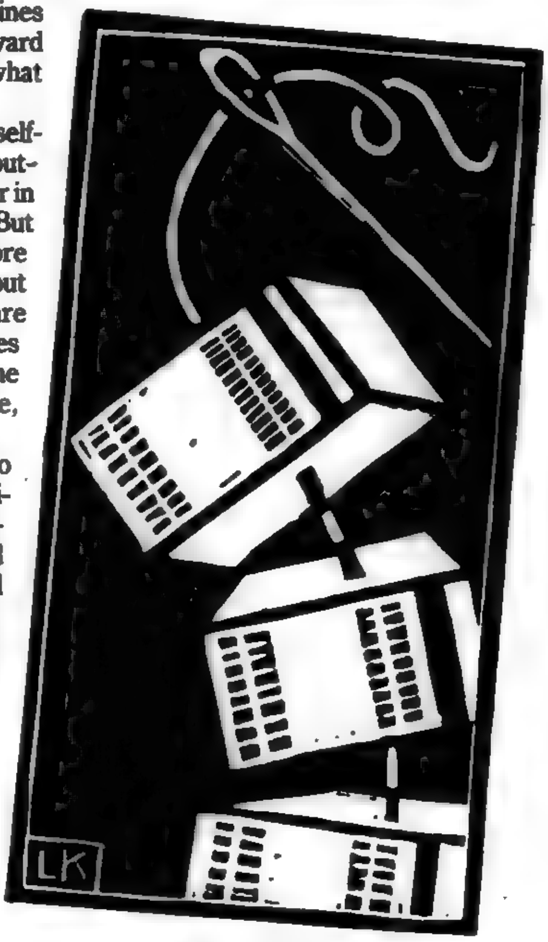
Management of VAX machines used to be straightforward enough. What you saw was what you used.

The VAX-11/780 or 11/785 were self-contained engines for end-user computing, often located down the hall from, or in the same building with, its end users. But today, DEC spokesmen say, out of more than 100,000 VAXs worldwide, about 6,000 are Vaxclusters that are networked on Decnet or Ethernet lines across the country and around the world. As a shared computing resource, VAX is no longer so simple to manage.

DEC has responded to users' pleas to optimize Vaxcluster performance primarily on the hardware end of the Vaxclusters — improving bus channel speeds through the VAXBI bus and providing a common access to multiple high-capacity disk drives.

But leading-edge users have begun to feel that in the wealth of DEC products available, there is something missing: performance and monitoring software that would help them fine-tune their Vaxclusters.

In DEC, many such applications



LES KANTUREK

Bozman is *Computerworld's* Midwest correspondent.

exist, primarily within its field service operations. But users report few offerings in the following key areas of Vaxcluster systems management:

- Resource- and job-accounting software.
- Monitoring applications.
- Tuning applications.

The need for resource-accounting software is felt most at the largest accounts, where a single Vaxcluster may provide 50 million instructions per second or more of computing power. "People want more control," said one East Coast user who asked not to be named. "More Digital customers are using clusters as clusters, not just as a bunch of connected machines."

Trying to fill gap

DEC may already be moving to fill this gap in management software, according to Larry Pfeifer, vice-president of marketing at Signal Technology, Inc. in Goleta, Calif. "We believe that Digital is placing special strategic emphasis on the area of resource management," he says, "because of the complexity of new VAX systems."

Some DEC observers predict that VMS Release 5.0, due out this fall, will contain more built-in features for detailed performance and usage monitoring.

One such feature is job-accounting software, an application or series of applications that give users feedback on who is using the Vaxcluster computing resource and for how long. Only 2.3% of all VAX sites, including those with clusters, have installed systems-accounting software, according to Computer Intelligence in La Jolla, Calif. In contrast, about one-third of all IBM mainframe sites run some kind of accounting package, the firm says.

According to Dave Eulitt, a market analyst with Computer Intelligence, "Most of the accounting software that is installed [on DEC systems] comes from third-party vendors."

Accurate chargebacks

Job-accounting software is founded on resource-accounting software, which collects statistics on the number of users logged onto one Vaxcluster machine at any given time. It allows MIS to charge end-user organizations more accurately for their computing time.

For the moment, DEC has clearly left this field open for third-party vendors of systems-accounting software. DEC distributes the market-leading accounting software package from Signal Technology through the Digital Classified Software program. Computer Information Systems is the second largest, with its Quantum RS accounting package. Two other players round out the field: Gejac, Inc. in Riverdale, Md., and Raxco, Inc. in Rockville, Md.

In the absence of many vendor-supplied solutions, many users have written their own systems-accounting applications. One such site is the Midwest Stock Exchange (MSE), which runs two Vaxclusters composed of a total of five VAX machines.

MSE programmers wrote their own package to track the level of computing use for the Vaxcluster trading system. "We want to make sure that people are getting charged properly for their use of the VAX cycle times," says Mary Jo Moccia, vice-president of electronic data processing services for the Chicago-based exchange.

Carnegie-Mellon University in Pittsburgh wrote its first systems-accounting package more than five years ago, even before it installed its first Vaxcluster. Now, the university computing center runs a five-machine Vaxcluster that supports hundreds of end users. "We do our chargebacks internally, but all the software we use to do it is homegrown," says Tom Bajzek director of the computer center.

Control via monitoring

But accounting software is by no means the only way that users can gain greater control over the use of their Vaxclusters. Another key area is systems monitoring and performance.

DEC provides several forms of systems monitoring, including several elements of the VMS operating system. Among these are the Software Performance Monitor and the VAX Performance Adviser. In addition, DEC recently enhanced its Vaxcluster Console System to support 24 nodes or attached CPUs.

The console system, based on a Microvax II, can display the level of system utilization, but it does not provide systems-accounting functionality, says Tom Lowery, Vaxcluster Console Systems product manager. "It's a system management tool that eliminates the need for hard-copy monitoring by showing the information on a Microvax II or Vaxstation II/GPX screen."

Field engineers at DEC's Colorado Springs Customer Support Center use dozens of other programs to diagnose system errors and pinpoint I/O bottlenecks, says Ronald Ochoa, an engineer in the Customer Integrated Systems Group. These applications allow field engineers to probe system errors in Vaxclusters located thousands of miles away and find patterns in the errors they detect.

Recently, there have been signs that DEC may be ready to share some of these applications with users by bringing the applications into the company's 24 applications centers.

Such customer support centers could be the location for the genesis of even more fine-tuning software for large Vaxcluster systems.

CAN DEC PROVE MIPS CLAIM?

BY BOB DJURDJEVIC

In an Annex Research, Inc. report released early this year, I noted that "DEC's successes have got IBM's attention." But I also warned that this was not necessarily a good thing — for DEC.

In March, DEC found out why, when IBM escalated the "war of MIPS." In a glossy brochure entitled "The IBM 9370 Information System: Performance by Design," IBM published performance figures whose million instructions per second (MIPS) ratings dwarfed those of comparable DEC VAX processors. Assuming an 80%-20% ratio of commercial to scientific processing, this document implied that "IBM MIPS" were 2½ times greater than "DEC MIPS."

"Our senior management is very concerned," a DEC spokesman said when asked about the reaction inside the firm to IBM's allegations. "We see it as a case of 'DEC-bashing.' "

"DEC-bashing" or not, IBM's claim directly challenges DEC's assertion that its "net usable MIPS" are about 42% greater than IBM's.

What may be surprising about the IBM claim is the aggressive bluntness with which the giant made the allegations. First of all, the very publication of a document that names and details information about competitors' products is unprecedented. It is not that IBM sales representatives have been above occasional mudslinging in hot and heavy competitive battles. Putting it in writing, however, is something that only the inexperienced or foolish among them would have done.

Now, the company's official publication number G360-2714-00 has referenced, in no uncertain terms, not just DEC's products but also those of Data General Corp., Prime Computer, Inc. and Gould, Inc.

Second, some of the statements in the IBM brochure may be interpreted as violations of IBM's own "Business Conduct Guidelines." John Opel, the company's former chairman, reaffirmed IBM's long-standing practice of not disparaging competitive products in the latest edition of the company booklet, published in 1983.

The IBM performance brochure states that the reason for the 9370's allegedly superior performance is its ability to simultaneously execute "370 instructions in the IPU [Instruction Processing Unit] and I/O functions in the I/O processors." So far so good, since the company is pushing the real or alleged virtues of its own products. But IBM goes on to say that "some less advanced processors are limited to executing only one instruction at a time, in one processor." To which "less advanced processors" is IBM referring? No one could mistake the target of the broadside.

Could DEC do anything about it? The answer to the question is yes — but not immediately. The 9370s were still phantom machines in March, announced but not yet delivered.

And IBM's RAMP-C benchmark, on which the company based its allegations of deficient VAX processor performance in a commercial environment, is an internal IBM test. Having tested its 9370s against only one DEC machine, the Microvax II, IBM then extrapolated its results to other DEC mid-range CPUs to arrive at its conclusions.

So how can DEC respond? One way would be to offer proof of its own position that it is the *network* throughput that counts, not that of the individual processors.

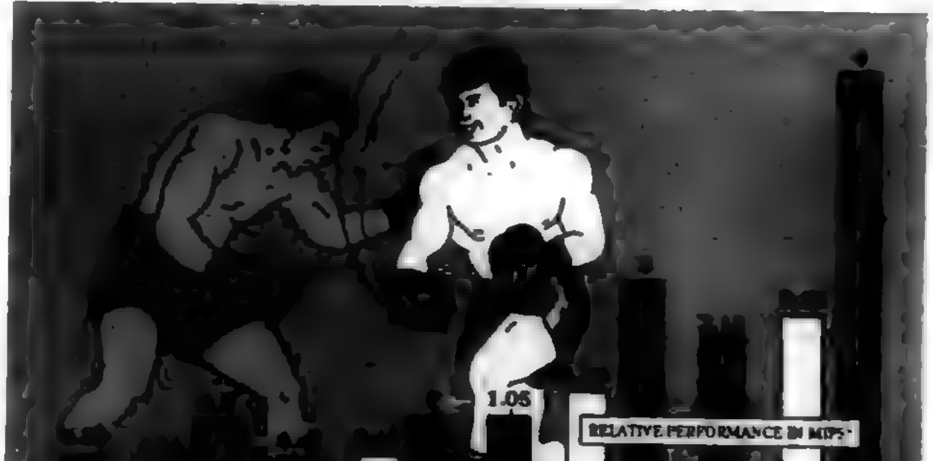
The next move in this MIPS war is clearly up to DEC. Now that IBM is delivering its 9370s, the industry will be looking for some proof behind DEC's cocky statements. If we don't get it in the near future, I, for one, will be obliged to accept IBM's allegations that its MIPS are worth 2½ of DEC's MIPS.

If you can't wait that long, however, you'll just have to pick your own multiple — between 1 or less, as DEC claims, and 2½, as IBM alleges.

Djurdjevic is a computer industry analyst and president of Annex Research, a Phoenix-based computer research and consulting firm.

THE IBM AND DEC WAR OF MIPS

IBM claims its MIPS are 2½ times greater than DEC's



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T-3 Managing Mixed Vendor and Local Networks
Leader: Dr. Kenneth Thurber, president, Architecture Technology Corp.

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Leader: Amy Wohl, president, Wohl Associates

Examining the status of DEC's All-In-1 in today's office environment, this seminar discusses current applications, as well as those likely to evolve in the future. A comparison of All-In-1 with competing architectures, such as those offered by IBM, includes a look at how it fares in an ever-changing market. **Who should attend:** A good choice for professionals who currently use All-In-1 and for those who are considering new architectures for their communications network.

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Circle Reader Service Number 41

SALES FORCE UNDERGOES A MAKEOVER

In the battle to win customers, will DEC relinquish its old attitudes toward sales reps?

BY ALAN RADDING

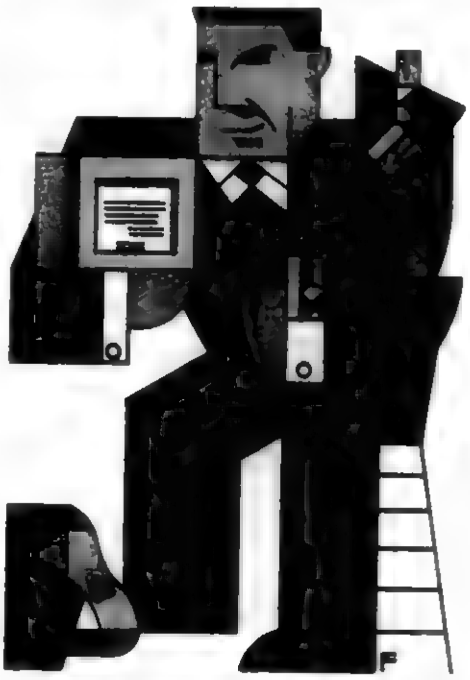
DEC's sales representatives, as described by customers, have progressed beyond the image they once held — of "techies" in cheap suits performing such errands as running specifications between DEC's engineers and the engineers and MIS professionals who were its users.

The DEC sales force still spends a lot of time running between customers and the DEC production and operations people; now, however, the sales representatives are frequently described as better trained, better informed about the customers' business and more inclined to discuss the customers' business problems in terms of solutions and applications rather than in terms of specific hardware.

But the DEC sales force still falls short in comparison with IBM's, considered the preeminent computer sales force — and arguably the most effective business sales organization in the country.

In particular, customers say, the DEC reps fall down in the areas of training, business sophistication, speed and decision-making authority.

The comparison has not gone unnoticed by DEC. Its sales force is going through a period of transition and clearly appears to be headed in the direction of IBM's.



MARK FISHER

About a year ago, DEC recalled all its sales reps for a two-week retraining course. The intensive seminar, held on the Boston University campus, focused on "solutions-oriented training," according to one DEC spokesman. The idea was to bombard the sales reps with the language of business solutions and vertical markets. According

See next page

Radding is a Boston-based author specializing in business and technology.

SALES FORCE

FROM PREVIOUS PAGE

to customers, the plan worked. Many users report a sharp increase in the sales reps' interest in and conversation about users' business problems since last fall. Of course, learning about the business of each customer takes more than a two-week training course, but users say they notice a different set of questions being asked.

DEC also experimented with a bonus program for the top 20% of its sales force last year. Not exactly a commission, these cash bonuses were attached to specific sales objectives. Apparently, the pilot program was successful; DEC has implemented it as an ongoing, "permanent" program called SP-2.

The changeover to slick marketeers is not something that can happen overnight, however, and the evolution of the DEC sales force is far from complete. "They're going through a growing phase. We give them about two more years to mature," says John Logan, a senior analyst at The Yankee Group in Boston.

From the company's beginning, DEC was leery of emphasizing the sales force, marketing or advertising. The attitude at DEC has always been that if you build a better product, customers will come to you, explains Logan, who has been surveying VAX users about their relationships with the DEC sales force.

DEC began as an engineering-driven company, and there has been a pervasive feeling in the industry that DEC's top management believes that an aggressive sales force cheapens the product, Logan says. Often this attitude creeps through the ranks. "In order of importance, we're third or worse" behind engineering and production, complains a veteran DEC sales rep.

"Olsen's heart is in engineering," not marketing, agrees Gregory Richards, a securities analyst who covers DEC for New York-based Fred Alger & Co.

The engineers have been wrong in the past. Performance tests showed the DEC personal computer family — the Rainbow, the Professional and the first Decmate — was better than the IBM Personal Computer from an engineering standpoint. At every technical benchmark, the machines could beat a comparable IBM PC.

But DEC personal computers died in the marketplace and were largely withdrawn. They may have been more elegant technically but not in ways that were meaningful or that attracted the nonengineer end users who were making the IBM PC such a commercial success.

Sales specialists

Over the years, one of DEC's responses to customers' complaints about the sales force has been to reorganize it. Originally, DEC salesmen specialized in a particular product line or application. As users turned to DEC for a variety of products and applications, this approach turned into chaos.

Pretty soon, there would be a gaggle of DEC reps calling on the same customer and competing with each other for the customer's information systems dollars.

In the early 1980s, DEC switched to a sales force organized by account. Regardless of which DEC product the customer wanted, he worked through the same DEC sales agent. This arrangement was an improvement from the customer's point of view, but it was difficult for the sales reps, who suddenly found they needed to be knowledgeable about the entire DEC product line.

Continuing evolution

The process continues to evolve. Today, most of the major DEC customers are served not by a single sales rep but by an account team, much like IBM customers are. Heading the account team is the account representative, assisted by other DEC salesmen who help chase down information for the customer and provide detailed sales follow-through and support.

"I like the changes. In the past, I felt that business customers were being discouraged," says Douglas Anderson, director of software development at Wisconsin-based Northwest Telephone. After 12 years as a DEC

Continued on page 58

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USERS ACT OUT APPLICATIONS

BY ALAN ALPER

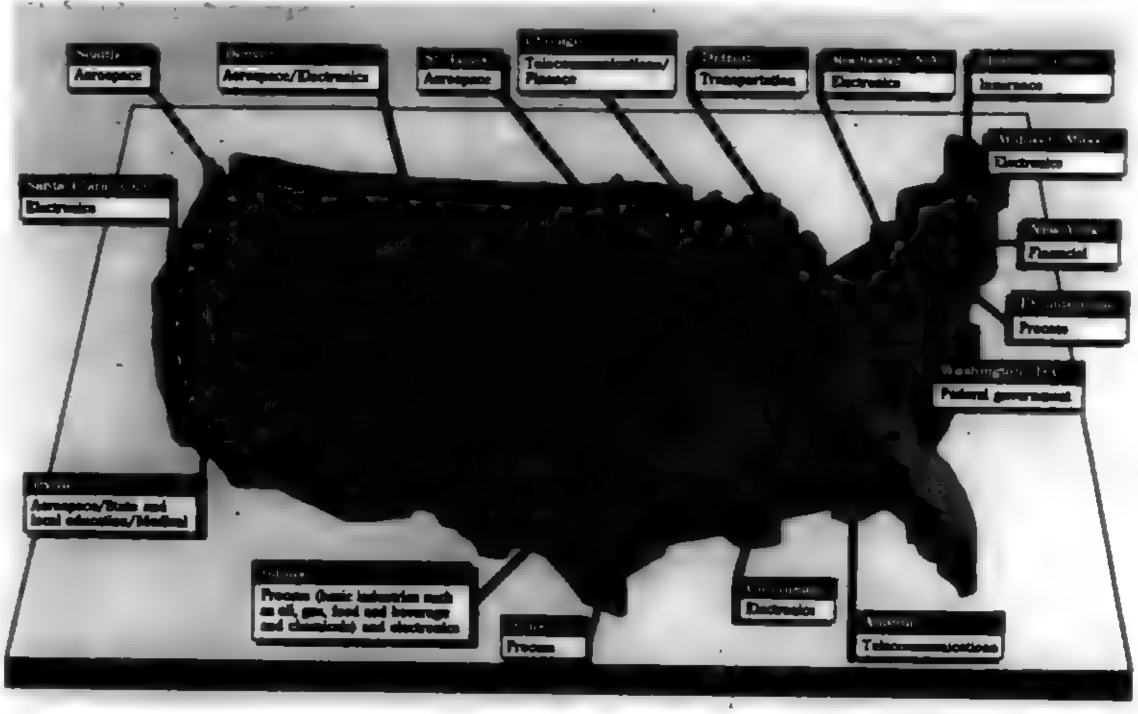
DEC's Application Centers for Technology (ACT) capitalize on the idea that seeing — for the increasingly skeptical user community — is believing.

In this case, "seeing" means witnessing DEC equipment simulating a user's own environment in a regional demonstration center, or ACT. And seeing their specific problems up and running goes a long way toward convincing jaded MIS executives of the validity of DEC's system proposal.

"The ACT gives you touch and feel of the quality of the solution," notes Bence Nagy, manager of the factory automation program at Xerox Corp.'s Information Products Division in Fremont, Calif. "At least you leave with the notion that what they are giving you is feasible."

DEC'S APPLICATION CENTERS FOR TECHNOLOGY

First ACT opened in Irvine, Calif., in July 1986.
There are now 17 positioned around the country, and each specialises in a particular industry vital to the local region.



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Since August 1986, DEC has launched 17 ACTs worldwide in cities such as Houston, New York, Tokyo and Santa Clara, Calif. Each focuses on a vertical market that reflects the type of business most prominent in that locale. Thus, the ACT in Hartford, Conn., demonstrates insurance industry systems, the ACT in Houston displays petroleum exploration technologies and the ACT in Chicago showcases food and beverage processing products.

The centers are equipped with hardware and software to simulate a variety of environments, including office and factory automation, departmental processing and computer-aided design (CAD). Many applications are demonstrated running on DEC Vaxclusters; DEC's networking prowess and connectivity to the IBM world permeate the exhibits.

As combined sales and support vehicles, the ACTs are staffed with sales personnel and consultants whose mission it is to recommend customized, or third-party, solutions. Many products sold through DEC's Cooperative Marketing Program are now on-line at ACTs for customers to try out.

Funding for the ACTs comes out of the corporate sales budget rather than from the regional offices, notes Bob Randolph, director of DEC Advisory Services for International Data Corp. "That gives the ACT an air of independence" from the regional sales group, he says. He suggests the separate funding helps the ACTs create their consulting firm ambiance. "This is not the kind of place where the minute you walk in, 10 salespeople jump all over you."

Xerox's Nagy visited the Santa Clara ACT last May to examine networking products to integrate his operation's office automation, engineering and manufacturing departments. "They gave me a very solid demonstration on how every facet of our operation would work," he recalls.

Xerox is a very large user of DEC VAX minicomputers for design and manufacturing automation. "Our visits to the ACT confirmed that we made the right vendor choice," Nagy says. "And now we know our connectivity requirements will be satisfied."

Another DEC customer, Siemens Components, Inc. in Santa Clara, visited the ACT in its hometown recently as part of its investigation of networking personal computers with VAXs. The semiconductor vendor would like to tie appropriate PCs to its VAX 8700, which is used for integrated circuit design, and link other micros to a VAX 8550 running office and financial applications.

The ACT staff helped Siemens set up a pilot program hooking up six PCs to a VAX, with a Microvax II acting as a network server. "If the trial is successful, we expect to order links for about 100 PCs," explains Randy Collins, manager of CAD systems.

Collins believes the pilot designed by the ACT provides strong evidence of DEC's connectivity advantages over its competitors. "Other vendors have come in here to show us how they link PCs to VAXs and [have] eliminated themselves because their products did not work," he says.

Another prospective customer is ESL, Inc., a TRW, Inc. government contracting subsidiary in Sunnyvale, Calif. ESL visited the Santa Clara ACT a number of times to evaluate hardware and software for MIS and CAD. The company's MIS operation is currently true Blue, but engineering uses a mix of DEC and Hewlett-Packard Co. hardware, says Beverly Gerber, program manager of computer information systems.

Although ESL has not made any purchase decisions yet, Gerber says the ACT is a convenient way to witness product demonstrations. "It's a very good marketing tool," she says. "It doesn't disrupt anyone's business in the shop."

While the ACT concept is popular, it is not unique to DEC. IBM, for example, operates two demonstration centers. Its Mid-Range Performance Center in Dallas highlights mid-range systems and connectivity, while its National Technology Support Center in Gaithersburg, Md., showcases large systems, data base management, wide-area networking and network management.

"DEC pirated the idea from IBM," Randolph says.

"Perceptually, it's a different approach," explains Tom Turkot, senior associate with Motivational Marketing in Ramsey, N.J. In IBM's centers, which he has visited, "You get a feeling they're going to sell you what they want to sell you," he says. In ACTs, "DEC just shows you what they have."

DEC is making a substantial investment in the ACTs as a marketing vehicle. Randolph estimates the company spends $4 million per ACT installing hardware alone. He adds to that an average staff size of 20, each garnering $50,000 in salary. Add also software costs, overhead and network management. Multiply by 17 ACTs, and the figure begins to push $100 million.

Nick Romaquera, vice-president of manufacturing software development for Camco, Inc., an oil industry parts manufacturer in Houston, has worked with the ACT in his area extensively. When Romaquera joined Camco 2½ years ago, the firm was using only IBM equipment. Seminars that Camco's management attended at its local ACT convinced the company to switch almost exclusively to DEC equipment for factory automation, CAD and computer-aided manufacturing.

"Viewing the latest equipment firsthand, rather than out of a catalog, is nice," Romaquera says.

Alper is Computerworld's mid-Atlantic correspondent.

SALES FORCE

CONTINUED FROM PAGE 56

customer, Anderson says he feels he is finally getting the attention from his DEC sales team that was reserved only for engineering customers in the past. When it becomes time to negotiate prices, terms, delivery and contract specifications, however, the DEC sales team reverts to its old style of running messages between the customer and higher management at DEC, Anderson says.

Anderson also notes the growing resemblance of DEC reps to IBM reps. One DEC insider says that is no accident: The impetus to mold the sales force in the IBM image comes from the highest levels of DEC. Senior-level managers "are obsessed with IBM," this veteran DEC sales rep says.

The sales force senses that obsession and responds accordingly. DEC sales reps say that each sale comes down to either DEC or IBM, and their goal is to beat IBM. "We're the only ones out there," the DEC rep brags. During the past year, he says, he has not lost any sales to Wang Laboratories, Inc., Data General Corp., Unisys Corp., Prime Computer, Inc. or others — just IBM.

Still, the transformation of the DEC sales force has not made it an IBM clone. "The DEC people are more casual. They're a little more up-front and personable," says Gene Robbins, assistant provost of Queens College, City University of New York.

Robbins works with both DEC and IBM sales reps and says he finds many similarities, despite a difference in style. Both companies send technical people to fill in the details that the sales reps lack, and both companies generally respond quickly to Robbins' calls. If anything, DEC sales reps tend to be more sensitive to the technical aspects of the problem, he says.

Turnover among DEC reps varies. Robbins reports a single change of sales reps in the past two years, while Anderson says his rep has not changed at all in that period.

David Dandro, vice-president of information services at Hartford, Conn.-based Emhart Corp., reports frequent change. "It's like a revolving door," says Dandro, who admits that he is hard on sales reps. "We're a tough customer. Neither DEC nor IBM like the way we do business."

What the sales reps don't like is that the company does not listen to the reps. "We treat them as order takers," says Dandro, who reports that his reps are promoted away and that new, less experienced reps replace them.

DEC's new business solution-oriented sales strategy implies that the sales rep become more of a consultant to the customer, who may not always oblige. A major university complains that its DEC sales team has suddenly become very hard-sell oriented. "They are like IBM salesmen of the 1960s — no sophistication, just pressure," says the university's head of information technology, who prefers not to be identified because he doesn't want to alienate his DEC team any more than he has already.

The sudden hard sell coincides with a recent change in the way DEC handles this university account. Until recently, one DEC sales rep handled the entire university. Now, the account is served by a team, which may explain the added sales pressure. With more people on the account, the customer gets more attention, but DEC needs higher sales to justify the additional human resources applied.

But more than anything, cost is what is driving the university away from DEC. "We put in a VAX that cost $500,000. A year later, we got an Alliant [machine] for the same money but with 10 times the power. Then we got a Sun [computer] that was equal in power to the VAX but at one-tenth the cost," he says. "It's the money, not the salespeople."

DEC reps have no authority to address pricing, and they lose sales as a result. "We'll buy the computer, the basic box, from DEC, but then we buy everything else from third-party vendors, because we get a much better price," says David Stanley, manager of systems and programming for Richmond, Va.-based Best Products Co., a $2.3 billion discount retailer.

Other avenues

Customers are not restricted to working with their DEC reps. There are other ways to obtain product information and make a purchase. Customers can buy a variety of products on-line via a computer service called the Electronic Store.

By telephone, customers can contact DEC Direct, which offers catalog sales of just about all its products short of a full-fledged VAX, but some large customers report they do not bother using the system.

Those who are familiar with DEC Direct complain that its prices are higher and that buyers must have all the necessary buying information on hand to complete the transaction — an assertion that DEC says is not true. In any case, for a large customer already served by a DEC sales rep, he might just as well call his rep.

In the final analysis, DEC may see IBM as its chief rival, but its customers tend to do business with both. Typically, the customers buy networking and scientific and engineering systems from DEC while remaining with IBM for the central business and data processing applications. The way the customers see it, the DEC sales rep is no more likely to sell them in areas in which they traditionally buy IBM than the IBM rep is likely to convince them to replace DEC in the areas in which DEC is entrenched.

Circle Reader Service Number 43

ENTRY POINTS TO DEC

Interviews with three DEC executives reveal strategies for keeping close to the customer

JOHN FISCHER

JOHN BUCKLEY

LEONARD VAIRO

As a customer sees it, every major computer supplier has various points of entry, points of interaction between customer and company. The bigger the supplier, the more dispersed these entry points tend to be. Therefore, customers may find frustrations instead of answers and promises rather than deliveries.

At DEC, now a $9.3 billion international giant with 110,000 employees, interaction between the firm and its customers has changed dramatically during the past five years. Explosive growth has put a strain on such key customer contact points as administration, sales and service. Expanding far beyond its traditional engineering/scientific customer base has made it imperative for DEC to refocus on these areas and upgrade not only its ability to produce quality products but also its ability to satisfy customers.

There are questions that the corporation faces in order to ensure that customers retain the good feeling toward DEC that sparked their interest in the first place.

Computerworld Extra spoke with DEC representatives from administration, sales and service to find out how the company is addressing customer concerns.

……

John Buckley
ENTRY POINT: ADMINISTRATION

PATRICIA GAUDETTE

As manager of DEC's business operations, John Buckley has a basic mandate to determine how DEC wants to do business with its customers. The 15-year DEC veteran spoke at the firm's Marlboro, Mass., facility with *Computerworld* Senior Editor Glenn Rifkin.

How has doing business with DEC changed during the last decade?
The business practices change as the kinds of customers we deal with and the problems we are solving for those customers change. Obviously, we're selling a significantly different kind of product set today than we did 15 years ago.

Do you work out individual agreements with major customers, or does DEC have a set contract for everyone?
It's a combination of both. We try to be as uniform as possible so that we are treating our customers fairly and also so we can set up automated systems, which will reduce our costs and increase predictability and efficiency in dealing with a customer.

How has DEC's recent dramatic growth caused problems with efficiency in dealing with customers?
Obviously, the growth has challenged all areas of the company, the administrative one particularly. Five or six years ago, virtually every order that a customer gave us came to Massachusetts to be acknowledged and scheduled. The invoice was prepared here, and the credit and collection function was all done centrally.

We quickly realized that we could not keep up that centralized facility — in both people and systems — to match the plant expansion of our business. So we embarked on programs to distribute that. And today, all of our transaction-oriented activity is handled in local offices.

As I recall, customers were having administrative problems with DEC during that period. What happened?
Part of the problem was that we were running with a system that had been designed 10 years before for a much simpler way of doing business — back when DEC was selling stand-alone individual computer systems, mainly minicomputer systems, with a much simpler configuration of hardware. Part of the problem was that it was all done centrally, and those systems were simply not set up for the sheer volume of transactions.

Then there was a period when the new systems were being developed but weren't fully there. And we were trying to phase in the new methodology and had probably let go of the steering wheel on the old system prematurely. So there was a little bit of a gap when the new system wasn't robust enough to handle the work load, and we had already started transitioning some of the people out of the older system.

What resulted from the customers' point of view?
The most common perception was that it took a long time between when a customer would give us an order and when we could commit to them an actual scheduled delivery date. There was frustration on the customers' part in not being able to plan their installation well.

In the area of software licensing, DEC customers have complained that the company is extremely inflexible and costs are very high. How are you addressing these complaints?
Most of the software licensing done at DEC — and in the industry in general — is based on the concept of a software product running on a single system. Some of it is even licensed to a number of active users within that system.

We are looking at alternatives that would make it easier for customers to use software in a network or clustered environment. We're piloting some concepts. We are finding that, in fact, there is a wide diversity of how our customers operate and really quite a difference of opinion as to what they'd like to see.

So right now we're in the active data gathering mode. I suspect that within the year we will be coming up with some new policies on how we license software, how we support it, how we price it.

What might the policies become?
I don't think the issue is negotiating a special price or deal for each individual customer, the same way I don't believe in doing that for hardware or service products.

What we are trying to do is understand the different ways customers use software in these new computing environments. They are trying to figure out what is the right level of centralized system management vs. responsibilities given to the individual users. And different customers have determined different answers to that question.

I would not expect us to come out and say we're going to negotiate price or license terms with each customer. It would be hopelessly confusing and just take much too much of our time and our customers' time.

Is there one specific complaint you hear a lot?
Yes, the thing I hear most is that as customers grow the use of their systems and have more and more multiple layered software products on the system, and as they network them together, it is becoming harder for the customer to really keep track of how much software they've purchased, how many licenses they have. The customers are asking for some assistance in helping them manage their own software licenses.

Billing is a problem area in the computer industry, and I've talked to some users who say that there are problems with DEC as with most large vendors.
I'm not aware of any major problem with billing. Individual customers may have a problem with a bill, but we do a lot of work when we receive the order to check that the internal order matches the customer's order. You can probably measure that by DEC's receivables being the lowest that they've ever been. We're running at about 60 days outstanding. At that rate, there couldn't be much of an opportunity for much misunderstanding going on.

What is a typical transaction like?
We interact with customers in two ways. One is on an annual basis. We sit down with a customer and try to determine the volume of purchasing the customer plans to make over the next 12 months, then sign a contract that specifies the standard terms and conditions of the sales and the amount of discount the customer will receive based on that volume.

The other period is a per-transaction or per-order basis. Each time a customer determines he has a need, he contacts his salesperson, who prepares a quotation.

We also have an AI [artificial intelligence]-based system that verifies that the configuration is technically correct. It verifies that the salesperson didn't inadvertently leave off some option and that he has the right complement of hardware to run the software he ordered.

What happens next?
The customer will receive that package of documentation, along with a proposal from the salesperson explaining the benefits and technical features of the products.

If the customer decides to purchase, he would give DEC a purchase order, which would reference the quotation, or include a copy of the quotation. That order goes into an order-entry system at the local office, where it is transmitted centrally to Massachusetts daily for scheduling with our manufacturing operation.

Since the configuration has been verified and the salesperson has already checked out the availability, there's usually very little problem [in] scheduling with manufacturing. For certain products, we call our Fastship Menu, and we may ship within the week. [For] other products that have to be customized, we send an acknowledgment back to the customer telling him when he will actually receive it.

What is the normal turnaround time on a machine?
The whole thing takes one to two weeks, from order to received.

Obviously, people weren't getting that response four years ago. How long was the turnaround time back then?
There was a great range. The ones we worried about most were some customers [who] waited in excess of a month.

Are customers invoiced the day they receive the machine?
The customer takes title when it leaves our shipping dock. And we invoice the day we ship or the following day.

Is there a discount for a prompt payment?
No.

How do you determine discounts?
The discount is based on the annual dollar value of purchases that a customer is making with DEC. That includes the customer's total product purchases, so if it's a multidivisional or multilocation customer, he can aggregate together the purchasing from all his purchasing entities. And we do that on a worldwide basis so that multinational concerns aggregate purchases.

What is the discount schedule?
It goes up to 21% for a customer buying in excess of $300 million per year. It's a graduated scale-down from there, starting at the $500,000 range.

Do you find many customers who want just one VAX, and if so, what can they expect? Is there any discount?
Customers needing only a single system and whose needs are not expected to grow will find it more convenient to deal with one of DEC's resellers, our OEMs or distributors, because in general, those people will be able to provide a better level of service to that customer. However, if the customer wants to buy from DEC directly, he certainly can.

I've heard that DEC is discouraging small buyers, that you only want to deal with big-volume customers. Is the lack of a discount for small customers a way to do that?
There's no discount for people buying less than $500,000 per year. I would say that through that practice, we are not actively encouraging those customers. I wouldn't say we are discouraging them. We simply have a limited number of salespeople, and there are just so many customers they can call on in a day or a month.

If we don't have enough salesmen for that account, a customer can always call DEC, place an order over the phone, get on the mailing list for our catalogs, or even access that electronically from their terminal. So it's very easy to order from DEC, whether you are a large or small customer. [Small customers] get the same terms and conditions of sale and same delivery schedule as a large customer.

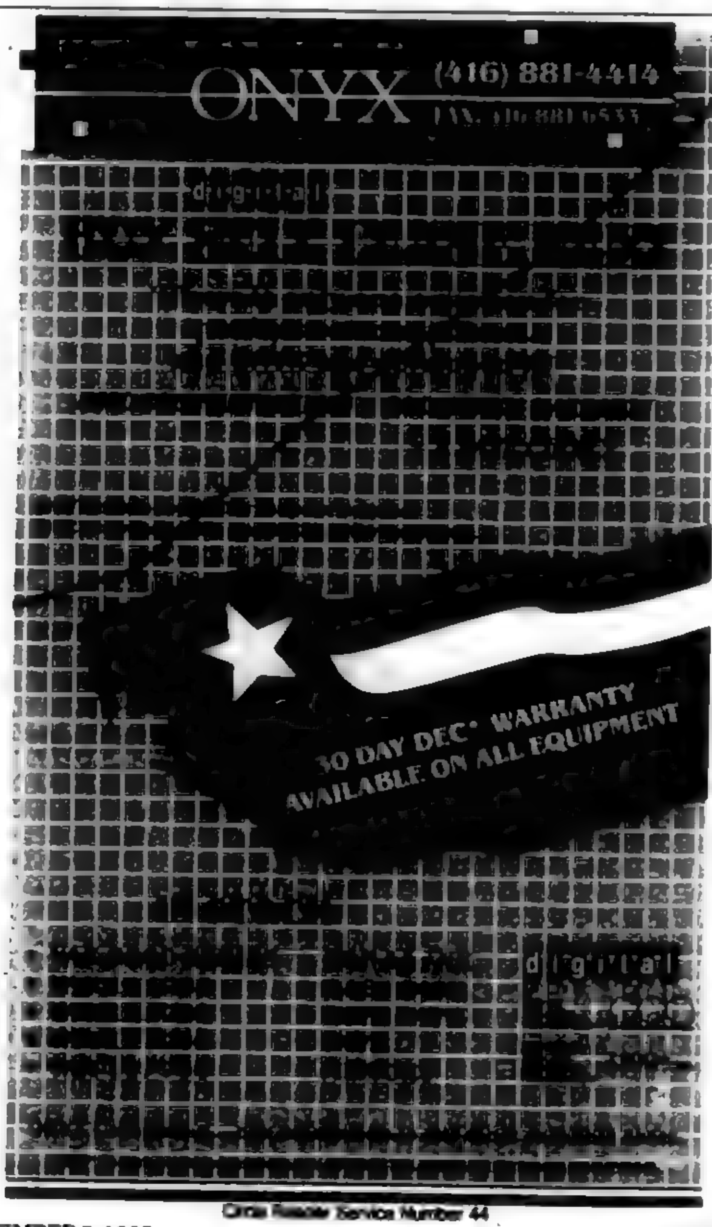
But you'd rather these customers go to a reseller?
If a customer is only buying a very small system, it usually means they don't have a large technical staff to assist them in developing the application, supporting it and verifying they are buying the proper equipment. Those are the kinds of services a reseller can provide. If a customer feels he doesn't need that and is more comfortable dealing with us directly, we're very happy to do that.

Do the big customers want to haggle and negotiate prices? Is there any flexibility beyond the discounts?
In order to be fair to all our customers, we believe we have to establish a firm list price and a firm discounting schedule based on volume. If we allowed ourselves to get into the business of setting a special price for a special customer, then very soon we'd not be treating all customers equally. So we don't negotiate price.

Who settles disputes?
If there's an issue with the customer, it's usually solved locally by escalating it up the chain in that service office. So ultimately, it is the local service manager who will be called in. It is extremely rare that a problem would get escalated above that. However, as a safety net, the customer always has the ability to contact an area sales vice-president or someone back at corporate headquarters.

Have you arranged electronic document interchange with large customers?
We've certainly done that on the ordering side. We have a large system called the Electronic Store where any customer can gain access and place orders with us, receive quotations and check prices. That is happening today. We are currently not doing electronic billing, although we have been looking at that.

Is that something we might see in the near future?
Not in the immediate future.



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Leonard Vairo

ENTRY POINT: SALES

PATRICIA GAUDETTE

Leonard Vairo, a sales executive in DEC's Western Massachusetts region, has worked eight years for the company, the past four selling in the field. He talked with *Computerworld* Senior Editor Glenn Rifkin about what it is like for customers to interact with DEC's sales force.

Customers feel that DEC is so big now that it is like dealing with several companies, not one.
DEC has undergone a major metamorphosis in how we approach our customers. We recently restructured such that we have multiple folks calling on customers, but they're all targeted to specific areas.

For example, existing installed systems would have somebody on the team calling at a particular level for smaller upgrades, while a general account manager coordinates all the activities in that customer's account. So there may have been some confusion by bringing in more folks over the past year, but it is to deliver better support and more focused support to the customer.

Also, DEC is so multifaceted in what we are selling — networks, computer systems, workstations — that we have to elicit support from our internal organization to come out and help us with those unique customers' needs because we can't do it all ourselves.

In that respect, we do bring a lot of faces into the customer's account. But that's a benefit to the customer.

What is the average tenure of a DEC sales representative?
In the past it was probably four years. That's fast approaching upwards of double digits. Sales has changed from a person who can do technical configurations to a business person. My background is [the University of Pennsylvania's] Wharton School, MBA. A lot of my colleagues are MBAs or have business experience. I was a finance manager before going into sales.

What qualifies someone to sell for DEC now?
Certainly one [qualification] is business acumen, the ability to understand the customer's business and have a macroeconomic view of the direction and trends in the business world. Probably foremost is the capacity to learn and identify how new technologies will affect that customer's business. Today, we're getting into imaging, desktop publishing and other new technologies.

How has selling for DEC changed in recent years?
When you look at DEC products today, they are pretty easy. You have a VAX, and it comes in a half-pint, a quart and a 55-gallon drum, so you really don't care what the hardware is. You're more focused on what the customer's business problem is: what solutions we have that can take an application set and solve the business need.

And then you can say what size the hardware needs to be, and we'll get the hardware.

So what we're really looking at is for that person to be like the doctor: Come in, we'll consult with you. And that industry expertise is extremely important. We train a lot of our people unique to industries.

How many times a year do you visit a typical large account?
More like how many times a week. As our business grows, we're heading toward one company, one sales rep.

Do customers want that much love and care?
Sure. If we're talking about a $20 million manufacturer with its own support staff, they don't want to see you every week after you've made the sale. There are, however, larger customers who have multiple projects going on and staffs of 300, 500, 1,000 MIS folks, and they are continually trying to integrate new applications, integrate DEC equipment with IBM, find new ways of doing it better, faster, cheaper. And there are opportunities for that customer and for DEC.

IBM has an office right at the customer site. They don't seem to get sick of IBM. And thus far, they haven't gotten sick of DEC, either.

Today, you face more multivendor shops and more aggressive sales representatives everywhere, especially from IBM. Do you find yourself sitting in the waiting room with other sales reps waiting to get the MIS manager's time?
I'm sure that's not uncommon. But what I've found, personally, is that companies today seem to be looking mostly for a two- or three-vendor strategy. So they are trying to minimize the standing-room-only crowd in the waiting room.

Some customers say that if they are a large organization, they can be characterized as both a "major" and a "national" account at the same time, and that causes confusion for them from a sales contact point.
We have divisions of national accounts which are geographically dispersed, and therefore we have a local person working with that particular division with local support. And we've come a long way in integrating that division strategy with the corporate strategy, getting the corporate resources and corporate direction that our national account folks are working on cross-pollinated to the satellite offices or the divisions.

That was a problem in the past, but our national account organization has put a lot of time and money behind the integration of our own DEC sales force and taking those folks who are remote and integrating them with the corporate offices to make sure we have one message going out to the customer.

How recent is that change?
The last 12 to 15 months.

DEC sales agents work on salary rather than commission. Do sales suffer due to lack of incentive?
You have to have a conviction that the products you sell and the customer satisfaction make your job easier, and you feel good about what you are doing. If you go into the commissioned environment, where there are fewer support folks, getting demonstrations is difficult. There's an aggravation factor in the commissioned environment.

But what kind of salary structure must you have to offset the lure of commission? How do you keep those people happy?
We certainly are competitive. If we weren't on an annualized basis, we would see an exodus from DEC. We are well paid. The other piece is that there is a bonus program such that the top performers do get an incremental hit.

How much is the bonus?
I don't want to say exactly, but the top 20% get a bonus. That's very important. The other piece of it is that a lot of commission structures are

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"WE wouldn't be where we are, and IBM wouldn't have woken up, if we had not stepped on their toes in certain areas. We've gained market share at their expense. We're cautiously enthused about that."

……

set, and if you want to go with a small start-up and take the chance, you may hit. If you don't — if you want to go with something a little more safe like the Apollos or Suns of the world — you're seeing that their base salaries are getting higher and commissions getting smaller. They are approaching what we are doing with a salary-plus-bonus program.

But when you are out there looking for good young people and they hear that there is no commission, is that a tough sell?
That question has never come up when I've interviewed or recruited people. What they care about is that DEC is growing at such a fast rate. If we are growing at 20% or 30% a year, we are doubling our size every couple of years, and the opportunity for advancement — to get into executive-level selling or management — is tremendous and probably supersedes that of the commission structure.

I have run into several former IBM sales reps now at DEC. Is that a trend you are seeing?
Absolutely. It used to be just the BUNCH people — the NCR [reps], the Honeywell folks — who were coming across. But now there're a lot of IBM folks. It's good to see that, and they bring to the table quite a bit of talent.

Has there been much movement of DEC sales agents going to IBM?
No, because IBM doesn't usually hire, except right from college, and then grooms people within their own arena.

I'm hearing that customers are frustrated because the good DEC sales reps are getting promoted away from their accounts, and they are left with younger, inexperienced people. Is it enough to train new people for a few months and then send them out head-to-head against IBM?
What happened in the past is that you had somebody who was a crackerjack, and they did move up. Now, we've restructured the sales organization with sales executives and account managers who are beyond the senior sales rep level. So you have alternative career paths. You can continue to be a sales professional, or you can go into sales management. You won't be impacted negatively either way.

Networking is a difficult concept and a tough sale. How do MBAs from Wharton without technology training sell networking?
First, the rep has to have some knowledge of what networking can do. That's where the training comes in. The next level is determining what is the customer's business problem such that — from a cost-justification standpoint, from an information-flow standpoint — the network provides a benefit to that customer that supersedes the cost.

Today, the customers really don't care if it says IBM or DEC on the box. They are looking for a solution to their business problem. Being able to eloquently and concisely communicate the benefits of our solutions to their business problems is the key.

Can the DEC sales force handle the onslaught from IBM?
Absolutely. We wouldn't be where we are, and IBM wouldn't have woken up, if we had not stepped on their toes in certain areas. We've gained market share at their expense. We're cautiously enthused about that. We've made sales and worked with customers who were previously only IBM shops because we had something to deliver to them.

How do you sell a VAX into an IBM account?
In the past, you wouldn't get that sale. And for the most part, you'd want to bring it down to a technology issue like MIPS or clock speed. Now, we have to try to help the customer understand what our solution delivers, which is better not only in the short term but in the long term, architecturally.

Are you specifically targeting IBM as the competition looming ahead of you?
It is a major concern. IBM is a fantastic company. They do very well, they have a big engineering staff, and they can crank out products effectively. The [IBM] 9370 just forces us to be that much more focused.

We're not standing still, either. We have new products coming out and a continued focus on the customer. If the 9370 doesn't solve a customer's business problem, then we're not worried about it. It will solve some business problems. But we feel we can solve those same business problems more effectively.

What are DEC sales reps measured by?
We have a quota that the corporation targets us for. In addition, we are measured on customer satisfaction. We have surveys that go out based on the sales and support function. And that goes right to our salary reviews.

DEC is rolling out VAXs so fast that customers don't know when to jump on the train. Doesn't that create tremendous pressure for sales agents to keep the customer happy?
The customers would feel betrayed if a VAX really did become obsolete. But the 11/780 is still an excellent product and still runs the same software that the new products today will run and the products five years from now will run. So you never feel that the customer is making an investment in obsolete equipment.

But in terms of price/performance, it could be made obsolete pretty quickly — for example, the 8600.
Yes. And we've learned from that lesson. Later, when we brought out the 8500, we went out and did free upgrades to the 8530 because we brought out that enhancement faster than the market was able to swallow.

Can customers expect that policy to continue?
What customers should expect is that they have business problems today that they want to solve and that they are going to need capacity. DEC has it now; we have the products today that, price/performance-wise, beat the competition at just about every point of comparison.

Can we get better? Sure. And I'm sure we will. If you have a business problem you need solved today, you buy what we have today. Don't worry about investment protection, because it will be there.

Do you ever get into a debate over millions of instructions per second [MIPS] with customers, based on IBM's reading of MIPS vs. DEC's?
MIPS gives you a relative thing. A sales rep would be remiss in not redirecting the discussion to, "What is your business solution, and can we process that application faster, cleaner, less expensively than IBM can process that application?" If we can do it on 2 MIPS and it takes them 20 MIPS, or vice versa, it really doesn't matter. Price/performance-wise, are we better in doing that same application? It's all in how you determine the benchmark.

Customers are also confused about discounts and licensing. They say DEC has been inflexible on this issue.
The most confusing part about the licensing has not been our policy but the confusion in setting that policy. The policy today is very cut-and-dry.

If I were to present it to you as a new customer who never knew DEC before, you'd say, "I understand that completely." [But] customers who went through that change and the wavering back and forth — we weren't going to license, now we are relicensing sales of used equipment — that's where the confusion has come up.

What is the single, toughest assignment for a DEC sales representative?
The single, toughest assignment is the investment assignment, which is putting together a well-documented plan and identifying the resources that go along with a multiyear strategy for a new customer that hasn't done business with DEC before.

Quite frankly, those customers aren't just in the commercial areas. They are in manufacturing, in our traditional accounts like insurance companies, banks, brokerage houses. You have to go through the stages of education and awareness. You have to battle misperceptions in overcoming that.

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Circle Reader Service Number 46

John Fischer
ENTRY POINT: SERVICE

John Fischer, DEC's area manager for service and support in the New York/New Jersey region, is responsible for customer satisfaction in an area that includes virtually the entire financial sector of DEC's business. He joined DEC's field service group 18 years ago and now oversees 1,100 employees.

Fischer spoke recently with *Computerworld* Senior Editor Glenn Rifkin about what customers can expect in terms of service and support.

P. CHARLES LADOUCEUR

What is your most common service call?
Customers are redefining service. They are moving toward uninterrupted applications. In fact, there has literally been a technology revolution taking place in the past year.

We have a responsibility to customers to make sure they meet their critical business success factors. It used to be they'd have a problem, call us, and we'd respond. Downtime would be tolerated, and we would go off and solve the problem. What's changed is that they no longer want downtime. They want to create "work-arounds" — uninterrupted applications.

Customers are redefining service in other ways, too. They are expecting more of a consultative approach. We're in a business where we stopped fixing hardware and are now fixing our customers. They're asking our engineers and our first-level management to spend more time with them. In many cases they are asking us to plan with them and [are] seeking advice. It's more partnership-oriented. Service used to be supplier and customer; today the two organizations are more of a partnership.

Service used to be looked on as an afterthought. Can you define what service and support are today?
The service model has changed almost overnight. A product would be on the street for seven years; today it is on the street maybe 18 months before the product is changed. As a result, your approach to taking care of the customer changes. You must invest up front in the proper training. We have to do it up front because we can't do it at the expense of the customer.

In fact, product life cycles have changed dramatically. We're moving to a very technology-intensive business vs. a labor-intensive business before. DEC has taken an integrated approach, in terms of its services. We look at how customers use their systems and design their service delivery strategies around the use of those systems. Three or four years ago, we would service a computer; today, we service a network of computers. The reliability of each component is very high. But it exponentially compounds itself when you tie all those components together.

As a result, we've made significant investments over the past few years in artificial intelligence and remote diagnosis. Remote diagnosis is very different from remote diagnostics. Diagnosis is monitoring and looking ahead, looking for symptoms prior to it breaking; vs. diagnostics, which means it's already broken.

We're looking at more predictive or symptom maintenance and software work-arounds that will keep the customer's business or application up vs. going in and fixing a down situation.

Are more calls handled remotely now?
From a pure fault situation, the algorithm has shifted dramatically to not having a down application. It isn't so much whether they've been done remotely, because in many cases the customer will look into the software and receive a flag and it is something they can handle themselves.

How does a customer get charged for service?
Many new customers may perceive that we come in and fix a computer. What we really do is sit down and plan with you right from the beginning what you want to do — from the design of the application to the design of the computer room to the design of the network. We'll manage the installation, we'll manage the life cycle of the application. And we offer every variety of service you may require, from guaranteed response times to next-day service. We're very flexible in what hours of coverage you might need. We try to match that up to how you run your business.

Do you have a deluxe service?
Our premier service is called Decservice. With that comes guaranteed response times and some other services.

But cost is based on the number of components. It's not a percentage of something.

We recommend our customers buy Decservice. It's a quality level of service that comes with all the engineering updates that would come out. That's priced accordingly to what you are doing with your system and all the components of your system, [as well as] the software.

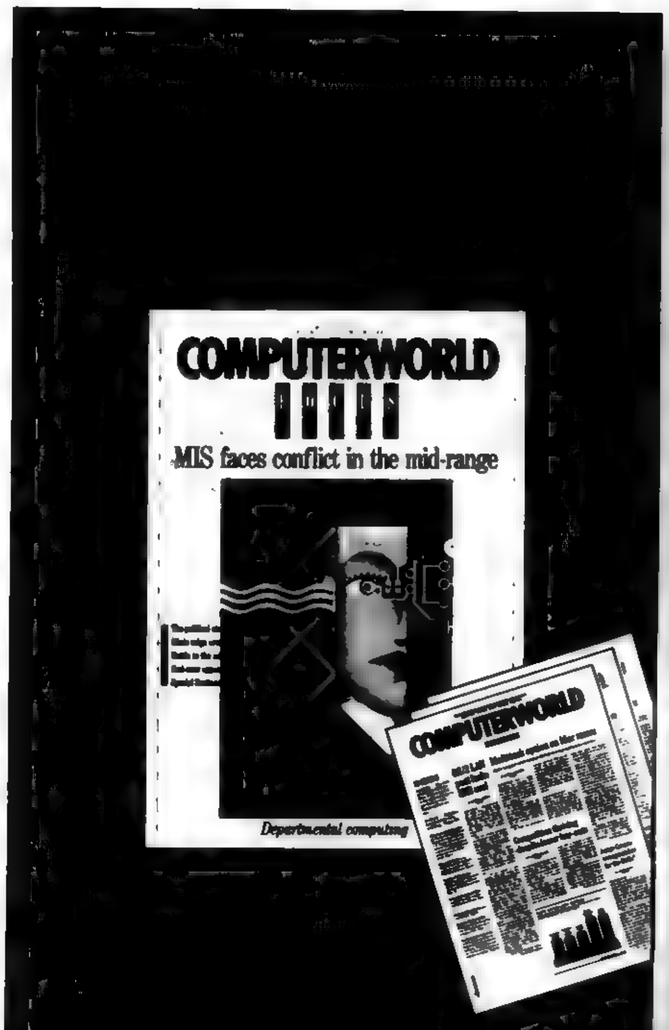
DEC is pushing hard in the area of networks. Does that make your job tougher than it was before?
A few years ago, we looked at how customers were going to use systems. We saw that they would use systems talking to systems. So we decided to approach service from the top down, from a customer's view of managing a network. We started with investment and design into those systems. We have our own internal services engineering organization that works and complements engineering in the design of a product.

In other words, there will be points within a particular product that can be software- or hardware-checked that would report a failure that comes up. As a result of putting those designs into the product, we've been able to invest in our remote diagnosis center artificial intelligence software that can then go in and monitor these.

Can customers expect one contact to the company when they get a service contract from DEC? Will they always deal with the same person?
If you have a large, dispersed geography and you only have two people covering two states, you may not get the same person all the time. But we do expect our account rep to call back and make sure the customer is taken care of. You can also have a designated person in our remote support centers who provides remote support.

In a multivendor site, who is responsible for service when it is unclear who controls what?
Customers are asking for one contact; that's what we're hearing. In most cases, our software is designed in terms of network management so that it is relatively easy to tell when it goes to someone else's piece of equipment, and we'll inform the customer of that and they can manage the other vendor.

We're acting much more now as a single source if they choose us to be, even to the point where we will manage the other vendor — do vendor notification, tracking the other vendor, making sure they respond, making sure they close it out and then going back and testing. It's a program called Netcare that was introduced a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If a customer so chooses, for a fee, will you cover everything?
It's now called Netsupport and Maintenance Management. It is an available service. We may be a single point of contact for the entire network, and we can be a contact for a majority of it.

How does that work?
It's very easy to determine that a node over here is not responding. In fact, the customer under Vaxsim sees all the pieces of equipment. Vaxsim is a software product they run that will tell them what errors are coming up, and who is there and who isn't. It's almost like a traffic light.

The system points out a software error over here, so a yellow flag comes up. A green flag says the product is working. A red flag says it's gone beyond the threshold and is not performing. And you can literally sit there and look across your network worldwide at every product.

Then we can have Netsupport go in and find out which component is faulty and figure out if it is a DEC product or someone else's. Depending on our relationship with the customer and what they want us to do, we'll go find out and manage the vendor, notify the vendor of what's wrong.

Do you run into any problems confronting a competing vendor saying, "We are now running the account's service maintenance, and you have to come and fix your equipment?"
We have not run into that. They are more than collaborative. I've seen instances where they clearly had the customer in mind.

What about the customer who doesn't have the Netsupport service agreement with you and it's every man for himself? What do you do if the link to the mainframe is not performing up to standards and you think it's IBM's fault while they say it's yours?
Until the problem is solved, I would make the assumption that the problem is ours so as not to penalize the customer.

Secondly, I would escalate the customer orientation to get him to manage the responsibility of whatever other vendors are involved. They have to assume some of the responsibility if they don't have someone accountable for the whole network.

In the banking and financial marketplace, if something is down they will be glad to work with anyone to solve it. They can't have those things down. In all my experience out there, I've never had to deal with another vendor to solve a major situation in a conflict mode. Either we've gotten the customer to do it, or we have worked with other people to do it.

If you took a typical configuration, say a VAX 8600 with Microvaxes serving Vaxmates, how often would service be needed in that setting?
That's a tough question. The reliability in our equipment today has gone up exponentially. Some of the products today still require a certain amount of preventive medicine. In many cases, it's software maintenance, optimization of software.

How many times do you get called in for that?
We provide that service called Digital Software Information Network (DSIN) to a customer. It's literally a software and media contract. The customer gets updates. Also, if they have questions and issues that come up, they have access to and [can] dial into a data base, look up the symptoms and get the latest information. So a lot is done without ever talking to a DEC service person. DSIN is the software information network, a very powerful tool.

I've heard that DEC is closing out some third-party vendors from its own learning centers. Is that accurate, and if so, why?
I'm not familiar with that, but I'll comment on it. We make available to third-party maintenance organizations the same spares and the same maintainability documentation and tools that many of our self-maintenance customers have. There are additional things not available to them, some specific licensing and associated training that goes with a certain level of proprietary software.

We make available to the marketplace the tools to maintain self-maintenance. We even provide kit levels and engineering changes to third-party maintenance organizations.

Now, there is another level of self-maintenance customers, or standard customers, people who own the system and have purchased the rights to licensing of higher level diagnostics and investments, which DEC has put in and which we will protect and provide to those customers. Understanding that we are moving from a hardware to a software orientation, our engineers are moving from hardware-oriented to comprehensive networking software skills. We are moving to a technology-intensive service delivery using artificial intelligence. We designed our services approach for all the components working together vs. the individual point/product approach. Third parties are feeling that technology is becoming their competitor.

But you are hearing grumbling from them as one more area where DEC is closing the doors to them?
We want to be the service vendor for DEC products, and we will be. But technology is changing the ground rules. The ability for a service organization to recapture its investment — where you need to invest up front in very costly and complex inventories that require specific handling and training, and having the use of diagnostic tools that we put tremendous investments in — creates a barrier to entry. It's technology driving that; technology is their competitor.

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Circle Reader Service Number 47

THE BOTTOM LINE

CAN DEC CONTINUE TO FLY?

BY CLINTON WILDER

The DEC story of the past two years is destined to become a classic business school case study of corporate financial success. Although a huge challenge to achieve in reality, the formula is actually quite simple: Increase market share to grow revenue, while driving profits with dramatically improved operating margins.

The question now is, Can DEC keep flying? The answer, according to financial analysts, is yes — but not using the same methods of the past two years.

The company admits that it will be hard-pressed to improve on pretax profit margins that surpassed 18% — more than triple DEC's margins two years ago — in the fourth quarter of fiscal 1987, ended June 27. That margin growth, which is astounding for a $9.39 billion company, resulted from a higher margin VAX product line as well as manufacturing efficiencies. It was those increased margins that accounted for DEC's 84% rise in profits during the fiscal year on a 24% revenue increase.

"The market share that DEC gained at IBM's expense is very high-margin market share," says Marc Schulman, minicomputer industry analyst for Salomon Brothers, Inc. "A lot of the difference between DEC's and IBM's financial performances is the fact that in the past, that would have been IBM's business."

But margins have reached their peak and will probably decline slightly in fiscal 1988, analysts say. During that time, DEC's profitability will depend much more on its ability to increase sales. DEC plans to spend aggressively in a few key areas, raising its break-even point in the short term in an effort to solidify its future growth.

"We're in the best position we've been in in a long time," says Mark Steinkrauss, DEC's director of investor relations. "We've got to go for it. We will reinvest in research and development, sales and sales support to gain more market share, now that we have the people and the resources to do it."

DEC is well aware of its past business cycles, which saw profits drop 9% in fiscal 1983 and 3% in 1985, according to Shao Wang, an analyst with Smith Barney, Harris Upham & Co. "DEC clearly wants to avoid that trough period again," Wang says. "You have to build for the future, and it costs money, so you won't see that huge ramp that drove earnings before. In a sense, that puts DEC in the same camp as everyone else."

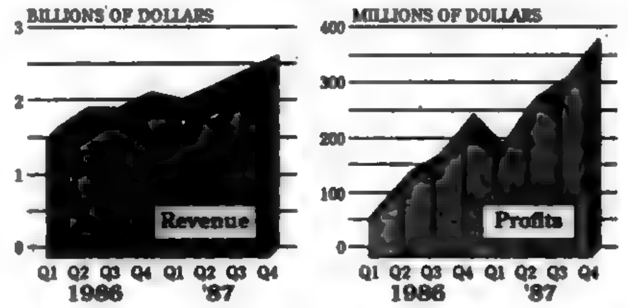
Like other analysts, E. F. Hutton & Co. veteran Michael Geran is confident that DEC can achieve the roughly 25% revenue growth it needs to maintain strong profitability. "In a business where product prices always come down, one of the keys is to offer a better product mix," he says. "Twenty-five percent is a pretty ambitious target, but they can make it with the products they have on the way."

In many ways, DEC's formula for success mirrors the pattern of IBM's fast-paced growth in the heyday of its 360 and 370 architectures. In the late 1980s, however, corporate America's computing needs have called for departmental processing and intrasystem communication. DEC is the mid-range vendor of choice to meet those needs.

Wilder is *Computerworld's* senior editor, computer industry.

DEC DOLLARS

DEC's revenue and profits for fiscal 1986 and 1987



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PRODUCTS

THE LAST 12 MONTHS

COMPILED BY SUSAN GRECO

The following information was gleaned from computer analysts, DEC press releases and published news reports. DEC has introduced more than 60 products since the publication of the last *Computerworld Extra* on DEC in September 1986; following is a selected list of products and their current status.

* Indicates the starting price of a product.

The *Vaxmate*

SEPTEMBER 1986

Product name: Vaxmate
Price: $4,045*
Specifications: IBM Personal Computer AT and Microsoft Corp. MS-DOS compatibility; built-in Decnet and Ethernet local-area networking (LAN); 1M-byte memory; 1.2M-byte floppy drive.
Introduced: Sept. 4, 1986
Ship date: September 1986; February 1987 for hard-disk option
Initial outlook: Makes the Rainbow obsolete and presents more formidable competition to the IBM PC family.
Current status: DEC has fixed the problems with the Vaxmate's 20M-byte hard-disk box. Still, "it is not what you would call an aggressive, barn-burner product," says Tom Roberts of International Data Corp. (IDC). "The Vaxmate proves DEC isn't serious about personal computers," says John McCarthy of Forrester Research, Inc. in Cambridge, Mass. Roberts says DEC is shipping about 1,200 units per month. Expect a price cut, both analysts say. "We certainly get some customer push-back on the price," admits John Rose, manager of DEC's Personal Computing Systems Group.

Product name: PC All-In-1
Price: $81,160
Specifications: Microvax II system for up to 30 users; 5M-byte memory; three RD53 71M-byte hard disks; LN03 laser printer; All-In-1 software.
Introduced: Sept, 4, 1986
Ship date: December 1986
Initial outlook: Extends All-In-1 to the desk top, enabling the Microvax II, Vaxmate, Rainbow, IBM PC XT and AT to work together.
Current status: One of several critical low-end products that is not meeting DEC's expectations. Forrester's McCarthy says the product is stymied by its inability to run applications. Look for enhancements soon.

Product name: VAX/VMS Services for MS-DOS
Price: $650-$19,500
Specifications: Includes MS-DOS 3.1, MS-Windows interface, Network/Server software, Vaxmate terminal emulation.
Introduced: Sept. 4, 1986
Ship date: Sept. 4, 1986
Initial outlook: Brings MS-DOS applications into VAX arena.
Current status: DEC has been "cagey" about answering questions on the product, IDC's Roberts says. He believes the burning issue is whether DEC is working on VMS Services for IBM's OS/2. Marty Gruhn, an analyst with The Sierra Group, disagrees, saying the real question is whether DEC should combine VAX/VMS Services with All-In-1. Clearly, the product has not sold as well as hoped, Gruhn says, but she believes DEC will solve the program's problems down the road. McCarthy says the product is too VAX-oriented for most PC users: "It just doesn't perform, and it's too difficult."

Product name: LA75 Companion Printer
Price: $695
Specifications: Dot matrix printer with five printing modes and speeds; dual compatibility with DEC and IBM; uses DEC423 serial interface.
Introduced: Sept. 4, 1986
Ship date: Sept. 4, 1986 (parallel-interface model in November)
Initial outlook: Companion to Vaxmate, printing both MS-DOS and VMS files.
Current status: Doing moderately well, says IDC's Angele Boyd, and should soon surpass sales of LA50, which runs at half the speed.

Product name: Muxserver 100/Decmux II
Price: $10,150
Specifications: Supports up to 16 users and eight remote terminals, printers or PCs; 19.2K bit/sec. transfer rate; automatic error detection.
Introduced: Sept. 22, 1986
Ship date: January 1987
Initial outlook: Complements DEC's line of Ethernet terminal servers, including the Decserver 100 and 200.
Current status: Shipping and will be around for a while; fills a void in the DEC world.

Product name: RD54 hard disk drive
Price: $7,900
Specifications: 159M-byte, 5¼-in. disk drive; average access time of 38.3 msec; transfer rate of 625K byte/sec.
Introduced: Sept. 25, 1986
Ship date: Sept. 25, 1986
Initial outlook: Fills gap between 71M- and 456M-byte disks; targets office, engineering and educational environments.
Current status: Demand is good but not as high as DEC expected, according to IDC's Dave Vellante. He categorized the RD54 as a transition product. "We're waiting for Decworld" to see if new products emerge, he says.

OCTOBER 1986

Product name: VAX 8200/8300 Configuration 2
Price: $89,000-$169,000
Specifications: 24-slot VAXBI bus backplane; Ethernet networking interface; support for up to 128M bytes of memory.
Introduced: Oct. 8, 1986
Ship date: Oct. 8, 1986
Initial outlook: Third enhancement since VAX 8200/8300 introduction in January 1986; provides opportunity for add-on manufacturers thinking of defying DEC's licensing plans on the VAXBI bus.

Continued on next page

Greco is a Boston-based free-lance writer and editor.

LAST 12 MONTHS

FROM PREVIOUS PAGE

Current status: No longer strategic products, says The Sierra Group's Gruhn. Basically, the 8200/8300 has been made obsolete by VAX 8350, although it is still not clear whether you can upgrade directly from the 8200 to the 8350. Gruhn says DEC may be doing away with earlier VAX models too quickly: "Customers will start to say, 'You can always wait for a better deal next year.' "

Price was reduced and memory expanded in August; Gruhn expects DEC to continue to push the price/performance ratio "to the wall" in 1988.

NOVEMBER 1986

Product name: Local Area Vaxcluster
Price: $1,000 for Vaxstation IIs; $1,900 for Microvax IIs; up to $9,500 for VAX 8800
Specifications: Software that provides clustering capabilities for up to 13 Microvax IIs or Vaxstation IIs and a Vaxserver.
Introduced: November 1986
Ship date: January 1987
Initial outlook: Reinforces DEC's ability to link its computing power across networks as well as within smaller work groups.
Current status: In June, DEC doubled the capacity of this strategic product from 14 nodes to 28. Licenses for the new Local Area Vaxcluster are included with Vaxstation 2000 and Vaxserver products. In August, DEC announced the ability to directly attach all VAX 8000 series systems, eliminating the need for Unibus.

Product name: VAX DEC/MAP
Price: $12,000-$16,500
Specifications: Implements seven-layer Manufacturing Automation Protocol (MAP) system.
Introduced: Nov. 12, 1986
Ship date: January 1987
Initial outlook: DEC is walking a tightrope; must stand behind the coming MAP standard to keep position as a primary vendor of factory floor computers but is trying to sell its Ethernet and Decnet — which do not meet all MAP standards — into the factory environment.
Current status: Ken Olsen has been quoted as saying that General Motors Corp.'s MAP "tries to achieve too much technically and is too expensive to implement." His argument has firm grounding, says IDC's Marcia Brooks, but that doesn't mean DEC/MAP is in limbo. "It's less than whole-hearted commitment," Brooks says. But, she adds, "They can't throw it out the window."

DECEMBER 1986

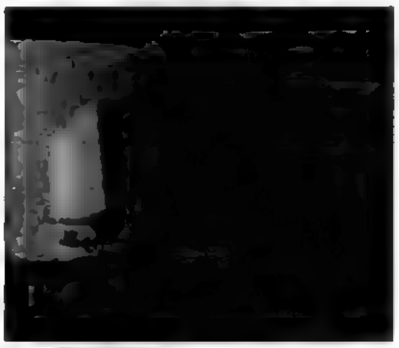
Product name: Decmate III Plus
Price: $5,145
Specifications: 20M-byte hard drive; floppy drive; Gold Key word processing; VT100 and VT200 emulation.
Introduced: Dec. 4, 1986
Ship date: February 1987
Initial outlook: Operates as a standalone workstation, terminal or host system; can also be used for document transfer.
Current status: Perhaps best summed up by IDC's Roberts: "What is it?" If nothing else, it satisfies the installed base's need for a hard-disk version of Decmate.

JANUARY 1987

Product name: RTVAX 8550
Price: $330,000
Specifications: VAXBI bus; 6.6 million instructions per second (MIPS); 8M-byte memory.
Introduced: Jan. 6, 1987
Ship date: January 1987
Initial outlook: Optimizes VAX 8550 for real-time applications; some say it competes with Concurrent Computer Corp.'s 3280MPS.
Current status: Bob Randolph, director of DEC advisory services at IDC, says early indications spell out greater increases in shipments of the 8200 and 8250 this year than in 1986. But even greater increases in shipments will occur at the upper end of the VAXBI 8000 series, including this model.

Product name: RTVAX 8700
Price: $398,000
Specifications: VAXBI bus, 6.6 MIPS; 8M-byte memory.
Introduced: Jan. 6, 1987
Ship date: January 1987
Initial outlook: Optimizes VAX 8700 for real-time applications.
Current status: See "Current status" above.

Product name: VAX 8978
Price: $4.8 million*
Specifications: Eight VAX 8700s, four HSC70s, two SA482s, up to 52 MIPS.
Introduced: Jan. 20, 1987



The *VAX 8978*

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Ship date: April 1987
Initial outlook: Part of campaign to gain ground in the lucrative, IBM-dominated Fortune 500 data processing market; aimed at IBM's high-end 3090 Models 200 and 400.
Current status: What's important in the very high-end computing arena is parallel processing, according to Gruhn. "DEC has some real screamers in the wings," she says.

Product name: VAX 8974
Price: $2.6 million*
Specifications: Four VAX 8700s; two HSC70 I/O processors, SA482 Storage Array; supports more than 1,000 users; 26 MIPS.
Introduced: Jan. 20, 1987
Ship date: April 1987
Initial outlook: Should help increase penetration of financial services marketplace.
Current status: See "Current status" above. While the 8974 and 8978 should help increase DEC's popularity in the Fortune 500 DP market as well as in financial services, the new models' impact won't stop there.

Product name: SA482 Storage Array
Price: $84,000
Specifications: Stack of four RA82s; 2.5G bytes of storage; linear density of 13.6 million bit/sq in.; 5.5-sq-ft rack; average seek time of 24 msec.
Introduced: Jan. 20, 1987
Ship date: Jan. 20, 1987 (or May 20 as an add-on)
Initial outlook: Opened the door to a "mainframe-class" disk subsystem.
Current status: Normal ramp-up, although availability not tremendous for some customers, IDC's Vellante says. DEC should be producing 30,000 to 40,000 units per year and is not quite there yet, he says.

Product name: Decwindows
Price: Not announced
Specifications: Not announced.
Introduced: Jan. 20, 1987
Ship date: Not announced
Initial outlook: Will eventually establish a standard DEC user and application interface for all DEC desktop computers; goes a step beyond DEC's Jan. 15 endorsement of MIT's X Windows system.
Current status: "It's essentially vaporware," Gruhn says. "The strategic intent is to be wonderful sometime in the future." Nevertheless, Decwindows is critical to DEC's overall integration theme. Expect to see it pop up on the Vaxmate and the Microvax 2000 and to eventually be bundled with All-In-1, Gruhn says.

Product name: VAX RDB/VMS Version 2.2
Price: $7,080-$35,400
Specifications: SQL interface; a VAX C precompiler; support for distributed data base management capabilities.
Introduced: Jan. 20, 1987
Ship date: Jan. 20, 1987
Initial outlook: Emphasizes DEC's commitment to Codasyl-compliant data base software and its more recently introduced relational data base product.
Current status: Pulling a growing share of the market away from competitors Ingres, from Relational Technology, Inc., and Oracle, from Oracle Corp. From a performance standpoint, it holds its own against its relational rivals.

Product name: VAX DBMS Version 3.2
Price: $10,920-$54,600
Specifications: Direct control of placement of data; enhanced statistics package.
Introduced: Jan. 20, 1987
Ship date: Jan. 20, 1987
Initial outlook: To run twice as fast as earlier versions and more easily restructure data bases.
Current status: A candidate for the "aging product" category, VAX DBMS is losing sales to its relational cousin, RDB/VMS.

Product name: VAX Data Distributor
Price: $1,800 (Vaxstation II); $27,000 (VAX 8800)
Specifications: Works with RDB/VMS, RDB/ELN, VIDA; two methods of data distribution; centralized storage.
Introduced: Jan. 20, 1987
Ship date: February 1987
Initial outlook: DEC becomes a competitor in one of the two most hotly contested arenas of its own third-party data base software market; first step toward a VAX distributed data base.
Current status: So far, it operates only one way, distributing data from a host data base, but has no provision for updating. A Band-Aid solution aimed at IBM's Distributed Data Management.

Product name: VAX SQL Software
Price: $1,770-$35,400
Specifications: Interactive data manipulation and data-definition languages; compatible with VAX RDB/VMS and the VAX-to-IBM Data Access product called VIDA.
Introduced: Jan. 20, 1987
Ship date: Spring 1987
Initial outlook: DEC becomes a competitor in the second most hotly contested arena of its own third-party data base software market; first implementation of SQL.
Current status: "Not doing astonishingly well," says Shaku Atre of Atre International Consultants, Inc.

SQL is a must-have item for DEC, which is trying to win back market share from established relational vendors Oracle and Relational Technology with a

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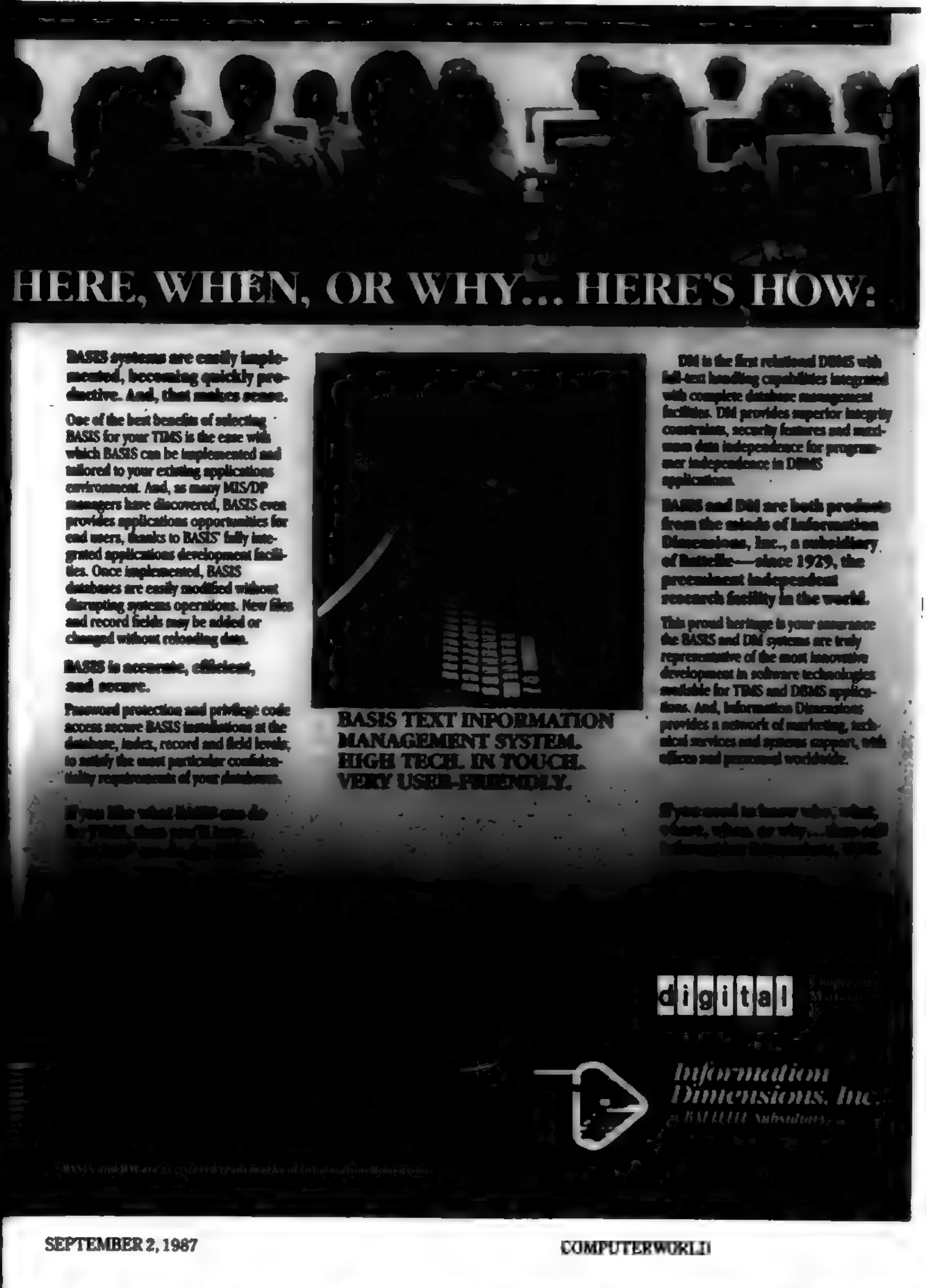

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LAST 12 MONTHS

FROM PREVIOUS PAGE

combination of VAX SQL software and its RDB/VMS.

FEBRUARY 1987

Product name: Vaxstation 2000
Price: $5,400 ($4,600 with 15-in. monochrome monitor)
Specifications: Entry level: Microvax CPU chip with floating-point unit, 4M-byte memory, VMS and Ultrix; up to 14 custom chips; 0.9 MIPS; 19-in. monochrome monitor.
Introduced: Feb. 10, 1987

The Vaxstation 2000 workstation

Ship date: March 1987; December 1987 (15-in. monitor)
Initial outlook: For the most part, replaces monochrome Vaxstation II. Viewed by some as aggressive positioning in the workstation market against the likes of Apollo and Sun; others say DEC still has a long way to go to compete against these two.
Current status: DEC slashed its starting price from about $10,500 to $5,400 for a monochrome system, spurring what some have called an all-out price war at the low end of the workstation market. "It's a shake-'em-out mentality," says Norman Weizer, a senior analyst at Arthur D. Little, Inc. "Cutting prices in half — who ever heard of that?"

Product name: Microvax 2000
Price: $11,100-$20,195
Specifications: Entry level: Microvax II CPU and floating-point unit, 4M-byte memory, 42M-byte hard disk; 1.2M-byte floppy; up to 14 custom chips; 0.9 MIPS.
Introduced: Feb. 10, 1987
Ship date: May 10, 1987
Initial outlook: See "Initial outlook" above.
Current status: With the Microvax 2000, DEC is less likely to declare an all-out price war.

MARCH 1987

Product name: Scriptprinter
Price: $6,295
Specifications: LN03 laser printer; supports Adobe Systems, Inc.'s Postscript page-description language and Regis, ANSI/Sixel and Textronix 4010/14 protocols; 29 resident typefaces; 8 page/min.
Introduced: March 3, 1987
Ship date: May 1987
Initial outlook: Complements VAX Integrated Publishing (VIP) work group solutions.
Current status: LN03 fared well; within the VIP publishing arena, so should Scriptprinter, IDC's Boyd says. Here's the issue DEC faces: Would a customer buy a competitor's product if it also had Postscript and was cheaper?

Product name: Vaxmate VIP Publishing System
Price: $6,670 ($12,190 for VIP Plus including Scriptprinter)
Specifications: Works with MS-Windows, MS-Chart, WPS-Plus and Aldus Corp.'s Pagemaker; runs under VMS.
Introduced: March 3, 1987
Ship date: July 1987
Initial outlook: DEC's attempt to integrate electronic publishing from the top down and to counter desktop publishing solutions from IBM, Apple Computer, Inc., Wang Laboratories, Inc. and Hewlett-Packard Co., among others.
Current status: "No intense demand," IDC's Joan-Carol Brigham says. Vaxmate sales are slow anyway, she adds.

Product name: Vaxstation Publishing Solution System
Price: $154,060
Specifications: Six-user Vaxstation 2000 with Interleaf, Inc.'s Technical Publishing Software; diskless.
Introduced: March 3, 1987
Ship date: April 1987
Initial outlook: Tied to success of Vaxstation.
Current status: Huge price drop in the Vaxstation 2000 should help sales. The question remains, How long will DEC be able to hold out with these prices?

Product name: VAX Departmental Publishing Solutions
Price: $41,691*
Specifications: Can be configured for any VAX system with publishing software that can be accessed from All-In-1; supports Information Dimension, Inc.'s Basis.
Introduced: March 3, 1987
Ship date: March 1987
Initial outlook: Not a packaged system but a generic umbrella term.
Current status: Although this is the high end of the VIP series, DEC faces much competition here as well. From a systems point of view, IBM is the main competition. Interleaf is both friend and

Continued on page 72

The Silent 700™ Data Terminal Series from Texas Instruments.

Next time you take off, take the DEC connection.

Talk about convenience for the DEC user. TI's TravelMate™ 1200 is display, printer and communications all rolled into one lightweight, go-anywhere package that emulates a VT-100™ video terminal. With it, you can access DEC computers from just about any remote location as long as there's a phone handy.* Perfect for on-the-go DEC communications.

The TravelMate 1200 VT-100 emulation cartridge also includes auto access features such as stored phone numbers and log-on sequences. This actually makes your TravelMate-to-DEC communications easier than using a phone. And the VT-100 emulation cartridge can be programmed to fit individual applications within your DEC operating environment.

The TravelMate 1200 with VT-100 emulation capability also carries an impeccable pedigree — a 15-year heritage of reliable, rugged design and dependable operation. After all, it's a member of the Silent 700 Series of Portable Data Terminals family from Texas Instruments. It's definitely a terminal you can trust.

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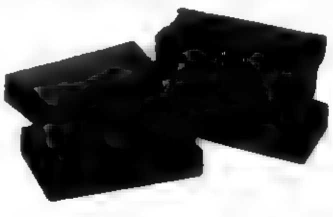

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CONTROL DATA

LAST 12 MONTHS

CONTINUED FROM PAGE 70

foe, IDC's Brigham says. With Interleaf, DEC "walks a fine line," she says.

Product name: VAX 8250
Price: $65,000*
Specifications: VAXBI bus; 1.2 MIPS; memory expanded to 128M bytes using 1M-bit chips.
Introduced: March 4, 1987
Ship date: March 4, 1987
Initial outlook: Replaces VAX 8200, helps DEC fill holes in VAX line and maintain price/performance advantages over IBM's 9370.
Current status: IDC's Randolph says he suspects that users who have "run out of steam on the Microvax II" are buying the 8250. Throughput increased (DEC claims by 40%) in August via expanded high-density memory. Price reduced to $92,000 from $96,000 for a 16M-byte configuration.

Product name: VAX 8350
Price: $88,000*
Specifications: VAXBI bus; 2 MIPS; memory expanded to 128M bytes using 1M-bit chips.
Introduced: March 4, 1987
Ship date: March 4, 1987
Initial outlook: Replaces VAX 8300; see "Initial outlook" above.
Current status: Compared with the low and high ends of the VAXBI line, only moderate increases in shipments are expected for the mid-range systems — the 8300, 8350, 8500 and 8530 — this year over 1986, according to IDC.

Throughput increased (DEC claims by 40%) in August via expanded high-density memory. Price reduced to $124,000 from $132,000 for a 32M-byte building-block system.

Product name: VAX 8530
Price: $291,000*
Specifications: VAXBI bus; 4 MIPS; 50% reduction in footprint size to 6 sq ft; memory expanded to 256M bytes.
Introduced: March 4, 1987
Ship date: March 4, 1987
Initial outlook: Replaces VAX 8500; see "Initial outlook" for VAX 8250.
Current status: See "Current status" above. Price reduced in August to $342,000 from $347,000 for 32M-byte system.

Product name: Industrial VAX 630
Price: $32,615*
Specifications: Sealed, passively cooled Microvax II with floating-point processor; 5M-byte memory; 71M-byte disk.
Introduced: March 24, 1987
Ship date: July 1987
Initial outlook: Moves VAX processor family and Decnet onto the factory floor. Designed for supervising or controlling a group of similar tools in a manufacturing cell.
Current status: "DEC's factory tool offering is probably the strongest of any computer vendor," says Tony Friscia of Advanced Manufacturing Research.

Product name: Industrial VAX 620
Price: $11,330 (diskless); $23,930 (with 71M-byte disk)
Specifications: Sealed, passively cooled real-time VAX with floating-point processor, 1M-byte memory, six or 12 slots.
Introduced: March 24, 1987
Ship date: July 1987
Initial outlook: Developed to control robots and other devices that require real-time response time.
Current status: See "Current status" above.

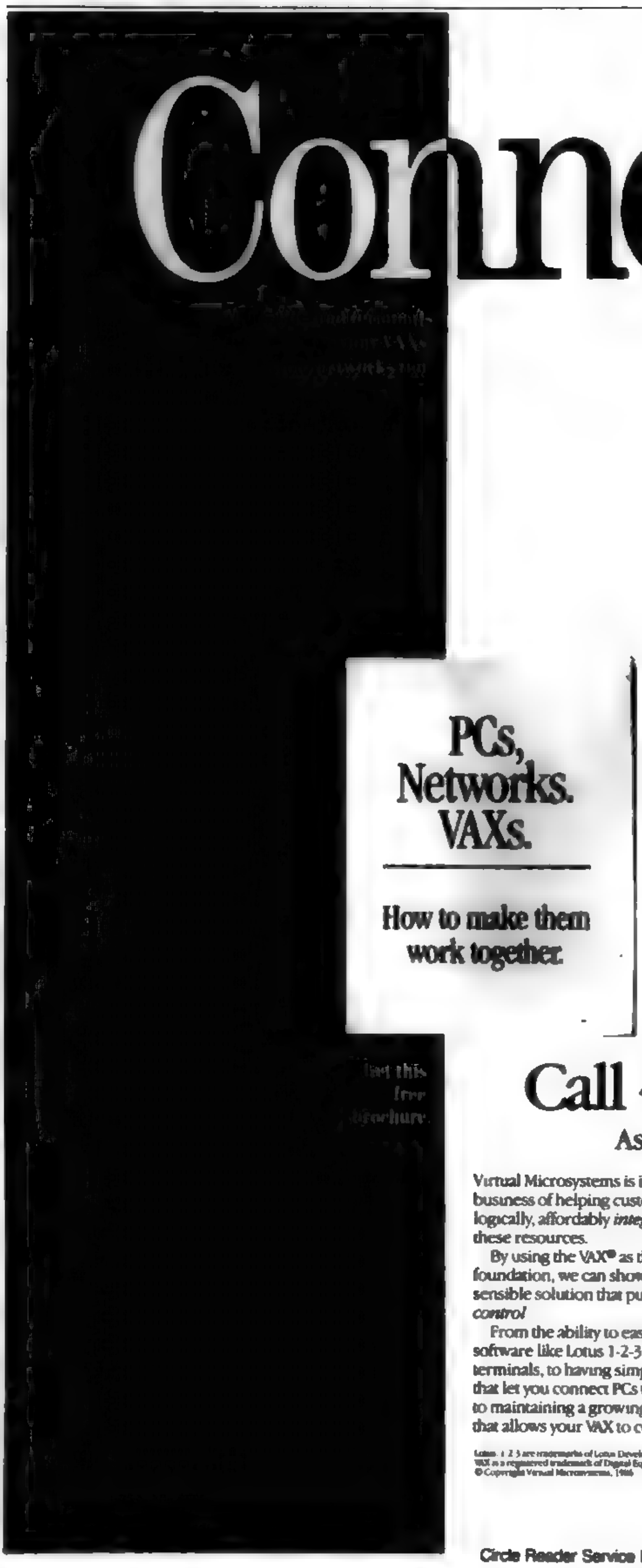
Product name: Industrial PDP-11/83
Price: $29,315*
Specifications: Sealed, passively cooled MicroPDP-11/83 with floating-point processor; 2M-byte memory; 71M-byte disk.
Introduced: March 24, 1987
Ship date: July 1987
Initial outlook: A factory floor version of a processor previously used in manufacturing plant computer rooms.
Current status: "DEC is keeping faithful," IDC's Brooks says. "They won't ever pull the plug on the PDP — there are too many out there."

APRIL 1987

Product name: Dectalk Voice Response System
Price: $40,000*
Specifications: Microvax II, 5M-byte memory, 71M-byte 5¼-in. hard disk; supports two to eight Dectalk channels.
Introduced: April 13, 1987
Ship date: April 13, 1987
Initial outlook: Works with Dectalk; designed to access data bases via Touch-Tone phones.
Current status: Arthur D. Little's Weizer reports that the product is not a big winner, from what can be surmised so far.

Product name: Metrowave Bridge
Price: $28,000
Specifications: 23-GHz microwave link; connects Ethernet LANs between buildings up to 4½ miles apart; 10M bit/sec. throughput.
Introduced: April 13, 1987
Ship date: June 1987
Initial outlook: Expands on LAN Bridge 100.
Current status: "Just one more way to get from Point A to Point B," says Dave Terry, editor of the "Network Monitor" newsletter. Not a technological feat for DEC or a strategic advantage, he says, but useful in terrain in which stringing

Connect.



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fiber-optic cable is not practical.

Product name: VT340 color terminal
Price: $2,795
Specifications: Dual sessions, built-in color graphics editor, resolution of 800 by 500 pixels; interconnects to IBM world.
Introduced: April 21, 1987
Ship date: May 1987
Initial outlook: Replaces VT241; DEC playing catch-up with competition to an extent.
Current status: The VT300 series includes features the competition has sported for a year, IDC's Diane Farrell says. But DEC has added one very important feature: dual-session capability. Farrell is also impressed by the much-improved graphics (i.e. the "dragon chip"). Expect to see some heavy competition for the new models this fall, she says.

Product name: VT330 terminal
Price: $1,895
Specifications: Dual sessions; graphics in four shades of gray; stores up to six screen pages; resolution of 800 by 500 pixels; interconnects to IBM world.
Introduced: April 21, 1987
Ship date: May 1987
Initial outlook: Replaces VT240; DEC playing catch-up with competition.
Current status: See "Current status" above. With the monochrome model, you're approaching a price range "where people are getting picky," Farrell says.

MAY 1987

Product name: VAX Document
Price: $1,350-$32,400
Specifications: Standard mark-up language; standard error messages; multinational character set.
Introduced: May 11, 1987
Ship date: September 1987
Initial outlook: Aimed at high-end technical publishing environment.
Current status: Shipping two months late.

JUNE 1987

Product name: VAX Supercomputer Gateway
Price: $180,000* (DEC hardware), $2,500/month (Cray Research, Inc. software)
Specifications: VAX 8250 with 20M-byte memory; memory-to-memory transfers at 3M byte/sec.
Introduced: June 3, 1987
Ship date: July 1987
Initial outlook: Faster link to Cray X-MP supercomputer; seen by some as strategic move against IBM, Convex Computer Corp., Alliant Computer Systems Corp. and others.
Current status: No long lead times expected in shipping, according to George Weiss, program director at the Gartner Group, Inc. in Stamford, Conn. He says anything DEC can do to make the coupling between itself and Cray more secure is to DEC's advantage. IDC's Donald Bellomy says, "Digital gets what amounts to a free ride in a boom market."

Product name: Color Vaxstation 2000
Price: $7,900-$11,900
Specifications: Microvax II chip set; 4M-byte memory; 15- or 19-in. monitor; four-plane, 16 simultaneous colors; 1,024- by 864-pixel resolution.
Introduced: June 16, 1987
Ship date: October-December 1987
Initial outlook: First to break $8,000 price barrier for color workstations; preemptive strike against low-end workstation vendors and PC makers such as IBM and Apple.
Current status: Price must go down in proportion to other products' drops.

Product name: IBM PC Network Integration Package
Price: $1,195
Specifications: Includes Ethernet controller module, LK250 keyboard, MS-Windows, mouse, VT220 emulation.
Introduced: June 15, 1987
Ship date: June 15, 1987
Initial outlook: Central to DEC's success in extending its proprietary architecture to IBM-dominated environments.
Current status: Shipping one quarter late following delays in testing and evaluation.

Product name: Vaxserver 100
Price: $65,000
Specifications: Microvax II chip set; 16M-byte memory; 456M-byte hard disk drive.
Introduced: June 16, 1987
Ship date: July 1987
Initial outlook: Designed to be a server and/or boot node in a Local-Area Vaxcluster, Decnet or NFS/Ultrix environment.
Current status: Alongside the extension of Local Area Vaxclusters to 28 nodes (from 14), the Vaxserver 100 bolsters the position of the Vaxstations.

JULY 1987

Product name: VAX LISP Version 2.2
Price: $2,400*
Specifications: Enhanced version of VAX LISP (Common LISP) offers 20% performance increase over Version 2.1; runs under VMS and Ultrix; allows users to integrate artificial intelligence techniques with existing systems.
Introduced: July 9, 1987
Ship date: July 1987
Initial outlook: Lowers entry cost for VAX-based AI applications. Requires no purchase of separate runtime licenses.

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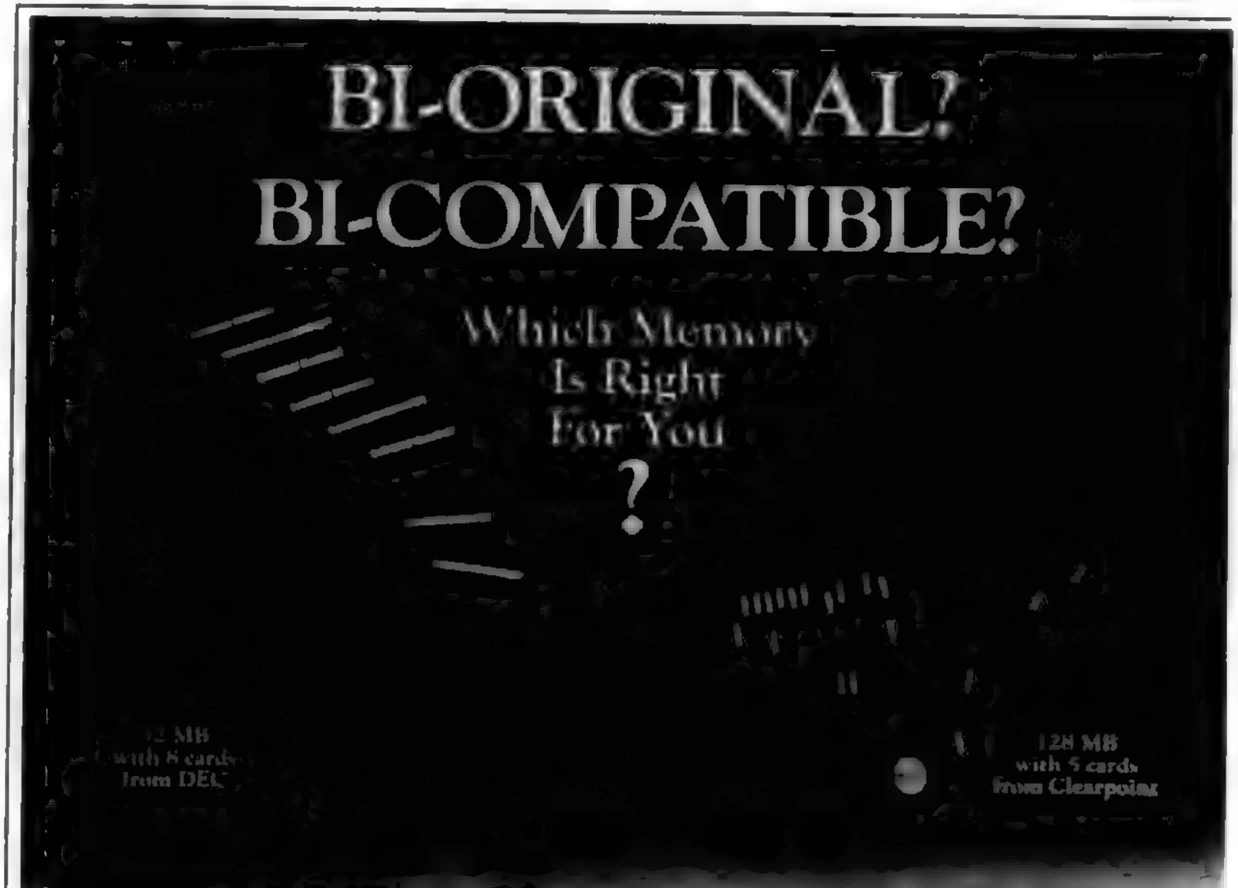
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BI-COMPATIBLE?
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NEW—128 MB Density Available with 32 MB Array Cards
The VBIRAM offers the maximum memory density using 32 MB array cards. Clearpoint also offers 32 MB in 5 slots using the 8 MB array cards or 64 MB in 5 slots using the 16 MB arrays.

Only One BI Node per Memory Subsystem
To put 32 MB of DEC memory on an 8300 would consume half of all the BI nodes for memory. DEC cannot deliver 128 MB since all 16 nodes would be needed. Clearpoint offers up to 128 MB using only one BI node, allowing sophisticated systems and maximum memory.

Trade-in and Trade-up
Clearpoint lets you upgrade existing 2 or 4 MB memory cards up to 128 MB. By re-using the BIIC (Bus Interconnect Interface Chip), customers are assured of 100% VAXBI compatibility. The Clearpoint trade-in program gives users the maximum value for their boards—call Clearpoint and get the most for your DEC 2 MB cards.

Compare the Facts:

	DEC	Clearpoint
Memory per BI node	4 MB	128 MB
Memory per 5 BI slots	20 MB	128 MB
Read stall cycles	2	1
Future expandability	No	Yes
Full EDC—single bit correction and double bit detection	Yes	Yes
Warranty	1 Year	Lifetime with 24 hour repair/replace
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Circle Reader Service Number 54

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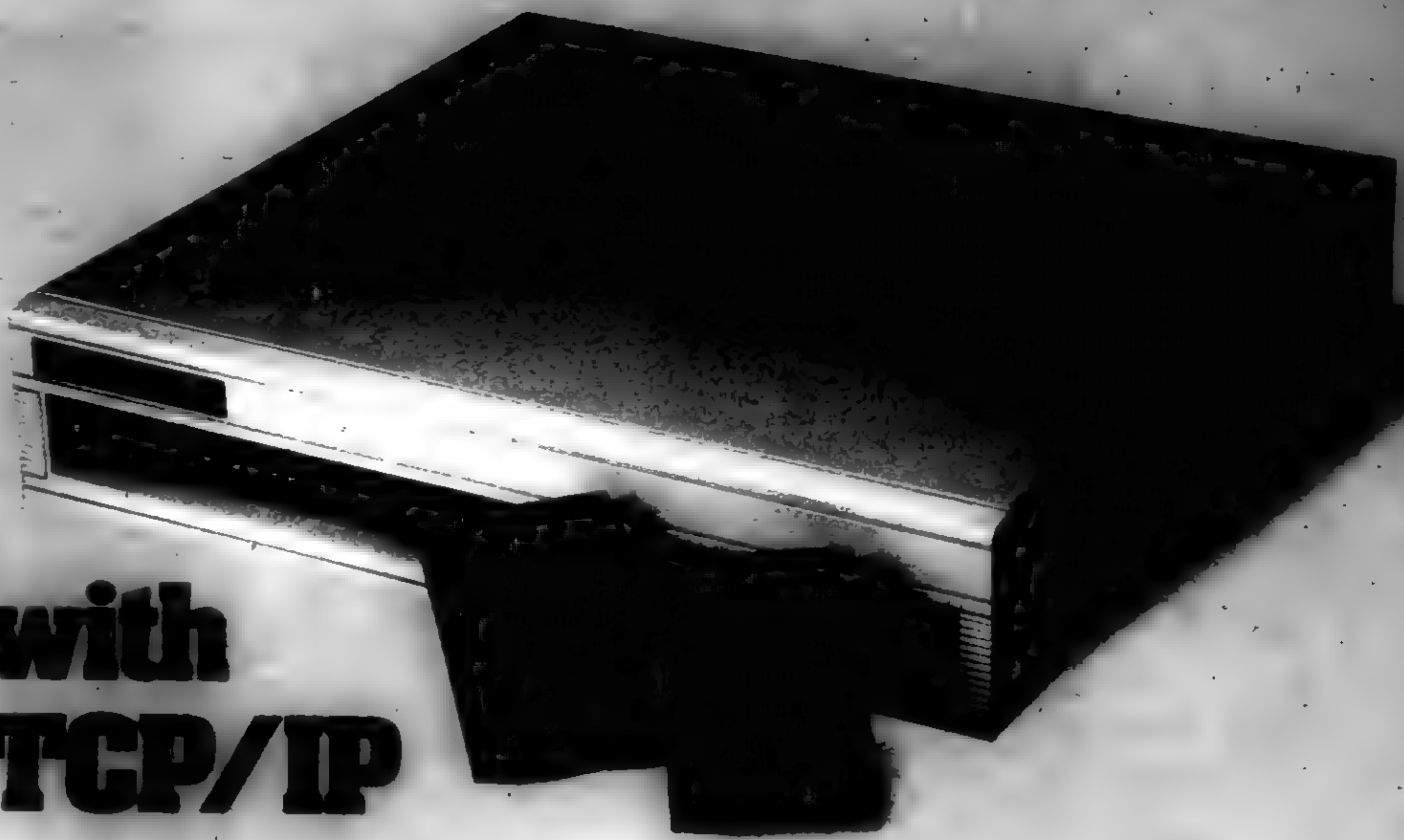

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Circle Reader Service Number 55

LAST 12 MONTHS

CONTINUED FROM PAGE 73

Product name: PDP-11/84E
Price: $16,000* (5¼-in.); $20,000* (10½-in.)
Specifications: Series based on PDP-11/84 CPU with nine-slot backplane; packaged as 5¼-in. rack mount; also available in 10½-in., 27-slot packaging; supports 5¼-in. form factor; 2M or 4M bytes of memory; Unibus adapter.
Introduced: July 6, 1987
Ship date: July 1987
Initial outlook: DEC signaled its continued commitment to the PDP-11 line with this announcement, which it says provides the basis for a building-block approach to system configuration. Prices for 32- to 48-user systems with RA series disk drives and TU series tape drives range from $55,000 to $75,000.

Product name: MicroPDP-11/53 Plus
Price: $14,500*
Specifications: Boosts memory to 1.5M bytes from 500K bytes in existing models; supports full-height 5¼-in. storage devices and DHQ11 Q-bus communications controller.
Introduced: July 6, 1987
Ship date: July 1987
Initial outlook: DEC claims a 25% performance increase over a similarly configured MicroPDP-11/53 at the same price. Targeted at price-sensitive applications — such as industrial process control and real-time technical applications — that do not require the cache of the MicroPDP-11/73.

AUGUST 1987

Product name: LJ250 printer
Price: $1,695*
Specifications: Color ink-jet printer with serial interface (parallel interface model LJ252); prints seven colors at 180 by 180 dot/in.; up to 255 colors at 90 by 90 dot/in.; supports ANSI/Sixel and color protocols, Regis graphics, HP-PCL protocol.
Introduced: Aug. 25, 1987
Ship date: October 1987
Initial outlook: Text-only documents print at 167 char./sec. This 10-lb device is for use with VAXs, Vaxmates, Microvaxes and Vaxstations as well as IBM PCs and compatibles under MS-DOS.

Product name: VT320 terminal
Price: $545
Specifications: 14-in. flat-surfaced monochrome text terminal; green, amber or "paper-white" display; 80 and 132 columns with 25 display lines; compatible with Decconnect, VT100 and VT220 software.
Introduced: Aug. 25, 1987
Ship date: October 1987
Initial outlook: Lowest priced member of VT300 family replaces VT220 Text Unit but costs 30% less. Price includes one-year warranty.

TOUGH

CONTINUED FROM PAGE 11

in back of his suburban house until "The Day DEC Lowered the Boom."

DEC had always been happy to sell him the hardware he needed to patch together turnkey systems for retailers. So what if he didn't order very much. DEC is for engineers, right? And he's an engineer, right? Wasn't that enough?

Suddenly it wasn't. The new strategy set a minimum figure of a half-million dollars in annual sales to qualify as a DEC OEM, and he didn't make the cut. "I've been doing business with that company for 20 years, and they don't kiss me off in person. And I even went to MIT with Ken Olsen!" he moans.

……

NO MORE racetrack-plaid jackets on DEC sales calls; these guys are dressed to kill.

……

Without official OEM status, he says, he's nobody. No more product information, no more hot line, no more applications development seminars and, especially, no more discount. "They cut all of us loose to the distributors, and these guys all want their cut. It's getting so that smaller guys like us can't make a cent in this market," he says.

All this will come back to haunt DEC, he predicts, with more than a hint of sour grapes. "Look at where the leading edge of applications development has typically been — not with the large users, but with the small OEMs like me. Once we're cut out of the action, how long can it be until DEC gets into the same trouble that IBM was in during the mid-1970s?" he asks.

It's not as if DEC wants him back someday, either: While the cutoff for old OEMs was $500,000, you can't get reinstated unless you sell $1 million worth of DEC hardware a year — all without the benefit of discounts.

One more thing about doing business with the new DEC. The clothes have changed. No more racetrack-plaid jackets on sales calls. Instead, these guys are dressed to kill, with sleek wingtips, blue suits and yellow ties with red dots like spatters of opponents' blood.

And never, ever, any shirt that's anything but white.

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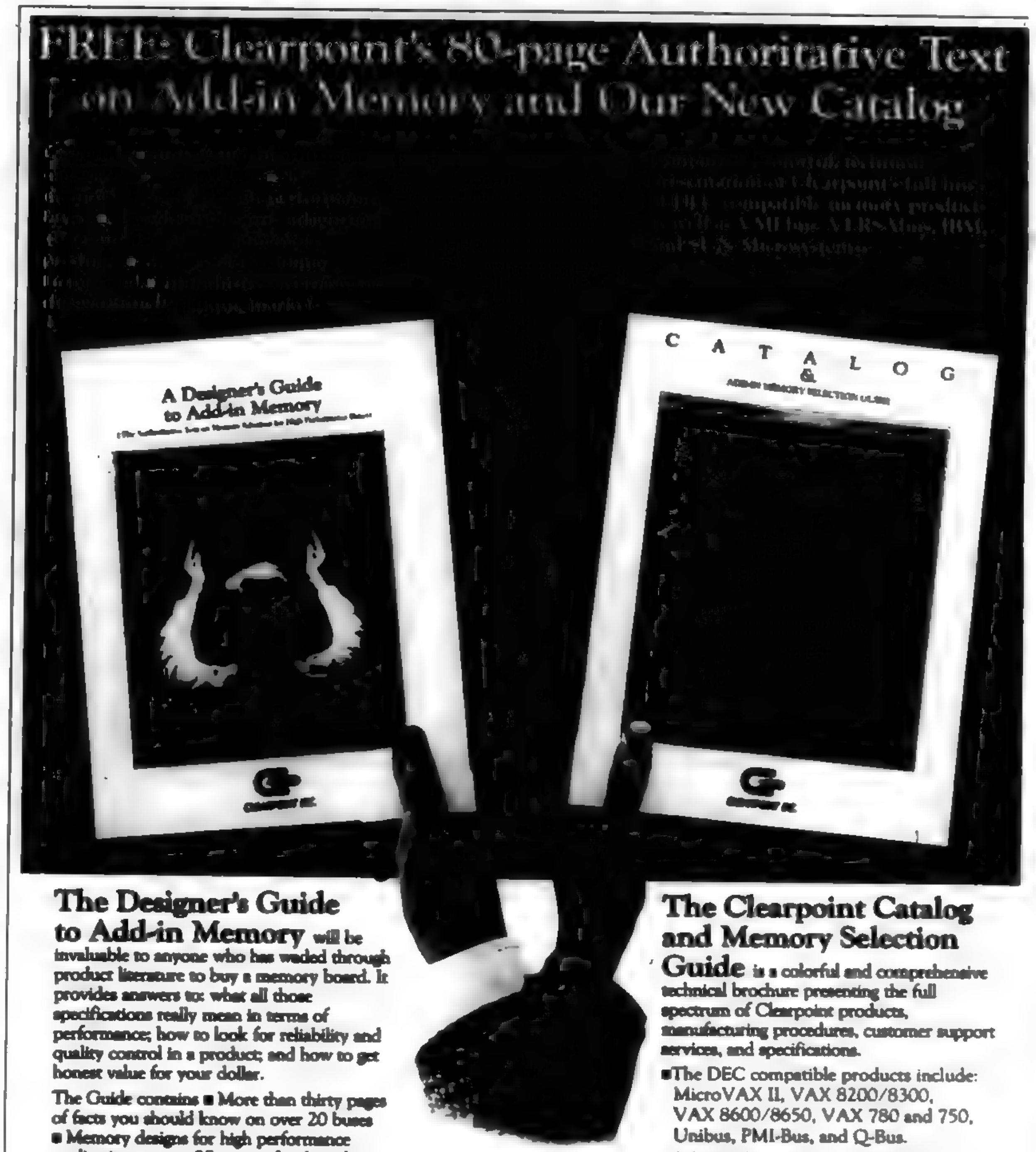

The Designer's Guide to Add-in Memory will be invaluable to anyone who has waded through product literature to buy a memory board. It provides answers to: what all those specifications really mean in terms of performance; how to look for reliability and quality control in a product; and how to get honest value for your dollar.

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Circle Reader Service Number 56

THE NEXT 12 MONTHS

BY MARTY GRUHN

Just what will the future hold for DEC users, and what new and innovative products and directions will emerge in the coming year? Part of the answer lies in understanding that DEC's future products will be firmly anchored to the solutions the company provides today.

The net effect of DEC's forthcoming products will be a new generation of solutions that are carefully built on the foundation of existing investments and strategies. Thus, from one perspective, DEC's new products will look much like the company is pursuing business as usual. On the other hand, DEC does have a few twists up its sleeve to change the view of corporate and departmental computing.

Workstations

If DEC has had one significant Achilles' heel, it has been the inability to establish a presence at the desktop with DEC solutions. DEC's early foray into this market is now legendary. Products like the Rainbow and the Professional personal computer met with limited success, even in DEC accounts. The Vaxmate, late to market and originally plagued with technical difficulties, has also failed to provide the company with much-needed critical mass. Despite these setbacks, the company has renewed its commitment to capturing the desktop, and it has done so by using a variety of strategems.

Of the most interest is the recent decision to switch its focus from fighting the battle to replace the personal computer to focusing on capturing the millions of existing PC users. To achieve this coup, DEC will rely extensively on its PC All-In-1 product, enhancing this offering to provide more flexibility and PC integration as well as better price/performance.

VMS versions of the most popular PC packages should also begin to emerge during the next year, complete with innovative licensing strategies that use the power of technology to monitor the number of active users. Thus, DEC's strategies will rely on capturing PC users less at the desktop level and more at the work group and departmental levels.

In addition to attending to the PC integration issue, the Vaxstation 2000 will also emerge as a catalyst in 1988, as it migrates from the technical environment into a business-oriented workstation for commercial markets. In an era of confusion in which the PC's clout is, at least temporarily, on the wane, future price cuts will position the Vaxstation 2000 as a solution that can provide significant added value.

The product's high-resolution display provides a platform for future compound-document and image products to be delivered by DEC, and its memory capacity offers the brute performance needed to run these next-generation applications. As important, the Vaxstation 2000 offers transparent compatibility with DEC's larger solutions and a future that will also include access to PC-oriented applications available on DEC-provided servers.

How DEC will provide transparency among its various workstations also illustrates the company's future desktop strategies. While slipped into the market with minimal fanfare, the Decwindows interface represents a foundation product for the future. Due for rollout in the next few years, this interface will assure that all workstations attached to a DEC environment will be provided with a consistent operating environment. Thus, Vaxmate, IBM Personal Computer and Vaxstation 2000 users will be able to see the same interface, regardless of their technology base.

……

IN ITS ONGOING battle with IBM, DEC is geared to match the maneuvers of its only significant competitive other by maintaining connectivity within SNA environments and support for other IBM standards, such as LU6.2.

……

VAXs

DEC's current claim to fame has been largely based on a single phenomenon — the popularity of its VAX product family. This year, the company initiated its new strategy to push the price/performance curve by announcing more powerful VAX models at successively lower prices.

At the low end, DEC even set new price points via its Microvax 2000. In the future, DEC will continue its strategy to push its technologies even further, to set new standards for competitors and to provide systems that will be attractive to a whole new range of users.

A peek into the future suggests that DEC's activities in its VAX line will move in two directions — up and down. First, the company will continue to leverage the price/performance offered by its popular Microvax series.

The new Microvax 3000 series, the third generation of the Microvax, to be announced at Decworld, will offer 3-million instructions per second (MIPS) performance (the Microvax II is rated at just under 1 MIPS) as well as the benefits of CMOS technology. Based on a sophisticated new chip that is nearly three times as powerful as that of the Microvax II, the machine will expand the range of the Microvax product family well beyond that of IBM's existing 9370 Model 90, where DEC's current 8000 series does not always have a price advantage.

This move suggests that DEC's current 8000 series will soon be repositioned as dedicated IBM 4381- and 3090-class competitors — which should provide some headaches for DEC's current competitors — and an interesting new market challenge for the company.

DEC's forthcoming VMS 5.0 will also set the stage for a new era of VAXs that will deliver parallel processing to networked users in work groups, departments and data centers. These systems will also be the centerpiece for future support of high-performance DEC workstations, which may be a Microvax 3000 on the desk. Activities in the disk drive arena also suggest that DEC's new high-end offerings will likely receive a substantial boost in performance via faster drives waiting in the wings.

While DEC pushes its product range into the very high end, the company will also maintain its commitment to departmental and, more important, work group computing. DEC's future directions will be based on providing more cost-effective work group-oriented solutions built around local-area Vaxclusters supporting multiple, often application-specific, small VAXs. Here, new Microvax solutions will be targeted at providing attractive entry-price points and feature maximum price/performance.

Just as important, high-growth environments will no longer require expensive upgrades to a larger VAX. Another small VAX will simply be added to expand the networked environment. Thus, DEC will transition its networking products from interconnection agents to an integral part of any DEC solution. To further support these new scenarios, DEC will focus on installation enhancements making its systems easier to use and install by first-time and/or nontechnical end users, as well as enhanced network management tools supporting remote management by highly skilled staffs.

Local-area networks

If there is a single trend in DEC's strategy and products, it is the company's attention to repositioning its networks as an integral part of its

---

Gruhn is vice-president of The Sierra Group, a Tempe, Arizona-based consulting and research firm.

computing solutions. Having laid its technical foundation during the first half of the 1980s, future activities will be largely focused on enhancing and expanding these existing offerings.

At Decworld, DEC will lay the groundwork for new products that will support wide-area networking requirements and position DEC as a provider of enterprise-oriented solutions a la Systems Network Architecture (SNA). Decnet Phase V is expected to support high-speed high-level data link control circuits to position Decnet as a backbone network for multivendor environments. The firm will also boost its support of industry standards and — despite the occasional faux pas in the press — will maintain a high-profile commitment to providing a reasonably open networking environment.

DEC is well aware that today's networking solutions are unlikely to support future applications requirements. To address high-volume applications such as image and voice, DEC will soon announce support for fiber-optic networking media, a technology that will prove equally critical to supporting the company's future parallel processing environments.

In the short term, Decnet supports unshielded twisted-pair wire at speeds of up to 10M byte/sec. And DEC will also clarify its plans for Integrated Services Digital Network, CCITT X.21 and IBM's Netbios protocols.

Finally, in its ongoing battle with IBM, DEC is geared to match the maneuvers of its only significant competitive other by maintaining connectivity within SNA environments and support for other IBM standards, such as LU6.2.

Software

Since DEC believes software is the users' most significant investment, the company is committed to becoming a premier supplier of business-specific solutions. A look at the company's current pricing strategies provides ample illustration of the company's belief in software as a watershed issue. The five-year cost of any VAX configured for the office is at least 50% software and 50% hardware. As such, users who opt for DEC solutions today are already making a substantial investment in DEC's view of the future.

As with many of its technologies, DEC's future software scenarios are largely based on products currently available, albeit not necessarily well integrated. Key products include the Decwindows interface, whose charter is to bring DEC's existing and future software offerings together sometime in the future.

Also critical will be new versions of DEC's All-In-1, which will evolve to be more than just an office solution; All-In-1 with a new Decwindows interface and compound-document support is *the* integration agent for business-specific software solutions of the future.

Current activities also illustrate that DEC will continue and, in fact, accelerate its announcement of third-party developed software aimed at specific industries and markets. Further, it will begin to fold these solutions under its Decwindows and All-In-1 environments as they become universally available.

If there is a common theme to DEC's future products, it is that these systems will offer more of the same as the past two years' announcements — but in new and varying configurations.

From a technology perspective, DEC's focus is clearly on providing successively more powerful systems across its entire product line — and at significantly lower prices. While there may be short-term price increases as DEC pushes its current advantage, the long-term strategy is for lower cost systems. DEC's moves may be accelerated by IBM, which will make price a significant issue in 1988.

This means that DEC solutions are likely to be more readily available to a new generation of users. At the same time, via its future interface and software products, DEC will provide the integration of all business solutions — a demand already expressed by a sea of technology-weary end users.

If there is a critical area for DEC in the future, it appears to be at the workstation level. Although DEC's strategies here are fairly straightforward, what remains to be seen is whether the offerings will actually be accepted by users who are highly PC-oriented.

Price will certainly emerge as a critical factor. DEC's workstations have never been accused of being "bargain basement." And new high-performance additions are likely to again push the high-price curve.

Also critical will be DEC's support of PC software standards. Users have resoundingly demonstrated they are not interested in migrating to new technologies without dragging along their favorite solutions. DEC's greatest challenge for the future may lie less in its VAXs than in its ability to capture the desktop.

GOING OFF TO VAX CAMP?

Current and potential VAX users will be targeted in three days of in-depth tutorials and conference sessions at New York's Roosevelt Hotel from Oct. 26-28.

The VAX Business User Forum will cover topics such as "Designing Networks with Digital," "Digital in the Office" and "Introduction to VAX-based Data Base Systems."

Sponsors of the event are the IDG Conference Management Group, located in Framingham, Mass., and *Digital News*, located in Boston.

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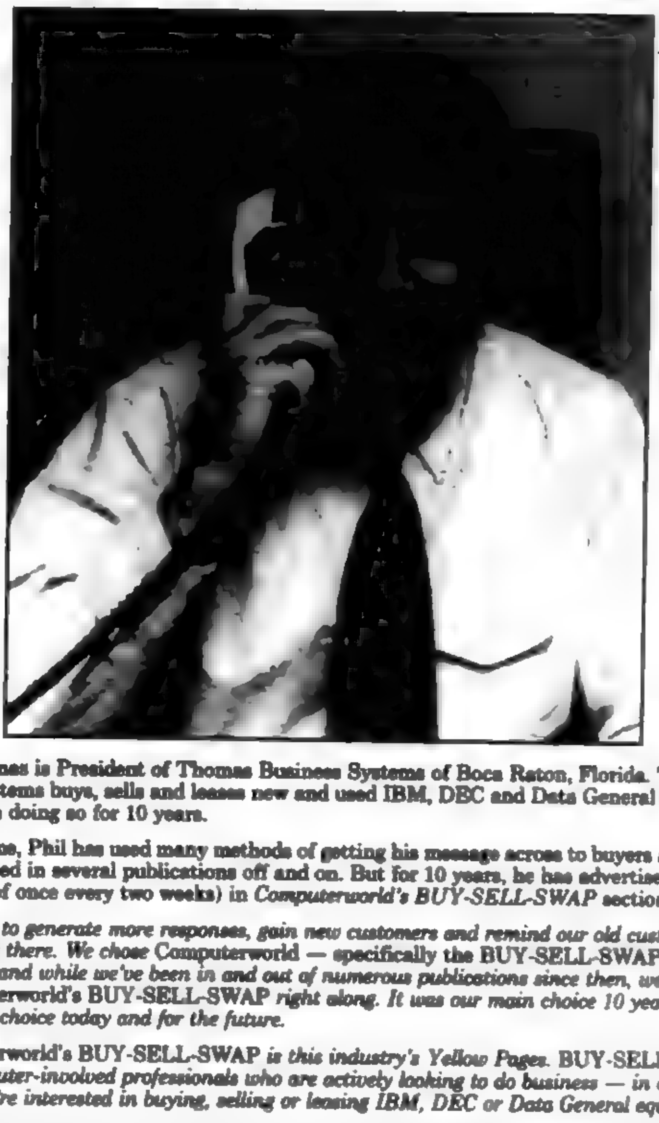
— Phil Thomas
Thomas Business Systems



Phil Thomas is President of Thomas Business Systems of Boca Raton, Florida. Thomas Business Systems buys, sells and leases new and used IBM, DEC and Data General equipment. They've been doing so for 10 years.

In that time, Phil has used many methods of getting his message across to buyers and sellers. He's advertised in several publications off and on. But for 10 years, he has advertised regularly (an average of once every two weeks) in *Computerworld's BUY-SELL-SWAP* section.

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BEYOND VAX

FROM PAGE 80

exception of the IBM 360, which had an inherent 32-bit address to get it to the 1990s, history also tells us that companies try to evolve their architectures for too long. They end up with 100% of their user base market but a declining share of the entire market. Eventually, even that market declines as users desert the obsolete machines.

A major computer technology generation lasts about a decade. I believe it is hard to design an optimum architecture that lasts much longer. While VAX may top out, it should be a fine base for evolution.

What will the topping out of the VAX mean to the thousands of sites committed to DEC's single-architecture prescription?
Again, let me rely on history. VAX was a major new hardware architectural evolution from the PDP-11, yet it preserved programming interfaces, languages and data bases. The same concept could be reapplied even if DEC changes the underlying hardware architecture. The program and data base interface must be preserved — in effect, it should be transparent if users adhere to certain VAX and VMS standards.

……………

"RADICALLY new applications should be sought that build on the environment and do things no other environment can support."

……………

It's probably important to define VAX, or VMS, compatibility and whether a new, basic hardware architecture could be used to implement this environment — that is, without object compatibility. The problem is much easier than with the PDP-11 or with the 370 because VMS is a single interface which subsumes the network but includes the command language, DCL, and various languages. Fortunately, nearly all programs are written in a high-level language today and would be compatible.

Can DEC engineers develop a totally new architecture for the '90s and beyond that will play on Decnet and run software from existing machines?
Companies with different underlying hardware architectures provide existing proof of VMS user-level compatibility. Certainly DEC should be able to do this, too.

Are the engineers at work on such a scheme now, and if so, what is the best guess as to what it is?
I hope so, because it is essential. The key is to identify the crucial limits of VAX and to eliminate them. Again, it might have goals similar to those we used to create VAX in the first place. The only goal I would add to the original VAX set would be the independence of the Instruction Set Processor hardware architecture. Just as VAX added new dimensions of comparison, a new architecture also must add those dimensions of comparison.

I would hope a new plan would address parallelism of all forms and performance for the scientific and engineering community, including the ability to collaborate effectively via the computer using high-speed interconnects. It would handle large scientific and engineering data bases.

A radical view of data integrity and data bases is also needed. Improvements in the cost of ownership and availability dimensions are quite possible. In addition, DEC could address the mass market for users who want a great computing environment but don't want to become system programmers or administrators. This would rule out any compatibility with MS-DOS and the IBM PC. The PC has allowed everyone to relive and retrace computing history and to become system administrators with all the accoutrements, including large manuals. I'm happy to avoid this trip back to the '70s; I use an Apple Macintosh.

You've made several comments about needing higher performance VAXs. What is the biggest VAX you can build?
There are two basic measures of performance: total processing power available to a single job stream — in other words, throughput; and power available to a single job. For the former, Vaxclusters partially provide this power, but multiprocessors extend the range even more and in a more cost-effective fashion. Furthermore, multiprocessors are starting to use parallel processing to provide speedup of a single job, which can be done either by the compiler or the user.

DEC should have already introduced a significant multiprocessor with dozens of microprocessors, a "multi" like those from Encore, Masscomp, Sequent, Stratus and others. VMS as a multiprocessor operating system shouldn't be the limit. By using the CMOS Microvax, more than 100 MIPS [million instructions per second] could be put in a small box. This approach would provide at least one or two non-"me-too" products. Moreover, it gets the price into the $10,000 per MIPS range vs. the $100,000 to $200,000 range typical of the large mainframe. These ridiculous prices aren't sustainable except for large mainframes, where users are locked into buying code museums — and someday the users may get smart.

What markets would such a machine address?
DEC seems enamored with the commercial and transaction processing markets. Multis are the best computers for these markets because the applications only demand total MIPS for a large collection of jobs. The system has advantages for a general, interactive job stream such as program development as demonstrated by the multi suppliers. The microprocessor inherently provides the best cost/performance by almost two orders of magnitude — we simply look at the MIPS per chip.

By ganging them and matching them to a memory, one can get the most power in a single system at a small fraction of the cost of an emitter-coupled logic-based computer with a few expensive processors. It also offers, inherently, much better availability characteristics.

Would such a system address all of your concerns about inadequate scientific and engineering performance?
Not entirely, but two multis could replace an entire product line and provide 100-MIPS-level performance and substantially better price/performance for the user than the current "model" approach.

In addition, consistently competitive compute servers are needed, which would run technical work in the [Cray Research, Inc.] Cray-1 speed range. In the long run, a multi might do the job, but for now, the vector multiprocessor is the main line . . . in effect, another Crayette.

What is the largest uniprocessor VAX that can be built?
The speed of a uniprocessor, such as the VAX or a 370, is correlated with the clock speed.

A high-end machine with a 40- to 60-MHz clock could probably be built and still be in the mini price range with a power of two to three times the current models.

Note that the current [IBM] 3090 uses about a 60-MHz clock, and the Cray XMP clock is almost twice as fast, although both have roughly the same scalar speed. Clock speed isn't always a good indicator.

Could you look retrospectively on what DEC might have done in the four years since you left?
Let me provide my own reference point first.

I've been involved with a bunch of new computers, three of which are on the market, plus several start-ups that are creating new markets. All of the computers provide more capabilities than VAXs, and the engineering has been done in a small fraction of the time and budget of DEC product designs. Aside from the evolutionary extensions and products, I would have probably urged for greater innovation and carried on enough experiments to have selected a VAX II architecture by 1986, with benchmarking now and delivery in '88 — a decade after the 780.

……………

"I would have probably urged for greater innovation and carried on enough experiments to have selected a VAX II architecture by 1986."

……………

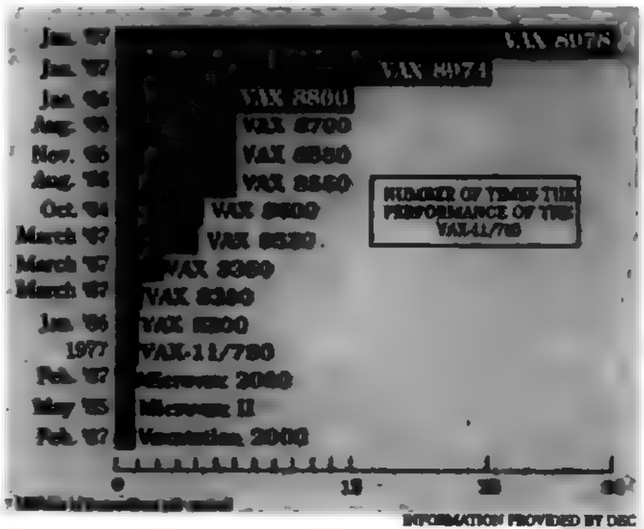
Would VAX II be reduced instruction set computing, or RISC, based?
Probably.

What other big issues face DEC in the future?
1. Thinking VAX is the end, not simply the best thing around today, is an enormous hurdle. While nothing is yet in the marketplace to challenge it, several new systems do and will. This thinking leads to arrogance. VAX gave DEC a monopoly in much the same way that the 360 gave IBM a product monopoly by the '70s that only lasted a decade. DEC should compare its products with the best small companies, not old-line suppliers.

2. Thinking VAX can do it all by itself . . . or by relying on the old IBM applications being converted to VAX just because VAX is better than the 360. Radically new applications should be sought that build on the environment and do things no other environment can support. Also, understanding the limits that come from new uses is critical to VAX II.

THE VAX FAMILY

In the past year, DEC has introduced seven VAXs (performance figures are based on the VAX-11/780 as the company's unit of measure; DEC does not use MIPS)*



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3. Being enamored with the commercial interests and not attending to the scientific and engineering base, especially in the universities. The commercial market tolerates high prices for higher performance, but they are unique. The technical marketplace is far more demanding on products.

4. Poor presence on the desk, and even picking MS-DOS and [Intel Corp.'s] 80286 or 80386 to implement. I don't see what another clone brings to the marketplace — certainly not profitability. Service revenue can be obtained simply by going into that segment of the service business. Integration with the Apple Mac is also important.

5. Responsive, efficient and creative manufacturing still appear to be nonexistent. While DEC is probably no worse than the average, it's not adequate to compete in the '90s when the Japanese and others arrive.

That's a big set of worries. Are you optimistic?
Certainly. They are making lots of money, have lots of cash and exceptional people. All they need is a challenge. The plethora of new start-ups certainly provides that.

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EXIT

BEYOND VAX:
A CONVERSATION WITH GORDON BELL

Gordon Bell, 53, is a legendary figure around the halls of DEC, even though he last worked there four years ago. As head of DEC's engineering effort in the 1970s, Bell formulated the company's VAX strategy and shepherded its introduction and implementation. That strategy remains the foundation of DEC's product line and marketing efforts. The company insists this strategy is flexible and durable enough to take DEC into the next decade and beyond.

Computerworld Extra asked Bell, now assistant director for the Computer and Information Science and Engineering (CISE) Directorate at the National Science Foundation in Washington, D.C., to consider the future of VAX.

What is the origin and essence of VAX?
VAX came from a tiny task force I led in April 1975. The idea was to create a new computer family to be "culturally compatible" with the successful PDP-11. Its principal design goals were to be compatible with key operating systems and languages; to have a much larger address space than any existing computer; to be efficient at implementing high-level languages, including Fortran, C [for Unix] and Cobol; to be implementable over a wide range of sizes; and simply to be the highest performance computer in its class when first implemented.

In December 1978, after the VAX-11/780 had achieved immediate success, the company adopted the VAX strategy to provide a VAX homogeneous computing environment for a range of interconnected computers.

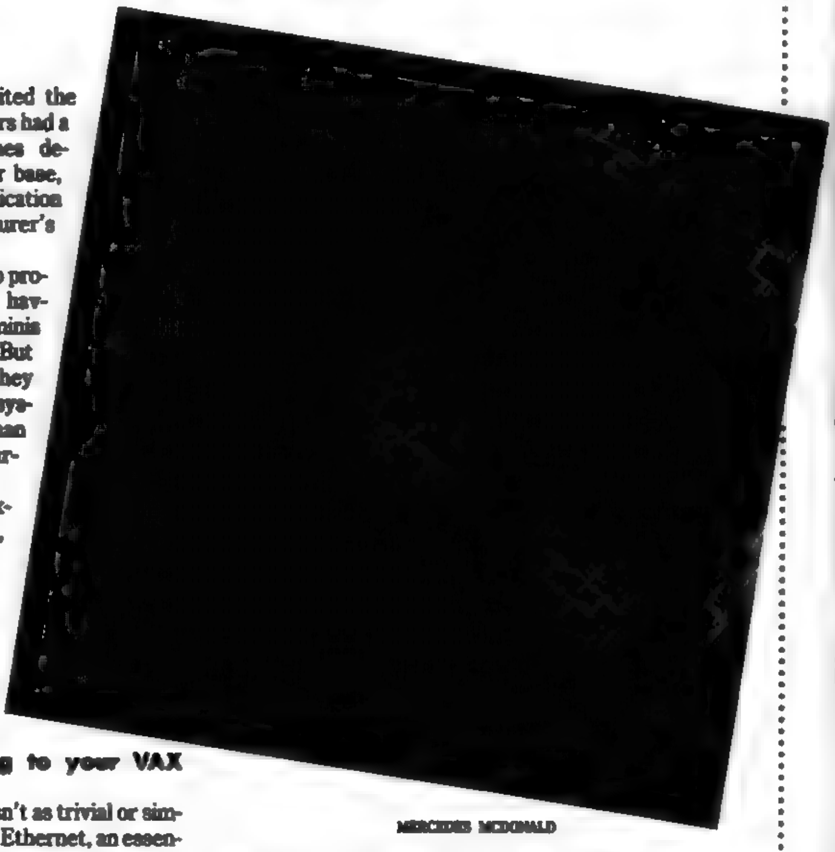
A user could compute in any of three styles from a cluster of large machines behaving as a single system, distributed traditional minicomputers and distributed clusters of workstations. The strategy also specified compatibility with other DEC computers and intercommunication with other standards and products.

Why has VAX been so successful?
The concept was incredibly simple, and hence everyone [customers and the company] could understand and support it. Also, the three-level computing hierarchy was right . . . even IBM discovered and endorsed it by the early 1980s. VAX provided the best, and only, totally compatible, single-interconnection environment. This required a range of computers, from VAX on a chip to the highest performance computers that could be built.

VAX gave DEC a product monopoly, since no other manufacturer has anything like this capability. It specifically exploited the fact that most manufacturers had a menagerie of product lines designed to segment the user base, fill product size and application gaps or help the manufacturer's organization.

Recently, IBM started to provide similar capabilities by having [IBM] 370-compatible minis and a plug-in card for a PC. But this is not enough because they have several operating systems, a worse problem than having multiple hardware architectures.

Also, given the complexity of the IBM architecture, including the I/O and operating systems, it's probably hard to make the architecture serve the wide range of users at this point in its life.



MERCEDES MCDONALD

Did things happen pretty much according to your VAX strategy?
Largely yes, although it wasn't as trivial or simple to do as one would think. Ethernet, an essential component, was questioned by various internal DEC committees, even after the whole system was working. Having adopted a VAX strategy in 1978, the company in 1980 decided it had to enter the PC market with a trilogy of non-VAX PCs, which only loosely fit the strategy. VAX was too large to build as a workstation until 1982 to '84.

At the same time, the high-end implementation of VAX — Venus [the 8600] — was more than two years late as engineers hit the complexity wall and essentially forgot the recipe of how to design computers. These two events accounted for DEC's poor financial performance in the early '80s.

Do you see anything that could challenge the VAX strategy yet?
No. In 1978, I thought the only possible threat was Unix, because it provides compatibility at a higher level, somewhat like VAX. I imagined that innovative or small companies would develop Unix systems for interconnect computing environments by the mid-'80s. Now I'll push that back three to five years.

A critical hole is in the PC space where Microsoft Corp.'s MS-DOS is similar to Unix, but isn't compatible. Unix needs to evolve in range, human interface and applications. Having AT&T control it doesn't help — it has to truly be a public standard. The government support of Unix [Posix] still could have an impact.

Also, I don't see a single large computer company coming up with anything like VAX because of the cost and commitments of preserving their code museums for running old programs.

How far can DEC go with the VAX architecture?
I don't believe all the capabilities in the architecture, as constrained by its addressing, have been exploited yet. DEC still has uniqueness.

Critics point out that even if clustered, the architecture will sooner or later top out. What do you think?
Here, history is a good guide. Every architecture has sooner or later either run into a limit or been inappropriate to the technology. With the

Continued on page 78

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Booster shots for 3B minis

Multiprocessor unit leads AT&T barrage

BY ALAN ALPER
CW STAFF

PARSIPPANY, N.J. — Attempting to rekindle its prospects in the fiercely competitive departmental computer arena, AT&T last week took the wraps off a long-expected high-end multiprocessor system that offers limited fault-tolerant capabilities.

The 3B4000, developed under the code name Apache, was one of 40 products and enhancements AT&T unveiled at a press conference here. The company said it hopes that its second product onslaught of the year will help convince a skeptical public that, despite repeated setbacks, the firm remains committed to the computer business.

The product blitz also included a mid-range 3B2 family mem-

Continued on page 6

IBM fires up 3380 performance

BY JAMES CONNOLLY
CW STAFF

RYE BROOK, N.Y. — IBM ended two years of speculation last week with the introduction of its third generation of 3380 disk drives and accompanying controllers.

Observers said there were few surprises in the announcements featuring IBM's first 4.5M byte/sec. channels, faster seek times and a triple-density 7.5G-byte direct-access storage device.

The improvements focus on better performance, a lower price per megabyte of storage and a 50% gain in capacity. IBM also set a course for its plug-compatible manufacturer competitors to follow by introducing write-to-cache and automatic copy capabilities for limited fault-tolerant operation in the company's new 3990 controller.

To support these features, which are aimed at highly interactive applications, IBM quadrupled cache to 256M bytes, added 48-hour battery backup and enhanced its Data Facility Product Set.

However, while the higher performance, higher capacity DASD and 4.5M byte/sec. channels are expected to be available next month, the new controllers will not be available until the third quarter of next year. In the interim, users can upgrade 3880 controllers to support the new drives and channel speeds. However, the upgraded 3880 will not support Dual Copy, DASD Fast Write or the larger cache.

The 4.5M byte/sec. channels are available only for IBM 3090 mainframe customers and require a free four- to six-hour engineering change on the host.

The drives include the 3380 Model J, with a capacity of 2.5G bytes and an average seek time of 12 msec, and the Model K, which stores 7.5G bytes of data and has a seek time of 16 msec.

In comparison, the 2-year-old 2.5G-byte Model D was timed at 15 msec, and the previous high-end Model E featured 5G bytes

Continued on page 8

IMS gateway precursor to peer-to-peer access

BY ELISABETH HORWITT
CW STAFF

RYE BROOK, N.Y. — IBM last week confirmed the immediate availability of a software gateway that allows its IMS data base management system to communicate with IBM and non-IBM systems running applications built around its LU6.2 architecture.

The IMS LU6.1 Adapter for LU6.2 Applications Program offering is a VTAM application that allows existing IMS applications to receive calls and requests from any device that supports LU6.2, IBM said.

Such devices include the IBM Personal Computer, System/36 and 38, Series/1, System/88, 370 host systems using CICS and certain computers from Digital Equipment Corp., Data General Corp. and other major vendors.

The product does not provide full LU6.2 support, but IBM indi-

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COMPUTERWORLD SALARY SURVEY

It's where you work — and for whom

BY JANET FIDERIO
and MICHAEL SULLIVAN-TRAINOR
CW STAFF

MIS directors in banking earn more than their counterparts in other industries, but the highest MIS salaries go to vice-presidents in manufacturing companies.

Those are among the findings from a comprehensive *Computerworld* survey of almost 1,500 MIS professionals. Despite vast differences in pay levels among vertical industries and various regions of the country, nearly 70% of those surveyed rated salary and benefit packages as good or excellent.

Inside

- Detailed charts appear on pages 83-86.

Conducted in cooperation with the Data Processing Management Association, the survey covers seven major industries and spans 10 metropolitan regions. The results revealed the following:

- Vice-presidents of MIS in manufacturing companies are the highest paid. Manufacturing vice-presidents reported a mean salary of $85,391, exceeding the high-paying fields of banking and finance by $7,853.
- While the professionals surveyed expect to receive a mean raise of 6% this year, 30% of them rated their salaries as fair or poor and would like a raise of 15% to increase their salary ratings.
- Utility companies pay the most overall for MIS/DP positions, followed, in order, by companies in banking and finance, insurance and manufacturing.
- Billion-dollar companies pay the highest salaries. But small companies (less than $500,000 in revenue) pay more than mid-size ones ($500,000 to $100 million).
- Although it is one of the lowest

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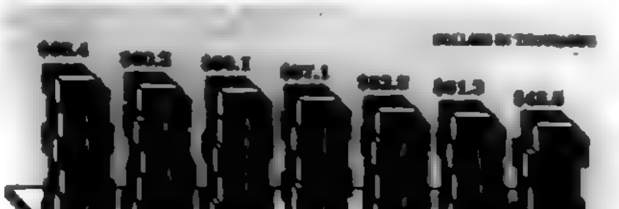
Where the money is

Average salaries of MIS directors surveyed in seven vertical markets reveals differences in compensation



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Show-and-tell. On display at PC Expo last week were Novell's long-awaited 16-MHz 80386-based file server, Information Builders' PC/Focus 3.0, Centram Systems' speeded-up Appletalk-compatible network operating system and VM Personal Computing's Relay Gold 2.0 micro-mainframe package. Pages 14, 15.

Unifying. Unisys unveils three low-end A series processors to replace older Burroughs computers and says a high-end processor for users of Sperry 1100 series machines is in the works. Page 4.

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"For any product to displace 1-2-3, it will have to cure cancer, taste like chocolate and cost a dollar."

JACK MCGRATH
EDITOR OF "@MAX"

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GM pension plan shift under IRS microscope

BY MITCH BETTS
CW STAFF

WASHINGTON, D.C. — The Internal Revenue Service is currently investigating whether General Motors Corp. illegally reduced the retirement benefits of data processing employees who were transferred from GM to Electronic Data Systems Corp. (EDS) after GM's 1984 takeover of EDS.

Approximately 3,200 of the 6,500 transferred employees could be affected by the change in retirement benefits, according to Patricia Molloy, a spokeswoman for GM in Detroit.

The GM benefits plan gives employees an early retirement option after 30 years of service, regardless of age, while EDS employees are not eligible for early retirement until they reach age 55.

Decision triggered uproar

The decision to transfer thousands of DP employees from the auto maker to the computer services subsidiary triggered an uproar among employees and resulted in two unresolved lawsuits over the reduced retirement benefits [CW, Dec. 17, 1984].

Molloy said GM is cooperating with the IRS inquiry — which is expected to last several months — and will make any changes required by the government.

The IRS could revoke the tax-exempt status of GM's whole retirement plan for salaried employees, which reportedly would cost GM at least $400 million in earnings per year.

Did GM violate rules?

The IRS review is intended to determine whether GM violated the anticutback rule of federal pension law. That law prohibits companies from retroactively cutting accrued retirement benefits, according to sources.

An IRS official refused to comment on the case.

The inquiry began after U.S. Sen. Carl Levin (D-Mich.) received two or three complaints from GM workers about the retirement program and referred them to the IRS, according to Philip Shandler, the senator's spokesman.

Plan approved in 1986

In March 1986, the IRS approved GM's retirement plan, but in an Aug. 5 letter, the IRS informed GM that it was reconsidering the plan's tax-exempt status, Molloy explained.

The GM retirement plan is currently under the jurisdiction of the IRS's district office located in Cincinnati.

GM is now collecting information to respond to the IRS concerns, which focus on eligibility rules for retirement benefits, Molloy said.

'Pretty confident'

"We're pretty confident that once they have the information, they won't find any reason to reverse the initial, favorable determination. But if there is a problem in their eyes, we would certainly rectify the problem," Molloy said.

The corporation's retirement plan was amended on Oct. 3, 1984, to exclude any subsidiary acquired after March 1, 1984, thus allowing EDS to operate as an independent subsidiary with an independent retirement plan, she said.

An EDS spokesman had no comment on the IRS review, except to confirm that approximately 6,500 domestic employees from GM DP departments were transferred to EDS on Jan. 1, 1985.

Employees file lawsuits

Some of the transferred employees, who are being represented by attorney Jules B. Olsman in Southfield, Mich., have filed lawsuits against GM claiming they were deprived of accrued retirement benefits.

GM has consistently argued that it had the right to change its retirement policy and did not tamper with the employees' accrued benefits.

In the initial suit, filed in November 1984 for GM employees Thomas Omans and Gary Cattin, the U.S. District Court in Flint, Mich., ruled in favor of GM on the pension issue, Olsman said. However, the August 1986 decision was appealed to the U.S. Court of Appeals for the Sixth Circuit.

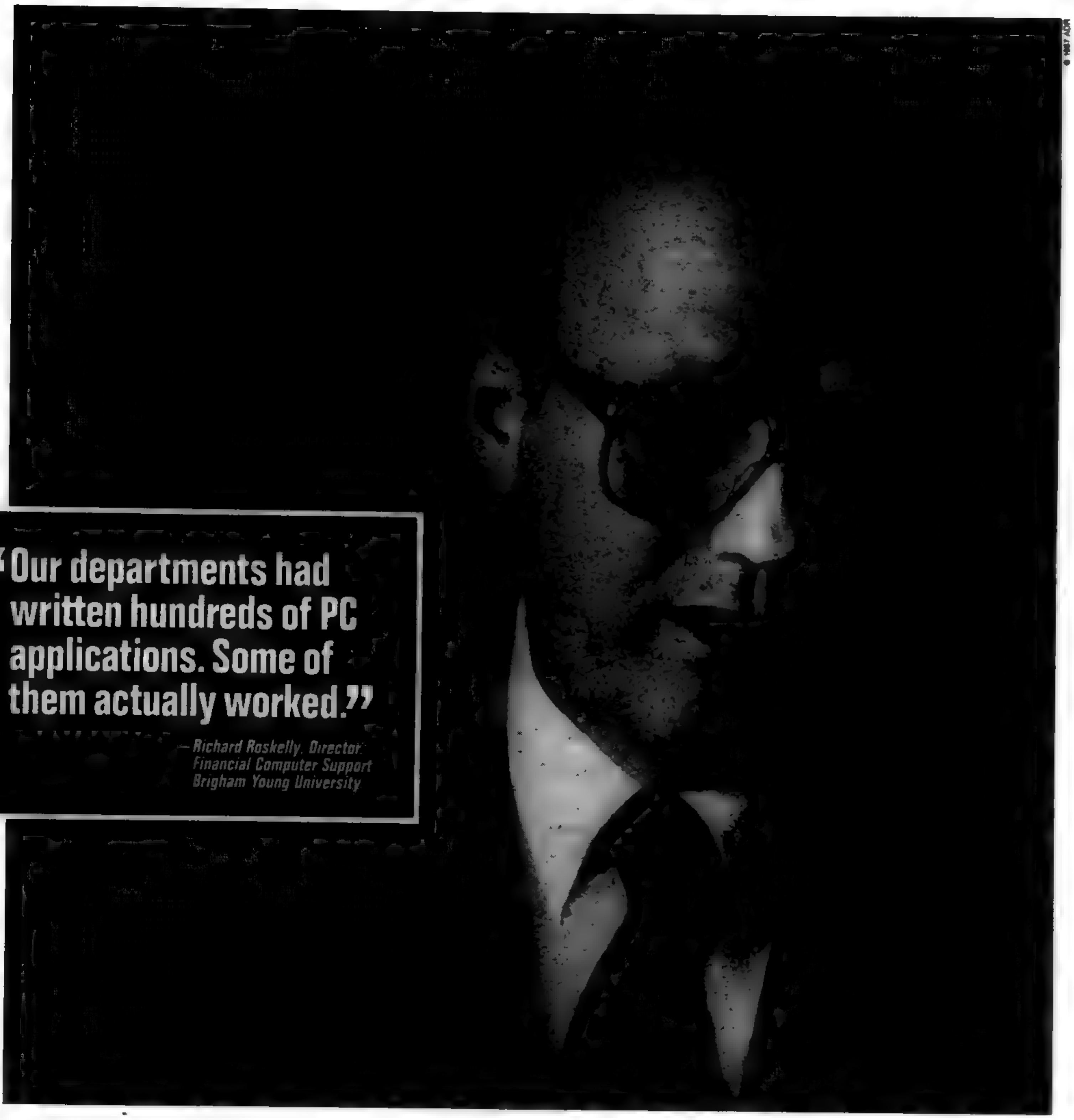
A second suit, filed in November 1986 for employee Ruth Malzhan, is pending in the U.S. District Court in Flint, Olsman said.

Olsman added that the IRS letter withdrawing approval of GM's retirement plan may tarnish GM's position in the lawsuits.

CORRECTIONS

Codex Corp. has reduced the price of its 9.6K bit/sec. dial-up modem to $2,795, not $2,495 [CW, Aug. 24]. There is no special error-correction model of the modem.

Bridge Communications, Inc. [CW, Aug. 31] was formed in 1981, not this year.



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—Richard Roskelly, Director
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Unisys shadows IBM mid-range

Introduction of 'smallframes' seen as me-too response to 9370 approach

BY STANLEY GIBSON
CW STAFF

NEW YORK — In a move that mirrors IBM's 9370 departmental processor strategy, Unisys Corp. unveiled three low-end A series processors last week.

The A1, A4 and A6 — which Unisys dubbed "smallframes" — replace the firm's A2, A3 and A5 machines. The A3 was introduced in 1984 by the former Burroughs Corp., and the A2 and A5 were rolled out last year.

In another move that mimics an IBM marketing tactic, Unisys introduced several Solution Partners — preconfigured packages of hardware, software and support for specific kinds of customers. IBM last year announced a series of Solutionpacs, which it intended to fill much the same needs. The Unisys packages were designed for managing manufacturing companies, hospitals, courts and school systems.

"We think the new products will be successful [in vertical markets], because they are bundled with the software," said John Logan, an analyst with The Yankee Group in Boston.

The new machines, like their A series predecessors, use a Burroughs-type 48-bit mainframe architecture and the Master Control Program/Advanced System operating system. They are intended for departmental and small business users. However, the new machines have greater memory capacity than the previous processors and offer price/performance levels that closely parallel the 9370. According to Unisys estimates, the new A series products are priced about 10% to 20% below comparable 9370 configurations for a three-year period.

Although there is considerable overlap between the new A series machines and the previous low-end A series models, Unisys said it would not discontinue the old models. However, all A2 and A3 models have been sold, and the remaining inventory of A5 models will be sold at discounted prices, according to a Unisys spokesman. The spokesman added that the A2, A3 and A5 models had been discounted for several months prior to last week's announcement.

Although an A1 can be upgraded to an A4 or A6 and an A4 can be upgraded to an A6, Unisys said the older A2, A3 and A5 models cannot be upgraded to the new machines. Peripherals and software currently in use in the A series can be carried over to the new machines, however.

The new models represent a logical migration path for users of the old Burroughs B1000, B5000 and B6000 series machines, Unisys said.

Available now

Unisys was able to achieve a substantial improvement over its previous low-end A series models by using CMOS technology, the company said. When shipped later this year, the A6 will reportedly use 1M-bit chip technology. The A1 and A4 models, which are currently available, use 256K-bit dynamic random-access memory microprocessors.

"At least the machines are available now. You have to give them credit for not preannouncing," Logan said, referring to IBM's early announcement of the 9370.

Although Unisys declined to produce performance measurements in millions of instructions per second (MIPS), a Unisys spokesman indicated it is essentially accurate to place the A1's performance at 0.5 MIPS, the A4 at 0.8 MIPS and the A6 at 1.6 MIPS.

The price for the new models, in basic configurations with operating system software, ranges from about $95,000 to $250,000, according to Unisys.

The new minicomputers, combined with the Solution Partner packages, signal an aggressive drive to attract new customers to the Unisys fold. While 30% of sales of previous A2, A3 and A5 models had been made to new customers, Unisys Chairman W. Michael Blumenthal said Unisys will seek to sell 71% of A1, A4 and A6 models to first-time customers.

Unisys's A series
Three new systems

NEW			
	A1	A4	A6
MIPS[1]	0.5	0.8	1.6
Number of users	10 to 25	[illegible]	50 to 200
Memory range (in bytes)	[illegible]	[illegible]	12M to 48M
Channel speed	3.4M byte/sec.	3.4M byte/sec.	[illegible] byte/sec.
Price[2]	[illegible]	[illegible]	[illegible]
OLD			
	A2	A3	A5
MIPS	0.4	0.6	1.4
Number of users	6 to 20	[illegible]	50 to 200
Memory range (in bytes)	6M to 12M	[illegible]	6M to 24M
Channel speed	3.4M byte/sec.	3.4M byte/sec.	[illegible]
Price	$78,000 [illegible]	$113,00 [illegible]	$242,000 [illegible]

[1] Million instructions per second
[2] Includes communication ports, disk, tape, printer, operating systems

CW CHART

Blumenthal pledges 1100 upgrade

BY STANLEY GIBSON
CW STAFF

NEW YORK — Users of the former Sperry Corp.'s 1100 series machines can expect a new high-end processor in the near future, Unisys Corp. Chairman and Chief Executive Officer W. Michael Blumenthal said last week.

Blumenthal's disclosure came during a press conference at the unveiling of the low-end A series machines that Unisys introduced to complement the former Burroughs Corp. lineup. Asked if users of Sperry's mainframe line might expect similar low-end machines from the merged company, he replied: "The first priority is to take the 1100 line further up. We hope to accomplish that very shortly."

Michael Geran, an analyst with E. F. Hutton & Co. in New York, predicted the 1100 would be enhanced first with software in early 1988. Later in 1988, a "Super 1190" model will be introduced that will include circuits made by Hitachi Ltd., he said.

Jan Lindelow, Unisys's vice-president of corporate marketing and services, said the new processor would be introduced in 1988. Although Lindelow would not rule out new low-end 1100 series machines as well, he stated that the company's principal strategy in broadening its offerings to both families of users is to provide applications written in fourth-generation languages. The Burroughs fourth-generation language Linc is available for the A series machines. The Sperry-developed language Mapper will be available for the A series in about a year, Lindelow said.

Move into Unisys mode

"This product will pull Sperry customers and salespeople into the Unisys mode. They are going to meld the sales force using the A series and then offer a combined Linc and Mapper in 18 months," said John Logan, an analyst with The Yankee Group in Boston.

Unisys's Blumenthal

Asked which architecture would be emphasized in sales in which both Burroughs and Sperry machines could apply, Lindelow said only that the machine bid would depend on the specific application.

Blumenthal said Unix sales are increasing at a rapid rate. From $100 million in 1986, Blumenthal said he expects sales to grow to $300 million this year. Overall, he said, he has seen better business conditions recently. "We have seen improved orders overall over the past year. We are hoping and expecting that that continues," he said.

"Order rates are up 10% over a year ago. Considering the tumult of the merger, that's excellent," Geran said.

Otherwise, Blumenthal reiterated that Unisys is "committed to the maintenance of the various architectures." He said the principal benefit of the merger of Sperry and Burroughs is that the combined company can move more quickly than either of the two previous companies.

When asked what price Unisys has to be at to compete with IBM, Blumenthal responded, "I don't believe that Unisys needs to sell its products at a discount." But, he added, "Obviously, we can't be more expensive."

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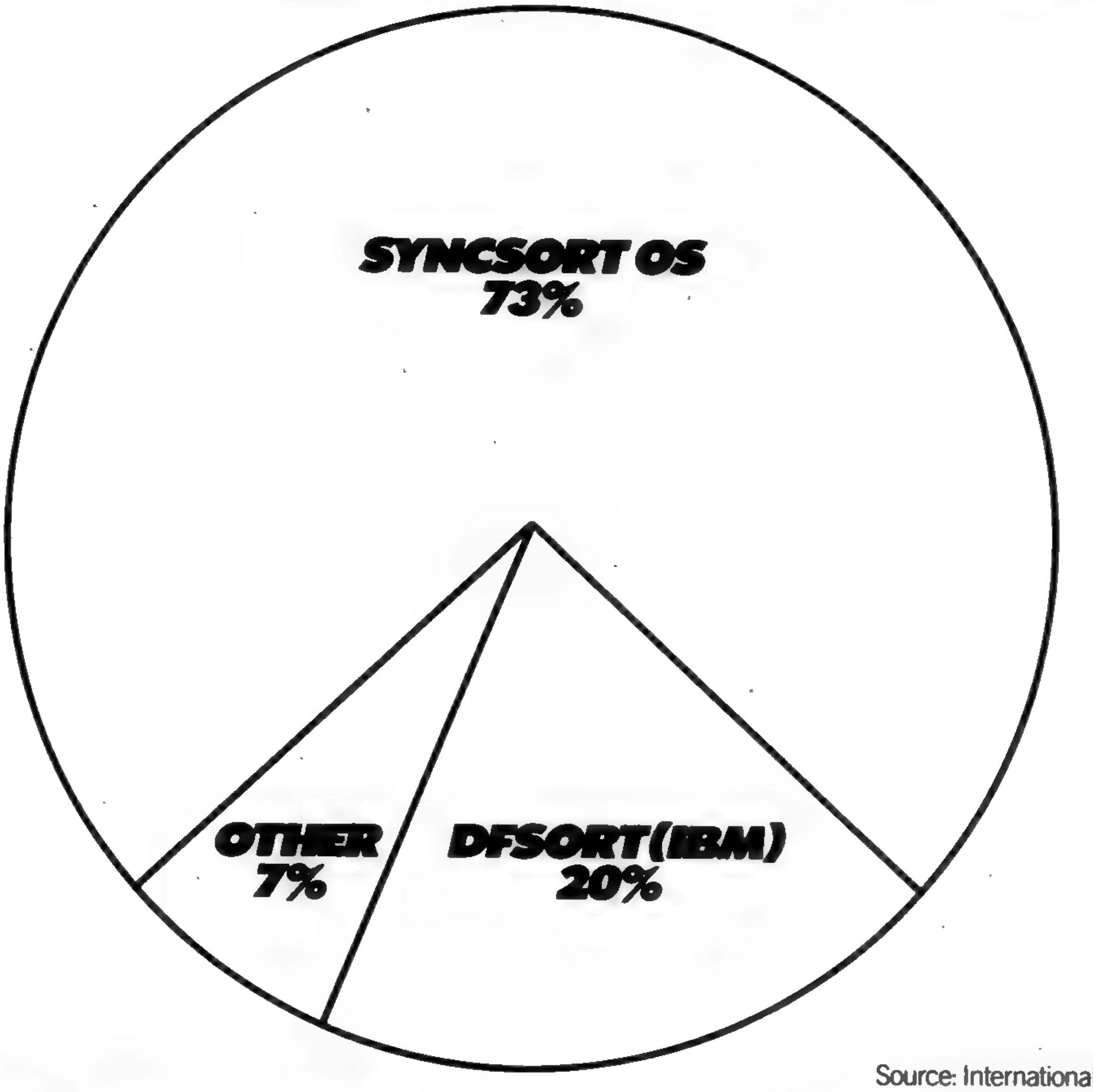

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AT&T PCs make multitask, multiuser bid

BY ALAN ALPER
CW STAFF

PARSIPPANY, N.J. — Moving to meet the high-performance microcomputer challenges laid out by IBM, Compaq Computer Corp. and Tandy Corp., AT&T last week unveiled its first machines based on Intel Corp.'s 80386 chip, featuring multiple operating environment support and true multitasking capability.

The 386-based micros, called the 6386 Workgroup System, run 386 Unix System V — a binary version of AT&T's Unix System V, Release 3.1 for Intel 386 machines that is being jointly developed by AT&T and Microsoft Corp. The new system is set for release during the third quarter of 1988.

The units reportedly will also run Microsoft's MS-DOS 3.2 and support Microsoft's MS OS/2 when that operating system is released early next year.

Under 386 Unix System V, the machines will also run AT&T's Simul-Task 386, a software product that allows multiple MS-DOS programs to be processed simultaneously as tasks under Unix running on a 386 machine.

To multitask while running under only MS-DOS, AT&T is using a proprietary utility, called DOS Supervisor, that allows up to eight MS-DOS applications to run concurrently.

"If AT&T can present a clear connectivity strategy and makes good on its promise to deliver certain functions on its 386 machines before IBM, then it could affect corporate purchasing decisions," noted Joe Cross, an analyst with Future Computing/Datapro, a Dallas-based market reseach firm.

As evidence that the strategy is working, AT&T last week disclosed that McDonald's Corp. has signed a contract to use the 6386 at all of its company-owned stores. However, AT&T declined to specify the size of the contract.

The 6386, which will use Microsoft Windows as its interface, comes in two models: a 16-MHz desktop model supporting up to 20 users and a 20-MHz floorstanding model that can accommodate up to 32 users. Support for the X Windows standard will be available by the middle of next year, the firm added.

Multiuser micros

AT&T combines the 80386 chip and Unix to offer multiuse capabilities

	6386 (desktop)	[illegible] (floor-standing)
Microprocessor	80386	80386
Clock speed	16 MHz	20 MHz
Standard memory (in bytes)	1M	2M
Expandable to (in bytes)	48M	64M
Diskette size	5¼ or 3½ in.	5¼ or 3½ in.
Fixed disk	Optional	135M bytes
Fixed disk options (in bytes)	40M, 68M, 135M	+Second 135M
Operating system	Unix System V	Unix System V
Expansion slots	7	10
Maximum users	20	32
Base price	$4,899	$10,395

INFORMATION PROVIDED BY AT&T
CW CHART

The desktop model is available in four configurations (see chart). They include a 1.2M-byte floppy disk model and three versions offering 40M, 68M or 135M bytes of hard-disk storage. The deskside unit comes with a 135M-byte hard disk drive and 2M bytes of random-access memory (RAM).

The 386-based micros are scheduled to be available next month through AT&T's own sales force and distribution channels. Prices range from $4,899 for a single-floppy disk unit to $10,395 for the 135M-byte version.

Work on 386 Unix System V, the merged Microsoft Xenix and Unix System V operating system, is proceeding on schedule, noted Microsoft Chairman Bill Gates. The operating system reportedly will be available for software developers in the second quarter next year and is expected to be released to end users during the following quarter, he added.

AT&T also unveiled a 12-MHz version of its Intel 80286-based PC 6310, offering 1M byte of RAM — double that of its predecessor — which is expandable to 13M bytes. The updated PC reportedly will be available, beginning in December, in four different configurations: a single 3½- or 5¼-in. floppy-disk or 20M-, 40M- or 68M-byte hard-disk versions. Prices range from $2,895 to $5,790.

Booster shots

FROM PAGE 1

ber, AT&T's first micros based on an Intel Corp. 80386 microprocessor and a faster version of its Intel 80286-based PC 6310 (see story above). The firm also reduced prices by approximately 25% on its low-end 3B2 Models 310 and 400.

AT&T also discussed plans to establish a consistent application interface, similar to IBM's Systems Application Architecture, that would span operating systems, languages and applications and embrace single-user and multiuser micros through high-end minis.

The project involves using Microsoft Corp.'s Windows as a user interface on AT&T's line of microcomputers, with that line migrating to the evolving X Windows standard during 1988.

The 3B4000 was designed around AT&T's new proprietary Abus, which transmits data at 20M byte/sec. between the system's main CPU and adjunct processors. In multiprocessing, each application is processed by a dedicated processor.

The system's modular architecture allows users to add power incrementally. Up to 14 processors, including a dedicated communications processor, can be linked to the main processor via the Abus, giving the system a maximum raw processing power of about 43 million instructions per second (MIPS). Up to 300 concurrent users can be supported, the firm said.

Multiple possibilities

Multiprocessor architecture of AT&T's 3B4000 provides modular expansion options

Architecture	Uniprocessor	Multiprocessor (modularly upgradable to 14)
MIPS[1]	2.6 (4 with multiprocessor enhancements)	1.5 to 43
Users	24 to 64	Up to 300
Standard memory (in bytes)	16M	8M to 16M on primary processor; 4M to 16M on adjunct processors
Base price	$46,500	$187,000

[1] Million instructions per second

INFORMATION PROVIDED BY AT&T
CW CHART

"A strong growth path is all the rage in the industry," noted Molly Upton, an analyst with International Data Corp. in Framingham, Mass. "They don't want to hand off their customers to Amdahl or someone else anymore."

The master processor, rated at 1.6 MIPS, uses AT&T's 32-bit proprietary microprocessor, the WE32100, which operates at 14 MHz. The company expects to eventually upgrade the master processor to the WE32200, a 24-MHz implementation of the chip, a spokeswoman said, noting that one version of the adjunct processor is already using the component.

The master processor supports up to 16M bytes of storage, while adjunct processors support between 4M and 16M bytes of storage. The system supports a mix of 300M- and 570M-byte fixed disk drives and 1600 and 6250 bit/in. tape drives for a total of 2.7G bytes.

Networking and connectivity support includes Unix-to-Unix system copy, AT&T's WIN 3B interface for Transmission Control Protocol/Internet Protocol (TCP/IP) over Ethernet, CCITT X.25, LU6.2 peer-to-peer communications and IBM's RJE and 3270 emulation.

The system is said to provide a measure of fault tolerance that AT&T dubbed "fail soft." The 3B4000 uses mirrored disks to provide duplicate copies of each file. Most critical computing failures come from disk errors, AT&T said.

The 3B4000 carries an entry-level price of $187,000, including an 8M-byte master processor, the Abus, a 4M-byte adjunct processor, two 300M-byte hard disk drives, a 120M-byte cartridge tape drive and AT&T's Unix System V, Release 3.1.1. The system will be available beginning in March 1988, the firm said.

For its 3B family members, AT&T also unveiled a transaction processing operating system, called Tuxedo, which sits on top of Unix. Tuxedo consists of four modules: a teleprocessing monitor and data entry system, a data base management system, a tool to allow programmers to embed SQL statements in C language programs and a fourth-generation language that provides a nonprocedural interface for data base creation and access. Available at the same time as the 3B4000, the components are priced at $25,000, $50,000, $10,000 and $22,500, respectively.

Tuxedo "identifies each transaction as an integral unit," said Howard Mitchell, product manager of the 3B computer line. "If a transaction were to be aborted because of hardware failure, Tuxedo would isolate the problem and back out the data to another file."

Offering a transaction processing system is critical if AT&T is to gain entry into banking and retailing accounts, analysts said.

As part of its software strategy, AT&T disclosed that it will create a single application interface across its product line. The user interface will support the X Windows standard.

Some of the strategic products included are: Unix System V, Release 3; Microsoft's MS-DOS and its derivatives; C and Cobol languages; Informix Software, Inc.'s SQL-compatible relational DBMS; Tuxedo; X.25; Ethernet and TCP/IP software; AT&T's Starlan networking software covering the first four Open Systems Interconnect layers; AT&T Mail; and LU6.2, 3270, IBM Systems Network Architecture and RJE emulation software.

Georgy Colony, president of Forrester Research, Inc. in Cambridge, Mass., said that while the 3B4000 is nicely designed and broadens Unix's appeal, technology is not AT&T's problem. "They need to form a dedicated sales force for computers and get their marketing act together," he said.

The new 3B2 mid-range processor — the 3B2/500 — fills the price/perfomance gap between the 3B2/400 and 3B2/600, which was unveiled in March. It is being positioned as a network server or as an office automation or general-purpose computer. Between 25 and 40 users — or 50 direct serial connections — can be supported on the system, AT&T said.

Priced at $28,000, the 3B2/500 comes standard with 4M bytes of main storage and a 147M-byte fixed disk drive. Operating at 2.1 MIPS, the system offers twice the performance and double the capacity of the 3B2/400, AT&T claimed.

Midwest correspondent Jean S. Bozman contributed to this story.

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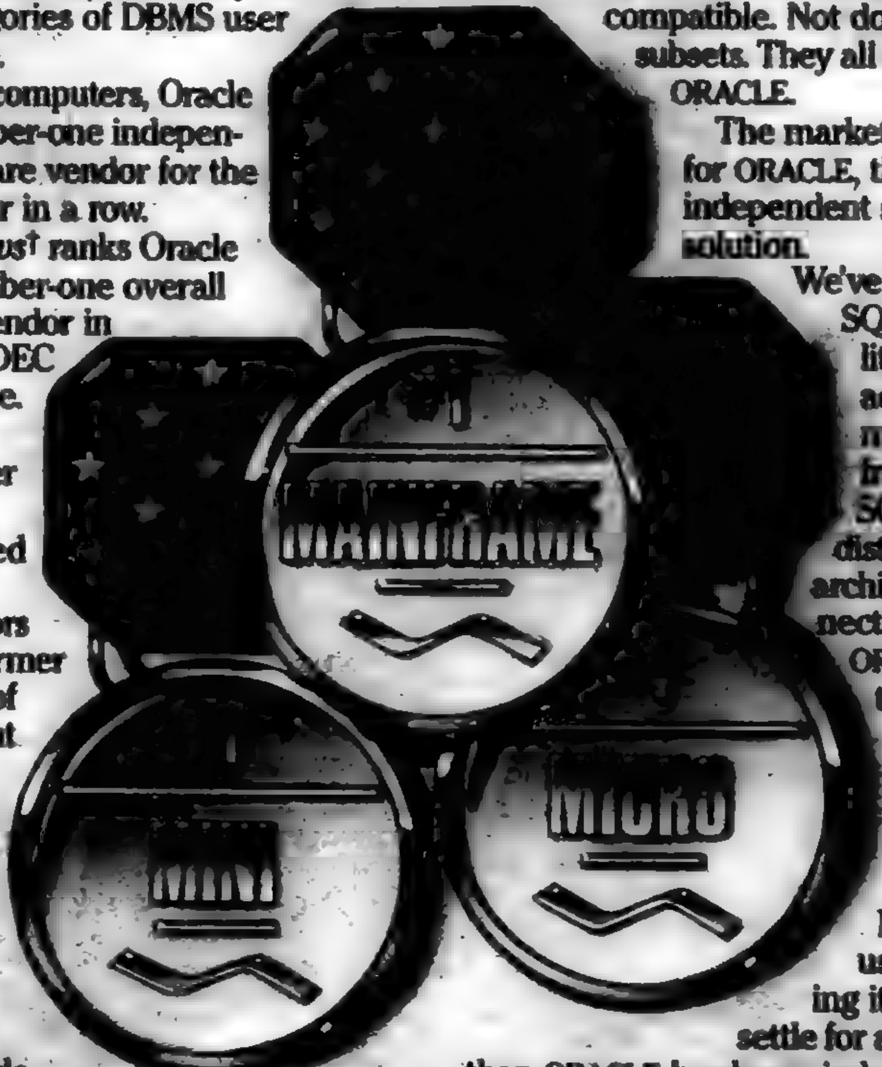

For minicomputers, Oracle is the number-one independent software vendor for the second year in a row. *Digital News*† ranks Oracle as the number-one overall software vendor in the entire DEC marketplace. So does The Gartner Group.‡

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CA	Lafayette	Sep 24, Nov 12
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	Newport Beach	Sep 17, Oct 6
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	San Diego	Sep 10, Oct 8
	San Francisco	Sep 15, Oct 20, Nov 17
	San Jose	Sep 2, Oct 7, Nov 5
CO	Colorado Springs	Sep 17
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	Iselin	Sep 16, Sep 29, Oct 8, Oct 22, Nov 5, Nov 17
	Princeton	Sep 22, Oct 14, Nov 12
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NY	Albany	Oct 6, Nov 4
	Buffalo	Sep 29
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	New York City	Sep 9, Sep 17, Sep 23, Oct 7, Oct 21, Oct 28, Nov 4, Nov 18
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IBM's Silverlake coming in '88

BY JAMES CONNOLLY
CW STAFF

WHITE PLAINS, N.Y. — IBM's mid-range strategy will advance next year with the announcement and delivery of the long-awaited System/36 and 38 follow-on processor, which has been commonly referred to as Silverlake, and the introduction of a smaller 9370 minicomputer, a top IBM executive told *Computerworld* in a recent interview.

In some unusually frank discussions about his company's strategy, IBM System Products Division President Stephen B. Schwartz cleared the air regarding the Silverlake introduction date.

Varied speculation from observers had set the debut for as early as this past summer.

On the board

Schwartz mentioned the following developments IBM has planned:

- The System/36 and 38 follow-on will use a 9370 chassis and elements common to the 9370 and is due during the second half of 1988.
- IBM will provide a smaller 9370 next year and "probably" will also enhance the 9370's price/performance during the same year. Further, the company "probably will offer a bigger one in a couple of years."
- An entry-level MVS/IS operating system is two to three years away.
- The mainframe-oriented IX/370 operating system will be enhanced to be compatible with the company's low-end AIX Unix operating system at the user-interface and application-interface levels.

IBM's Schwartz

Schwartz stopped short, however, of guaranteeing that the System/36 and 38 follow-on will be delivered on time.

"Yes, there is a 3X follow-on product," he said.

"We will provide a growth path for our System/36 customers and our System/38 customers," Schwartz emphasized. "Their application investment will be preserved, in that their applications will run on the new product.

"Our target is to try to do something by the second half of next year. Time will tell," he added.

Schwartz was firm in stating that a smaller 9370 will be delivered next year.

"We will continue to expand the 9370 line over the next few years," he said. "It is just beginning, as the saying goes."

Schwartz also confirmed that the follow-on product, code-named Silverlake, will use a 9370 chassis and as many common components and subassemblies as is practical.

He said the product will be manufactured at the IBM Rochester, Minn., facilities that now are producing System/36 and 38 computers and 9332 disk drives.

Growth path assured

System/36 and 38 users can be confident about the follow-on product providing a power range that will ensure a growth path that will last them "a long, long time," Schwartz added.

He claimed that the use of common components cuts development and manufacturing costs and helps keep end-user prices in check.

Schwartz said the development of an entry-level version of MVS comparable to the company's VM/IS is a large job that piggybacks high-end MVS enhancements and restructuring being done by IBM's Data Systems Division.

Flight system grounded

New air control setup crashes on second day

BY ALAN J. RYAN
CW STAFF

NASHUA, N.H. — A problem with a control display channel interface working on a day-old IBM 3083-BX mainframe caused flight delays in Boston recently that travelers could not blame on the airlines.

The problem was discovered Aug. 28, just one day after the mainframe had been installed to replace the IBM 9020 system that had been in use. The 9020 and a second system are still used as backup.

"The problem was not with the mainframe but with the computer display channel interface," said Susan Coulter, a Federal Aviation Administration spokeswoman in Boston.

Glitch dropped interface

FAA Technical Center spokeswoman Holly Baker said the problem was first recognized by a systems engineer, who said a slight hardware glitch caused the interface between the display and the host to be lost.

When the hardware problem was corrected, engineers were unable to reestablish the interface between the display channel and the host computer, she said.

The IBM mainframe processes all flight plan information on all aircrafts that have filed flight plans with the FAA, Coulter explained. The control channel then transmits the signal and creates a flight pattern picture on a screen.

Because of the problem, at least three departing flights were delayed. "The backup system is not quite as sophisticated as the host and, as a consequence, there are some slowdowns generated" when the backup kicks in, she said. "The air traffic people did an analysis and said there may have been three flights delayed because of the problem." The flights were delayed from between 17 and 22 minutes, she added.

While approximately 18 arriving flights were also delayed, "We can't say whether or not that was related to the computer display channel problem or to the [inclement] weather or control procedures at the center," Coulter said.

The problem was rectified by the following morning, according to Coulter.

The FAA has 20 air route traffic control centers around the nation, the spokeswoman said. Eventually, all will be upgraded to IBM mainframes, she said. Boston's Logan International Airport was the fourth to be upgraded, but the facility has not been formally commissioned yet, Coulter said. The FAA reportedly plans to commission the facility in October.

3380

FROM PAGE 1

of storage and a 17-msec seek time.

IBM claimed that with the addition of a third and fourth data path, the 3990 controllers achieve up to 30% higher performance gains over 3880s. Analyst Louise Biggs of San Jose, Calif., market research firm Dataquest, Inc. likened the additional data paths to expanding a highway from two lanes to four to support more cars. "What is important is that the quad-pathing increases the I/O," she said.

However, Biggs noted that the PCMs are unlikely to be surprised by most of the announcements and that most of them, including Amdahl Corp., Storage Technology Corp., National Advanced Systems Corp. and Memorex Corp., have been preparing for the IBM moves.

Analyst James Porter, president of Disk/Trend, Inc. in Los Altos, Calif., speculated that the PCMs could be hurt in sales of their high-end 5G-byte drives as customers look toward IBM for triple-density units. But Porter noted that the PCMs' lack of surprise could mean they will deliver their own triple-density DASDs to users in six months rather than the nine months it took to answer IBM's E models.

One user who immediately expressed interest in the drives was Edward Gillette, data processing manager of The Bank of New York in Harrison, N.Y. Gillette said he was disappointed by the one-year wait for the 3990 controllers and by IBM's choice of 4.5M byte/sec. channels instead of 6M byte/sec. transfer rates. He reported, however, that if he were buying a DASD now, he probably would commit to the Model J, with the possibility of upgrading to a Model K.

Analyst David Vellante of Framingham, Mass., market research firm International Data Corp. said the 3990 could present a challenge to the PCMs.

"The controller is an issue with its microcode. The PCMs can simulate features easily enough, but I'm not sure they are going to be able to ensure compatibility," Vellante said. He noted that the PCMs may use "some muscle" in the longer term by tailoring their solid-state storage devices to compete with IBM cache controllers, now that they know IBM's strategy.

That strategy, according to Bill Wilson, group director of large-system management for IBM's Information Systems Group, includes providing some fault tolerance through the Dual Copy feature. "Customers could write backup copies before, but keeping them in sync was next to impossible," Wilson said. With Dual Copy, systems software can be set up to automatically write two copies of a file to two disk volumes, keep them updated and use the backup if one file is destroyed.

The 3990 Model 3 cache controller also supports the DASD Fast Write feature, which sends data to the cache at channel speeds and to battery-powered storage asynchronously. Wilson said DASD Fast Write allows data to be written at electronic speeds and improves the performance level of previous cache controllers by 2½ to three times.

In a move that analysts Vellante and Porter said appears aimed at Digital Equipment Corp., IBM introduced a direct-connect subsystem, the 3380 Model CJ2. The 1.25G-byte unit, including a 3990 Model 1 controller, costs $70,000 — only $11,000 more than an entry-level 3380 Model J.

IBM reportedly will promote the subsystem to mid-range users, such as those of high-end 9370s and low-end 4381s, by emphasizing its low cost in comparison with mainframe-class subsystems and its 12-msec seek time in comparison with other vendors' offerings.

IBM cut the purchase prices of the 3380 Models D and E by 8% and those of the 3880s by 15%. The firm slashed rental costs for 3880s by 61% to 67%.

The 3380 Model J costs the same as comparable D models: $82,000 for "A" drives and $59,000 for "B" drives. The 3380 Model AK4 costs $128,000, and the Model BK4 costs $105,000. IBM also offered a one-year warranty and claimed a 40% savings in maintenance for the new drives.

Prices for the 3990s range from $60,000 for a Model 1 with two paths and no cache to $984,000 for a Model 3. with four paths and 256M bytes of cache. A 3880 upgrade feature supporting the faster channels costs $3,000.

3380 expansion

Shorter seek times and a greater range of configurations distinguish new IBM subsystems from the older Models D and E

	Model D	Model E	Model CJ2	Model J	Model K
Minimum seek time (msec)	3	3	2	2	2
Average seek time (msec)	15	17	12	12	16
Actuators per unit	4	4	2	4	4
G bytes per device	0.63	1.26	0.63	0.63	1.89
G bytes per box	2.52	5.04	1.26	2.52	7.56

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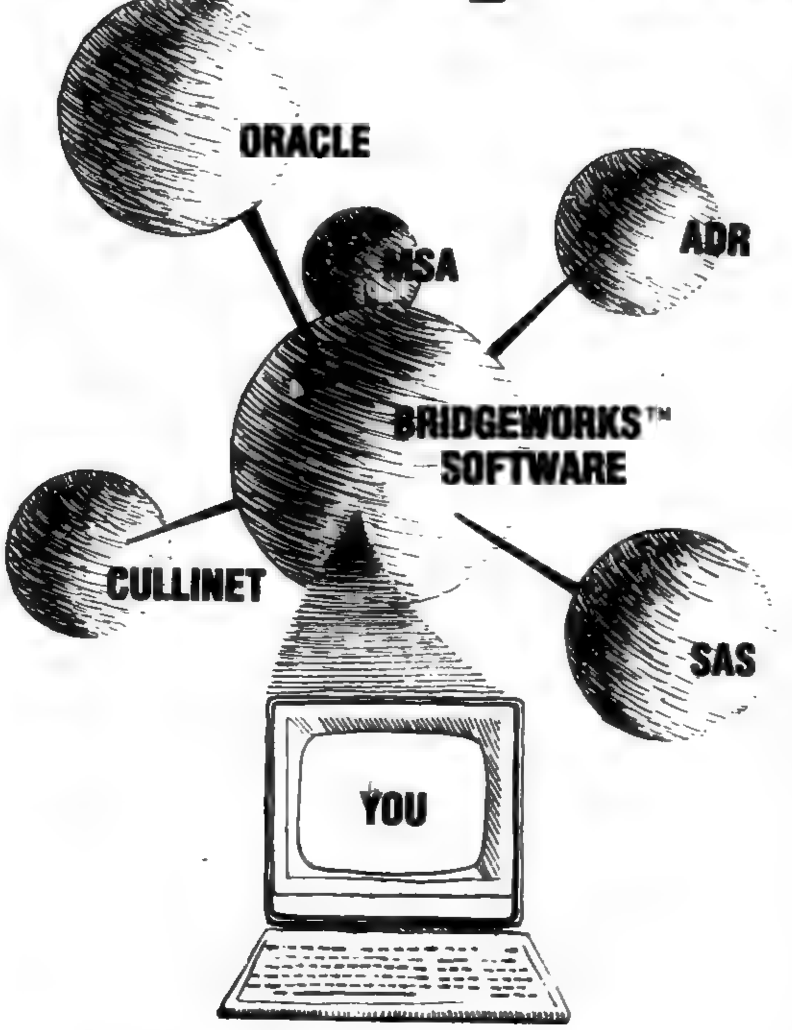

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Cray dumps massive processor plans

BY JEAN S. BOZMAN
CW STAFF

MINNEAPOLIS — Cray Research, Inc. decided last week to discontinue a costly project to develop a new parallel-processing supercomputer, prompting the resignation of one of the company's top two developers.

System designer Steve Chen, design chief of the X-MP models, decided to continue the project independently and planned to resign this week. Chen's departure leaves founder Seymour Cray, design chief of the Cray-1 and the Cray-2 models, as the company's only systems designer.

Chen's MP project began in October 1985 and was supposed to result in the introduction of a 64-processor computer in 1990 or 1991. Meanwhile, Seymour Cray has been heading a separate project to design the next-generation Cray-3.

Chen's five-year project reportedly was costlier than expected and was stopped by Cray's executive committee after a summer budget review. Originally budgeted at $50 million overall, the project would have run up $100 million in expenses by the end of this year, Cray executives said.

"Cray Research has succeeded because of its preference for small, innovative design groups, groups that worked with very few resources and no backup plan," said Cray Chairman John Rollwagen in a company video broadcast last Monday to employees here. "The MP project was going down a different path, exploring new technologies and conducting primary research."

Rollwagen said that such basic research, which probed new areas of physics, was impossible to carry out on Cray's $700 million in annual revenue. "If we try to do what IBM and NEC do, I don't think we can keep up with them," Rollwagen said. "But if we do what we do best, IBM and NEC can't keep up with us."

Chen, who had been with Cray since 1979, would reportedly like to raise enough venture capital to start his own supercomputer business. He could not be reached for comment. If Chen is successful, he would be following the path taken by Seymour Cray, who left Control Data Corp. in 1972 to start Cray Research. Company officials said that probably half of the MP project's 180 staffers will remain at Cray Research, with many planning to join Chen in his new venture.

Product commitment

In discontinuing the MP project, Cray underlined its commitment to the existing X-MP and Cray-2 product lines. Major enhancements are expected in the next three years. "We think that the Cray-3 full-scale prototype should be available at the end of next year, just one year after the Y-MP," Rollwagen said.

The Cray-3 is equivalent to 100 Cray-1s, and the Cray Y-MP is equal to 40 Cray-1s, said Gary Smaby, managing director of technology and research for the Minneapolis investment firm of Piper, Jaffray and Hopwood, Inc.

Chen had made major contributions to the Y-MP design, but industry analysts saw Chen's departure as a temporary setback for Cray, which has 160 installed machines at 100 sites worldwide. "When a company's business matures, you tend to have product extensions at both ends of the line," Smaby said.

Earlier this year, the company revamped its entire product line, adding several smaller machines to the low end.

Pleasing Cray's commercial customers has become increasingly important, as automobile and aerospace companies buy Crays for product simulations. "Cray is expanding its population of commercial users and is moving away from its original base of defense and university users," said Jeff Canin, a senior technology analyst at the San Francisco firm of Hambrecht & Quist, Inc. "Commercial customers need a lot of handholding, and they're a little less forgiving about software problems."

To remedy a weakness in software development, Cray named Robert Ewald, former vice-president of commercial marketing, as vice-president of software development. "The migration from the Cray Operating System to the new Unicos Unix operating system on the X-MP is not going as smoothly as they would like," Canin said. "Cray executives have decided to put their development resources into making sure the migration goes as smoothly as possible."

Hyundai releases first micro, puts corporate field in sights

NEW YORK — Hyundai Electronics America announced here last week its first microcomputer to be sold under its own label.

The Super-286C system is said to be compatible with IBM's Personal Computer AT and suited for corporate networks, graphics, desktop publishing and computer-aided design and manufacturing.

The system will reportedly be released by the end of this month at a suggested price of $1,499.

Bundled Alpha programs

The company also announced it will bundle Alpha Software Corp.'s Electric Desk and Keyworks software programs.

The system's standard configuration includes 640K bytes of random-access memory expandable to 1M byte, six expansion slots, an IBM Enhanced Graphics Adapter video card, a real-time clock and calendar, one parallel port, two serial ports and one floppy disk drive.

Options include a second floppy disk drive and a 30M-, 40M- or 70M-byte hard disk drive. The system also has a monochrome monitor.

The Super-286C measures 15 by 15½ in., has an 8- to 10-MHz keyboard-switchable clock, which Hyundai believes makes it competitive with 10Hz micros currently available, while being able to run software developed at 8 MHz.

Hyundai reportedly is also supplying Super-286C buyers with Microsoft Corp.'s GW-Basic programming language.

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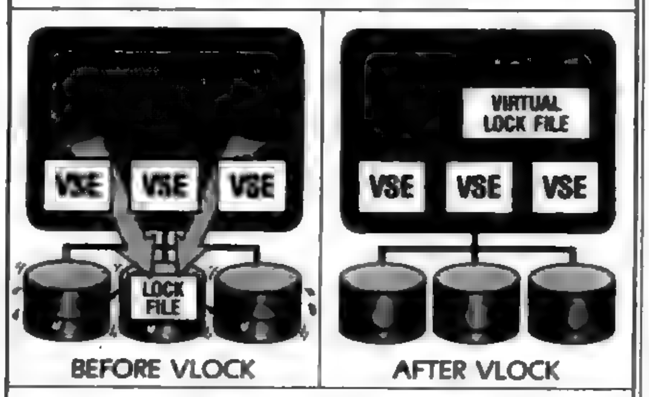

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MCI buys Globcom, bolsters international run

BY ELISABETH HORWITT
CW STAFF

WASHINGTON D.C. — Determined to wrest from AT&T a greater share of the international communications market, MCI Communications Corp. last week signed a letter of intent to purchase RCA Global Communications, Inc. (Globcom) from General Electric Co.

"It's a perfect strategic fit for us," said MCI spokesman Gary Tobin. "Acquiring Globcom makes us the definitive company in the international market; now when we approach multinational companies, we can provide everything they need." MCI has recently been making a major push into international communications services, a market that is growing by between 20% and 25% per year, according to Tobin.

Globcom, which became a GE subsidiary along with the rest of RCA Corp. in June 1986, is a major provider of international telex and high-speed data services, including electronic mail. Acquiring the company will double MCI's capacity to provide telex services and add facsimile services to its offerings, Tobin said. "We'll be far and away the largest telex and leased-line carrier internationally in terms of share of minutes and revenue," he added. MCI and Globcom combined will have 40% to 45% of the international telex market, according to MCI.

The acquisition will "make MCI No. 1 in the wholly international data arena," which is primarily telex at the moment, noted John Bain, a senior vice-president at Shearson Lehman Brothers, Inc. "But there is still the question of whether they can leverage their dominance of the telex market — which is declining — in computer-to-computer communications."

Ownership of Globcom will not help MCI break AT&T's stranglehold on the international market, according to Bain, "but it will absolutely help MCI get its foot in the door of more international accounts. It also gives them a still better entree into a market that is very difficult to break into."

MCI also plans to leverage Globcom's stake in transatlantic cable and satellite-based communications links, providing users with more cost-effective international connections, Tobin said. "Right away, we can save money by moving traffic from the access lines that Globcom leases from AT&T to MCI's own lines."

"GE does not feel that Globcom is a vital part of our strategy, and it looks like a good fit for MCI," said GE spokesman Bruce Bunch. The price of the transaction is $160 million subject to closing date adjustments, if any. MCI and GE expect to complete the transaction by year's end.

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BY CHARLES BABCOCK
CW STAFF

ROCKVILLE, Md. — Sage Software, Inc. last week announced a data base painter that will enable data base administrators to fill in the blanks of an IBM ISPF-type screen to create file structures for an IBM DB2 data base.

Called the APS/DB2 Data Base Painter, the mainframe software product can create DB2 tables, table spaces, indexes, columns, rows and other file structures needed to build the data base, according to Gary G. Greenfield, vice-president of marketing.

The definition of data base structures occurs outside the DB2 production environment and does not involve learning DB2 syntax. The data base painter captures the definitions and specifications, functioning somewhat like a data dictionary underlying the development process. The painter can provide referential integrity, or integrity to related information when primary information is changed, in the development process. The referential integrity does not extend to the functioning of DB2, Greenfield said. "As long as someone uses the correct name, we can ensure that same name will be used across the development process," he said.

Assesses and analyzes

The painter provides a staging area outside DB2 in which the data base administrator can define and document DB2 structures, assess data interrelationships and analyze the impact of potential design changes before updating the DB2 catalog, Greenfield said.

The painter works under IBM's MVS and MVS/XA operating systems, ISPF 2.2 or higher and DB2 Release 1.2 or higher. The painter is available immediately and sells for $20,000 per copy.

The tool can also be used as a stand-alone data base creator or in conjunction with other Sage development software. Sage is the producer of the APS application generator for building mainframe Cobol applications.

Sage has sold 115 copies of its APS development system since its introduction in 1984, company officials said. The firm realized $14.5 million in revenue for fiscal 1987, ended April 30.

Interleaf tool in spotlight

Macintosh version of publisher to highlight Seybold show

BY STEPHEN JONES
CW STAFF

SANTA CLARA, Calif. — Interleaf, Inc.'s entry into the personal computer desktop publishing market is expected to highlight a flurry of product offerings at this week's Seybold Desktop Publishing Conference.

Sources said Interleaf will announce an Apple Computer, Inc. Macintosh II version of its Technical Publishing Software, a high-performance desktop publishing package that currently runs on technical workstations from companies such as Sun Microsystems, Inc. and Digital Equipment Corp.

With the increased power of the Mac II, Cambridge, Mass.-based Interleaf has been able to port its powerful software down to personal computer platforms and offer it at lower prices.

Industry watchers speculated that the new Interleaf software, which currently sells for about $15,000, could sell for as little as $2,000. The product will reportedly be available by year's end.

This could pose a serious threat to established vendors such as Aldus Corp. that have built their fortunes on high-end PC desktop publishing systems.

The Interleaf product is one of three offerings from third-party vendors expected to be endorsed Tuesday by Apple as "milestone products" in desktop presentation applications for the Mac II, conference participants said.

The two other packages expected to be sanctioned are as follows:

- An enhanced version of Powerpoint, the presentation organizer software for the Mac that Microsoft Corp. acquired when it purchased Forethought, Inc. last July.
- Cricket Presents, from Cricket Software of Philadelphia, a presentation software package.

Analysts said Apple will be pumping up similar third-party software for the Mac as the vendor launches a campaign promoting the Mac as a desktop presentation machine. Apple hopes to differentiate itself from the IBM Personal Computer environment by focusing on presentation solutions in much the way it has emphasized desktop publishing in the past, said Amanda North, marketing manager of Apple's newly formed desktop presentation unit.

Although few observers said they expect success equal to the desktop publishing craze, some analysts said the strategy could pay off.

West Coast senior correspondent Julie Pitta contributed to this story.

Commodore touts desktop system

NEW YORK — Commodore Business Machines, Inc. last week confirmed that it will announce a multistation desktop presentation and publication system and an adapter board to allow its Amiga 2000 to read DOS files.

Commodore said the publishing system, due to be announced at the Seybold Desktop Publishing Conference in Santa Clara, Calif., this week, is based on the recently shipped Amiga 2000 and comes standard with a dual floppy disk drive CPU, 2M bytes of random-access memory and the Commodore A2002 color monitor.

The system retails for less than $3,500, the company said. That price includes the A2300 Genlock, a hardware peripheral that allows users to connect video cameras to the Amiga.

The A2088D Bridgeboard for IBM Personal Computer XT compatibility, also scheduled to be introduced at the show, is available for $699.

Additionally, Commodore said 12 of its developers will announce or display products for the system at the show. Among the products is Wordperfect Amiga from Wordperfect Corp., which offers onscreen columns, a 115,000-word dictionary, an on-line thesaurus, macros, math and support for some 200 printers. Its list price is $395.

Page-composition products introduced for the system include the $395 Professional Page from Gold Disk, Inc. and the $225 Shakespeare package from Infinity Software.

Microsearch will introduce an Amiga-specific, windowed page-layout package called City Desk, which will sell for $149.95. Brown Wagh Publishing will display its Publisher 1000 newsletter production program, which sells for $199.95.

Ameristar Technologies, Inc. said it plans to introduce its Arcnet local-area network card plus networking software that reportedly permits several Amigas to share files and an Adobe Systems, Inc. Postscript-compatible printer. It will sell for $599.

Two products will be announced for users who need to create video presentations. Videotitler from Aegis Development Corp., which will be sold for $99.95, and Deluxe Productions from Electronic Arts, which will cost $199, are said to utilize the Amiga's 4,096-color palette and to offer fades and wipes.

But We're Still A Mystery

If the name Compuware isn't familiar, perhaps it's because Abend-AID is. We're the company who created this powerful software product that puts the burden of analyzing program abends — on the computer — in the IBM mainframe environment. And our product is so well-known, we've been a bit overshadowed.

Since its introduction in 1977, Abend-AID has become a familiar investigative tool for some 3,500 OS sites and 400 DOS sites around the world. While back at Compuware, it spawned several groups of remarkable tools. Names like CICS Abend-AID, Compuware CICS dBUG-AID, File-AID, and Compuware CICS PLAY-BACK. Equally powerful. Equally practical. And equally dedicated to making a name for themselves improving data processing. You can read about them in the following pages of this magazine.

But Compuware is more. We're a full-service data processing company. So there are names like Professional Services for a staff of some four hundred people who, with their expertise, help companies meet the challenges of the data processing world such as short and long term project management, software support, and program implementation and conversion. And Educational Resources — people who provide the training that's necessary to change with that world. We'll tell you more about them in the next few pages, also.

Sound too good to be true? It's not. That's the differences between a legend and a myth.

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File server for 80386 checks in from Novell

BY PATRICIA KEEFE
CW STAFF

NEW YORK — Novell, Inc. unveiled its long-rumored Intel Corp. 80386-based file server and announced an agreement providing Novell's Netware users access to Transmission Control Protocol/Internet Protocol (TCP/IP) hosts at a sparsely attended PC Expo here last week.

In addition, Novell announced availability of the first Netware software releases under the company's recent restructuring of its product line.

Built by Novell subsidiary Santa Clara Systems, Inc. (SCS), the 16-MHz Novell 386A file server reportedly gives Netware users enhanced performance as well as a turnkey package from Novell.

The server supports Novell's Advanced Netware 286 and System Fault Tolerance Netware Levels I and II, SCS's PC Terminal diskless workstation and the IBM Personal Computer and Personal System/2 families. PS/2 Models 25 through 60 are also supported.

The 386A server comes with 1M byte of memory, expandable to 4M bytes on the motherboard, and can support up to 2G bytes of disk storage with external disk drives. Also included are two 32-bit expansion slots, five 16-bit slots and one 8-bit slot. A server with 1M byte of memory, a 1.2M-byte floppy drive and a 42M-byte fixed disk costs $6,295; with an 80M-byte fixed disk, the price is $6,995.

Also unveiled was a joint marketing agreement with Excelan, Inc. in San Jose, Calif., for Excelan's TCP/IP Workstation board for Netware. Unlike Novell's previous agreement with Micom-Interlan, Inc. in Boxboro, Mass., which supplies a Netware-compatible TCP/IP gateway, the Excelan agreement is targeted at serious TCP/IP users, said Craig Burton, Novell's vice-president of corporate planning and development.

TCP/IP Workstation reportedly enables networked PCs to gain direct access to and transfer files concurrently with a Novell IPX-based Netware server and dissimilar TCP/IP-based hosts. This gives PC users high throughput and supports up to 64 sessions with multiple resources, Novell said.

Excelan's TCP/IP Workstation for PCs will be available in December for $995. The turnkey package includes Excelan's Exos 205T Intelligent Ethernet Controller, TCP/IP network software and applications and a Netware 286 driver kit.

Novell's software releases encompass Entry Level Solution Netware 286 Level 1 Version 2.0A and Level II Version 2.1, which are available now and in the first quarter, respectively. Neither version requires a key card. Both feature 1.5M bytes of random-access memory, simplified installation and documentation and support for Ethernet, Arcnet and IBM PC Network adapters, Novell 386 file servers in a nondedicated mode and Microsoft Corp.'s MS-DOS 3.0 and higher.

Level I is priced at $595 and supports four concurrent users. Level II is priced at $1,395, can service as many as eight concurrent users and includes one remote internetwork connection.

Upgrades steal Expo spotlight

NEW YORK — The fifth annual PC Expo featured numerous enhanced versions of popular software packages, including the following:

- Information Builders, Inc. in New York introduced PC/Focus Multiuser Release 3.0, an upgrade said to offer a menu-driven interface; the enhanced functionality of PC/Focus Release 3.0; additional windowing interfaces; three-dimensional graphics; improved micro-to-mainframe communications; and enhanced communications features.

Available in October, PC/Focus Multiuser Release 3.0 will range in price from $1,995 to $6,000. All registered users of PC/Focus Multiuser will automatically receive the new version.

- Centram Systems West, Inc. in Berkeley, Calif., tripled the speed of its Apple Computer, Inc. Appletalk-compatible TOPS network operating system for IBM and compatible personal computers. The software facilitates PC-to-PC network transmissions at .77M bit/sec. Centram President Nathan Goldhaber said this upgrade provides TOPS users with 80% of the effective throughput speed and all the functionality of 10M-bit Ethernet at a third of the price.

A new driver enables both Appletalk and the faster PC-to-PC communications to take place simultaneously. The enhanced software will ship in the fourth quarter and will cost $389, including a TOPS card. Updates will be available for existing users.

- VM Personal Computing, Inc. in Danbury, Conn., shipped Relay Gold 2.0, an enhanced version of its PC communications and micro-to-mainframe package, said to feature IBM 3270 emulation board support, background operation, an application program interface, an improved interactive tutorial and better documentation. The upgrade retails for $250, and current users can upgrade their software for $100.

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Takes The
Mystery Out Of
CICS

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Compuware also takes the mystery out of CICS with exceptional Professional Services people. They're available to take their special know-how into the field to help companies better manage their CICS systems and applications. While in the classroom, Compuware's Educational Resources staff provides crucial ongoing CICS training.

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AST targets PS/2s for emulation role

BY PATRICIA KEEFE
CW STAFF

NEW YORK — AST Research, Inc. in Irvine, Calif., capped off a busy summer of product announcements by introducing at PC Expo five emulation products for IBM's Personal System/2 Models 50, 60 and 80 said to address the micro-to-mainframe and mid-range market.

Also unveiling a micro-to-mainframe gateway was Rabbit Software Corp. in Malvern, Pa.

These introductions are indicative of a resurgence in micro-to-mainframe sales, according to communications reseller Robert Mignogna, president of Main Street Computer Products in Northboro, Mass.

"There's more mainframe software available that emulates PC software," Mignogna said. He questioned statements by Microsoft Corp. Chairman Bill Gates suggesting that the "network island concept" is getting stronger. Mignogna was referring to stand-alone "islands" of networked personal computers. "I think users are going in the opposite way: linking up to mainframes," he said.

AST's family of emulation products for the PS/2 consists of the following:

- The AST-SNA/A, which provides IBM 3270 terminal emulation and communications line sharing in an IBM Systems Network Architecture/Synchronous Data Link Control (SNA/SDLC) environment,without the need for protocol converters or terminal control units that limit support to locally attached devices. It costs $895.
- The AST-3780/A, said to emulate IBM's 2770, 3780, 3741 and 3780 RJE terminals for communications line sharing and file-transfer capabilities in IBM's Binary Synchronous Control (BSC) environment. The product provides RJE capability without the need for protocol converters. It also supports BSC batch communications with IBM mainframe and mid-range hosts. It costs $895.
- The AST-5251/12/A package, which emulates IBM's 5251 Model 12 terminal for communications with IBM System/34, 36 and 38 machines in an SNA/SDLC environment via two asynchronous modems. It costs $790.
- The AST-5251/12/A Remote Gateway and AST-5252/11/A Local Gateway were designed for 5251 emulation with an IBM Netbios-compatible local-area network (LAN). Full IBM 5250 support with each gateway system is provided for up to seven nodes. The Remote Gateway costs $1,995, and the Local Gateway costs $1,995.

Rabbit Software's gateway product is said to link LANs to mainframes at speeds of 56K bit/sec. while reducing PC memory consumption.

The Intel Corp. 80186-based Rabbitgate provides access to mainframes for PCs and PS/2s on Netbios-based LANs. It supports up to 32 host sessions per communications line. Multiple gateways can be installed on the same LAN, enabling any PC to access multiple mainframes simultaneously using special Rabbit software. Rabbitgate reportedly includes an adapter board with software that provides concurrent emulation of SNA and BSC 3270 and 3770 remote communications devices such as IBM 3270 control units, displays and printers and 3770 RJE terminals. In early 1988, Rabbitgate will be enhanced to provide IBM LU6.2 support. The software includes support for IBM's IND$ FILE standard for PC-to-host file transfer. Pricing depends on the number of host sessions available, starting at $2,395 for a gateway supporting eight host sessions.

Ashton-Tate ships Dbase Mac

TORRANCE, Calif. — Ashton-Tate last week shipped Dbase Mac, its long overdue relational data base management system for Apple Computer, Inc.'s Macintosh. The program is the company's first offering in the Macintosh market.

Ashton-Tate unveiled the program in August 1986, expecting to deliver it by the end of the year. However, in early December, the company announced that it was taking longer than expected to achieve the program's "competitive performance targets" and said it would postpone delivery until the second quarter of this year.

Ashton-Tate said it has corrected the program's performance deficiencies in speed and functionality and believes the chances are good for Dbase Mac to establish a dominant market position. "We have improved it in every area in which one compares data base performance, including speed and depth, in terms of its ability to create comprehensive applications," said Lydia Dobyns, Ashton-Tate's vice-president of marketing.

Looking for the cloud's silver lining, Dobyns admitted the delivery delay hurt the company's chances in the market but said it may prove beneficial because of Apple's success in the corporate market since Ashton-Tate announced the delay.

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*Available fourth quarter

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Spreadsheet feeds power-hungry 1-2-3 users

High-end Surpass will pursue current Lotus users dissatisfied with system's capabilities

BY DOUGLAS BARNEY
CW STAFF

NOVATO, Calif. — With a bold name and equally bold plans, Surpass Software Systems, Inc. last week introduced Surpass, a high-end spreadsheet package designed to satisfy power-hungry users of Lotus Development Corp.'s 1-2-3.

But like Javelin Software Corp. and Daybreak Technologies, Inc. before it, Surpass is entering the treacherous world of direct competition with Lotus. Like Javelin and Daybreak, some observers said, Surpass may gain only niche status.

"For any product to displace 1-2-3, it will have to cure cancer, taste like chocolate and cost a dollar," said Jack McGrath, editor of "@Max," a Massachusetts-based newsletter for 1-2-3 users. Surpass is expected to ship next month and to sell for $495, a price familiar to 1-2-3 users.

Pursuing dissatisfied 1-2-3 users

Aware of the immense challenge of head-to-head competition with Lotus, Surpass Software's Chairman Seymour Rubenstein, who founded Micropro International Corp., said he is only pursuing current Lotus users who are dissatisfied with 1-2-3's capabilities.

He said the firm also hopes to capture the attention of users considering Microsoft Corp.'s PC Excel, an integrated spreadsheet package due out this fall. "We wanted people to have it in mind when looking at PC Excel," Rubenstein explained.

Surpass is based on Farsight, a Lotus-compatible spreadsheet that, despite a $100 price tag, built-in word processing and guaranteed 1-2-3 compatibility, fared poorly in the market. Surpass Software acquired the technology from Farsight developer Interface Technologies Corp. last year and reworked the product, Rubenstein said.

Unlike 1-2-3, Surpass is not copy-protected, and site licenses are available.

Surpass has added features like three-dimensional graphics, a Microsoft MS-DOS shell that allows easy access to files and file-sorting capability and an Undo command that allows users to retrace steps to eliminate errors.

Surpass is reportedly completely compatible with 1-2-3 Releases 1A and 2.01 and shares the same file structure, macro language and formulas.

Senior Editor Ed Scannell contributed to this report.

Turbo Pascal leaps 64K wall

BY STEPHEN JONES
[illegible]

SCOTTS VALLEY, Calif. — Borland International said it will introduce this week a version of Turbo Pascal, its popular microcomputer language compiler that breaks the 64K-byte memory limitation in earlier applications of the product.

Turbo Pascal 4.0 will sell for $99.95, the same price as the current Turbo Pascal 3.0 offering, according to Gary Whizin, Borland's Pascal product manager. Upgrades for registered Turbo Pascal users will cost $45. Whizin said the package will be available by the middle of October.

With increased memory and compiling rates of more than 25,000 line/min, the new product should attract professional users in MIS and data processing environments, according to Borland President Philippe Kahn.

While earlier versions of Turbo Pascal have enjoyed success among hobbyists and nonprofessional users, performance limitations caused some professional developers to opt for programs with larger memory capabilities, according to long-time users of the product.

Microsoft Corp. and IBM currently dominate the high end of the language market with compilers that can support large memory models.

Turbo Pascal 4.0, which Borland said is a complete rewrite of the current compiler, is a large-code model that can support programs larger than 64K bytes of random-access memory (RAM).

In the past, users were required to juggle add-in cards with the main compiler program if they required more than 64K bytes of RAM.

Lane Ferris, a San Francisco programming consultant who has been testing alpha and beta versions of the product for the last two months, said he was impressed with the expanded memory. A user of Turbo Pascal 3.0, Ferris said he found out just how prohibitive the 64K-byte barrier can be.

Chris Dunford, a general partner with Cove Software Group in Columbia, Md., said the increased memory should entice more professional developers to use Turbo Pascal. "Previously, there wasn't a big decision to make with compilers because you only had IBM and Microsoft," said Dunford, who has used a beta-test version of Turbo Pascal 4.0 for the last six weeks.

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Compuware also takes the mystery out of databases by providing extensive support. A Professional Services organization has the unique ability to help convert to, or build new, DB2 systems. While an Educational Resources Division offers the training and crucial updating of database skills.

IMS, IDMS, DB2. Compuware takes the mystery out of databases by taking the guesswork out for you.

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Tcom offers 9370-based national mail service

BY MITCH BETTS
CW STAFF

WASHINGTON, D.C.— Tcom Systems, Inc. is expected this week to unveil a computer-generated mail service similar to one the U.S. Postal Service abandoned in 1984 as a failure.

Tcom executives, including former Postal Service officials involved with the ill-fated Electronic Computer-Originated Mail (ECOM) service, said their high-volume mailing service will not be plagued by the outdated technology and political problems that killed ECOM.

"I wouldn't say that we're resurrecting ECOM. We took the concept and breathed life into it for the first time," said Robert F. Ryan, Tcom's president and chief executive officer. Ryan, a pioneer in the electronic mail industry, was a founder and former president of Dialcom, Inc.

In addition to Ryan, Tcom executives include Chairman William F. Bolger, a former Postmaster General; Executive Vice-President and Chief Operating Officer Eugene Johnson, a former Postal Service official in charge of ECOM and Mailgram services; and board of directors adviser Benjamin F. Bailar, a former Postmaster General.

Network links minis to Florida hub

Tcom's service is based on a distributed network of IBM 9370 minicomputers at 25 regional centers and an IBM 3090 mainframe at the hub in Tampa, Fla. [CW, May 4]. The data processing and network services are provided by GTE Data Services, Inc. under a $50 million contract.

With the service, called HPM, or High Priority Mail, computer-generated messages are routed to the regional centers, printed by laser printers and taken to post offices for regular first-class delivery.

Tcom promises overnight delivery in metropolitan areas and two-day delivery elsewhere in the U.S. at a cost of 65 to 90 cents per letter, which includes 22-cent postage.

Possible applications include political lobbying and fund-raising letters, financial statements, product recalls, marketing and public relations letters and other mass mailings, the vendor said.

Mailers transmit messages to Tcom's hub via a leased-circuit or a very small-aperture satellite link. The communications links, software and training are provided by Tcom at no extra cost, Ryan explained.

Tcom's competition includes third-party bulk-mailing services, in-house mailing systems and overnight couriers, according to Mark Winther, an analyst for Link Resources Corp. in New York.

Winther said Tcom has impressive management and financial backing, but he said it is not clear that its regional distribution network offers significant cost or speed advantages over the centralized operations of third-party mailing services.

In response, Ryan asserted that by moving the mail closer to local post offices, the regional network will enable Tcom to reach its eventual goal of 100% overnight mail delivery.

Wang adds to PC series

LOWELL, Mass. — Wang Laboratories, Inc. last week announced a low-end addition to its Wang Professional Computer (PC) 200 and 300 series.

The latest family member, the PC 240, has four option slots, a smaller footprint and a lower price tag than other products in the line, according to Sharon Matthews, director of product marketing. The PC 240 is based on Intel Corp.'s 80286 processor. Wang's PC 280 is also 286-based, but it has eight option slots, Matthews said.

The PC 240 is offered in three configurations: the PC 240-1, with one floppy disk drive, which sells for $2,125; a two-disk version that retails for $2,325; and a one floppy-, one hard-disk version, which costs $2,895. All versions are available immediately, Wang said.

The base configuration includes 640K bytes of random-access memory on the system CPU card and Microsoft Corp.'s MS-DOS 3.2 and Windows. User memory can be upgraded by adding Wang or industry-standard 16-bit expanded memory cards. The unit is reportedly completely compatible with IBM Personal Computer AT hardware and software.

Support for MS OS/2

Wang intends to provide Microsoft's next-generation operating system on the product line, Matthews said. "We have signed a letter of intent to deliver MS OS/2 when it becomes available. You can expect to see it on these boxes."

The standard configurations include 5¼-in. disk drives, but a 3½-in. internal drive is available as an option for $170, according to Ralph Specht, senior manager of central systems product marketing.

The other Wang PC 200 and 300 series units also run MS-DOS 3.2 and are software compatible. The PC 280 base configuration sells for $3,850, while the Intel 80386-based PC 380 sells for $6,495.

The Legend Continues

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MCDONNELL DOUGLAS

EDITORIAL

$$$$$

I don't care too much for money, 'cuz money can't buy me love. —The Beatles

Perhaps it is unfair to contrast the pecuniary interests of today's MIS professionals with those of the free-and-easy generation of the 1960s.

But pay problems are really not big problems for today's MIS professionals, nor is money the main determinant of overall job satisfaction.

These are two of the main findings that we begin reporting this week in a two-part series beginning on Page 1 and based on the most comprehensive MIS salary and job satisfaction studies ever conducted.

We funded the salary study, done in conjunction with the Data Processing Management Association, as a direct result of the interest readers have shown in this kind of work. Whether a manager is looking for work or is just interested in seeing what opportunities his workers may be examining, reliable information on salaries and job satisfaction command a lot of attention.

The principal piece of information that emerged from our work is that MIS professionals generally rate their salaries as being very adequate and fair. Furthermore, the great majority of them like their jobs, which the second installment of the series will show next week.

The fact that most managers and professionals have few salary complaints is interesting in light of the general slowdown in pay increases in the last five years. Low inflation and consumer interest rates have certainly made smaller pay increases more palatable.

However, there are problems looming imminently on the horizon that could change this hunky-dory situation very quickly.

For one thing, the demand for MIS professionals with the right skill set needed to meet the information challenges of the 1990s will outstrip supply. We predict a sellers' labor market within a few years, and this situation will most definitely bid up the price for that labor. It will be a situation comparable to the programmer shortages of the late 1970s and early 1980s, which skyrocketed programmer salaries.

Moreover, even if salary demands are met (and they'll have to be), our job satisfaction study makes it clear that today's professionals want much, much more than money. And these other wants had better be provided because — let's face it — company loyalty went out with penny candy.

First and foremost, today's professionals want variety in their jobs in order to increase their level of responsibility. No doubt this is inextricably linked to the desire to climb the corporate ladder as soon as possible.

Secondly, they want to work for senior managers who communicate needs clearly and consistently. This is a way of saying they want managers who handle people as well as they manage the machines of the information system.

Finally, they want respect and recognition for their work. Amen.

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LETTERS TO THE EDITOR

Super-cilious

I found that Harvey Newquist's article, "Faster than a speeding molecule" [CW, Aug. 17], contained a number of factual errors and dubious opinions.

First, the process of superconductivity is a bit more complicated than stopping obstructing molecules "dead in their tracks."

Second, the statement "the faster it goes . . . the hotter it gets" with respect to the speed of electrical signals makes no sense. As a matter of fact, just the opposite is true (i.e. your toaster gets hot because the coils slow electrons down). Cray Research, Inc.'s Cray supercomputer is immersed in refrigerants not because the electrons are moving faster but because of the heat generated by the density of the component packaging.

Third, the picture of "wearing a parka and sealskin boots" in the DP center is amusing but irrelevant. The only part of the computer that will require deep refrigeration is the CPU (and possibly some memory), which occupies only a fraction of the total bulk of a computer system. Superconductivity will allow for even denser packaging, so that the entire CPU will be the size of a couple of shoe boxes and could run on a 9V battery.

Finally, the history of technological advances is filled with pessimistic "at-least-X-years-away" statements. Higher temperature superconductivity is a stunning technological achievement, and problems of malleability are simply mere annoyances on the road to practical application.

Lee Gruenfeld
Touche Ross & Co.
Los Angeles

Different trenches

E. F. Codd, in his letter to the editor [CW, Aug. 10], took major exception to my article [CW, July 6]. He challenged me to give a public answer to two questions. That is the purpose of this letter, but first I need to make a few statements.

The error in Codd's first name was a mistake on my part; a slip of the word processor; an apology was required and was taken care of personally.

However, never did I question his position in the relational data base arena. His research is the definitive research on the relational model. My article was not intended to challenge his reputation.

The history of the Pick system began in 1965 at TRW, Inc. Donald B. Nelson and Richard A. Pick developed the Generalized Information Retrieval Language System for the IBM 360 and dubbed it GIRLS. In 1969, Pick's system was delivered to the U.S. Army. The Army called it General Information Management, or GIM. Nowhere did I state that any technical papers defining the relational data base predate the technical papers of Codd. The article correctly stated that the Pick system predated the published works of Codd.

Now on to Codd's questions.

1. "What were the papers you or your colleagues published prior to 1969?"

"GIM-1, a generalized information management language and computer system" by Nelson, Pick and Kenton B. Andrews is included in the AFIPS Conference Proceedings, Volume 30, April 1967. This paper defined what became the Pick system. While it did not define relational data base, it did define a data structure with data-list relationships, called correlatives, that are value based.

2. "Where were you?"

I was working to translate the needs of the manufacturing community into computer systems.

"I did not see you in the trenches."

I certainly was in the trenches, but in a different war zone. I was developing and delivering solutions to the user community.

An ex-boss once told us a very

Continued on page 22

This week in history

Sept. 5, 1977
Like HAL, the computer in the film "2001: A Space Odyssey," the computer on the unmanned spacecraft Voyager II decides it knows better than its human operators. While heading for Jupiter, the machine refuses navigation orders from ground control; it was only "trying to protect itself from a rough ride," one scientist says.

Sept. 6, 1982
While workers march in parades to celebrate Labor Day, they also worry about whether automation will eliminate their jobs. Chrysler Corp. workers are currently demanding at least six months notice before the company introduces automation technology, while other labor groups seek to link the introduction of automation technology to specific gains for workers, such as working fewer hours for the same pay.

Interface race: Win, place or show

For users, the friendly, Macintosh-like interface will finish by a length

AMY WOHL

Computers are about to look substantially different.

Computer workstations are not going to be redesigned to hang from the ceiling or fit neatly in your pocket, although both of these design changes might be closer to reality than you think.

I am talking about changing the user interface that appears on the computer's display screen and offers the user, whether new or experienced, access to its function. Also, I am not talking solely about personal computers, with their dazzling array of interfaces, but about computer workstations of all types, from the dumbest terminal to the smartest industrial-strength workstation.

PCs have brought about a revolution in the number of noncomputer professionals who successfully use computers. More than 10 million of us have learned that a > is not a mystical incantation to be naively ignored, but a New Wave cultural imperative to open a dialogue with your PC.

Users' expectations about computers have also expanded greatly. Today, users think that reasonable access to computing resources is a business requirement. To reach the millions of potential users who haven't yet agreed to learn about the intricate demands of PCs, computers with much greater appeal — in both what they do and how easy they are to learn and use — are needed.

Power to the people

A new generation of much more powerful PCs is beginning to arrive in the marketplace. Their continually reducing prices are going to put vast amounts of computing power in the hands of nearly anyone.

Such power can, and will, be used to handle giant number-crunching applications and data bases of enormous size, but a great deal of this power should also be used to make computers easier to use.

Most computer vendors of the old school firmly believe that using a computer is a privilege and that users should be willing to pay dearly for it. Not only do these users get to purchase expensive hardware and software, they must also learn new skills to understand and command their surly servant.

PC vendors — and users — often read the rules differently. The investment in hardware and software can be made too casually and inexpensively for the user to take on enormous training investments. Users demand a casual way to feel reasonably competent.

In fact, such an interface exists; it's just not on enough systems yet.

'Macintosh-like'

This interface is called "Macintosh-like" by industry commentators, although, in fact, it is really based on research done by Xerox Corp.'s Palo Alto Research Center (PARC) in the 1970s.

With its always-visible menu, its point-and-select mouse interface and its English-labeled pull-down menus, this "new" interface is happily used by several million people; but it still seems fresh (and perhaps too friendly) to users of the more traditional computer systems.

> AN interface is only good if it is widely accepted, and interface vendors must go after volume, not exclusivity or high unit prices, if they are to succeed.

A recent poll of vendor product design and management folks at two computer conferences made it clear that most major vendors of office automation systems are definitely heading toward this style of product in their next generation of interfaces.

A further survey of PC software vendors would reveal that much of the next generation of PC software will bear interfaces (whether under the auspices of Microsoft Corp.'s Windows, IBM's Presentation Manager, Digital Research, Inc.'s GEM or others) that are remarkably similar to those found on the Macintosh.

It is unlikely, I believe, that all of these interfaces will converge into a single standard. Software developers are likely to continue to think that their interface has unique advantages that outweigh the marketing advantage of being able to stamp a product "industry standard."

IBM, of course, will follow its own star, knowing that others will blindly follow. This year — and for the next few years — that star is called Systems Application Architecture (SAA). I believe that it is unlikely that dozens or even hundreds of software developers will give up their mature products, their style strategies or their concepts of product differentiation to follow SAA, but some undoubtedly will.

In fact, IBM has recently formed its own Applications Systems Division to encourage and support both IBM-written software (especially, I suspect, for the 9370) and the efforts of the third-party developers IBM hopes to attract.

The Look-and-Feel Wars

Interfaces in the generic sense are probably protected from the vagaries of the Look-and-Feel Wars.

In fact, an interface is only good if it is widely accepted, and interface vendors must go after volume, not exclusivity or high unit prices, if they are to succeed. An exceptionally crafty interface vendor would probably try to give away his interface (like Gillette Corp. offering razor handles) and make his money selling software that fits perfectly under that interface (the razor blades).

Who has won this race? In some sense the sun has set on the day of the blank screen and black cave interface. Xerox's PARC and its disciples at Apple Computer, Inc., at Microsoft and in hundreds of smaller software companies have found the right interface, and we are the winners, the end users who will now find computers infinitely more accessible, more friendly and more useful as a result.

Some tough decisions lie ahead, however.

- Is it better to standardize on one interface style, or is variety and flexibility better (if harder to remember)?
- How do you extend a friendly standard interface to support more complicated functions? The Macintosh is already straining at the seams, and if a standard mechanism for multiple-levels of menus doesn't emerge soon, the "Let a thousand flowers bloom" school will take over.
- How do you put the friendly interface that you have just built into the older and less friendly systems? And should you compromise the best interface you could build now to facilitate this process?
- How do you build a friendly interface that new and experienced users, casual and frequent users can all successfully and happily share?

Successfully answering these questions is what will determine the next generation of software winners. I'm glad I judge computer horse races, rather than run in them.

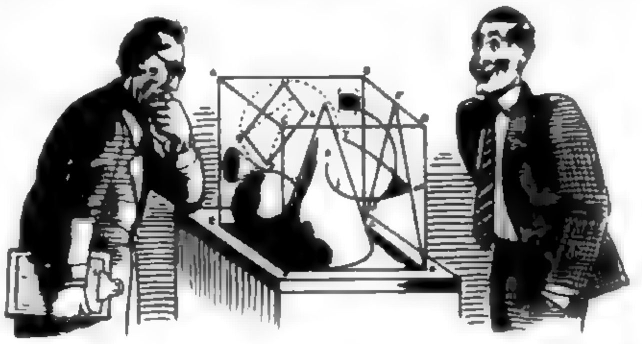
Wohl is president of Wohl Associates in Bala Cynwyd, Pa., and editor of "The Wohl Report on End-User Computing" newsletter.

Giving prototyping free rein and just due

JOHN BARNES

I came late to appreciating prototyping. My training is more formal and mathematical than that of most DP professionals. Even now, I usually do programs for my home system in formal, logical notation first.

So I naturally tend to think of prototyping as sloppy messing around. Prototyping, it seemed to me, was the art of writing a program without quite knowing what it was going to do for a user who didn't quite know what he wanted it to do so that both could persuade the other that this was what they really wanted.



TOM LULEVITCH

I've been coming around to a different view for a long time. After a recent visit to the American Association for Artificial Intelligence convention in Seattle, not only am I convinced that the advocates of prototyping have a good case, I think they haven't gone far enough.

Maybe this opinion is just the familiar phenomenon of the new convert becoming an extremist, but here's what I now think is true: If a prototype is defined as a program and written *before* the developer fully understands the problem so that a user can use the program to explore what the computer can do for him, then the really important innovations, the kind that transform the whole industry, are quintessential prototypes.

What I mean will be made clearer by the following examples:

- While researching some old predictions of the future, I ran across an article on computing written in the early 1950s. The author ventured to predict that very few companies below Fortune 500 size would ever buy computers — after all, what calculations did a company of that size need to do that it wasn't already doing?
- Word processors were introduced as super-typewriters that gave one the ability to turn out perfect copy. Their impact on how writers and editors would actually work, however, was completely unanticipated.
- The creators of Visicalc clearly thought of it as a new programming language. Yet one of the major appeals of spreadsheets now is that you don't have to know any programming to use them.

Nearly everyone in the business seems to have the following story to tell: "Well, they couldn't really tell us what they wanted. So we just kept going in circles. Then one day, they came in and said they had to have a new system right now. We came up with this little thing to tide them over. Now, X years later, they're using it for all kinds of stuff it wasn't designed for. And they still can't tell us what they're doing, so we can't replace it."

The creative play factor

It may give nightmares to anyone in charge of data integrity, but human beings like to find out what a new thing is good for, and they don't always do it the way the book says.

If you don't believe it, watch the kids on Christmas morning ignore the toy and play with the box. The creative play factor — innovation in use as opposed to innovation in design — is a big part of the rapid development of the industry.

It's the reason prototyping has such a good track record, despite every theoretical reason for failure. Prototyping harnesses the human habit of messing around instead of desperately looking for a way to fence it out.

So when I see the vast array of new prototyping tools, object-oriented languages, expert system shells and all the other fallout of the artificial intelligence movement, I am inclined to say

Continued on page 22

Barnes is the Pacific Northwest area manager for ADG, a high-tech marketing organization based in San Pedro, Calif. His first novel, *The Man Who Pulled Down the Sky*, was recently published by Congdon & Weed.

Prototyping

FROM PREVIOUS PAGE

that what we are looking at is not just a new way to prototype, but the prototype of something entirely new.

For want of a better name, I'll call it "machine-assisted natural intelligence," as machine processes make it cheaper and easier for people to do smart things.

There are a lot of inexpensive new products out there now; hobbyists, small businesses, micro users in big offices can now afford the toys to begin playing with the rudiments of AI.

We could employ all the mathematicians and logicians in the world till doomsday without finding out what these things are really good for. However, the way we actually will find out — and fairly quickly — is to let people mess around with them.

Now is not the time to coordinate and centralize too much. If the development of the American West had been carefully and formally planned (as the development of Siberia has been), the year 2000 would probably see the first buildings going up in Cincinnati or Little Rock.

Of course, you have a job to do, and most of the time your organization needs to be doing it. However, part of your purpose is to get ready for the future. A few "purpose not yet known, but it looks interesting" purchases and some time given to plain old playing around, might turn out to be the most important investments you make this year.

Continued from page 20

relational philosophy he had concerning advances in high technology. He said, "Technology for the sake of technology is interesting to observe, but what the user wants is a solution to his business problems."

The Pick community has been relatively kept quiet in the technical journals. As a result, the system is not as well known as it could have been. But developers of applications systems using Pick have produced superb software solutions that are flexible, user oriented and support programmer productivity.

John Blumberg
Director of Marketing
Northeast Data Systems
Burlington, Mass.

IBM's modern math

Some of your readers may not have noticed that the numbers in "PS/2 defies storm of criticism as 250,000 ship" [CW, June 29] simply did not make sense.

IBM claimed that (1) it has already shipped 250,000 Personal System/2 systems, (2) it already has a backlog of orders for 500,000 more PS/2s and (3) its plants have been working "flat out" to meet demand.

Furthermore, William Lowe, president of IBM's Entry Systems Division, claimed that 2,000 PS/2 Model 30s and 800 Model 50s are being produced each week.

At these stated production rates, it would have taken 89 weeks (250,000 ÷ 2,800) to produce the quantity sold to date.

That would mean that production commenced 1.7 years ago or, to be exact, in January 1986.

It would also mean that the current backlog will take 179 weeks (500,000 ÷ 2,800) or 3.4 years to fill — let alone the few new orders IBM might get in the future.

This interpretation, together with reports of big dealer discounts and PS/2 systems turning up on the gray market, make it difficult to believe the reported sales volumes.

In any event, the solution now seems clear. Anyone who is considering the purchase of a new microcomputer should take a very close look at Apple Computer, Inc.'s Macintosh line, since they will not have to wait more than three years if they order now — and they will get a lot more value for their money.

Like Digital Equipment Corp., Apple has it now.

Donald A. Leslie
Milton, Ontario, Canada

Method over madness

Your editorial, "CASE advantage" [CW, July 27], was excellent up to the fourth paragraph. Then it degenerated into sheer nonsense. Promoting the development of systems without adhering to strict methodology is like recommending to scientists that they conduct their studies without using the "scientific method."

The results in both instances are the same — chaos.

Milt Bryce
M. Bryce & Associates, Inc.
Palm Harbor, Fla.

Rumors disconnected

Regarding the column "Will AT&T hang in up?" [CW, July 13], what we told the author several weeks ago as she prepared her column still holds true. Rumors about a computer division spin-off are absolutely untrue. AT&T is totally committed to its data networking strategy, and our results for the first half of the year are on target.

Barry R. Campbell
District Manager,
Media Relations
AT&T
Basking Ridge, N.J.

Computerworld *welcomes comments from its readers. Letters may be edited for brevity and clarity and should be addressed to Bill Laberis, Editor,* Computerworld, *P.O. Box 9171, 375 Cochituate Road, Framingham, Mass. 01701.*

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SOFTWARE & SERVICES

SOFT TALK

Fred L. Forman and
Jerrold M. Grochow

New tools, old approach

Until the majority of systems analysts stop thinking of their analyst workstations as just fancy drawing tools, the potential return on investment in computer-aided software engineering (CASE) technology will remain unfulfilled.

While many analyst workstations on the market have the capability to be significant productivity enhancers, most users of those workstations are exercising only a fraction of that capability.

What is needed is a major management commitment to ongoing training and support programs and a recognition of the fact that, like every other investment, this one must be nurtured and managed if it is to pay off.

The overall investment in CASE software in the past two years has been estimated at $50 million, which represents only the software cost of the approximately 8,000 analyst workbenches, designer tool kits and so forth that are now sold. These workstations, however, only reach an estimated 2% of the nation's systems analysts. Clearly, significant penetration of CASE technology into the ev-

Continued on page 32

Mainframe software's new order

With DB2 slicing into revenue, vendors experience evolution pains

BY MICHAEL SULLIVAN-TRAINOR
and CHARLES BABCOCK
CW STAFF

Second in a two-part series.

Mainframe software companies, still reeling from their loss of data base system revenues to IBM's DB2, are trying to realign themselves with a changing marketplace.

No single pattern dominates as the companies scramble for position, but slowly, an outline of the industry's new structure is beginning to emerge in the following trends:

- Companies that offer products across different levels of hardware will fare better than those that address a single processor family.
- Emphasizing connectivity to IBM and, increasingly, Digital Equipment Corp. will be more successful than producing standalone products.
- An ability to focus development efforts around emerging standards, such as SQL, will fare better than insisting on following proprietary techniques.

Robert Borland

Behind these technology trends is a growing need for increased service and support that many observers think will sort out the successful software companies of the future from the also-rans.

"The successful mainframe software company of the future will not be strictly a mainframe company. The survivors will distribute their products across PCs, minis and mainframes," observes Scott Smith, vice-president of Donaldson, Lufkin & Jenrette, Inc. in New York.

But perhaps the most important lesson of DB2's success is also the most obvious. "IBM pushing DB2 has created a greater market for relational technology," says Dennis Yablonsky, president of the Carnegie Group, Inc. in Pittsburgh.

Opportunity comes in many guises in the software industry, and DB2, while causing a setback for the mainframe companies, has launched a huge new market for SQL-based data base products (see story page 30).

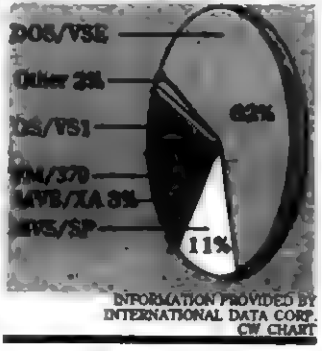
"Relational [technology] is a requirement today. People are so sold on [the] relational [concept] that it's hard to believe you would try to go back to sell networked or hierarchical systems," says Michael Cohn, a market analyst with Input in Mountain View, Calif.

Input predicts that the market for relational data base management systems on personal computers and minis will grow at annual rates of 28% and 30%, respectively, during the next five

Continued on page 27

Data View

IBM VM distribution
Majority of installed copies host DOS/VSE



INFORMATION PROVIDED BY INTERNATIONAL DATA CORP.
CW CHART

Cullinet AI still needs a job

BY JEAN S. BOZMAN
CW STAFF

WAUKEGAN, Ill. — Cullinet Software, Inc. is beginning to circulate its Application Expert among a few high-profile users to identify practical uses of the mainframe expert system shell.

Despite general availability since January, the product has yet to sell in volume because of lack of demand. "Where this fits in a company's MIS development plans is still in the process of definition," a Cullinet spokesman said.

Application Expert was developed by Lexington, Mass.-based Distribution Management Systems, Inc., which Cullinet acquired in April.

During the past few months, several large end-user firms have started to search for Application Expert implementations. Among them are Montgomery Ward & Co., Texas Gulf Corp., Baxter Travenol Laboratories, Inc. and Colgate-Palmolive Co. Application Expert is priced at

Continued on page 25

Tool tracks travel cost using 4GL

BY ROSEMARY HAMILTON
CW STAFF

DALLAS — American Airlines later this year will offer a software package that automates travel and expense reporting procedures, a company executive said recently.

Capture, a fourth-generation language-based system, is aimed at corporations with travel budgets of $100 million or more, said Al Ramacciotti, president of American Airlines' Capture business unit.

The system, which is written in Informix Software, Inc.'s fourth-generation language, runs under the Digital Equipment Corp. VMS operating system as well as Microsoft Corp. MS-DOS and Unix-based systems, Ramacciotti said.

An IBM mainframe version is under development, he added.

The package will be priced according to hardware platforms.

For example, a typical midrange license fee for such systems as the DEC VAX is $50,000, according to Ramacciotti.

Works with Sabre

Capture can be interfaced to American's Sabre reservation system, which will allow busi-

Continued on page 32

Inside

- Dynasoft spreadsheet update looks like Lotus's 1-2-3. Page 25.
- Skok Systems adds 3-D features to CAD package. Page 33.

UPDATE: INFORMIX-TURBO

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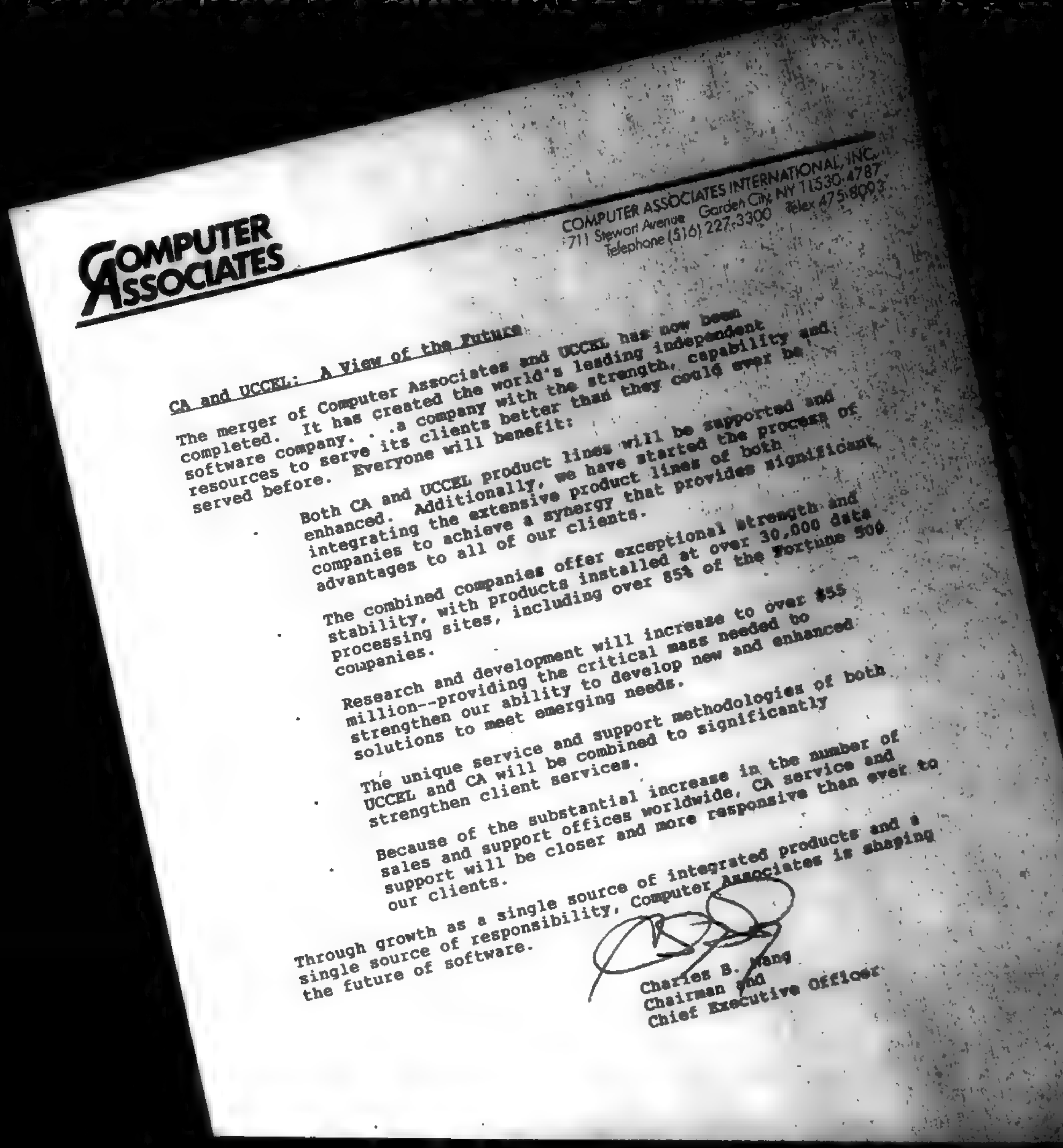
CA and UCCEL: A View of the Future.



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Tool sails in 1-2-3's waters

BY ALAN ALPER
CW STAFF

ROSEMONT, Ill. — Dynasoft Corp. recently unveiled a release of its mainframe spreadsheet that it said incorporates functions and features similar to Lotus Development Corp.'s 1-2-3.

Dynaplan Version 3.2 features string-handling and data base functions for direct work sheet entry into the spreadsheet or uploading and downloading from 1-2-3 on a personal computer. The version also executes stored 1-2-3 commands uploaded from a PC through a limited 1-2-3 macro support function.

In addition, Version 3.2 offers a choice of Lotus-like, repetitive command prompting or the pop-up menus that were provided with early versions of the product.

Dynasoft President Ed Spire said the choice of user interfaces should appease prospects that are worried about having to retrain users accustomed to 1-2-3's repetitive prompting.

"We don't think the bulk of users will use the Lotus-like interface. Some might use it as an interim until they get more familiar with our pop-up menus," Spire said, noting that repetitive prompting consumes too much mainframe resource.

Dynaplan Version 3.2 is currently available. It carries a license fee of $6,000 to $19,000, depending on processor size, but is available without charge to currently licensed users. Version 3.2 is one component in the firm's mainframe integrated software package, the Dynasoft Integrated Software System, which links spreadsheet, word processing, graphics and data base interface functions.

European users

Dynaplan has an installed base of approximately 600, Spire said, one-third of which are in Europe. Major domestic users include Exxon Corp., Allstate Insurance Co. and Commonwealth Edison Co. in Chicago, he said.

Shearing Plough Corp. in Madison, N.J., has used an early copy of Version 3.2 for the last few weeks, according to Bret Bickman, senior systems engineer. Bickman said he is pleased with the added functionality of the new release but is still waiting for fuller compatibility with 1-2-3.

"When you download Dynaplan into Lotus, some things — such as If, Date, Time and Lookup — are not converted properly," Bickman said. "These are things they said would be corrected with the next release."

Demand for mainframe spreadsheets, which had been somewhat flat as users flocked to PCs, has increased thanks to Lotus's disclosure last spring that IBM would begin marketing a mainframe version of 1-2-3 beginning early next year [CW, May 4], Spire said.

Cullinet

CONTINUED FROM PAGE 23

$60,000 for IBM mainframes, $40,000 for Digital Equipment Corp. VAX computers and $15,000 for DEC Microvaxes.

At Baxter Travenol in Waukegan, an expert system task force has been searching for ways to implement Application Expert for several months. "Here is a technology tool, and we're asking what can we do with it," said Terry Schwarting, senior distribution consultant for the laboratory's consulting services group.

Application Expert is a Cobol mainframe shell with which customers may build an expert system to emulate the decision-making processes of a human expert. In one trial, Schwarting asked Application Expert to cull deviations from a sales forecasting report. The system allowed end users to identify which sales varied from predicted levels.

But the trial was clearly a test rather than a finished product. Schwarting only wrote down enough rules to guarantee that the system was 30% reliable. Additional programming would increase the degree of reliability. "Whether Application Expert gets embedded in the order entry system is not clear," he said.

Another trial attempted to streamline Baxter Travenol's application for employee benefits. That test allowed employees to select medical plans on a computer terminal rather than a four-page form.

Developing prototypes

"Our goal has been to develop prototypes," Schwarting said. "We have to gain an acceptance level among our end-user community before we can build production systems with this product."

Expert system technology could be used in many decision-making processes that today are not automated. "People make many business decisions that are based solely on experience. An expert system would maintain key managers' knowledge bases," Schwarting said.

For its work in developing Application Expert prototypes, Baxter Travenol received an unspecified discount on the Cullinet software. Although primarily an IBM mainframe shop, the hospital supplier uses VAXs in its warehouse operations. The company reportedly plans to add an IBM-compatible version soon.

"We want to deliver systems to end users on a timely basis, and we're thinking that Application Expert would be a way for us to reduce the time it takes to develop some of these systems," Schwarting said.

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In the beginning, fabled designer Coco Chanel orchestrated the development of each fragrance that bore her name and personally inspected every stitch of her innovative fashions shown in her Paris rue Cambon salon. The House of CHANEL is now a world-renowned institution, but its commitment to quality, service and the small but vital detail remains unequalled.

CHANEL still depends on personal craftsmanship to produce many of its famous products. But now, those processes that can be entrusted to modern methods are entrusted to Unisys.

"It's a perfect marriage of high tech and high fashion," says Prakash Trivedi. His Unisys team worked with CHANEL to develop an on-line inventory and manufacturing system that enables The House of CHANEL to monitor production standards and to keep track of goods that are shipped to stores and CHANEL Boutiques across the country.

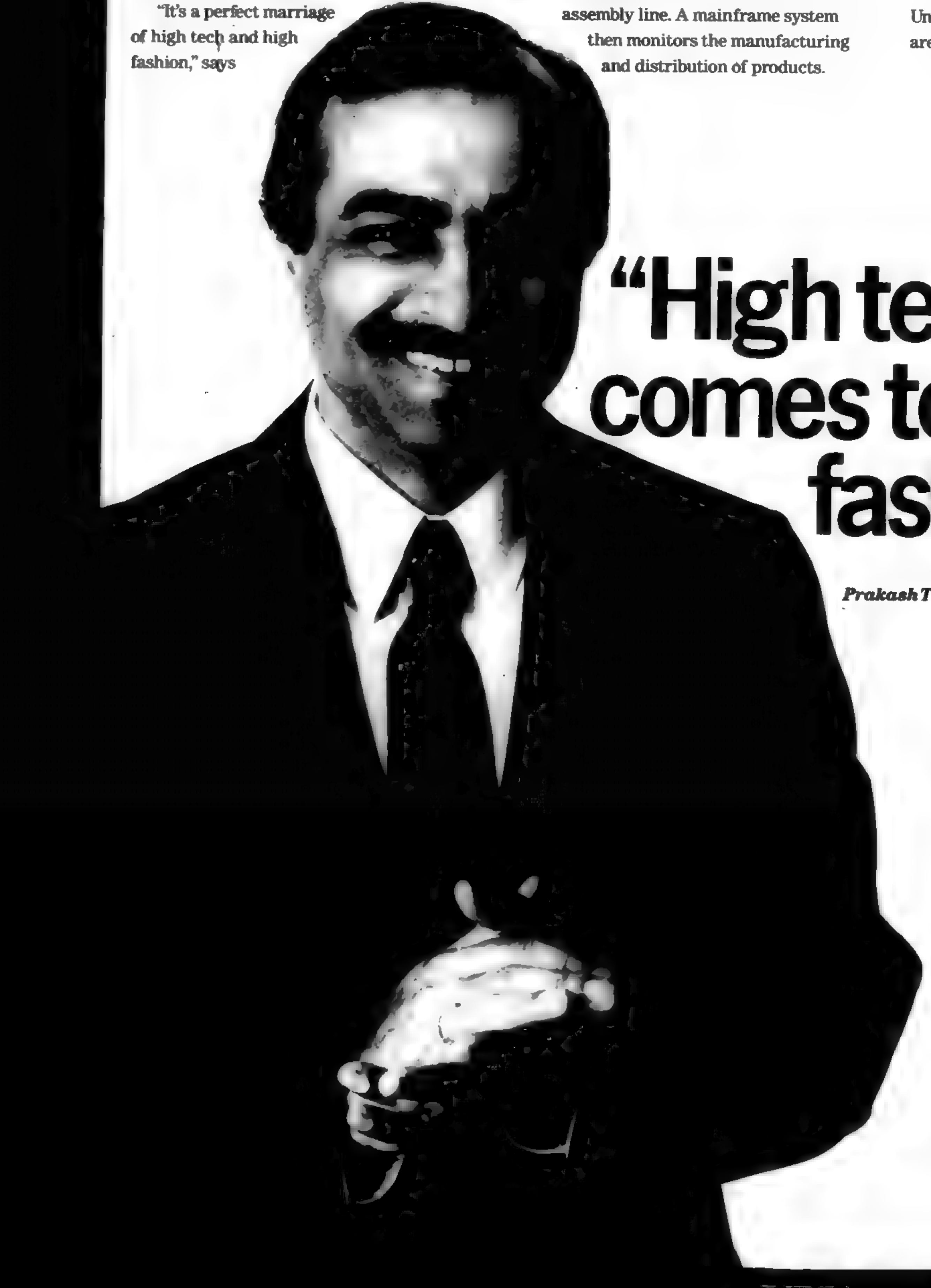
"Efficiency is the key word." Manufacturing specifications for the company's famous perfumes, including CHANEL Nº 5, are stored in Unisys microcomputers in Piscataway, N.J. The microcomputers also are used to evaluate perfume samples as they come off the assembly line. A mainframe system then monitors the manufacturing and distribution of products.

This manufacturing data is immediately available to company executives, along with information from microcomputers in CHANEL Boutiques across the country, providing an up-to-the-minute inventory database. It used to take three to four days for this information to reach executive desks.

"By having the data to make better, more-informed decisions, profits have increased while the high level of product excellence and customer service has been maintained," says Trivedi.

CHANEL has long been familiar with the sweet smell of success. "And now with Unisys, CHANEL has found that computers are very much in style."

Unisys and manufacturing. The power of ^{2}.



"High tech comes to high fashion."

Prakash Trivedi, Branch Sales Manager, Unisys

UNISYS

The power of ^{2}

New order

FROM PAGE 23

years. Mainframe relational systems will grow at a slower, 12%, rate, but in the mature mainframe market, relational systems are considered a growth segment.

The rebirth of the DBMS and DBMS tool market is one byproduct of DB2's success that the independent software vendors are beginning to exploit. A second effect, which IBM may not have anticipated, has been to nudge the mainframe vendors toward DEC

The loss of DBMS revenue at Cullinet Software, Inc., one of the most visible companies on Wall Street, forced the software firm to wrench itself away from heavy dependence on its IDMS/R system and seek new markets. Risking its stock price in a series of losses that is likely to stretch over seven or eight quarters, Cullinet went on a technology development and acquisition binge to place itself in the DEC VAX market.

Robert M. Therrien

Changes of heart

At first dismissing this move as expediency on the part of a limping vendor, market researchers now say they believe the binge has long-term implications that are favorable to DEC but not to IBM.

Several mainframe vendors that have been marginally in the DEC market for five to 10 years — such as McCormack & Dodge Corp., Cincom Systems, Inc., Software AG of North America, Inc. and, more recently, Computer Associates International, Inc. — all say they plan to gear up VAX product lines and that they anticipate an increasing share of their revenues from DEC customers.

Both M&D and Cullinet are working closely with DEC to move their applications to the VAX. The availability of sophisticated accounting and human resources software will upgrade the VAX as a departmental or small mainframe-style processor, DEC officials say.

"Clearly, the new market is commercial applications," says William Heffner, vice-president for systems software at DEC's Nashua, N.H., software development center. Having M&D and Cullinet applications on the VAX "will help sell more VAXs," he predicts.

When asked if DB2 has helped push the mainframe vendors toward becoming suppliers to DEC, IBM's Robert Berland says, "I hope that's not the case. . . . We love to have those vendors providing solutions for our hardware and systems software."

Nevertheless, DEC represents a tempting market. In its survey of VAX sites, Computer Intelligence, a market research firm in La Jolla, Calif., found the market expanding rapidly. Five years ago, the researcher says, there were 2,776 VAXs installed, compared with 43,000 — not including the widely used DEC Microvaxes — at the start of this year. Only 10% of the surveyed sites used accounting software for the VAX (financial software represents a maturing market on the mainframe), and only 6% used payroll software on the VAX.

Kenneth Ross, president of Rossdata Corp., a Palo Alto, Calif.-based firm that supplies accounting software for the VAX, said his company's sales have grown from $500,000 in 1982 to a projected $8.5 million this year, an annual growth rate of 76%. He professes to be unconcerned about M&D or Cullinet moving applications to the VAX market.

Ask Computer Systems, Inc. in Mountain View, Calif., a supplier to customers of Hewlett-Packard Co. and DEC, has seen its VAX manufacturing software catch on since 1984, with revenue rising from $65 million to a projected $98 million this year.

"People who think they can move into the VAX market overnight are wrong," Ask Computer Systems Vice-President David Sohm says. The VAX software deal is more of an end-user sale than a sale addressed to the data processing manager, an approach for which the traditional mainframe houses are unprepared, he says.

Charlotte Walker, senior vice-president at L. F. Rothschild & Co., a New York brokerage house, says the mainframe vendors were not responding to DB2 so much as they were to the slowdown in mainframe sales when they shifted toward DEC. Either way, market analysts say, the mainframe houses that want to participate in a growing market are moving toward the VAX.

In addition, the mainframe software companies are in a strong position to put applications on minicomputers and micros that work in conjunction with the host application; many call this distributed processing.

Distributed processing is one of the "top requirements" of a software company of the future, says Paine Webber, Inc. analyst Robert M. Therrien.

M&D recently announced plans to off-load mainframe processing cycles to PC applications that would execute accounting functions appropriate to desktop machines. The PCs would be tied to the host and would upload their work into the mainframe general ledger or accounts payable application. The firm's two Satellite series applications reportedly will be available Oct. 1.

A 6-year-old company one-sixth of the size of M&D, Global Software, Inc. in Raleigh, N.C., announced a similar approach recently for its general ledger package.

Applied Data Research, Inc. (ADR) in Princeton, N.J., has been an exception to the trend of companies moving toward DEC, but it has moved directly toward distributing functionality of its DBMS and Ideal fourth-generation language to PCs. ADR says it foresees networked PCs serving as departmental processors linked to servers and mainframe hosts.

Tangram Systems Corp., a start-up in Cary, N.C., is attempting to open more doors to distributed processing by offering LU6.2 or application-to-application communications in a new product, Arbiter.

Distribution is key

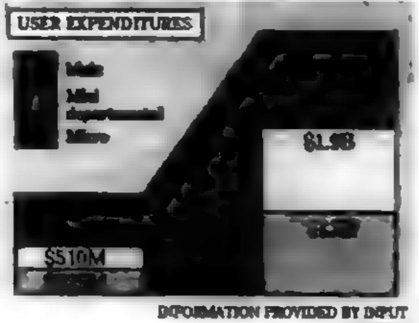
Distributed processing is an even larger issue for data base companies. One element in the popularity of relational data bases is their ability to be distributed across different hardware platforms while being accessed by the common SQL language.

Oracle Corp. and Relational Technology, Inc. were among the first companies to offer a dis-

Continued on page 30

Relational data base management systems

Five-year forecast predicts 22% growth overall



INFORMATION PROVIDED BY INPUT
CW CHART

Oracle emerging as profile of future

BY MICHAEL SULLIVAN-TRAINOR
CW STAFF

BELMONT, Calif. — While the established players in the mainframe data base management system market are saying you cannot compete with IBM's DB2, the young and brash Oracle Corp. is saying the opposite, and people are beginning to listen.

Oracle officials acknowledge they are rewriting their underlying data base engine to make it work more like a mainframe processing system. They want to incorporate heftier transaction processing capabilities, backup and recovery and data base security features typical of a mainframe processing system, says Peter R. Tierney, vice-president of marketing.

The rewritten product will be so different from the minicomputer-based product on which Oracle built its reputation that Tierney says the firm has not decided whether to use the name Oracle. It is set to be announced in the fourth quarter, with a controlled release in early 1988.

Challenging DB2

Competing head-to-head with DB2 is simply the latest of what seems to be a series of unlikely goals that Oracle sets for itself and often achieves.

Having increased its revenue by almost 100% to $55 million in 1986, Oracle predicted it would increase it 100% again this year and then proceeded to grow by 138%. In fiscal 1988, it says it anticipates growing to $225 million, which, if it came to pass, would put Oracle in roughly the same class as Cullinet Software, Inc.

It was not long ago that industry analysts were wondering whether to take Oracle seriously. "I don't understand the secret to their success. What the heck are they doing?" asks Thomas Lawton, editor of the "Computer Services Report" newsletter in Belmont, Mass. But, in several ways, Oracle fits the prototype of a software company of the future.

It has not only followed industry standards by bringing out a system patterned on the relational model and employing SQL, but it has also anticipated the standards by several years. It built its reputation on the Digital Equipment Corp. VAX before DEC became a hot name and competes as an equal with DEC's own relational product, RDB.

Despite this track record, or because of it, DEC recently selected Oracle's California rival, Relational Technology, Inc., to supply a relational system to VAX customers who use the DEC Ultrix operating system.

Once Oracle was firmly entrenched in the VAX market, it moved its data base system to the personal computer and IBM mainframe two years ago, allowing it to claim that the data base runs on all three platforms. Tierney claims Oracle has nearly 300 copies on the mainframe, a figure that Oracle has declined to divulge in the past and that is higher than skeptics' estimates of 100.

Oracle says it has sold 16,000 copies for PCs and 6,000 for 40 different mini and supermini computers. "Oracle has identified very closely with the right trends, from distributed data base to PC and PC local-area network support," says Paul Zorfass, president of First Consulting Group, Inc. in Natick, Mass.

"I think they will be a major player," says Sharon Weinberg, president of the Codd and Date Consulting Group in San Jose, Calif., a group that advises DB2 users how to implement relational systems.

Oracle already brought to market a combination of its relational DBMS, development tools and memory boards to offer a patchwork version of IBM's OS/2 Extended Edition.

Large mainframe DBMS vendors like Cullinet and Applied Data Research, Inc. could also slow Oracle's growth by moving into the relational arena. But Tierney says he does not see them as threats. "Frankly, the horse is out of the barn" on relational systems, he says, and a mainframe company will have to play catch up with an established product.

During the next five to 10 years, Oracle says it will invest in increasing the performance of its DBMS. "We are now at the size where we can invest substantial amounts in performance, and we can lead the technology in that regard," Tierney says.

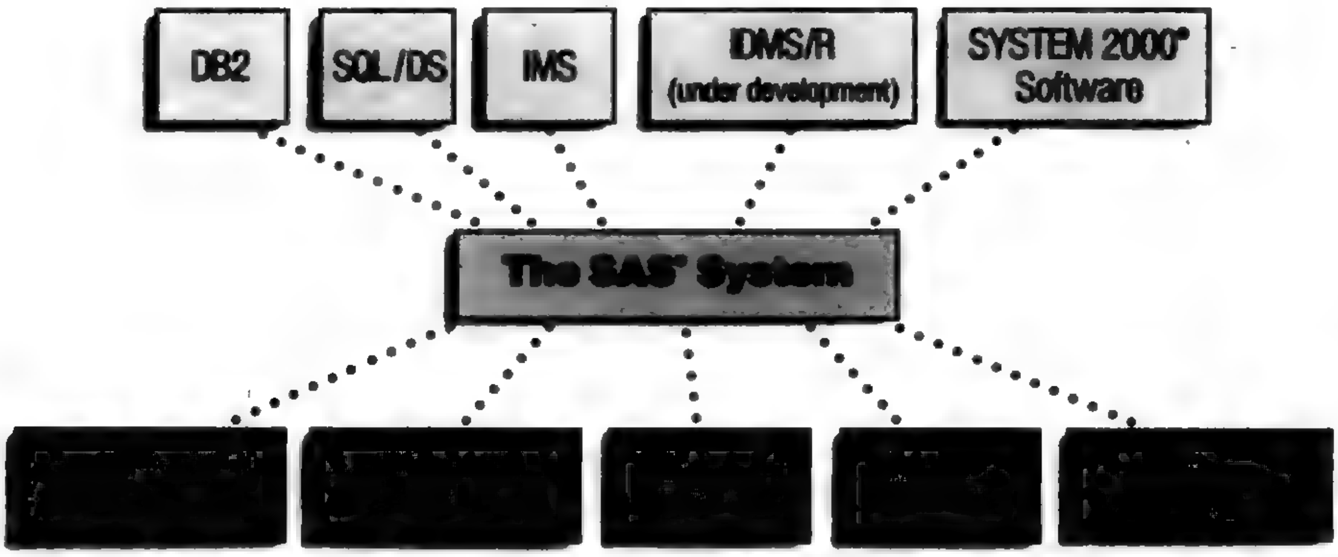
Serious about support

Perhaps even more important, however, is an increasingly serious tone to Oracle statements about training, service and support. Tierney says Oracle is increasing the education it offers its sales force and its customers. The company is expanding support services and building a force of 250 consultants.

The transition to offering an Oracle product to compete with DB2 is more than just a question of technology. "We intend to put a support organization around the product appropriate to the market we are going after," Tierney says.

He acknowledges that those "who build their whole business plan on replacing DB2 don't understand the market," but says an independent vendor can offer mainframe customers an advantage that IBM will not offer: portability to other hardware.

Get the Facts from Your DBMS.



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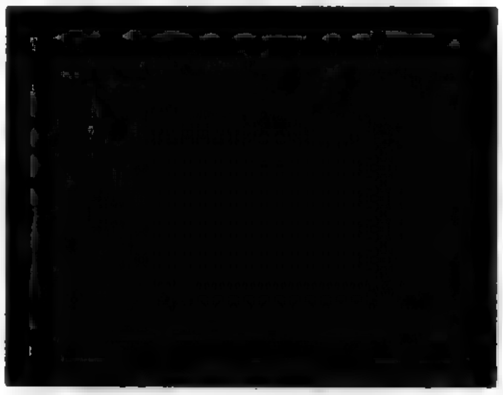

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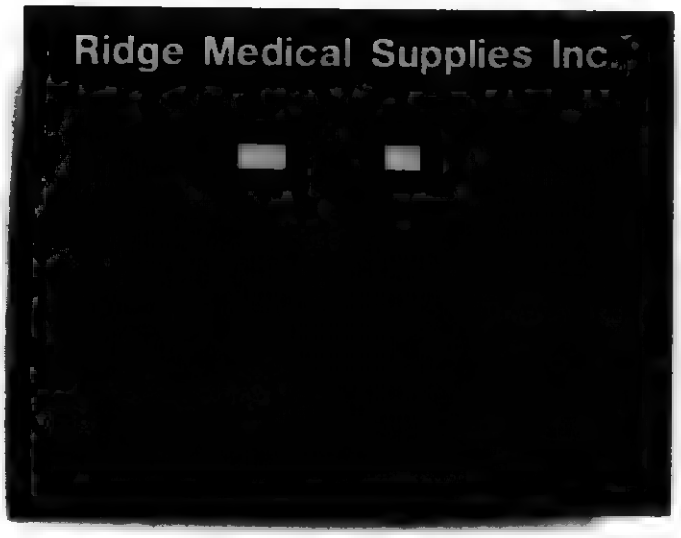

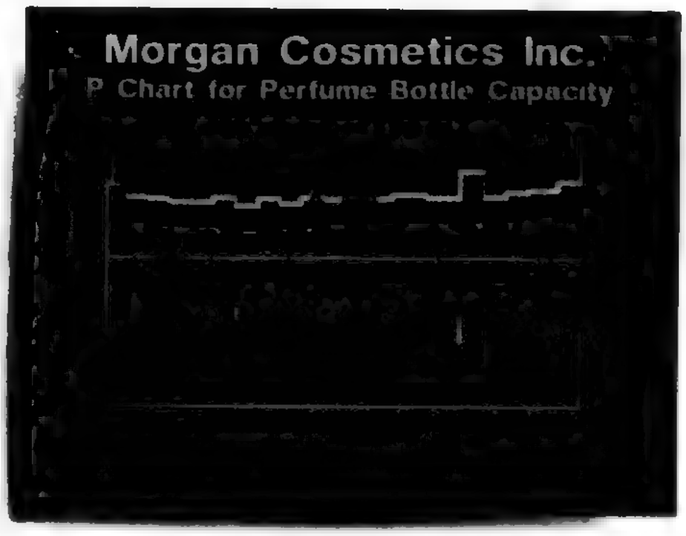

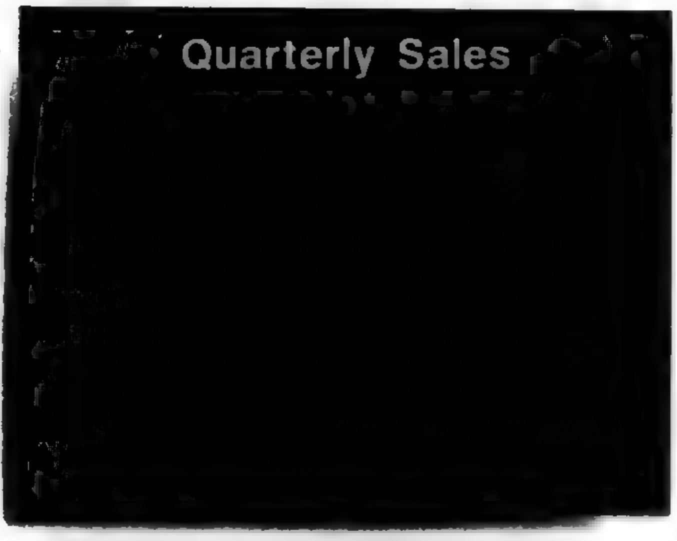

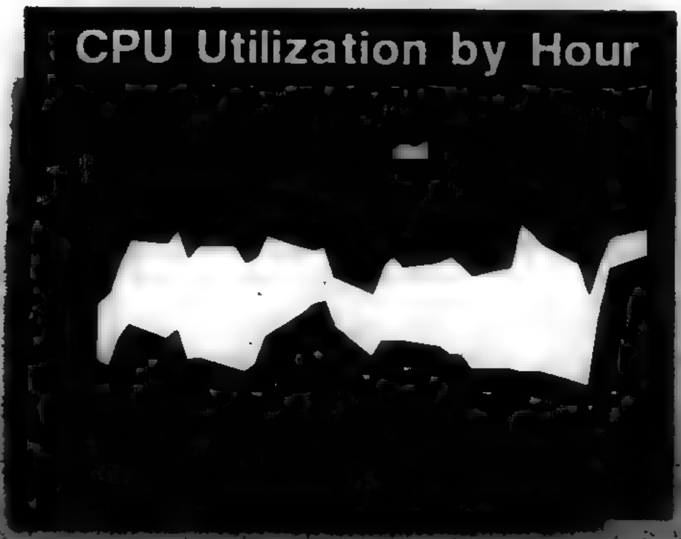

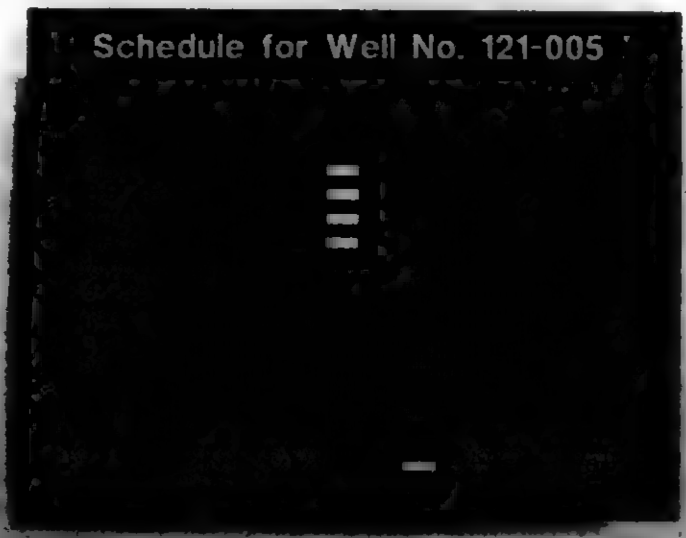

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New order

FROM PAGE 27

tributed data base with their relational systems. Oracle, in particular, was early to move its system to PCs.

After two years of selling the system, Oracle has 16,000 systems installed, company officials say.

Analysts say Oracle's emphasis on portabilty between mainframe, mini and micro systems has helped power its revenue to the $131 million mark.

Even though their products are similar, Oracle's growth (see story page 27) has outstripped Relational Technology's because Oracle was quick to adopt SQL as its data access and manipulation language while Relational has stuck with its proprietary QUEL language and an SQL interface, analysts say.

Such adherence to nonstandard protocols and interfaces is increasingly out of favor.

Long lifeline?

"There are many software companies that believe they can be trailblazers and not conform to standards. But users are worried about the life cycle of software," notes Paul Zorfass, president of Natick, Mass.-based First Consulting Group, Inc., a business development firm for software companies.

IBM's recently announced Systems Application Architecture outlines another set of software standards that will eventually allow applications to run across a range of IBM hardware platforms.

These standards will help the software companies concentrate their development efforts, vendor representatives note.

> "GETTING in the door is half the battle. A lot of small companies are saying, 'We have the technology. All we want is to be called to play.' "
>
> TED JASTRZEMBSKI
> INTERNATIONAL DATA CORP.

The new breed of mainframe software companies will also focus increasingly on effective marketing and consulting services, industry observers say.

Direct sales are expensive, particularly for smaller companies that do not have instant name recognition with MIS managers.

"Getting in the door is half the battle. A lot of small companies are saying, 'We have the technology. All we want is to be called to play,' " says Ted Jastrzembski, a software market researcher at International Data Corp. (IDC) in Framingham, Mass.

Telemarketing popular

Telemarketing, a relatively inexpensive sales technique, is catching on as one popular sales option.

On-Line Software International, Inc. in Fort Lee, N.J., grew to a $36.3 million company without a direct sales force until it acquired Ramis II and a range of other products from Martin Marietta Corp. last October.

Until then, the firm relied solely on telemarketing its products.

Similarly, Duquesne Systems, Inc., a 200-employee Pittsburgh-based systems utilities producer, grew from revenue of $3.5 million in 1982 to $24.2 million in 1986, relying largely on telemarketing, IDC's Peter Burris notes.

Consulting increases

In addition, vendors are increasingly offering consulting services and other forms of direct support.

Although several mainframe companies are implementing consulting services, a Big Eight accounting firm's business is closely tied to consulting services and, thus, gives a firm like Arthur Andersen & Co. an edge if it begins marketing software aggressively, Input's -Cohn notes.

As restructuring continues, the mainframe companies are adopting some or many of these recommendations in pursuit of resuming their historic 25% growth rates.

With sales cycles more drawn out and demands for support increasing, the players will find that "the big get bigger, and the small get in trouble," Paine Webber's Therrien says.

Cullinet shifting away from IDMS/R

BY CHARLES BABCOCK
CW STAFF

WESTWOOD, Mass. — In 1982, Cullinet Software, Inc. received 99% of its revenue from sales of its mainframe data base management system, IDMS/R.

That statistic highlights the dilemma in which Cullinet found itself when sales of mainframes slowed, and IBM's DB2 took the marketplace by storm in 1985 and 1986.

Although its dependence on IDMS/R had started to shrink by the mid-1980s, Cullinet's 10K reports to the Securities and Exchange Commission show that IDMS/R still represented 70% of Cullinet's business in 1985 and 1986.

Cullinet thus had little choice but to diversify if it did not want to become the Univac of the software world — a once-promising failure. Furthermore, it had to diversify into growth markets at a time when its most reliable source of revenue was shrinking.

To upgrade its technology offerings, it has acquired, since July 1986, an expert systems company, an SQL data base company, a repetitive manufacturing software company, an application development company and a fixed-asset system. Reworking these acquisitions to fit with Cullinet's other mainframe products has boosted Cullinet's expenses while adding little to the revenue stream. The result has been a string of losses that now stretch across five quarters and are expected to last at least two to three more quarters.

"I don't think Cullinet is going to come back with its present management. How many quarters of losses is the board of directors going to give [President and Chief Executive Officer David L.] Chapman?" asked Thomas Lawton, editor of "Computer Services Report" in Belmont, Mass.

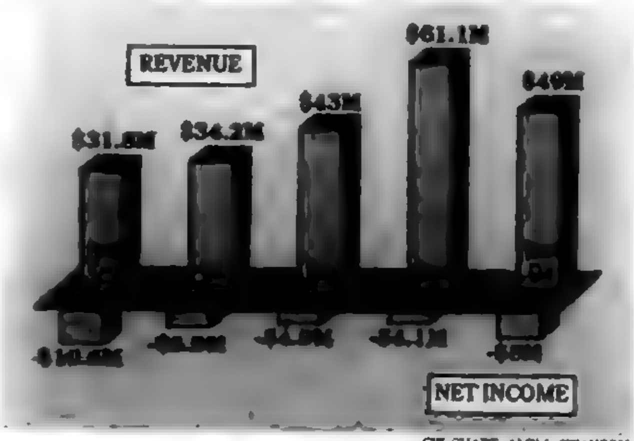
Other observers, however, point out that in the fourth quarter of fiscal 1987 and first quarter of fiscal 1988, ended July 31, Cullinet's revenue grew to record levels of $61.1 million and $49 million, despite losses of $1.8 million and $8 million, respectively.

With its round of acquisitions over, Cullinet officials say they are concentrating on cutting costs and regaining profitability. The cost control has gone to the extreme of requiring an executive higher than a department head to approve a Federal Express Corp. mailing, Cullinet employees say.

By the time it completes the transition, Cullinet will have a diversified product line that includes DBMSs, commercial applications and development tools on the mainframe as well as the mini and microcomputer. Applications represented 32% of its business in the recently completed fiscal 1987, company spokesmen say.

The bloom is off

With five losing quarters behind them, Cullinet officials talk of becoming profitable in the fourth quarter ending in April 1988



CW CHART AMY J. SWANSON

"They are planning 19 new product introductions before the end of the year. They have to catch up, but once they do, they will be way ahead of everybody," says Charlotte Walker, senior vice-president of L. F. Rothschild & Co. in New York.

Cullinet is falling behind its own catch-up schedule. In September 1986, it held a "blueprint" press conference, where David Litwack, executive vice-president of product development, announced that the company would offer an SQL-based DBMS for the Digital Equipment Corp. VAX market "within 12 months." Cullinet officials recently said that IDMS/SQL will go into beta testing in four weeks.

At the same press conference, Chapman announced that Release 10.2 of IDMS/R "now features SQL support for user queries." Release 10.2 would go into beta testing in October 1986, he said. Cullinet officials now indicate that Release 10.2 will be announced for general availability in November.

"Cullinet will be successful," Walker says, voicing a commonly expressed opinion on Wall Street. Cullinet fell behind IBM and its SQL-based products and is now learning to be more market-driven, she said.

SQL gives relief

As sales of DB2 have climbed, a number of mainframe software companies have turned to the IBM-developed data access and manipulation language Structured Query Language (SQL) as a way to participate in the marketplace for relational products.

Officials at Cullinet Software, Inc. plan to offer SQL support for on-line SQL queries in Release 10.2 of their IDMS/R system, due out this fall, and full SQL support in Release 11 in one year. The latter would permit an application written with ANSI SQL to run against IDMS/R.

Cullinet also plans to offer an SQL-based data base management system for the Digital Equipment Corp. VAX this fall and an SQL-based DBMS for the IBM 9370 low-end mainframe in 1988. Cullinet's commitment to SQL "is an important element" of its plan to reach new growth markets, said David Chapman, president and chief executive officer.

Officials at Computer Corporation of America say the company will produce an SQL interface to its Model 204 DBMS in the first half of 1988. Spokesmen for Software AG of North America, Inc. and Applied Data Research, Inc. (ADR) confirm similar plans. ADR has already produced an SQL-based relational system for the personal computer as part of its Ideal Escort fourth-generation language.

McCormack & Dodge Corp. has announced that its Millennium SDT product will be able to be used to develop applications for DB2. Arthur Andersen & Co., the Big Eight accounting firm in Chicago, announced its entry into the software market with a DB2 development tool, and additional development tools have been offered by Sterling Software, Inc.

Despite the rush to SQL products, not all of the mainframe companies have accepted the view that relational systems are here to stay in corporate data processing. "Relational is just the latest thing. It's like the gearbox on a car. You feel you've got to have one, but you don't know why," said Stuart Miller, president of Software AG of North America in Reston, Va.

CHARLES BABCOCK

In software research and development, bigger is not necessarily better.

Many of our competitors use the size of their R & D staffs as a selling point. But all the propaganda in the world can't change the fact that budget and staff size are not necessarily the keys to software success. If they were, the government and the IRS would have the best systems going.

No, size is not an advantage. But quality is. Other companies choose to have an army in R & D. For 14 years, Data Design has proven that a superior product can be produced by a smaller, experienced group of senior-level people.

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Ask them why, if "bigger is better," hundreds of FORTUNE 1000 companies have instead chosen financial software by Data Design. Companies like Alcoa, Burger King, Greyhound, Pillsbury, Bankers Trust, Federal Express, General Electric, Chicago Tribune Company and Security Pacific Bank. In fact, 68 percent of our customers are companies that previously purchased other vendor's systems.

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SOFTWARE NOTES

Pick nears 100,000 installations

The number of installed **Spectrum Manufacturers Association** (SMA) systems, based on a standard Pick Systems, Inc. operating system, is expected to reach 100,000 by 1988, according to a recent survey by the International Data Base Management Association of San Diego.

The SMA represents a group of vendors, including Prime Computer, Inc. and Ultimate Corp., that sell systems based on a standard version of the Pick system. Pick systems have been available for 20 years, and, in that time, the installed base has grown to 61,269 systems that support 430,400 users, the survey said.

Infodata Systems, Inc. in Falls Church, Va., and **Northwestern National Life Insurance Co.** in Minneapolis said they will jointly market a software tool that can assist in evaluating insurance applications. System for Underwriting Evaluation was developed by a team of medical and underwriting experts, Infodata said. It includes background information on diseases and conditions with ratings on associated risk factors. It also includes a medical data base that will be updated quarterly.

Old approach

CONTINUED FROM PAGE 23

eryday work environment of most data processing shops is still in the future.

However, even this installed base of CASE workstations is currently a very underutilized resource.

While it is a relatively straightforward matter to draw data flow diagrams and other graphics using a workstation rather than pencil and paper, it is another matter to begin thinking about automating the analysis process itself. For example, having the structure and content contained in a data flow diagram available in machine-manipulatable form opens up a wide range of possibilities for changing the design process, the review process, management methods and nearly every other process we perform as analysts and designers. With the potential for changing not only the work environment but also the nature of the work itself, management commitment to this change must be highly visible. The commitment first to train people in additional consulting and training is a must.

Understanding CASE

Individual training is necessary but not sufficient. Project teams must be trained in how the use of CASE tools will affect them as a group, not just individually. When a group of system analysts and users sits down to review a design, they need to understand that their focus can be almost totally on the design content, and that they can rely on the CASE system to have verified that the design follows a proper set of design rules. The vast majority of analysts and designers are either unaware analysis tools exist, insufficiently trained and supported in using them or hampered from using them by some constraint in their system development methodology.

Methodologies in the past have been largely implemented by filling out forms. The introduction of CASE technology has created a dissonance in many organizations as analysts and designers try to fit the new tools into the old approach. One of the biggest management challenges in introducing CASE is to justify a significant and ongoing program of support in anticipation of productivity payoffs. It would not be unusual for analysts and designers initially to see a productivity decrease when using CASE technology, but that must be accepted as part of the start-up costs. Even a 5% to 10% steady-state improvement in productivity would be enough to justify a CASE procurement and support activity.

But even this productivity improvement will be lost if staff isn't trained and supported effectively. Visible, continuing, top-level data processing management involvement is a necessity if this is to be a successful effort.

Grochow and Forman (pictured) are vice-presidents of the Corporate Technology Group of American Management Systems, Inc., a management consulting firm in Arlington, Va.

Tool tracks

CONTINUED FROM PAGE 23

ness trip information to automatically be transmitted to a Capture system at a customer site.

The software generates a travel work sheet that includes all prearranged travel information. The traveler then writes down expenses on this work sheet and makes any changes to existing data, such as airline cost. On his return, he inputs the additional expense data and changes. Company management is then able to approve the on-line expense report and send it to the accounting department.

According to Ramacciotti, the system has been programmed to use required expense reporting procedures. With the Tax Reform Act of 1986, the meals and entertainment deduction has been limited to 80%. Capture allocates these deductions automatically, he said. Capture can also be tailored to an individual customer's expense reporting policies, he added.

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NEW PRODUCTS

Systems software

A VSAM allocation management system for IBM mainframes has been announced by the Systems Software Marketing Division of **Sterling Software, Inc.**

VSAM Allocation Manager is said to allow users to allocate VSAM data sets without having to identify a specific volume, eliminating the task of manually locating sufficient direct-access storage device space before defining a VSAM data set.

Additional features include standards enforcement, redirection of specific volume requests and automatic control of space allocation amounts and buffer-space standards.

The VSAM Allocation Manager runs on IBM 370, 3000 and 4300 series mainframes using IBM's MVS and MVS/XA operating systems. It costs $12,500.

Sterling Software, No. 100, 11050 White Rock Road, Rancho Cordova, Calif. 95670.

On-Demand, a software system that provides an on-line work environment for IBM mainframe end-user computing, has been announced by **Decision Technology, Inc.**

On-Demand insulates end users from IBM operating systems, JCL and other system facilities. It is said to support both menu- and command-mode edit operations and provide user libraries for the storage of retrieval-language requests, data definitions and text. Security is provided by various site- and user-defined security options.

On-Demand is available for use with IBM's DOS/VSE and MVS operating systems using CICS or IBM's TSO. Entry license prices range from $4,995 on Group 10 processors to $15,000 on Group 40 processors.

Decision Technology, Princeton Corporate Center, 1020 U.S. Route 1, Princeton, N.J. 08540.

Applications packages

A three-dimensional version of **Drawbase**, its computer-aided design data base software, has been announced by **Skok Systems, Inc.**

With the updated version, the vendor said, users can view drawings from any angle and at any elevation. Designing can be done on horizontal, vertical or oblique planes. Users can creates cones, cubes, prisms, cylinders, spheres, domes and arches.

Users can view 3-D models in orthographic, two- or three-point perspectives. In these views, users can rotate the object, fly around it or walk through it without defining a flight path in advance.

According to Skok, all drawings created in earlier versions of Drawbase can be used in Version 104.

Drawbase costs $4,995.

Skok Systems, 222 Third St., Cambridge, Mass. 02142.

Utilities

PRTQMGR, a print queue manager for Wang Laboratories, Inc. VS computers, has been announced by **BEI Corp.**

The software is said to display the contents of users' personal print libraries. System administrators display every print library across all mounted disk drives and can display the contents of an individual print library. Operators have the option to display file attributes, display the file, print, print and scratch, rename, convert to a word processing document or run any predesignated program.

Features include temporarily altering print mode and class and form with automatic reset.

Software pricing is tiered and follows Wang's A, B, and C CPU classifications. A single class B license is $750.

BEI, 2129 Eastlake Ave. E., Seattle, Wash. 98102.

Igesview, a graphics program used to view or plot an initial graphic exchange specification file directly, has been announced by **Iges Data Analysis.**

Igesview is said to allow the user to zoom, pan and rotate the image. It supports Version 3 of the initial graphic exchange specification and runs on Tektronix, Inc. 4010 through 4014 terminals. Igesview is written in C and runs in the VMS environment. It is priced from $6,000.

Iges Data, 5670 McDermott Drive, Berkeley, Ill. 60163.

Development tools

Catalytix Corp. has ported its **Soft C** family of software development tools to the Hewlett-Packard Co. 9000 Series 300 and 500 Unix-based computers.

The Soft C family includes the Interpreter for interactive execution of C programs and the Runtime Analyzer for automatic detection of C programming errors. C Trainer, an interactive instructional package for teaching the C language, is also available.

The Soft C Interpreter costs $2,000; the Runtime Analyzer costs $1,200; and the C Trainer package costs $220. The software also runs on HP's Precision Architecture Series 800 systems. It costs $4,000 for the Interpreter; $2,400 for the Runtime Analyzer; and $420 for the C Trainer.

Catalytix, 55 Wheeler St., Cambridge, Mass. 02138.

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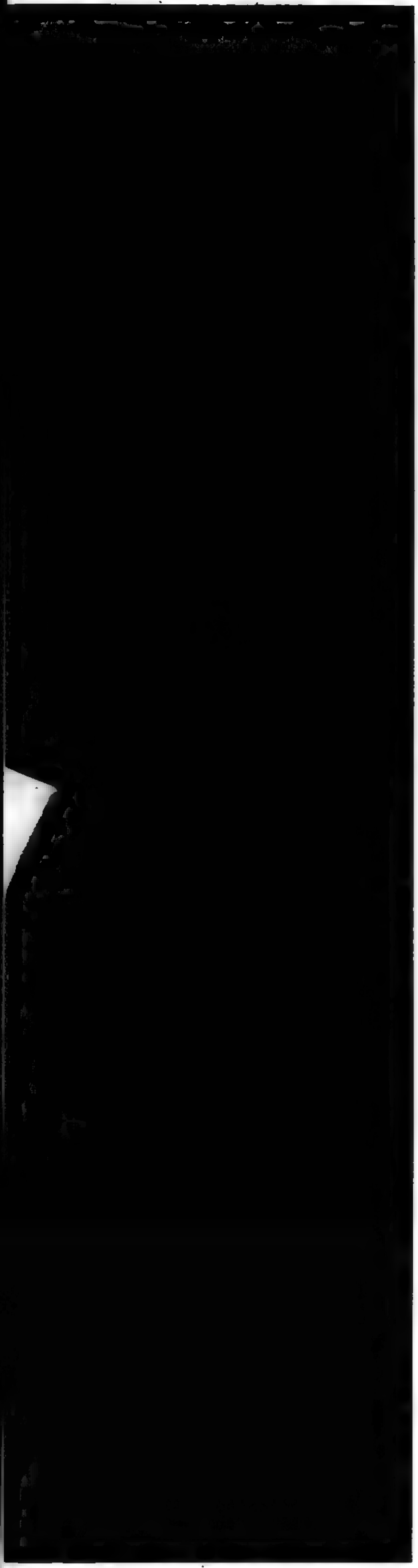

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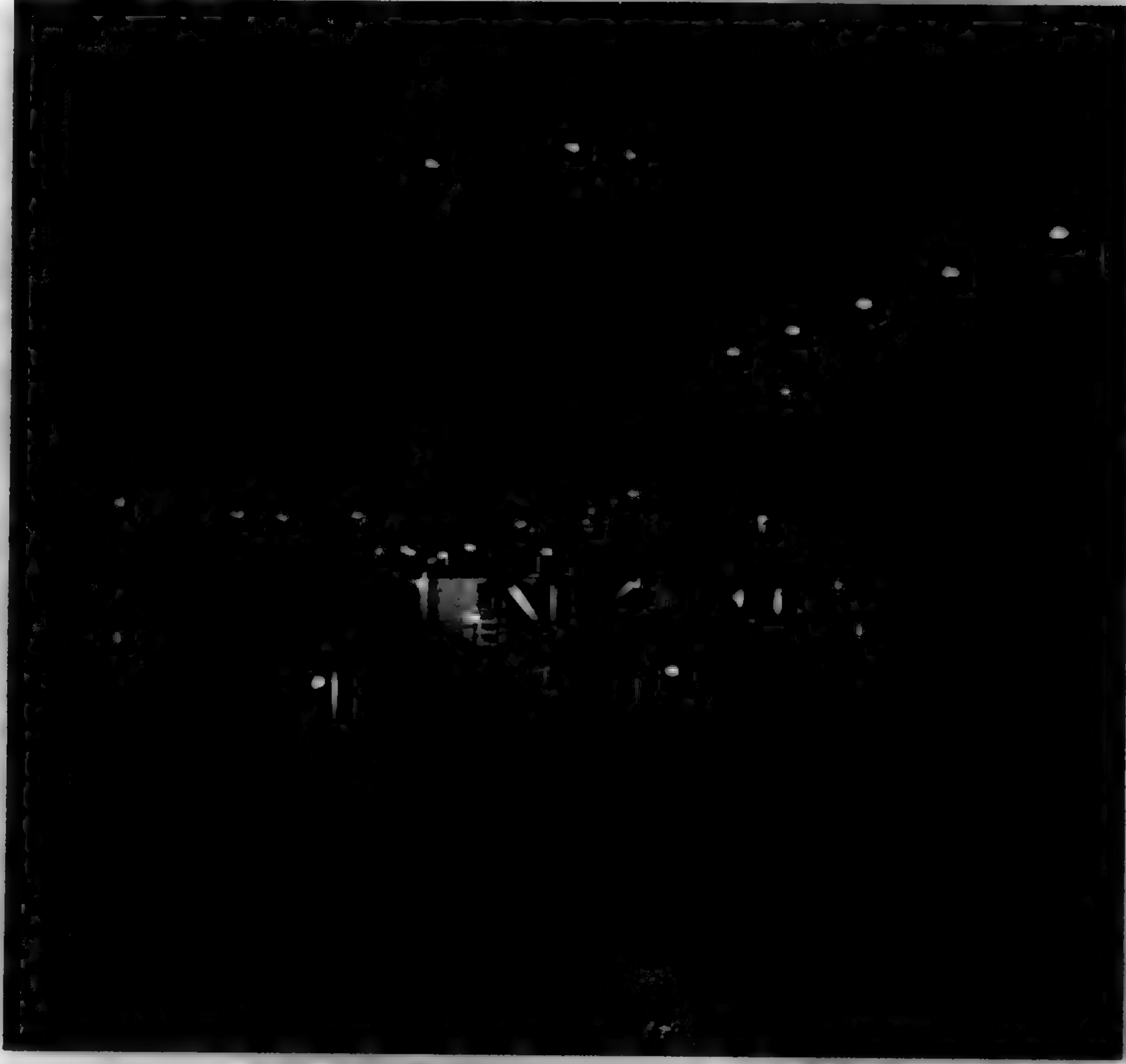

McDermott International, Inc., makes the world's largest offshore oil-producing platforms. It also makes jobs for thousands of people all over the world, which makes for a fairly complex and dynamic payroll. A payroll that had become even more complex because of the acquisition of the Babcock & Wilcox Company. That's why McDermott went to Management Science America, Inc., where they found some excellent payroll solutions with the MSA Human Resource System.

Babcock & Wilcox had a payroll system that was incompatible with McDermott's. So McDermott's first step was to draft a list of their new software needs. "We had a 50-item, 10-page document that listed the specifications we needed for our software," notes Jim Maumus, Payroll Specialist at McDermott. "We listed some pretty stringent requirements, but MSA had a system that was what we needed for payroll purposes. Now our payroll department responds more accurately and rapidly to corporate needs. We're saving time with our new Human Resources System, which means we're saving money."

Maumus is a good authority on the subject of payroll administration–in 1986, the American Payroll Association honored him with the national Payroll Man of the Year award. His summation assessment of MSA?

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MICROCOMPUTING

SMALL TALK

William Zachmann

Javelin Plus is topflight

Cambridge, Mass.-based Javelin Software Corp. probably would be happy to have Rodney Dangerfield's problem. Javelin, the company's flagship product, has never suffered from lack of respect. The only problem is that, so far, not all that many people (just more than 50,000) have bought it.

Javelin Plus, an updated, expanded and improved version of the original, was introduced early this summer and offers a terrific opportunity to correct the problem. Priced at $249.95, Javelin Plus adds data base functions, date and text manipulation features, a general "snap in" building-block capability and lots of other bells and whistles to what was already the best tool for financial modeling and analysis that I've ever seen.

While it is not really a spreadsheet program (although it has a spreadsheet capability), Javelin is a genuinely better mousetrap for nearly any application you'd ordinarily use a spreadsheet program to do. If you want a low-cost way to try it,

Continued on page 39

Will Microsoft extend OS/2?

BY PATRICIA KEEFE
and DOUGLAS BARNEY
CW STAFF

ANALYSIS

Microsoft Corp. remains cagey on the subject, but many industry analysts and key vendors say the software publisher must counter IBM's OS/2 Extended Edition, a proprietary version of the companies' jointly developed OS/2 operating system, the core of which is slated for delivery during the first quarter of 1988. IBM has given no timetable for the delivery of OS/2 Extended Edition, which will include an IBM DB2-compatible version of SQL and a communications manager.

In addition to keeping pace with IBM's OS/2 plans, Microsoft faces stiff competition in its effort to position its LAN Manager as the standard for distributing processing in work group environments from network kingpin Novell, Inc. Competing with the LAN Manager for the resources of third-party developers is Netware, Novell's proprietary network operating system, which today claims the lion's share of the local-area network operating systems market.

IBM and Microsoft share an almost identical core version of OS/2, but IBM surprised the industry — and Microsoft — by announcing plans to develop proprietary extensions to OS/2, an expanded-memory, multitasking operating system.

Despite the anticipated pressure from clone vendors, Microsoft has no plans "at this point" to provide a clone of IBM's OS/2 Extended Edition "as such," according to Paul Maritz, Microsoft's general manager of networking. He suggests that it is up to Microsoft OEMs (IBM clone vendors) to decide whether they want to go after IBM's market with data base and communications managers.

Some analysts and Microsoft officials contend that an OS/2

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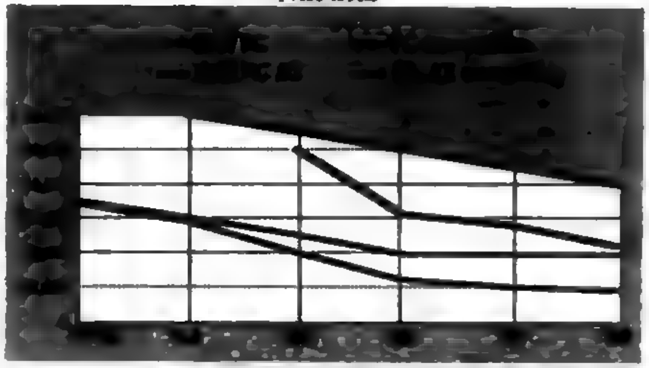
- Printronix rolls out 12 page/min. laser printer at PC Expo. Page 40.
- Tatung uses show platform to launch high-resolution monitor. Page 40.
- Optotech enhances Laser Databank optical storage subsystem. Page 40.

Data View

IBM PCs and compatibles
Price levels



INFORMATION PROVIDED BY INTERNATIONAL DATA CORP
CW CHART

DG ready for hardball in microcomputer field

Data General Corp. has sold fewer personal computers than most of its minicomputer competitors. Through the end of 1986, according to industry estimates, the firm had installed fewer than 50,000 units, including its hybrid Desktop Generation systems.

C. J. Duggan

While the IBM Personal Computer was building momentum in 1983, DG announced the Desktop Generation dual-processor machine that can run both minicomputer and personal computer software. The following year, DG unveiled the Data General/One, one of the industry's first IBM PC-compatible laptop systems. In 1986, DG announced the Dasher/286, said to be software-compatible with the IBM PC AT. And in June of this year, DG brought out its PC Integration product for integrating PCs with its minicomputers.

C. J. "Skip" Duggan, director of product marketing for peripherals and personal computers, says DG has recently become more aggressive in the micro arena. He recently discussed the new strategy with *Computerworld* senior writer David Bright.

Why has DG been less successful than most minicomputer manufacturers in selling personal computers?

We've been very successful selling PCs to our customers. We've been unsuccessful, or not as successful as I'd like to be, selling PCs to new customers. We have been successful selling our portable to new customers. We've recently reduced our prices on our Dasher/286, and we're a lot

Continued on page 38

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Extend OS/2?

CONTINUED FROM PAGE 37

Extended Edition clone is unnecessary because IBM and Microsoft are focusing on different user needs. IBM's intent is to address the needs of worldwide IBM mainframe shops, Maritz says, whereas Microsoft's focus is on providing connectivity between OS/2 and Microsoft MS-DOS computers in work groups. "We think there is a need for both kinds of solutions," he says.

Although some analysts agree that an OS/2 Extended Edition clone or functional equivalent is unnecessary, other software vendors and analysts contacted by *Computerworld* last week argued that Microsoft must offer similar extensions of OS/2 to OEMs like Compaq Computer Corp. in order to keep pace with IBM.

Evidence of Microsoft's true strategy may be its still unannounced licensing agreement giving it access to SQL data base technology from Sybase, Inc. in Berkeley, Calif. This venture is seen by observers as the first step toward providing many of the tools necessary to counter the Data Manager component of OS/2 Extended Edition.

Microsoft chose Sybase for its speed, according to analysts at Forrester Research, Inc. in Cambridge, Mass. In addition to providing data base power for OS/2 users, Microsoft may go a step further. "Microsoft wants to be able to port the data base manager down to the MS-DOS 3.3 world. . . . [It] is hoping to offer a value added over IBM by supporting users' old PCs," says John McCarthy, research director at Forrester Research.

Maritz notes that Microsoft has never confirmed the Sybase deal, insisting, "We have no announced SQL plans at this point and do not anticipate making any imminent announcement about providing a data base server." Of course, with delivery of OS/2 Extended Edition at least 18 months away, according to industry observers, there is no rush for Microsoft to reveal its plans in this area. Maritz also says Microsoft is unlikely to come out with a product that competes with key developers such as Ashton-Tate or Lotus Development Corp.

Nonetheless, many observers say Microsoft means to shut out both developers, noting that Ashton-Tate is concerned enough to be seeking an alliance with a third-party data base vendor similar to the Microsoft-Sybase partnership. Some industry observers say Microsoft is wary of provoking IBM by too closely mimicking IBM's OS/2 Extended Edition.

A popular theory holds that Microsoft will offer capabilities nearly identical to IBM's but will avoid packaging a data base with a version of the operating system. Others say packaging the two together is essential in order for IBM clone vendors to compete for large accounts.

The picture is further muddied by the question of whether IBM's OS/2 Extended Edition will run on current or future clones of IBM microcomputers. IBM will offer OS/2 Extended Edition for $795. If the Extended Edition runs on the bulk of clone machines, users could conceivably replicate IBM's proprietary functions just by using the IBM software. Clone makers, however, would still not be able to offer extensions bundled with their systems.

But ultimately, the key to Microsoft's dilemma is user demand, according to both the company and industry observers. If users want an integrated approach, Microsoft will have to provide one, even at the risk of offending key third-party developers and IBM itself.

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DG ready

CONTINUED FROM PAGE 37

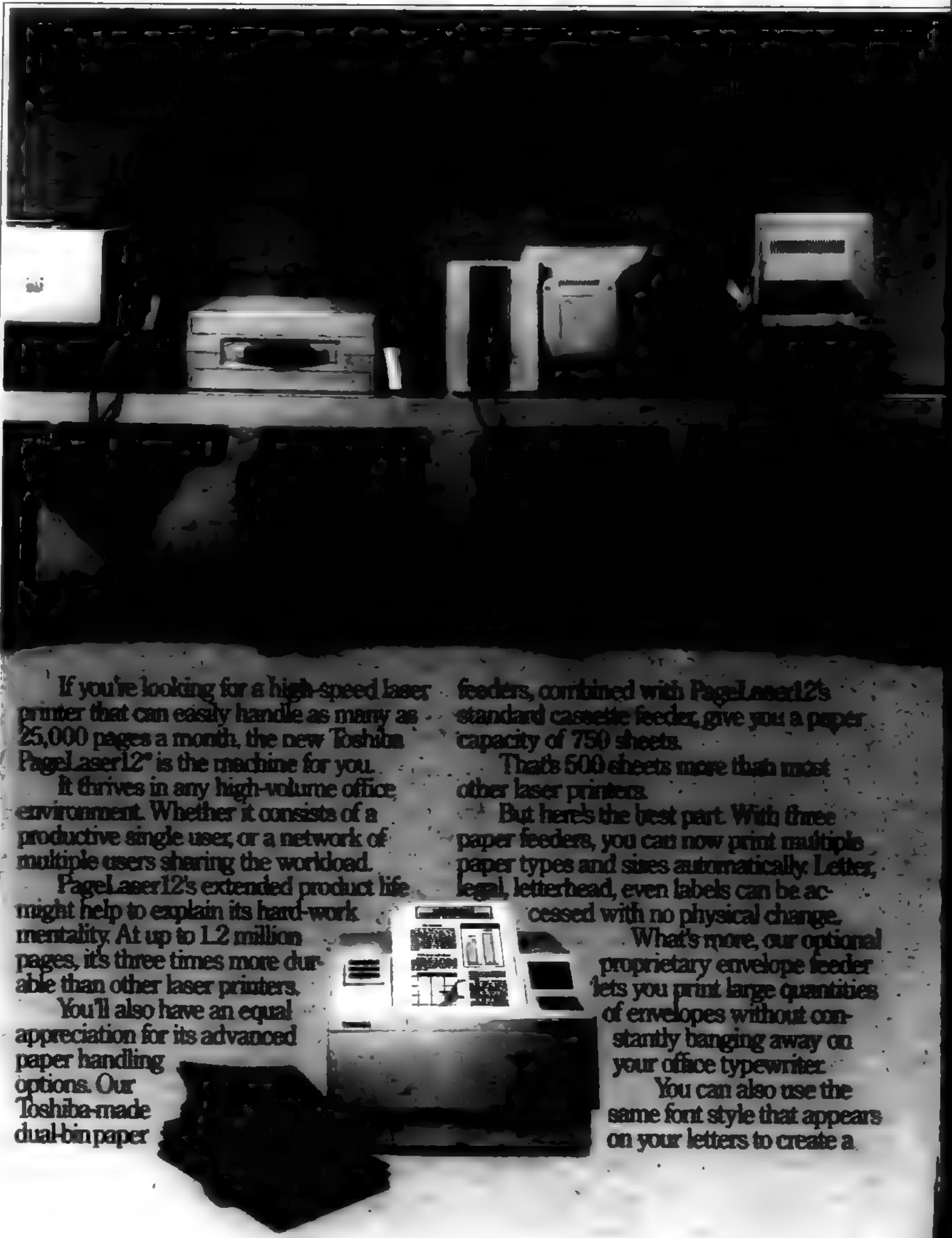
more price-competitive now. Our strategy now is to offer all the service and support and benefits of a system vendor and try to price ourselves just about where some of these quality clones are. We're getting more aggressive in our pricing.

So that should help to bring about a change?

That's one thing that will help. The second thing is we just recently announced PCI, for PC Integration, which will integrate the PCs into our CEO office automation solution. We have needed a differentiator. No one is going to sell PCs in the commodity space unless they have a differentiation. I think PCI will be our differentiation. But I don't think that you could play unless your price was right, so we fixed that.

When the portable was introduced in 1984, there were some problems, such as a hard-to-read screen.

There were two problems: the screen and the price. The technology that we used to make the product was more expensive than, perhaps, the market would bear. There is a tremendous amount of price volume and elasticity in the portable market. And now, at $1,695 entry — where we used to be $2,895 — the current product has many more features, like the



If you're looking for a high-speed laser printer that can easily handle as many as 25,000 pages a month, the new Toshiba PageLaser12™ is the machine for you.

It thrives in any high-volume office environment. Whether it consists of a productive single user, or a network of multiple users sharing the workload.

PageLaser12's extended product life might help to explain its hard-work mentality. At up to 1.2 million pages, it's three times more durable than other laser printers.

You'll also have an equal appreciation for its advanced paper handling options. Our Toshiba-made dual-bin paper feeders, combined with PageLaser12's standard cassette feeder, give you a paper capacity of 750 sheets.

That's 500 sheets more than most other laser printers.

But here's the best part. With three paper feeders, you can now print multiple paper types and sizes automatically. Letter, legal, letterhead, even labels can be accessed with no physical change.

What's more, our optional proprietary envelope feeder lets you print large quantities of envelopes without constantly banging away on your office typewriter.

You can also use the same font style that appears on your letters to create a

backlit screen and more memory. We're on the knee of the curve on price elasticity now.

Why was that portable introduced with the screen the way it was?
That was the best technology that there was. It was not any different from any of the other screens that were introduced by the competition over the next year. It's just that we were first.

In the past, did not having strong PC offerings hurt DG in attracting large accounts?
I don't think that a large account will determine that they will not do business with you because you don't have a PC offering. That's because there are a lot of PC alternatives. When the large accounts are picking a vendor to do business with, they're primarily going to look at the overall sales and support of the company and its resource. They're shopping for a DP partner. They're shopping for an office automation vendor. They're shopping for a departmental systems vendor.

So the PC strategy is definitely very different right now?
It's different. Originally, our PC strategy was to sell PCs against the clones through dealers. Our strategy now is completely different. It's to sell personal computers as workstations on DG departmental minicomputers or on large DG office automation installations.

Will you be supporting OS/2?
When and if the applications software can take advantage of OS/2, we'll have a product like that to offer as part of our PCI solution. There's not a lot of need to have that product until there's something you can do with it.

What will be the impact of IBM's Personal System/2 on DG's micro strategy?
One thing that's happened already is the PS/2 has driven down the price point. No. 2 is that OS/2-type functions will allow the users to have a bit more flexible PC workstation attached to their systems. In the future, we'll have to take a look at the [communications] features that OS/2 has, like the multitasking function.

Javelin Plus

CONTINUED FROM PAGE 37

you can still get Javelin Version 1.1 for just $99.95.

One of the reasons Javelin hasn't been a best-seller is that, without actually using it, you can't really understand why it is so much better than a spreadsheet program for so many applications. Another reason is that Javelin's powerful ability to view the underlying model in various ways can initially appear a bit confusing to a spreadsheet user.

Before Javelin, I simply did my taxes with a hand calculator, for one simple reason: Implementing a tax table with a spreadsheet program is equivalent to trying to implement word processing-style word wrap with the macro capabilities of a programmer's text editor.

Javelin's unique building-block feature, however, made tax table creation and lookup a snap. Input ranges are linked to base output values and optional interpolation rates with a simplicity that is downright spectacular compared with the gyrations required in a spreadsheet program to accomplish the same result.

Javelin's building blocks provide ways to do quite complex data transformations and to supplement the rich array of basic operations and more complex functions provided in the program. The curve building block, for example, lets you create tailored functions by actually shaping a graphics function form on the screen.

The "snap in" building blocks in Javelin Plus are actually created in separate files that can be dynamically accessed by the program. Four of these are included with Javelin Plus, for "what-if" analysis, forms input and multiple regression.

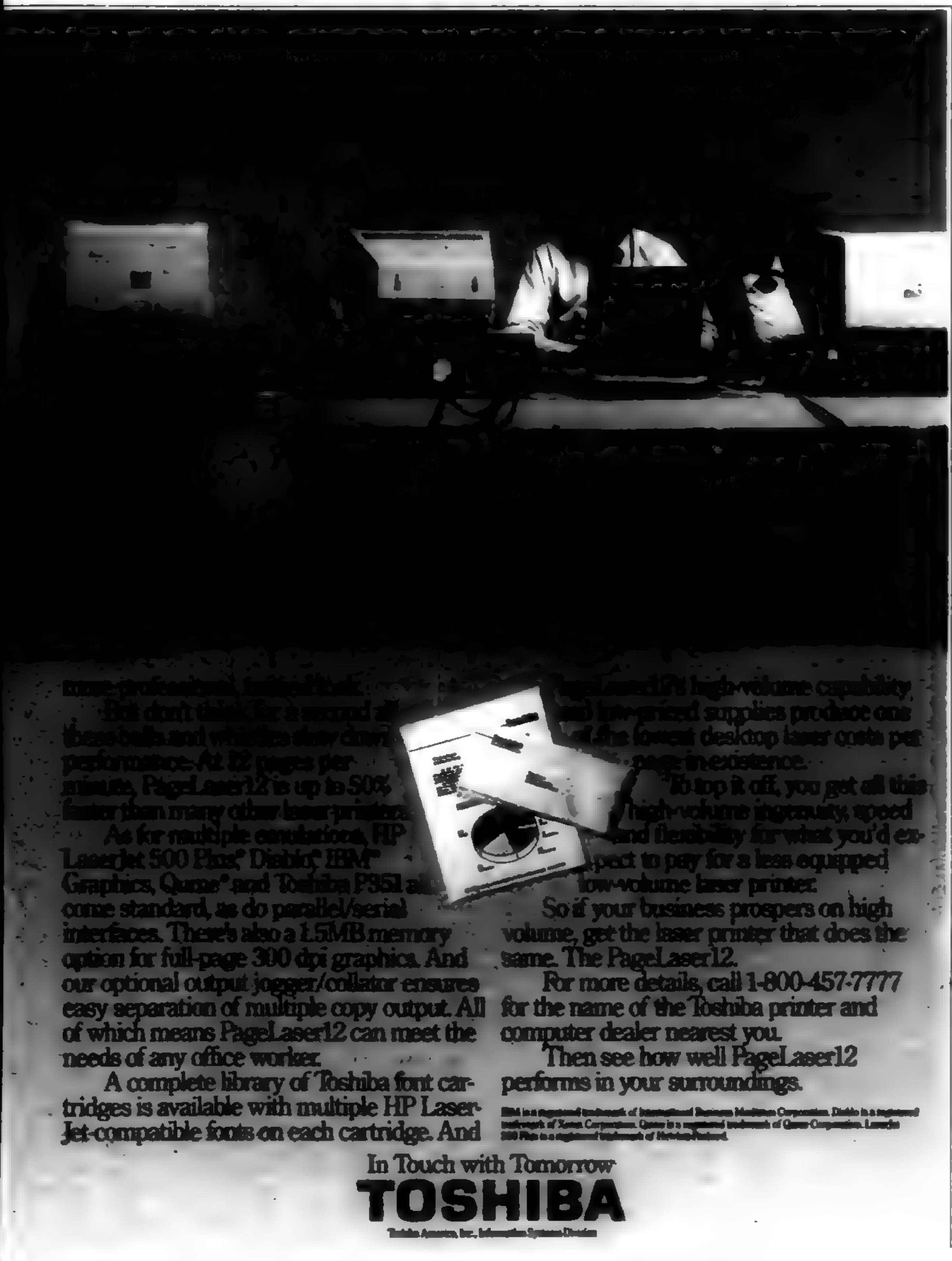
Another important feature of Javelin is a capable graphics view of the data. In addition to making it easy to create graphs for analysis and presentation, Javelin provides a "quick graph" view that can actually be used to input data.

Spreadsheet views of all or part of the underlying model can be created, presented and manipulated. In addition, the model can be dealt with as a linked network of variables and formulas.

The data base enhancements in Javelin Plus nicely complement the basic financial modeling and analysis capabilities of the original product. They make it possible to handle things like mailing labels.

Javelin is one of the best products I have seen in the past couple of years, and Javelin Plus makes an excellent product even better. Between the two, let's hope that Javelin Software begins to enjoy the kind of success that a company with a terrific product deserves.

Zachmann is vice-president of research at International Data Corp.



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But don't think for a second all these bells and whistles slow down performance. At 12 pages per minute, PageLaser12 is up to 50% faster than many other laser printers.

As for multiple emulations, HP LaserJet 500 Plus, Diablo, IBM Graphics, Qume and Toshiba P351 also come standard, as do parallel/serial interfaces. There's also a 1.5MB memory option for full-page 300 dpi graphics. And our optional output jogger/collator ensures easy separation of multiple copy output. All of which means PageLaser12 can meet the needs of any office worker.

A complete library of Toshiba font cartridges is available with multiple HP LaserJet-compatible fonts on each cartridge. And PageLaser12's high-volume capability and low-priced supplies produce one of the lowest desktop laser costs per page in existence.

To top it off, you get all this high-volume ingenuity, speed and flexibility for what you'd expect to pay for a less equipped low-volume laser printer.

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For more details, call 1-800-457-7777 for the name of the Toshiba printer and computer dealer nearest you.

Then see how well PageLaser12 performs in your surroundings.

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NEW PRODUCTS

Software applications packages

A module said to provide the user with control over graphics images has been added to the Kinetic Graphics System, **Kinetic Presentations, Inc.** has announced.

The module, **Kinetic Art**, allows users to stretch, compress and rotate text, change intercharacter spacing and edit objects point by point. Edit functions include move, copy, scale, rotate, delete, undelete and pan and zoom capabilities.

Kinetic Art supports all Kinetic Graphics System features including text fonts, special text commands and 255 colors. Modules cost from $195 each; the entire system costs $995.

Kinetic Presentations, Distillery Commons 250, Louisville, Ky. 40206.

An accounting package called **Accountpac** has been announced by **The Accounting Specialist**.

The package is said to include General Ledger, Accounts Receivable, Accounts Payable, Payroll, Inventory, Invoicing, Job Cost, Sales Analysis, Custom Report Generating, Graphics, Export to Data Bases and Spreadsheets and On-Line File Query. The system utilizes a single input screen for all entries and features a report writer. Graphics can also be generated.

Accountpac costs $1,595. It runs on IBM Personal Computers and compatibles.

The Accounting Specialist, Suite 200, 1485 N. Tustin, Orange, Calif. 92667.

Software utilities

A memory-resident natural language interface for Ashton-Tate's Dbase III and Dbase III Plus has been introduced by **Elf Software Co.**

Elite features synonyms, antonyms, phrase definitions and a dictionary. Its logic interpreter generates efficient code from look-up queries to range searches, simultaneous totaling on multiple fields and data-correlation tasks.

Elite costs $189 and was designed for use with IBM Personal Computers and compatibles.

Elf Software, Suite 148, 210 W. 101 St., New York, N.Y. 10025.

Software enhancements

Version 4.00 of Pico Publishing's **G-Spell** 90,000-word spelling checker for IBM Personal Computers and compatibles was recently released.

Version 4.00 is said to take 1½ min to check a typical 22,902-byte file. It also aids in automatically creating and maintaining personal dictionaries, with no limit to the number of words a personal dictionary can contain.

Other features include the ability to preview misspelled words, edit words in context or write a list of misspelled words to an output file. G-Spell can proofread any ASCII format file.

G-Spell Version 4.00 costs $9.95 plus $2 for shipping and handling.

Pico Publishing, Suite 512, 305 2nd St. S.E., Cedar Rapids, Iowa 52401.

An enhanced version of its open-architecture computer-aided software engineering tool, the **Analyst/Designer Toolkit**, has been announced by **Yourdon, Inc.**

The upgraded version includes the ability to analyze structured models for errors, an expanded dictionary featuring an internal editor and pop-up selection screens, support for IBM's Enhanced Graphics Adapter and the ability to make programmatic changes of text fields on diagrams.

The Analyst/Designer Toolkit runs on IBM Personal Computers with 640K bytes of memory, a 360K-byte floppy disk drive, a 10M-byte hard disk drive, a parallel port and a serial port. It costs $1,995.

Yourdon, 1501 Broadway, New York, N.Y. 10036.

Data storage

Optotech, Inc. has enhanced its **Laser Databank** plug-and-play write-once optical-storage subsystem for IBM Personal Computers and compatibles.

The subsystem's read and write device driver has been enhanced to overcome the 32M-byte barrier in Microsoft Corp.'s MS-DOS. Users can create files of up to 200M bytes in size and use the entire surface of the 5¼-in. optical disk for a single file if needed.

Laser Databank is composed of Optotech's Model 5984 write-once optical disk drive, PC-Bus Controller and an IBM PC-DOS Optical Drive Toolkit.

The Laser Databank is priced at $2,950.

Optotech, 740-770 Wooten Road, Colorado Springs, Colo. 80915.

A storage subsystem said to be capable of 0.5 msec average access time and incorporating built-in fault tolerance has been announced by **1776, Inc.**

Named the **Patrick Henry**, the Microsoft Corp. MS-DOS-compatible subsystem features cache memory on the disk controller. It makes use of the small computer systems interface standard for connection to the host. According to the vendor, data is transferred to the host at the rate of 1.2M byte/sec.

The built-in fault tolerance includes automatic reallocation of disk space when bad sectors are suspected and maintenance of duplicate copies of the directories and file allocation tables.

Storage capacities range from 70M to 1.28G bytes. A base system consisting of a 70M-byte disk and 0.5M-byte cache costs $9,900.

1776, Suite 700, 4522 Murietta Ave., Sherman Oaks, Calif. 91423.

Printers/Plotters/ Peripherals

A family of nine-wire dot matrix printers has been announced by the Computer Products Group of **Fujitsu America, Inc.**

The **DX2300** 80-col. printer and the **DX-2400** 136-col. printer each offer 270 char./sec. printing in draft mode at 10 pitch, 324 char./sec. in draft mode at 12 pitch and near-letter-quality printing at up to 54 char./sec.

Features include bidirectional tractor feed, Centronics Data Computer Corp. parallel or RS-232C serial interfaces and emulation of Epson America, Inc.'s FX80 and IBM Graphics Printer and Proprinter commands. A 8K-byte buffer is standard.

The DX2300 and DX-2440 dot matrix printers cost $645 and $845, respectively.

Fujitsu America, 3055 Orchard Drive, San Jose, Calif. 95134.

The **Scripten** 10 page/min. laser printer, incorporating the industry-standard Postscript page description language from Adobe Systems, Inc., has been announced by **Qume Corp.**

The Postscript page description language built into the Scripten printers lets users create documents combining text, graphics and scanned images on a page. The Postscript mode provides 35 resident fonts in 11 families along with enhanced, user-defined graphics and the ability to incorporate scanned images onto a page.

The Scripten printer is available in a 2M-byte model for $4,795 and a 3M-byte model for $5,295. Both offer print resolution of 300 dot/in.

Qume, 2350 Qume Drive, San Jose, Calif. 95131.

Board-level devices

Hercules Computer Technology, Inc. has introduced the **Hercules Text Card**, a half-size alternative to the IBM Monochrome Display Adapter (MDA) for standard text applications.

The card is said to display text, but not graphics, on IBM-type monochrome monitors. It is compatible with the IBM Personal Computer as well as with standard text-mode software and is supported by all text software programs that are compatible with IBM's MDA, the vendor said.

The Hercules Text Card is priced at $139.

Hercules Computer Technology, 2550 Ninth St., Berkeley, Calif. 94710.

Microstar Laboratories has added three models of the 12-bit **DAP 1200** to its Analog Accelerator series of intelligent data acquisition boards for the IBM Personal Computer.

DAP 1200 sampling speeds go to 150,000 sample/sec. An on-board Intel Corp. 80186 coprocessor runs at 8 or 10 MHz with up to 512K bytes of local memory. Real-time processing software is included in read-only memory and capabilities range up to digital filtering and fast Fourier transform.

All DAP 1200 modules feature 16 analog inputs, expandable to 512; 16 digital inputs, expandable tc 64; 16 digital outputs; two 12-bit analog outputs; and hardware and software triggering. Prices range from $1,595 to $1,995.

Microstar Laboratories, 2863 152 Ave. N.E., Redmond, Wash 98052.

Orchid Technology, Inc. has reduced the price of its **Tinyturbo 286** accelerator board for the IBM Personal Computer XT and compatibles.

The Tinyturbo 286 takes up half a slot and features a toggle switch for switching between the Intel Corp. 8088 and 80286 processors, the vendor said. It can run Microsoft Corp. Windows and other programs that use IBM's Enhanced Graphics Adapter graphics, in addition to the Lotus/Intel/Microsoft Enhanced Memory Specification memory and local-area networks.

Tinyturbo 286 is priced at $595.

Orchid Technology, 45365 Northport Loop W., Fremont, Calif. 94538.

Auxiliary equipment

Topaz, Inc. has introduced its industrial **Escort** micro power conditioner designed for protecting computerized industrial equipment against electrical power disturbance.

According to the vendor, it attenuates common mode noise at a ratio of two million-to-1 and normal-mode noise at a ratio of 800-to-1.

Escort also features a constant output voltage of +3% to -6% of nomial-rated voltage.

Available in power ratings from 70VA to 2 kVA, in floor- and wall-mount terminal-style models and in-line cord/receptacle modes, Escort is priced from $145.

Topaz, 9192 Topaz Way, San Diego, Calif. 92123.

NEW AT PC EXPO

The **L1012** 12 page/min. laser printer, the **P6000 series** matrix line printers and the industrial-strength multimode **L150** bar code label printer were introduced by **Printronix, Inc.** Prices for the products range from $3,495 to $8,415. Printronix, P.O. Box 19559, 17500 Cartwright Road, Irvine, Calif. 92713.

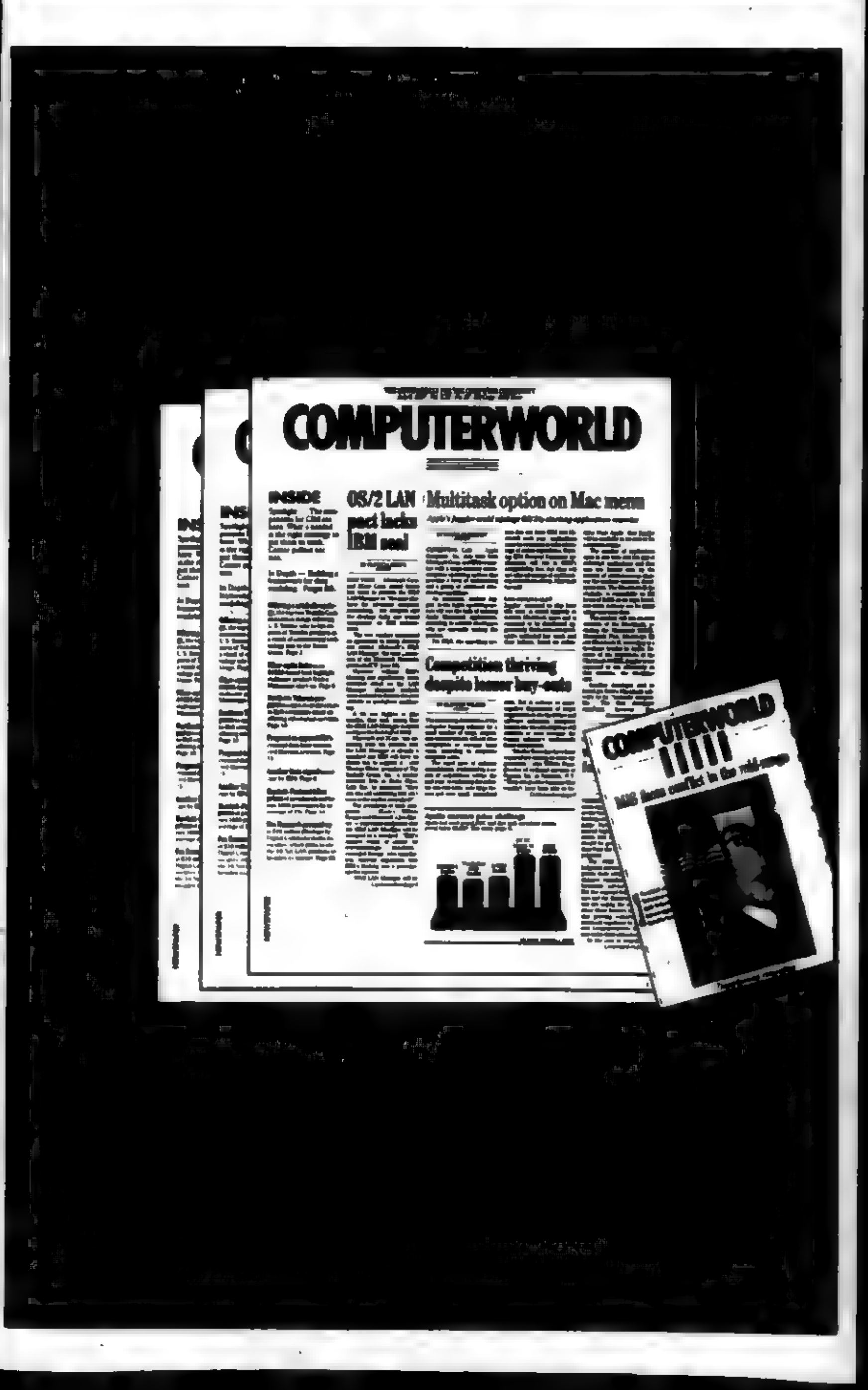
Attachmate Corp. announced the **3179G Vector Graphics Option** for its Extra Connectivity Software for use on the IBM Personal System/2. Users may choose among more than 70 output devices. It costs $695. Attachmate, 3241 118th S.E., Bellevue, Wash. 98005.

A data storage hard-disk and intelligent-disk controller subsystem, called **Co-Star**, was announced by **DSC Communications Corp.** Available in 80M-byte capacity for $1,495 and 150M-byte capacity for $2,495, the subsystem includes a 256K-byte memory and coprocessor and a small computer systems interface. DSC Communications, 1000 Coit Road, Plano, Texas 75075.

Kinetic Access, a security and management tool said to restrict access to the machine DOS environment, individual DOS commands and execution of programs on a personal computer system, has been announced by **Kinetic Corp.** It costs from $175 per unit. Kinetic, Distillery Commons 240, Lexington Road at Payne St., Louisville, Ky. 40206.

A multiple-scan frequency, 14-in. super-high-resolution color monitor, called **Omniscan CM-1495**, was announced by **Tatung Company of America, Inc.** The monitor offers 800- by 560-pixel resolution with frequency ranging from 15 to 35 KHz horizontally and 50 to 70Hz vertically. Omniscan CM-1495 costs $875. Tatung, 2850 El Presidio St., Long Beach, Calif. 90810.

Quickshare, software said to allow an Apple Computer, Inc. Macintosh to connect to DOS-compatible personal computers on Fox Research, Inc.'s 10-Net local-area network, was announced by **Compatible Systems Corp.** Quickshare consists of software, a cable and a circuit card that occupies a half-size slot. Quickshare costs $465. Compatible Systems, P.O. Drawer 17220, Boulder, Colo. 80308.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   - 80. Manufacturer of Computers, Computer-Related Systems or Peripherals
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   - 31. Dir., Mgr., Suprv., of Programming
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   - 38. Data Comm. Network/Systems Mgr.

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338736-2

NETWORKING

DATA STREAM

Walter Ulrich

Sorting out E-mail issues

One goal of office systems is the universal interconnection of businesses. A key to achieving that goal is tying in-house electronic mail systems to public E-mail services for intercompany messaging.

Some companies have only an internal mail system, which is analogous to having a mail room but no U.S. Postal Service. Other companies use a public service for all messaging, which is analogous to using the Postal Service to deliver a memo to the person in the next office. This column updates the status of E-mail interconnection.

According to a recent survey conducted by Coopers & Lybrand, 74% of large companies use text E-mail, and 54% use voice mail. Another 14% will implement E-mail in the next year, and 20% will implement voice mail. E-mail is an essential element in office system strategies for big companies.

Possible boom market

By 1991, the public service sector could potentially deliver more than one billion intercompany messages originating on in-house systems. Western Union Telegraph Co. established its E-mail gateway program in 1984. Today, 12% of some 7.5 million

Continued on page 45

Bank designs hybrid network

Communications architecture shields users, joins sites worldwide

BY ELISABETH HORWITT

NEW YORK — Having decided that its computing needs are best served by a hybrid computer shop consisting of IBM and Digital Equipment Corp. systems, Bankers Trust Co. has spent the last few years creating a matching hybrid network to allow users to access transparently either type of system.

In 1984, when the bank had a 60-40 ratio of IBM to DEC installations, top management approved a project to implement a corporatewide communications architecture that would provide transparent user access to data, applications and resources and eliminate worry about physical location, type of system and type of protocol being used. By the end of last year, the system was substantially implemented.

Leon B. Smith

Two utilities form the basis of the Bankers Trust network. The communications utility was designed to allow any application in the bank to communicate with any other, in either batch or on-line mode, "so an application can query another system's data base and get an answer back," says Leon B. Smith, a vice-president at the bank.

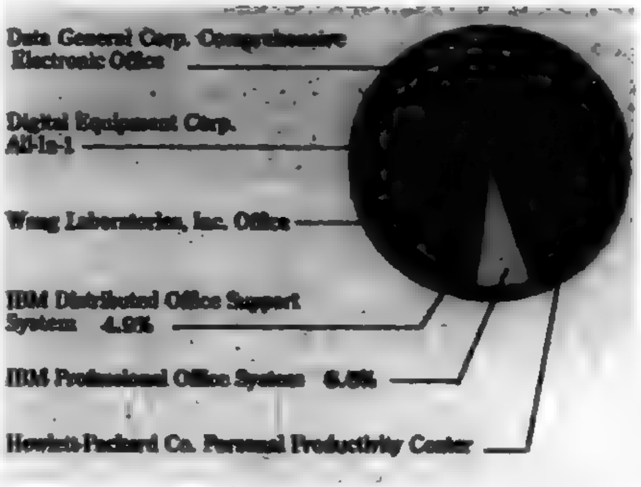
This utility also shields users and programmers from the technical complexities of DEC's and

Continued on page 44

Data View

Integrated office systems shares

All-In-1 leads in worldwide market shares of 1986 installed base



INFORMATION PROVIDED BY INTERNATIONAL DATA CORP.
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BIT BLAST

Accunet fees discounted

Bowing to pressure from competitors and users, **AT&T** has introduced a tariff that will allow users to obtain volume discount pricing on its Accunet T1.5 services. The tariff, which will go into effect Oct. 15 if granted Federal Communications Commission approval, provides reduced prices for various dollar volume commitments for one, three or five years, AT&T said.

Prior to the filing, AT&T was the only interstate vendor that did not offer volume pricing plans for this type of service.

AT&T also announced that it

Continued on page 45

Remote links tie users, host

BILLERICA, Mass. — Ideassociates, Inc. recently introduced two IBM 5250 remote products enabling multiple personal computers to access the resources of IBM System/34s, 36s and 38s.

The Ideacomm 5250/Remote Gateway was designed for remote offices that have IBM Token-Ring or Netbios-compatible local-area networks (LAN). The Ideacomm 5250/Remote Share is suited for offices with multiple stand-alone PCs. Both products reportedly eliminate the need to purchase cluster controllers and emulation boards for each PC and require only one telephone line and communications port for the server PC.

An Ideacomm 5250/Remote board and the Ideacomm 5250/Remote Gateway software are installed into each server PC, which connects to the System/34, 36 or 38 remotely via a synchronous modem. User PCs only need to load gateway software; they do not require any boards.

Remote Gateway reportedly supports nine sessions per gate-

Continued on page 44

Inside
- 3Com licenses token-ring technology patents. Page 44.
- Pilkington Communications unleashes Watchdog security system. Page 44.

MAINFRAME
printf("Hello, ^ world\n");

Meet the Industry's New Standard for Mainframe C Compilers

SAS Institute Inc. announces a mainframe version of the Lattice® C compiler—your key to truly portable applications.

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We designed the compiler listing and cross-reference to make programs easy to follow and errors easy to find. An extensive library offers functions from Kernighan and Ritchie and the Lattice PC C compiler. The run-time library produces explicit numbered error messages and a traceback of active function calls if an error occurs.

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A Lot Of Promises.

Take a close look at these two machines. At 10 MHz, operating at one wait state, you might believe IBM's® Personal System/2™ Model 50 is one of the fastest 80286 computers available. Fact is, an InfoWorld benchmark test ranks the AST Premium/286's™ CPU performance number one.

You might also think IBM's system is the first to take advantage of powerful multitasking operating system software. And you'd be wrong again. When we introduced the AST Premium/286 a year ago with advanced FASTslot™ architecture, we designed a home for Microsoft's® MS OS/2.™ In fact, it delivers all zero wait-state memory for MS OS/2.

Of course, MS OS/2 may not be available for a while. Which is okay, if you have an AST Premium/286. Built into every system is AST's Enhanced Expanded Memory (EEMS), allowing EEMS software such as Windows™ 2.0 and DESQview™ to multitask existing applications… today.

So, hold on to any of your existing off-the-shelf application software. As long as it's AT®-compatible, it will run on the AST Premium/286.

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Benchmark Test Results
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CPU measures main processor performance relative to the 6-MHz (Model 099) IBM PC AT. Hard disk performance is tested for sequential and random data access.

SYSTEM (80286-BASED PCS) (Clock speed in MHz/No. of wait states)	**CPU**	**Hard Disk** (sequential)	**Hard Disk** (random)
AST Premium/286 (10/0)	***2.25***	***1.41***	***2.12***
IBM PC AT (6/1)	1.00	1.00	1.00
IBM PC XT-™286 (6/0)	1.32	1.33	1.03
IBM PC AT (8/1)	1.37	1.17	1.40
IBM PS/2 Model 50 (10/1)	1.71	1.70*	1.19*
IBM PS/2 Model 60 (10/1)	1.72	2.02	1.67

*With RAM cache: seq. 1.92, ran. 1.03
Source: InfoWorld Hardware Benchmark System, as published in InfoWorld May 11, 1987

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RESEARCH INC.

3Com given free rein on token-rings

SANTA CLARA, Calif. — 3Com Corp. recently licensed the U.S. and foreign patents for token-ring technology held by Willemijn Holding BV, allowing 3Com to produce, market and distribute token-ring products without restriction.

A similar agreement between IBM and Willemijn restricts use of IBM Token-Ring products to IBM machines, but terms of the 3Com license permit dealers and users to employ 3Com token-ring products in IBM and non-IBM environments. The license agreement applies retroactively to 3Com's existing products based on the IEEE 802.5 token-ring standard. Under terms of the agreement, which remains in effect for the life of the patents, 3Com will pay Willemijn a royalty for all 3Com token-ring products sold.

Two years ago, Willemijn granted 3Com limited use of token-ring technology, giving the latter's product developers, distributors and customers the legal right to implement the 802.5 standard, said Olof Soderblum, inventor of the token-ring technology.

Remote links

CONTINUED FROM PAGE 41

way server and allows up to four gateway servers per LAN, for a maximum of 36 sessions. Users can access up to nine sessions.

Remote Share is said to allow four remote PCs to access System/34, 36 and 38 minicomputers via one emulation board installed in the server PC and software installed in the user PC. User PCs are connected to the server locally via RS-232 cable or remotely through an asynchronous modem. Nine sessions per user and per group are supported as well. Both products support IBM 5251 Model 12 and 5294 controllers, the vendor said.

The suggested retail price for the complete Ideacomm 5250/Remote Gateway package, including an Ideacomm 5250/Remote board and gateway software, is $1,775. Users of the 5250/Remote card can purchase the Remote Gateway software for $995.

The complete Ideacomm 5250/Remote Share package, including an Ideacomm 5250/Remote emulation card, Ideacomm 5250/Remote Share software, two serial ports on the Ideamini card (for the server PC) and cables, sells for $1,395. Users of the 5250/Remote card can purchase the 5250/Remote Share software for $495.

Both products are set to be available late this month.

Also, a remote dial-up package, including Ideacomm 5250/Remote Share software and two Ideacomm 2400 modems, sells for the suggested retail price of $1,495.

Hybrid net

CONTINUED FROM PAGE 41

IBM's communications protocols. "We're putting our own utility software between the network and the programmer so that if the network changes, we need not rewrite applications," Smith says. "Our sense is that communications protocols are changing rapidly, so we are buying protection."

For example, Bankers Trust has written LU6.2 utilities to provide DEC-to-IBM communications via DEC's Decnet/SNA Gateway, which supports LU6.2. "If a user requests a message [be] sent to money transfer, the system can look up whether it's IBM or DEC and which protocol to use," Smith explains.

The systems staff has found IBM's communications protocols harder to deal with overall than DEC's. "IBM's communications architecture is both powerful and complex, and it's still hard to shield programmers from that complexity," Smith notes. "Even to send a message between two CICS systems, you have to understand CICS, Intersystem Communications, LU6.2; VTAM and then call the telecom guy about hardware."

LU6.2, with its common application programming interface, has been a key element of the bank's communications strategy, according to Smith. However, the firm is still waiting for IBM to implement LU6.2 under IMS, which was announced by IBM as a statement of direction approximately two years ago.

Sharing applications worldwide

The second major component of Bankers Trust's hybrid network system is an access utility that "allows any terminal in the world to access any application on the Bankers Trust network around the world," Smith says. All terminals are viewed as asynchronous, with IBM 3270 conversion provided as needed in New York and New Jersey offices, where the IBM hosts are concentrated.

Supporting the above utilities are a preexisting CCITT X.25 network that links Bankers Trust sites worldwide and also IEEE 802.3 Ethernet local-area networks (LAN) to link user workstations within sites. Bankers Trust chose to standardize around both the asynchronous world and X.25 rather than IBM's synchronous, leased-line environment.

"We had to reach a broad market, including international sites, and X.25 is a European standard, while asynchronous lines are easier to get abroad," Smith says. "And it was easier to do protocol conversion between an asynchronous terminal and an IBM host than between a 3270 terminal and a DEC host."

The bank currently links IBM hosts to its X.25 network by making them look like asynchronous devices via the IBM 7171 synchronous-to-asynchronous protocol converter.

So far, Bankers Trust has avoided IBM's Network Packet Switched Interface (NPSI), which links IBM Systems Network Architecture hosts directly to an X.25 network. "We revisit NPSI periodically, and IBM keeps telling us it's improving, but it currently provides no full-screen 3270-mode support," Smith reports.

In 1986, Bankers Trust installed 10M bit/sec. Ethernet backbones at many of its sites. "It was available when we wanted it and supports asynchronous communications," Smith explains.

However, the bank also has 15 to 20 IBM Token-Ring networks, each with approximately 20 IBM Personal Computers. "The Token-Ring is good for work groups in small areas that need high-speed communications among themselves, and it can run over existing telephone wire," Smith says. "Ethernets work better for the whole building."

Token-Rings still make up a small percentage of the bank's networking installation. "Our frustration [with] the network is that the host link is announced but not available," notes Lydia Borgatta, a vice-president at the bank. "Right now, you can only have PCs talking to each other on the LAN."

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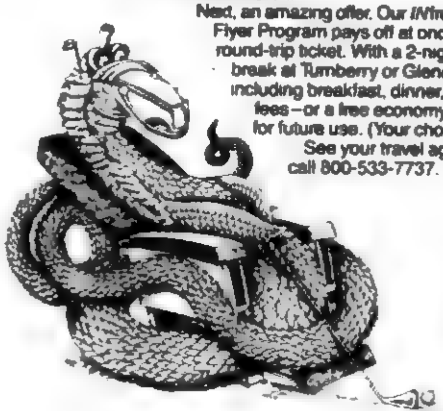

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E-mail issues

FROM PAGE 41

Easylink Instant Mail Manager messages each month originate on customers' internal message systems.

According to Joe Norton, assistant vice-president of Western Union, "In the last two years, the share of electronic mail traffic from private host-based systems has grown four times. We see a growing recognition of the need for interconnection by the corporate E-mail community, which will drive increasing message traffic."

MCI Communications Corp. also established its Mail Link gateway program in 1984. According to Doug Brackbill, the company's senior marketing manager, "MCI is devoting the majority of its sales efforts at selling our family of links to in-house host-based systems. The volumes are significant, and the majority of our new growth comes from this area."

Standards smooth ties

Standards now being implemented will simplify E-mail interconnection. New applications will drive the interchange of electronic messages. The CCITT X.400 message-handling standard will be generally available in the U.S. within 18 months for easy interconnection between in-house systems and the outside world.

Today, major computer and office system vendors are working to implement the X.400 standard for their products. During the past 12 months, some 20 vendors, including IBM in Europe, have demonstrated X.400 interconnection. The public E-mail services are completing their X.400 implementations, and many U.S. companies have pre-X.400 links to European messaging administrations.

Electronic data interchange (EDI) provides for the electronic exchange of information between vendors and suppliers. Entire industries, such as the transportation, grocery and automotive fields, are agreeing on methods to electronically exchange purchase orders, shipping documents, invoices and administrative messages. EDI speeds document exchange, reduces errors and saves data entry costs. EDI is expected to blossom into tens of billions of transactions in the early 1990s.

Together, EDI and E-mail provide strong economic incentives for businesses to interconnect. Companies cannot afford to build numerous point-to-point links between themselves; they must rely on a few intermediaries for external communications.

Services firms form links

While the EDI and E-mail standards — that is, ANSI X.12 and CCITT X.400, respectively — provide common protocols, communications services vendors are the intermediaries. For example, they can link a manufacturer's host-based systems with those of a supplier, provide the actual communications facilities or function as gateways to other systems and networks.

Electronic ties between in-house computer systems and public services are natural, just like the physical ties between the in-house mail room and the post office. When X.400 becomes fully implemented during the next two years, companies will have ready electronic access to and across the world.

These topics will be discussed further at the Messaging '87 conference Oct. 8-9 in San Francisco, sponsored by the Washington, D.C.-based Electronic Mail Association.

Ulrich is president of Walter Ulrich Consulting, a subsidiary of Coopers & Lybrand.

Accunet

FROM PAGE 41

will expand the number of Accunet Packet Service nodes to at least 300 by early 1988, with 100 more nodes to be added later if demand warrants.

Network Research Corp. has announced that its Fusion Network Software for Digital Equipment Corp.'s VAX/VMS system can communicate using Sun Microsystems, Inc.'s Network File Server protocols.

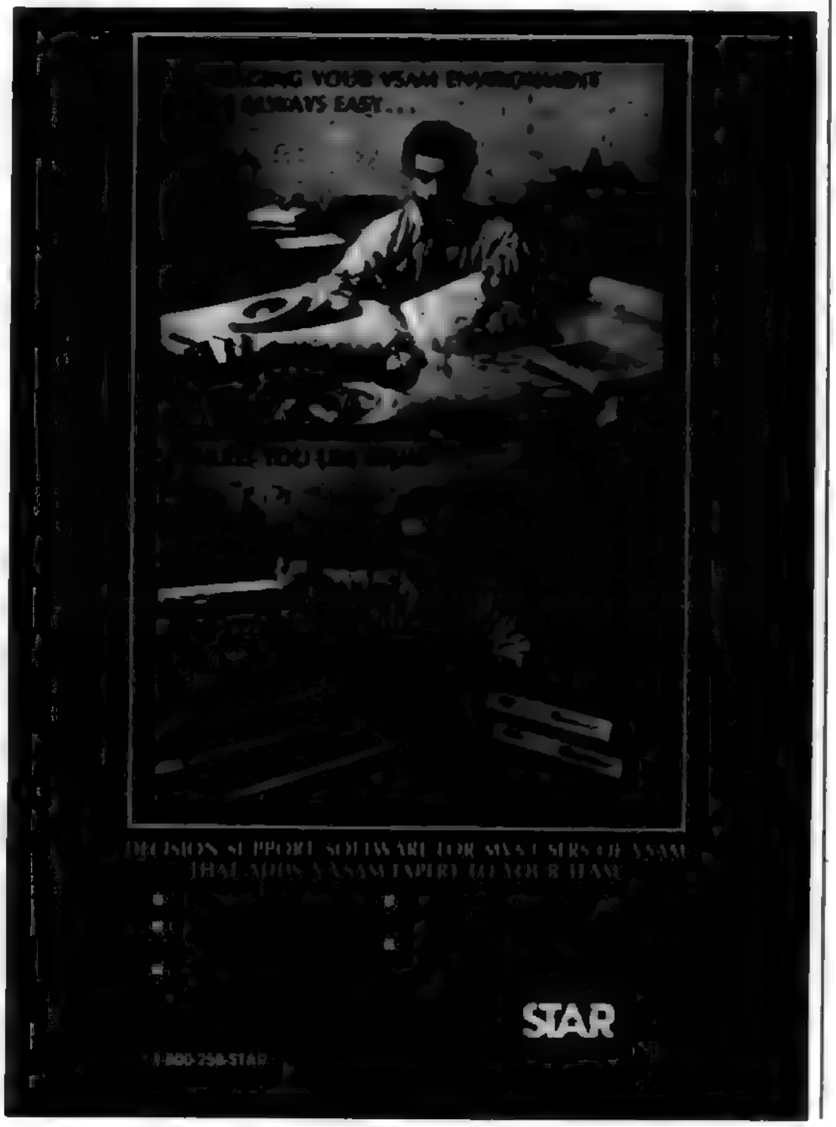
Also available is a source code license for Fusion supporting Digital Communications Associates, Inc. (DCA) products. DCA intends to use Fusion to implement Transmission Control Protocol/Internet Protocol connectivity on its own networking products, the company said.

GE Information Services, a division of General Electric Co., recently expanded its range of communications offerings by signing contracts with two software companies.

One agreement allows the Information Services division to resell EDI/36 and EDI/38 software from Concord, Calif.-based **Apparel Computer Systems.** The packages allow IBM System/36 and 38 users to exchange business documents with other systems using industry-standard electronic data interchange (EDI) formats. GE Information Sevices will market the software to customers of its EDI Express network service.

A separate agreement with **Communications Solutions, Inc.** allows GE Information Services to incorporate Communications Solutions' software based on IBM's Systems Network Architecture (SNA) and LU6.2 protocols into its Mark III network-based computer service. Customers reportedly will be able to execute applications, initiate conversations and transfer data between CICS applications on their own and Mark Net hosts. The service company also plans to use Communications Solutions' software to implement SNA connectivity on its Quick-Comm electronic mail system and on EDI Express.

Timeplex, Inc. and **Northern Telecom, Inc.** have successfully tested a linkup between Timeplex's Link/2 Data/Voice Exchange and Northern Telecom's Meridian SL1 digital private branch exchange. Users can make the connection via a 1.5M bit/sec. DS1 link, the companies said.



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NEW PRODUCTS

Local-area network software

Software that is said to drive the microprocessor-to-microprocessor communications required for transferring blocks of data and interrupting information on Multibus II systems has been introduced by **Microbar Systems, Inc.**

Message Passing Coprocessor Executive (MPCX) provides a switching facility that allows any console tied to a processor to become a console for any other processor. MPCX is integrated with AT&T's Unix System V, Release 2 operating system.

The MPCX package, which includes the MPCX Board Support Package, Source Code, five object licenses and documentation, costs $2,450.

Microbar Systems, 785 Lucerne Drive, Sunnyvale, Calif. 94086.

Links

A program-to-program communications software product for the IBM Personal System/2, Personal Computer and compatibles operating in a Systems Network Architecture/Synchronous Data Link Control network environment has been announced by **Network Software Associates, Inc.**

The product, called **AdaptSNA LUO**, offers an applications-independent implementation of IBM's Logical Unit Type O protocol for IBM PC-DOS applications. It includes two levels of Logical Unit Type O functions as well as a complete applications subsystem and interactive implementation tool kit.

The software system is priced from $50,000.

Network Software Associates, 22982 Mill Creek, Laguna Hills, Calif. 92653.

Protocol converters

Two converters, designed to facilitate the implementation of new Integrated Services Digital Network and T1 networks using selected RS-232-based equipment, have been announced by **Telebyte Technology, Inc.**

The **Series 67** RS-232-to-CCITT V.35 converter is available in two models, the 67-1 and 67-2, to accommodate both data communications and data terminal equipment devices, respectively.

The converters support differential signals such as transmit data, receive data, transmitter, receiver and external transmitter clock. Single-ended signals include request to send, clear to send, data set ready, data terminal ready and ring indicator.

The price of either model is $195.

Telebyte Technology, 270 E. Pulaski Road, Greenlawn, N.Y. 11740.

A four-port model of the direct channel attached protocol converter/controller **Hydra** has been introduced by **JDS Microprocessing.**

According to the vendor, the four-port Hydra helps users interface ASCII devices to mainframes. The four-port model supports any ASCII asynchronous RS-232 device and can be upgraded to support up to 64 such devices.

Hydra provides IBM 3270 emulation for personal computers and ASCII terminals.

Prices of the four-, eight-, 16-, 32- and 64-port units are $4,900, $7,900, $9,900, $13,900 and $16,900, respectively.

JDS Microprocessing, Suite 206, 22661 Lambert St., El Toro, Calif. 92630.

Electronic mail

An options package said to provide Programmatic File Transfer for **Acces/MVS**, software for Transmission Control Protocol/Internet Protocol communications in IBM mainframes, has been announced by **Advanced Computer Communications.**

The Acces/MVS software with the options package costs $17,000.

Advanced Computer Communications, 720 Santa Barbara St., Santa Barbara, Calif. 93101.

Security

An automatic security system for fiber-optic communications systems has been announced by **Pilkington Communications Systems, Inc.**

The **Model 901 Watchdog** was designed for continuous surveillance and detects tampering with the system or a broken cable. Attempts to tamper with the system activate an alarm.

Prices start at $8,500.

Pilkington Communications Systems, 65 Moreland Road, Simi Valley, Calif. 93065.

Modems/ Multiplexers

A full-duplex 9.6K bit/sec. modem called the **Fastcomm FDX 9600** has been introduced by **Fastcomm Data Corp.**

The dial-up modem uses a frequency-division multiplexed full-duplex modulation technique, the vendor said.

Data is automatically directed, based on flow demand, to the high-speed 9.6K bit/sec. channel.

The Fastcomm FDX 9600 modem carries a price of $1,195, according to the company.

Fastcomm Data, 12347-E Sunrise Valley Drive, Reston, Va. 22091.

A synchronous and asynchronous fast-poll modem has been announced by **Universal Data Systems.**

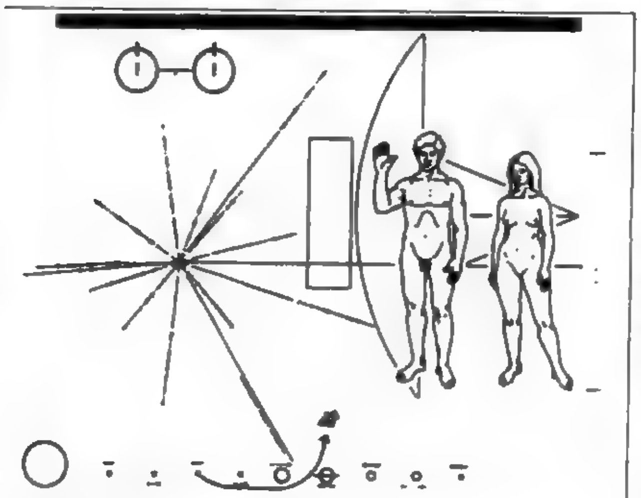
The **9600FP/AS** is CCITT Version 29-compatible in the 9.6K bit/sec. mode and AT&T 208A/B-compatible in the 4.8K bit/sec. mode.

The unit provides full-duplex synchronous or asynchronous operation at 9.6K, 7.2K or 4.8K bit/sec. over four-wire private lines.

Integral diagnostics permit the user to determine system performance and isolate faults within the communications link.

The 9600FP/AS costs $1,995.

Universal Data Systems, 5000 Bradford Drive, Huntsville, Ala. 35805.



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TSF is in use today at major companies making contact with in-house non-IBM computers, public databases, electronic mail gateways and networks.

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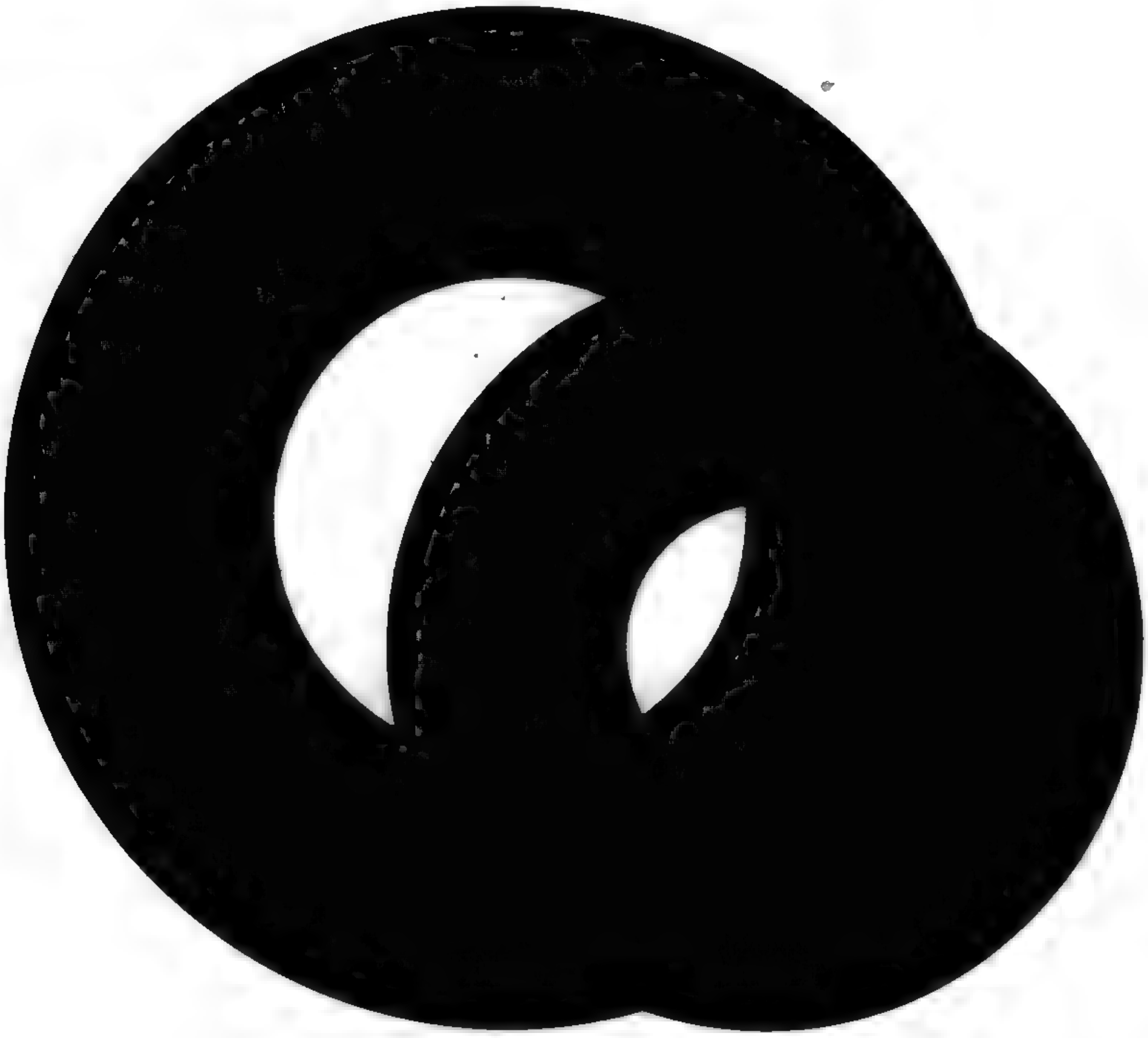

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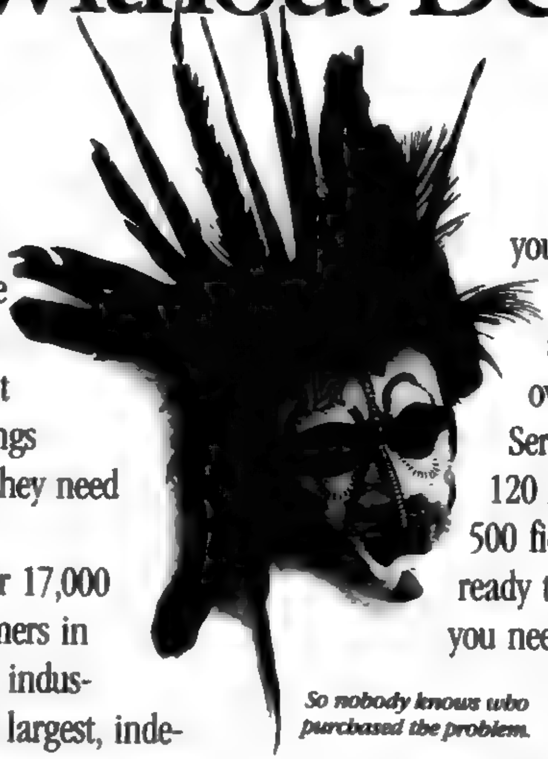

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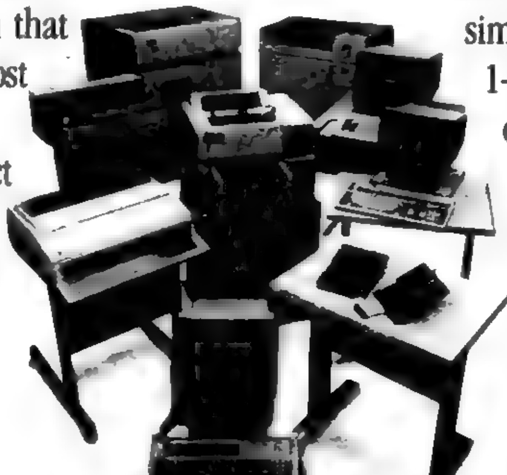

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SYSTEMS & PERIPHERALS

HARD TALK

James Connolly

Here we grow again

Those people who think the days of 30% annual growth are in the computer industry's past may be interested in knowing that such financial success is once again possible, at least in one area — supercomputing.

Predictions of an average 33.9% compound annual hardware revenue growth for the high-performance computer market recently came out of a study by International Data Corp. (IDC), a Framingham, Mass. market research firm. The high-performance market is immature in comparison with much of the industry and has more room to grow, but the 33.6% growth rate for the period from 1986 to 1991 sharply contrasts with a 6.5% rate for the rest of the market.

Supercomputing is hot. It will account for $4.164 billion worth of hardware in 1991. According to IDC analyst Marcia Brooks, the high-performance market accounted for only 1.7% of the industry's hardware revenue in 1986 but will hold 4.6% of the market by 1991.

Continued on page 51

Linked 4341s stave off upgrade

Dental group cuts enhancement costs with twin CPU and single image

BY JEAN S. BOZMAN
CW STAFF

CHICAGO — Less is more. That, in short, is the data processing management philosophy of the American Dental Association (ADA). And that is why the dental professional group decided to add a second IBM 4341 rather than upgrading to a new IBM 4381.

The ADA's approach called for both IBM 4341 Group 2 machines to be viewed as a single, virtual system so that end users would be unaware which machine was running their job.

Tying the systems together is IBM's Channel-to-Channel Adapter and a software product called the Single System Image (SSI) from VM/CMS Unlimited, Inc. in Boston.

The ADA received the first copy of SSI sold by VM/CMS Unlimited in 1985. The association is now one of 25 sites using SSI to tie together multiple VM machines.

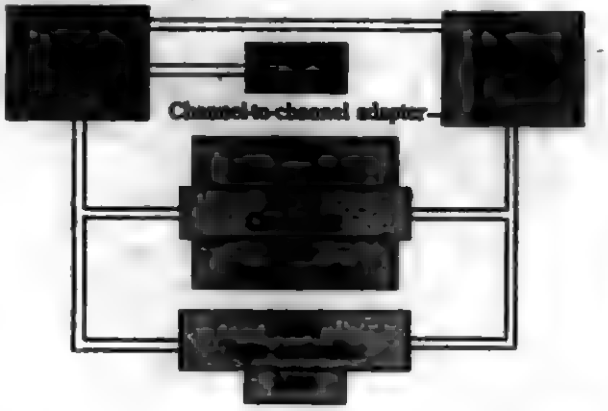
Balancing act

For the ADA, installing twin 4341s was a way to balance the need for greater capacity against rapidly rising costs. With fewer than 30 employees, the ADA is a relatively small IBM shop, but demand for capacity is growing 15% each year.

The ADA gives accreditation to dental programs thoughout

Continued on page 51

American Dental Association
Linked IBM 4341s share 3880 and 3803 controllers



CW CHART

Intel charges up hypercube family

BY JAMES CONNOLLY
CW STAFF

BEAVERTON, Ore. — Intel Corp.'s scientific computers division last week introduced its second generation of hypercube parallel processors with the announcement of the IPSC/2 family.

The IPSC/2 is based on Intel's 80386 microprocessor and was designed to operate up to 10 times as fast as earlier IPSC systems while being easier to program, according to the vendor.

The systems are intended for use as compute servers for large-scale scientific and engineering applications.

In addition to the performance gains tied to the use of 4-million-instruction-per-second 80386 chips in place of earlier 80286 processors, the IPSC/2 features an Intel Direct-Connect router built with CMOS gate array logic devices.

The Direct-Connect feature reduces message delays by a factor of three and increases message speeds by a factor of 10, according to Intel. Direct-Connect routing is based on research sponsored by Intel and the De-

Continued on page 51

Tape units targeted at IBM minis

WALTHAM, Mass. — Broadening its IBM plug-compatible peripherals line, IPL Systems, Inc. recently announced the IPL 6800 series of tape subsystems designed for IBM's System/38, 4300 and 9370 computers. The subsystems are compatible with IBM's 3422 and 3430 tape subsystems, according to the vendor.

IPL said the models offer better price/performance than the IBM products. The IBM 3430 operates at 312.5K bit/sec. and has a list price of $33,400 for a controller and one drive, while the IPL 6800 series operates at 625K bit/sec. and has a list price of $25,495 for a similar configuration.

An IBM 3422, which provides 20% greater performance than the 6800 series, lists for $40,480 for a controller and a single tape drive. The 6800 series comes with data streaming as a standard feature, but the IBM 3422 does not, IPL said.

Continued on page 50

Inside

- Imperial Technology offers a direct-access storage device subsystem for IBM and plug-compatible mainframes. Page 50.
- Apollo and Ridge Computers sign a joint marketing agreement. Page 51.

▶ IBM 3270 and System /34/36/38 Users: [illegible]

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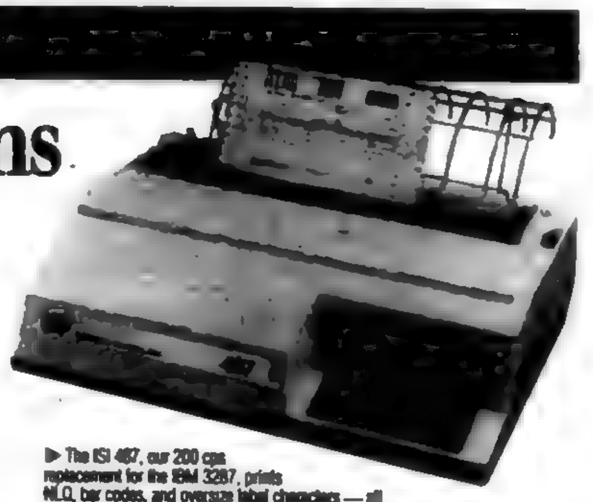

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5855 Interface Drive, Ann Arbor, MI 48103
Telex: 810-223-6058

Imperial enters mainframe arena

EL SEGUNDO, Calif. — Moving into the mainframe storage arena, Imperial Technology, Inc. recently announced the Megaram-3380 solid-state direct-access storage device (DASD) subsystem for IBM and plug-compatible mainframes.

A 256M-byte system is contained in a cabinet requiring less than 5 sq ft of floor space and is Imperial's first mainframe product. Imperial previously specialized in minicomputer storage. The system can begin at 32M bytes and grow to 2.048G bytes by adding modules, the vendor said.

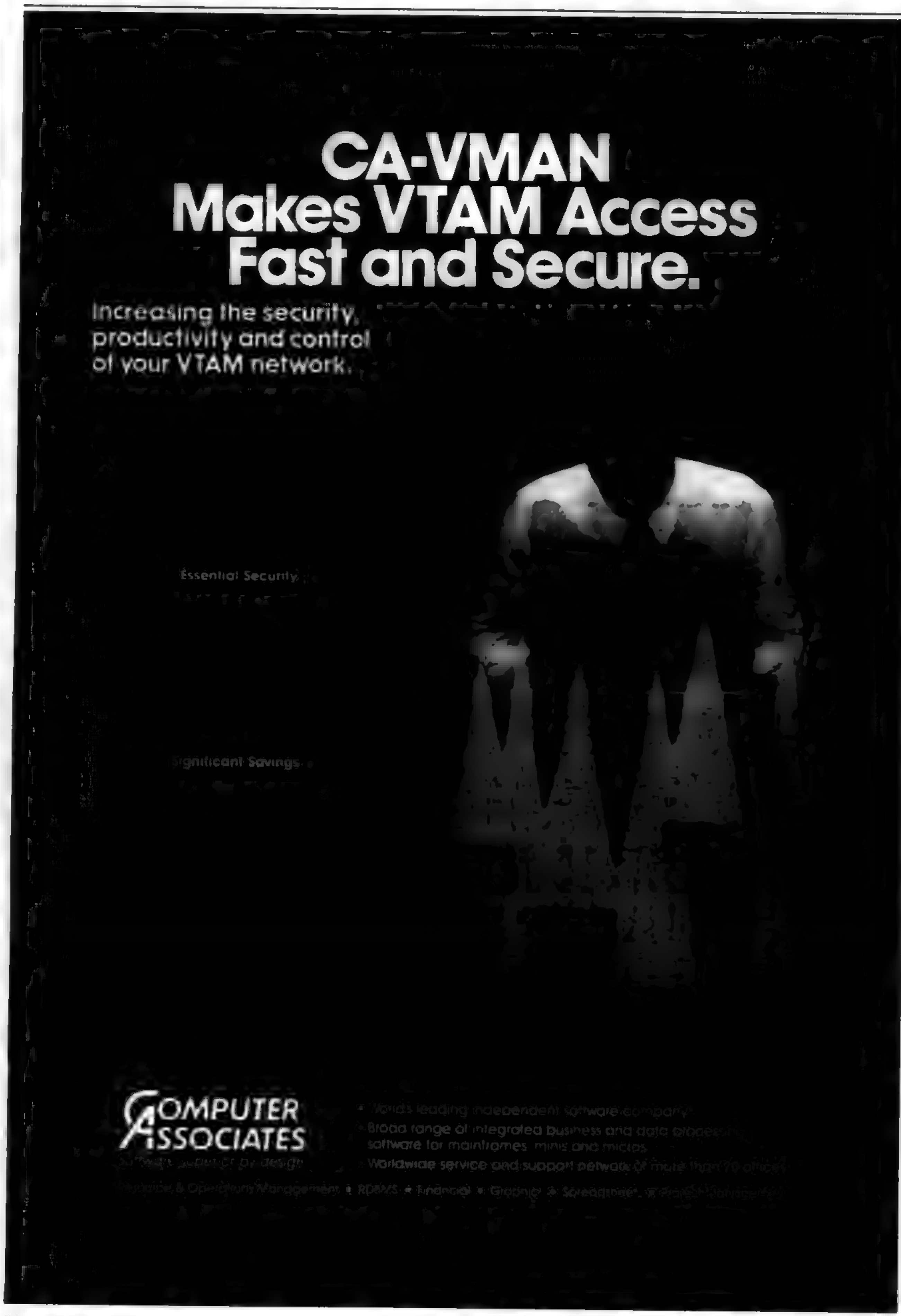
The solid-state storage appears to be the functional equivalent of an IBM 3880 or 3380 DASD subsystem, and no modifications are required of the operating system or storage system controlling software or applications, according to the vendor.

The Megaram-3380 can be plugged into any IBM 370, 3030 series, 4300 series, 3080 series or 3090 series as well as plug-compatible processors with block-multiplexer channels, the vendor said.

The Megaram-3380 achieves maximum use of the I/O channels by eliminating the mechanical delays caused by mechanical disk drive latency, according to the vendor.

A fully configured Megaram DASD subsystem consists of five subsystem cabinets containing 2G bytes of storage and 16 I/O channels per system.

Slated to be available in October, a minimum configuration of 32M bytes is priced at $69,000. Additional memory is added in 32M-byte increments and is priced under $1,000 per megabyte.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Point 4 fills mid-range

TUSTIN, Calif. — Point 4 Data Corp. recently filled in the mid-range of its superminicomputer product line with a 64-user sytem designed for medium-size businesses.

The Mark 6 is aimed at business applications such as transaction processing,- accounting, office management and data management. It runs Point 4's Iris operating system. It provides more than 64 direct-memory access user ports, up to 16M bytes of memory, up to 1.35G bytes of hard-disk storage and up to 500M bytes of cartridge tape backup. The company claimed that the CPU operates at 160 nsec and processes up to 6.25 million instructions per second.

Prices for the system start at $35,000.

The system fits in below the company's high-end processor, the Mark 12, which reportedly supports 128 users.

Tape units

FROM PAGE 49

A typical configuration includes an intelligent controller and two to four tape drives, although a controller can handle up to seven drives, according to Robert Berg, IPL's vice-president of marketing.

A 6800 series A01, consisting of a tape controller and a tape drive, is priced at $23,900, the company said.

A 6800 series add-on tape drive costs $13,900. A rack for mounting costs $1,595. Volume shipments for the new products will begin in the fourth quarter, according to IPL.

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Linked 4341s

FROM PAGE 49

the U.S., verifies the safety of dental appliances and tools and monitors the testing of dental students.

James Graham, director of DP at the ADA since 1982, says he wanted to double his capacity from 1.5 million instructions per second (MIPS) on the single IBM 4341 to 3 MIPS but that he was not prepared to spend $600,000 for a new IBM 4381 Model 3, which would provide 4 MIPS.

The ADA paid just $60,000 for its used 4341 Group 2 machine in late 1985 and received a discount on SSI's $50,000 price because of the dental association's not-for-profit status.

Buys hand-me-downs

"Some people like to stay in step with IBM's releases, but I like to stay one step behind IBM," Graham says. "It's cheaper that way. I may be running out-of-date equipment, but I'm not paying as much as if I had traded up."

Graham says he plans to purchase in 1990 a used 4381, which industry analysts project will then be priced at $125,000.

> "SOME people like to stay in step with IBM's releases, but I like to stay one step behind IBM. It's cheaper that way. I may be running out-of-date equipment, but I'm not paying as much as if I had traded up."
>
> JAMES GRAHAM
> AMERICAN DENTAL ASSOCIATION

The 4381 Model 14 would, at 6 MIPS, give the ADA enough capacity to last until 1995, Graham figures.

It would, however, replace his twin IBM 4341s.

During the last five years, the ADA's budget has dropped, down from $1.6 million in 1982 to $1.3 million this year.

Not ready to convert

The same cost-benefit analysis that brought a second 4341 inhouse is precluding a conversion from DOS to IBM's MVS, Graham says.

"If we went to MVS, our software costs would roughly double," he says, "and we don't need to go to MVS to run our applications."

The actual installation of SSI took several hours, including the adjustment for the ADA's unusual operating environment. The ADA runs both VM and DOS on its older "A" machine and IBM's VM/SP on its newer "B" machine.

The A machine runs batch jobs under DOS, while the B machine handles end-user data base queries from about 150 end users under VM/SP.

The two 4341s, each with 8M bytes of main memory, share four IBM 3380 Model D disk drives, which together provide 10G bytes of storage.

Files are switched between the two strings of two disk drives through one central IBM 3880 storage controller.

As the system's work load increases, SSI automatically routes new logons to the 4341 machine that is less busy.

'Complete transparency'

"What we are trying to achieve for end users is complete transparency," says Romney White, founder and president of VM/CMS Unlimited. and author of SSI. "From the end user's perspective, the multiple CPUs running under SSI should look like a single, large processor."

White, who installed the dental association's system personally, estimates that running SSI saps just 1% to 2% of each CPU's MIPS.

The SSI product allows both 4341s to be operated from a single console, although managers at some other SSI sites choose to maintain a console on each machine.

"We attempt to provide only partial transparency for operators," White says. "Operators can move virtual machines dynamically from one processor to another and can issue commands from any terminal in the SSI complex."

Before 1980, the ADA used had been using a Honeywell, Inc. mainframe for nearly 15 years. The group eventually scrapped the machine because it was so outdated.

In response to that early experience, the ADA has adopted a set of standards to ensure a smooth DP operation.

'Don't tinker'

"We keep it simple, and we don't go out on a limb," says George Wiegman, the ADA's technical support specialist. "We don't make any modifications to an operating system. We don't tinker with it like other people do, and we keep up to date on our releases."

All of the dental association's hardware is purchased from IBM, with the exception of terminals, personal computers, printers and a Wang Laboratories, Inc. word processing system.

ADA purchases systems software from IBM, but the group's applications software tends to come from third-party suppliers., including statistical analysis tools from SAS Institute, Inc. in Cary, N.C.

Intel charges

FROM PAGE 49

fense Advanced Research Projects Agency at the California Institute of Technology. The feature enables a programmer to ignore the hypercube interconnect, which calls for mapping a problem to the architecture, and to use all nodes of a concurrent machine as if they were connected to all others, according to Intel officials.

Standard IPSC/2 systems are available in configurations ranging from 16 to 128 processing nodes and feature up to 1G byte of memory. Vector arithmetic accelerators also are available for each node in configurations of up to 64 nodes. Intel claimed a peak performance rating of more than 400 million floating-point operations per second.

The company also said a 32-node IPSC/2 executes a two-dimensional fast fourier transform more than 10 times faster than a first-generation IPSC-VX.

The IPSC/2 also features Intel's Concurrent Workbench programming environment, which provides multiple programmers access to an IPSC/2 system from a network of engineering workstations.

The original IPSC was announced in February 1985 as the first commercial hypercube system and was shipped the following July. The company said customers can upgrade their original systems under a 90-day program and receive full credit for their original purchase.

The IPSC/2 is scheduled to ship to beta-test site customers at the end of next month with volume shipments in January. Prices start at $200,000 for a 16-node system and range up to $2 million.

In a related announcement, Intel and Nektonics, Inc. introduced the Nekton 2.0 fluid dynamics and heat-transfer software package for the IPSC-VX. The program is a numerical simulation tool designed to solve various complex 2- and 3-D fluid dynamics and heat-transfer problems. Prices range from $55,000 to $90,000, depending on system size.

Here we grow

FROM PAGE 49

Several factors will drive the growth, according to Brooks. For example, IBM will redouble its marketing efforts for its 3090 mainframes with vector facilities, and Digital Equipment Corp. will enter the minisupercomputer market in late 1988 or 1989.

"Digital is the traditional vendor to the technical marketplace, its original point of entry three decades ago. It was, among other things, Digital's need to grow beyond that market and put its priorities on the general-purpose commercial market that gave the high-performance start-ups their chance to fill the void. But with its commercial market growing very well and revenue and profits in solid shape, Digital is likely to soon return its attention to the faster growing technical market," Brooks says. The high-performance market is starting to attract giants to a field where much of the activity has been by start-up companies.

But other forces may drive the high-end market, including expansion of high-performance parallel processors from the research and defense fields into mainstream applications, according to IDC. Meanwhile, capabilities should continue to expand because competition is pushing processor technology.

Hurdles remain for users and vendors, but Brooks says people will overcome them. Roadblocks include system-to-system connectivity and the establishment of de facto standards.

Connolly is *Computerworld's* senior editor, systems & peripherals.

Firms ink sales pact

CHELMSFORD, Mass. — Apollo Computer, Inc. and Ridge Computers last week announced a joint marketing agreement under which Apollo workstations will be tied to Ridge's superminicomputers through Apollo's Network Computing System.

Under the pact, the vendors will distribute processing across networks of Apollo workstations and Ridge's reduced instruction set computer, the Ridge 3200 series of superminis.

The companies said they will work with third-party software vendors to tailor applications to utilize Ridge systems in a networked computing environment.

NEW PRODUCTS

Processors

An array processor designed for Sun Microsystems, Inc.'s workstations has been announced by **Sky Computers, Inc.**

The processor, **Sky Warrior/Sun**, is said to give Sun-3 users the ability to execute up to 15 million floating-point operations per second. The single-slot board features a library of software support.

The Sky Warrior/Sun costs $11,900.

Sky Computers, Foot of John St., Lowell, Mass. 01852.

Terminals

A video display terminal said to feature advanced ergonometric design has been introduced by **MAI Basic Four, Inc.**

The **DT-4313** terminal features black characters on a flat 14-in. white screen with a resolution of 864 by 350 pixels in the displayed area and 70 by 350 pixels in the character area. The keyboard has 80 downloadable function keys and 91 full-touch keys.

The terminal costs $795.

MAI Basic Four, 14101 Myford Road, Tustin, Calif. 92680.

Printers/Plotters

A 15 page/min. laser printer and display station designed to attach to IBM System/34, 36 and 38 via twinaxial cable has been announced by **General Business Technology, Inc.**

The laser station, called the **GBT 6625LM**, is said to be compatible with IBM Displaywrite/36 software. It offers 300 by 300 dot/in. resolution, six internal type styles and a forms-overlay feature. Standard features include two 250-sheet input paper trays and a 500-sheet paper-output tray. The display station features a 14-in. green or amber monitor and a 122-key keyboard with 24 command keys. Additional type styles, graphic characters and bar codes are available.

The GBT 6625LM laser station is priced at $7,995.

General Business Technology, 1891 McGraw Ave., Irvine, Calif. 92714.

Input devices

A bar code decoder/wedge reader featuring either RS-232 or RS-422 output has been announced by **Extech Instruments Corp.**

The **Extech Series 115** is said to autodiscriminate among Code 39, Code 128, Interleaved 2 of 5, Straight 2 of 5, Codabar, UPC-A, UPC-E, EAN and EAN 8. It scans high-, medium- and low-resolution bar codes. It comes with an external power supply and pen and two serial parts that permit network capability of up to 64 readers.

The Extech Series 115 costs $499.

Extech Instruments, 150 Bear Hill Road, Waltham, Mass. 01254.

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	Memory Management	Yes	No	Yes	No
3	DISK STORAGE:				
	Capacity	20 MB	20 MB	40 MB	20 MB
	Effective access time	85 ms	85 ms	35 ms	85 ms
4	COMPATIBILITY:				
	5¼" floppy	Yes	No	Yes	No
	Runs OS/2	Yes	No	Yes	Yes
5	PRICE:	$1,999	$2,295	$2,995	$3,595

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Conference Program Brochure

We may have to limit attendance. *Register early!*

CASExpo—

The National Computer Aided Software Engineering Conference & Expo

October 19 - 22, 1987 *Washington, DC*

More than 70 speakers, including:

Charles Bachman, Chairman, Bachman Information Systems
Eric Bush, Chairman, Language Technology, Inc.
Richard Harrison, Director, Programmers Workbench, GSA
T. Capers Jones, Chairman, Software Productivity Research, Inc.
Bill Joy, Vice President, Sun Microsystems
James Martin, Chairman, James Martin Associates
Morris Taradalsky, V.P. of Programming, IBM General Products Division
Fran Tarkenton, Chairman, KnowledgeWare, Inc.

Welcome from the Program Co-Chairs!

The best tools are useless unless there is an effective structure by which they can be used.

What CASExpo provides, and what we're committed to, is professional education about technical tools using CASE methodology as a framework. We consider education a comprehensive process which includes lectures, panel discussions, and a chance for every attendee to share experiences with colleagues from all over the country. Also, we strongly believe an important and vital educational opportunity is a major exhibit function—where an attendee can meet representatives from the computer hardware and software companies.

CASExpo serves as a crucible where the best products and techniques will be showcased. You can meet, question, and learn from the leading experts, and you can see, evaluate, and acquire just the right products which support these techniques in your environment.

We have taken great care to be sure the program has practical, immediate value and will help to make your work easier and more effective. This professional program assures that you will know the best way to use the technical tools. We look forward to seeing you at CASExpo!

CASExpo Program Co-Chairs

Rhoda W. Canter, Partner, Arthur Young and Co.

Joel S. Goldhammer, Partner, Arthur Young and Co.

Just a few of the companies providing speakers or exhibiting at CASExpo:

Applied Data Research
The Aerospace Corporation
AGS Management Systems
Alon Corporation
Alsys, Inc.
American Management Systems
Apollo Computer
Arthur Young & Co.
CADRE
CGI
Clyde Digital Systems
Computer Task Group
Context Corporation
Cortex Corporation
Digital Equipment Corp. (DEC)
Hartford Insurance Group
IBM
Index Technology
Information Engineering Systems
Interactive Development
  Environments (IDE)
International Information Systems
James Martin Associates
Jodfrey Associates
Language Technology, Inc.
Logicon
Manager Software Products
Mellon Bank
NASTEC
Mobil
Promod
Rational
Reasoning Systems, Inc.
Software Productivity Research, Inc.
Sun Microsystems
Tektronix, Inc.
Teledyne Brown
Texas Instruments
Westinghouse

Join the TECHNICAL TOOLS revolution — attend *CASExpo* this Fall

The *CASExpo* Pr

DAY TWO
Tuesday October 20, 1987

8:30 am - 9:30 am **REGISTRATION and INTRODUCTORY REMARKS**

9:30 am - 11:00 am
KEYNOTE ADDRESS: *"The Technology Future—What it Holds for the Next Forty Years"*
—**James Martin,** Leading Systems Productivity Expert

11:00 am - noon **REPORTERS' NEWSBREAK**
Representatives of the trade press conduct a free-wheeling question and answer session with Mr. Martin.

Session Moderator: **John L. Kirkley,** Former Editor, *DATAMATION*

Session Participants:
Charles Babcock, Software Editor, *Computerworld;* **Edith Holmes,** Editor, *Federal Computer Week;* **Darryl Taft,** Software Editor, *Government Computer News;* **Esther Dyson,** Editor, *Release 1.0;* **John Desmond,** Managing Editor, *Software News*

EXHIBITS OPEN noon to 7:00 pm

1:00 - 2:30 pm
GENERAL SESSION
"CASE Methodologies—Tools and Techniques"
-Panel Discussion-

Panel Chair and Leadoff Speaker:
Al Hershey, Director, Arthur Young and Co.
Address: "Setting the Stage for CASE"

Panel Members:
Ian Palmer, President, James Martin Associates
Clive Finkelstein, Chairman, Information Engineering Systems Corp.
Byron D. Miller, Manager of Methodology, KnowledgeWare, Inc.
Gary G. Greenfield, Vice President, Sage Software, Inc.

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Wednesday

8:45 - 9:00 am
INTRODU

9:00 am - 10:30 a
SPECIAL INVITE
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—**Fran Tarkent**

10:45 am - noon
SPECIAL WORK
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—**T. Capers Jo**
Research, Inc.

EXHIBITS O

1:00 - 2:30 pm
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Clive Finkelste
Engineering Corp.

"CASE—Methods
the Real World"
Byron D. Miller,
KnowledgeWare, I

These tracks represent areas of importance to any professional interest
methodological framework to increase system building flexibility, and
process. Each track runs over three days, so you can attend two complet

ofessional Program

AY THREE
y October 21, 1987

UCTORY REMARKS

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D ADDRESS: ***"Human Issues***
Technology to the

on, Chairman, KnowledgeWare, Inc.

SHOP ON IMPROVING
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OPEN noon to 4:00 pm

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DAY FOUR
Thursday October 22, 1987

8:45 - 9:30 am
SPECIAL INVITED ADDRESS: ***"How Technology Can Help Companies Be More Effective in the International Arena"***
—Dan Twomey, Managing Director, International Center for Information Technologies

TECHNOLOGY UPDATE SESSION—
9:30 - 10:15 am
"Update on UNIX: What New Features Are Expected"
—Bill Joy, Vice President, Sun Microsystems

10:30 am - noon
PANEL DISCUSSION: ***"Software Re-engineering: The Critical CASE Link"***
Session leader: **Richard Harrison,** Director, Federal Software Management Support Center, GSA
Panel participants:
Eric Bush, Chairman and Chief Technical Officer, Language Technology, Inc.; **Charles Bachman,** Chairman and CEO, Bachman Information Systems, Inc.

EXHIBITS OPEN noon to 4:00 pm

1:00 - 2:30 pm
GENERAL SESSION
"CASE Methodologies—Tools and Techniques"
-Two Addresses-

"CASE Integration Techniques"
Ian Palmer, President, James Martin Associates

"Tools: Building Blocks for a Methodological Framework"
Al Hershey, Director, Arthur Young and Co.

ed in CASE technology. Great strides are being made in using "tools" and a
these tracks, each covering three days, provide significant insight into the CASE
e tracks in the three-day program.

2:30 pm - 4:00 pm *Three Concurrent Tracks*

Track One:
"CASE AND THE EXISTING SYSTEMS ENVIRONMENT"

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SPECIAL ADDRESS:

"Opportunities for Productivity Improvement with Application of CASE Tools in Maintenance vs. Development"
George P. DiNardo, Executive Vice President, Mellon Bank

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"Cost Justification/Retu Methodology for Acquis Tools"

***Session Moderator:* Willi**
Language Technology, In

Session Participants:
William Cutler, Secre
Insurance Group

Track Two:
"CASE AND DATA BASE MANAGEMENT SYSTEMS (DBMS)"

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"Interfacing Your Current DBMS Environment with CASE Methodology"
Harry Reinstein, President, Aion Corporation

"Data Base Design Using CASE Technology"
Jim Emerson, Amhurst Information Systems

"Modern Techniques for Modeling—The Prerequi Database Design"
Scott Benson, Senior
Associates

"Case Study of Army F Architecture Modeling to and Data"
Paul Loth, ADR Service

Track Three:
"CASE AND PROGRAMMING LANGUAGES"

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"Effective Ada Use in a CASE Environment Through Object Oriented Design"
Dr. Benjamin Brosgal, Vice President and Technical Director, Alsys

"Using Code Generators in CASE"
Kevin J. Burns, President, Sage Software, Inc.

"Bridging the Gap: A Meth the Interface Between th Programming Process"
Dr. Allen Clyde, Clyde,

"Criteria for Selecting a P
John Anton, President,

4:00 pm - 5:30 pm *Three Concurrent Tracks*

Track Four:
"CASE AND MANAGEMENT"

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"Getting Productivity from Productivity Tools: The Management Challenge"
Dr. Fred Forman, Vice President, American

"Air Force Software Man and the Westinghouse R
Ron Clanton, Manage

e and re-engineering in the existing environment are often overlooked when CASE methodology
. The goal of this track is to refocus your perspective on the millions of lines of code that already
st organizations.

TUDIES:
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USER ROUNDTABLE:

"What Tools Have Vendors Failed to Deliver to Date?"

Session Leader: **J. David Ehlke,** Executive Vice President, Computer Task Group

Session Participants:

Alan F. Bignall, Vice President Corporate Systems, IDS Financial Services

ery important attribute of the CASE methodology approach is adding structure to the data. Good
S utilization means successful systems development and outstanding CASE utilization across
ases of the lifecycle.

Entity-Relationship
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Consultant, James Martin

FORSCOM Information
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s

"Object Oriented Design with the Empress Relational Database System"
Norman Snyder, Director of Software Services, Jodfrey Associates, Inc.

"New Directions in Data Base Technology"
John Korniatowski, President, Rhodnius Corporation

a programming language is an integral part of CASE methodology, yet it is often overlooked or
anted. This track emphasizes that attention must be paid to the right time to use a language, and
nguage to use.

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, Inc.

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Reasoning Systems

"Productivity Impact Achieved in Developing Command and Control Systems in Ada"
Bob Bond, Vice President Marketing, Rational

"Fourth Generation Languages (4GL)—Impact on CASE"
Shirley Ann Stern, MIS Application Strategy Group, DEC

ore important in a successful CASE implementation than good management. This track focuses
the key concerns with CASE implementation from a management perspective.

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of Software and Information

"From CASE to CAP"
Dr. Peter Hruschka, Vice President Product
Development, Promod

"Getting Productivity from Productivity Tools: The Management Challenge"
Dr. Fred Forman, Vice President, American Management Systems

"Getting More Out of Tools Than You Put In"
Elliot Chikofsky, Manager, Technology Programs, Index Technology, Inc.

Track Five:
"CASE AND OPERATING SYSTEMS"

"Automatic Programming at Kestrell Institute"
Janet Coursey, Research Scientist, Kestrell Institute

"The Role of the Operating System in the CASE Environment"
Paul Anderson, Director of Education, International Information Systems, Inc.

Track Six:
"CASE AND CAD/CAE"

"What Is the State of the Art in CAD/CAE?"
Carl Machover, Machover Associates

"The Efficient Technical Workstation: What Features to Look For"
Lou Mazzuchelli, Chairman of the Board, Cadre Technologies, Inc.

5:45 - 7:00 pm

★★ CASExpo Reception ★★

Leading industry professionals and CASExpo attendees meet in a "social mixer" on the exhibit floor as the CASExpo exhibitors host the CASExpo Reception.

DAY TWO
Tuesday October 20, 1987

"Air Force Software Ma
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Ron Clanton, Manage
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"Integrating CASE Into
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Alexander Polack, M
Aerospace Corp.

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to CASE"
Dr. Anthony I. Wasse
Development Environment

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Dr. Richard LeFaivre
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5:45 - 7:00 pm

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Attendees at CASExpo who us
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Guest Speaker: **Morris T**
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DAY T
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"From CASE to CAP"
Dr. Peter Hruschka, Vice President Product Development, Promod

"Implementation Strategy for CASE"
Cliff Murphy, Senior Technical Consultant for Corporate Technology Planning, MOBIL Corp.

, MVS, MS-DOS, CPM, PICK. The operating system is the central mechanism that makes
er engine run. Capabilities vary widely, but specific features of certain operating systems are vital
ul CASE implementation.

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Ass't Administrator for Satellite
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A)
em Environment"

"Tools to Make Your Life Easier"
Bruce Ketchledge, Applied Data Research, Inc.

"CASE Operating System Platforms — VM, MS-DOS, OS-2 or UNIX?"
David G. West, President
Visual Software, Inc.

on technology is changing rapidly and tremendous advantages can be obtained in the CASE
y using advanced workstation features. But, there are pitfalls as well as advantages.

hnology Is Going in the
and How it Relates

rman, President, Interactive
s (IDE)

AE Systems Design"
, Director of Software
ronix, Inc.

"Westinghouse Experience Using Design Technology from Microelectronics Computer Technology Corporation"
James J. Strunge, Supervisory Engineer, Westinghouse Corp.

"Development of Network Computing Applications"
Herrick Johnson, Senior Product Manager of Network Computing Systems, Apollo Computer

ther Session

se similar kinds of hardware
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draft beer will be provided.

Directions in Software
opment"
Taradalsky, Vice President
eral Products Division

5:30 pm CONFERENCE PROGRAM ADJOURNS

CASExpo—
The Technical Tools Showcase for the Computer Community
(703) 845-1657

HREE
ober 21, 1987

DAY FOUR
Thursday October 22, 1987

There are some subjects which require more time to cover than is available in the standard conference format. These one day seminars provide expanded in-depth training on topics of vital interest to all users in the technical systems world.

THREE CONCURRENT ONE-DAY SEMINARS

Monday October 19, 1987 *CASExpo Day One* *9:00 am - 5:00 pm*

Seminar One:
SOFTWARE MAINTENANCE: PRESERVING THE VALUE OF YOUR EXISTING SYSTEM'S ASSETS

- Differences between development and maintenance,
- Systems management activities model,
- Impact analysis—checklist,
- Establishing scheduled releases—IBM task force study.
- Building a software quality improvement plan

Seminar Leader:
Richard K. Ball, Director,
Software Management Institute

Seminar Two:
SYSTEMS SECURITY

- Overview of computer security,
- Building security in . . .
- Risk analysis,
- Issues and answers in contemporary systems security

Seminar leader:
Charles Russell, Logicon, Inc.

CASExpo—
(703) 845-1657

Seminar Three:
SYSTEM METHODOLOGIES—INFORMATION ENGINEERING, THE NEXT GENERATION

- A review of existing methodologies—what they have in common—how they differ,
- History of methodologies—why we use these techniques,
- Review of how leading methodologies work,
- The systems lifecycle—where do methodologies fit in?

Seminar leader:
Steven R. Perkins, Principal,
Arthur Young and Co.

This program will immediately benefit you and your organization.

You will learn:

- What CASE is: competing methodologies, how they work, and the advantages and pitfalls of each.
- How your organization can greatly benefit from these techniques. How to re-engineer what you already have. Often the use of even simple tools greatly increases a professional's effectiveness.
- Where this whole field is going. Experts discuss trends, colleagues share experiences, and many new announcements will be made.
- How to select just the right technical tool for your needs. See them demonstrated at the exhibits, meet representatives from all the leading companies, then listen to the experts.

Who should attend:

CASExpo is for anyone who wants to learn about CASE methodologies from the leading experts and experienced end-users, and receive the very latest update on the use of technical tools.

CASExpo would be of particular value to:

Managers—MIS/DP
Data Base Administrators
Applications Developers
Systems Planners
Software Engineers
Executives and Senior Managers
Systems Designers
Systems Analysts
Project Leaders
Senior Engineers

EXECUTIVE REPORT

MINI VENDORS

Can the minicomputer makers get back in the race?

CHRIS DEMAREST

In the computer business, times change quickly. The headlines four years ago in the trade press were dramatically different from how they are now when it comes to the traditional minicomputer vendor market.

Back in 1983, Wang Laboratories, Inc. was showing 40% annual growth rates and introducing products at a fast clip. Data General Corp. was bragging loudly about its innovative Comprehensive Electronic Office package and its latest MV series machine. Hewlett-Packard Co. was steadily shipping HP 3000s and making an early bid for the office market, while Prime Computer, Inc. moved quietly but determinedly forward.

In fact, the big story among the mini makers was how Digital Equipment Corp. had stumbled badly, with overdue VAXs and inaccurate internal accounting problems leading to a bleak period at DEC's home office in Maynard, Mass. Analysts questioned DEC's chances as a long-term vendor and showered praise on an apparently equal set of competitors. Customers started asking for business solutions rather than bells and whistles, and the players scrambled to find the catchiest phrases and the quickest ways to connect to IBM.

Four years later, DEC has surged into a two-horse race with IBM. The other four traditional mini vendors are now playing catch-up with varying degrees of success. The interim four years served to strip the veneer of success and allow brewing problems at each company to come to the fore. Growth alone was no longer the issue; holding on to an installed base took on new meaning.

What has also become clear is that the label "minicomputer vendor" is inappropriate in these days of networking, connectivity and applications software solutions. The markets, both traditional and new niche markets, are still open for any vendor with solid products and talented sales and marketing staffs.

The following profiles of HP, Wang, DG and Prime look at the current state of these companies as they race for revenue.

INSIDE

HP readies for a run at the top
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Wang finally turns the corner
Page [illegible]

Steady Prime stays on track
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Hewlett-Packard: Now that probation is over, can it join the top tier?

BY GLENN RIFKIN

After a two-year run of "Promises, Promises," a new production is finally scheduled to debut at the Hewlett-Packard Theater in Palo Alto, Calif. HP hopes to title the show "How to Succeed in Business" and that patrons will quickly forget the previous protracted engagement, which had clearly worn out its welcome.

After more than a year's delay, Hewlett-Packard Co. is finally shipping its commercial Spectrum HP 3000 Series 930 machine based on reduced instruction set computing (RISC) architecture. Although initial shipments last month consisted only of limited quantities of the Series 930, this movement in the logjam spells welcome relief to longtime HP customers as well as to beleaguered company executives who have waited too long for HP's new high-end machine.

"There's no question that HP has been on probation with MIS managers because of the delay with Spectrum," says Douglas Chance, executive vice-president of the business systems sector at HP. "And that has reflected on everything we do."

"We enjoy a loyal customer base, but in many cases, we've tried their patience for sure," adds HP's Chief Executive Officer John Young.

While HP engineers were solving the morass of software problems associated with the lengthy Spectrum delay, the company watched anxiously as Digital Equipment Corp. soared ahead of the pack in the very environment that HP covets — distributed computing. IBM, meanwhile, mounted an aggressive counterattack on DEC, and little attention was paid to the folks in Palo Alto.

That snub won't last long. While HP worked to get the Spectrum problems solved, the company also continued to do a lot of things right, and that work is paying off. "I believe HP could pull a DEC in 1988," says George Colony, president of Forrester Research, Inc. in Cambridge, Mass. "The Spectrum delay didn't hurt them as much as we thought it would, and they engaged in good damage control."

What HP did was simply to put all the pieces in place, the way DEC did two years ago, to ready a charge for when the commercial Spectrum finally shipped. This meant creating and expanding a highly praised networking and communications strategy, signing up an increasing number of value-added resellers (VAR) for its 3000 line to help reach small and medium-size businesses with specific vertical needs, polishing its personal computer integration strategy and maintaining its lofty position as the No. 1 vendor in service and support (according to the annual Datapro Research Corp. survey) for the seventh year in a row.

Whether HP can rev up the momentum to move to the top-tier preferred-vendor list with IBM and DEC remains to be seen. But industry analysts agree that HP's large and loyal customer base is secure and will flourish with the company's new architecture and strategies.

"I've never questioned HP during the delay," says Bill Gulledge, vice-president of information services at Harte-Hanks Communications, Inc. in San Antonio. "They work harder at customer service, they are more proactive, and they follow up better than anyone."

"They are good people, and they have good equipment," adds Pat Marshall, director of MIS at National Medical Care, Inc. in Lexington, Mass. "I can sleep at night with my decision to go with HP."

HP has made its strongest commitment ever to the VAR marketplace. "In the past, we vacillated on whether we shoud turn to VARs or do it ourselves. Now we realise that VARs are critical to our success," says Dick Alberding, executive vice-president of marketing and sales at HP. But the search for new customers, particularly in the Fortune 1,000 commercial world, may be more elusive.

"I don't see them as the DEC of '88," says Dale Kutnick, vice-president of the Gartner Group, Inc. in Stamford, Conn. "They'll get some new accounts, but frankly, they've been out of it too long. DEC took advantage of a hole in IBM's product line, and now that hole is at least puttied up. DEC made hay while HP didn't. Will HP grow? Yes, but in their existing base."

A question of image

HP says it expects skepticism at large non-HP accounts. "There is very genuinely a wait-and-see attitude or, 'Don't bother me until you can demonstrate what you can do,'" Young says. "That's what I would expect. But when you can buy a machine like our new Spectrum, which has literally a two-times performance advantage over the latest DEC machines, that is something you simply cannot ignore."

Convincing MIS not to ignore it will test HP's mettle, regardless of the new machine's price/performance. HP slashed prices on the Series 930 from $225,000 to $180,000 even before it shipped, bringing the price to 20% to 50% less than comparable DEC and IBM machines, according to International Data Corp. (IDC). Young is aware, however, that MIS managers can be a skeptical lot and that it took a superior effort for DEC to push its way onto the list with IBM.

HP will not try to emulate IBM or DEC in large accounts, according to Young. The company will continue to "build on [its own] strengths," he says, and target specific vertical markets that IBM and DEC have ignored. One major target market for HP is sales force automation, a potentially lucrative area, according to HP executives. Another challenge is to find niches within markets such as area cell controllers in the factory floor arena. "When two big giants fight, they leave a lot of turf unattended," Alberding claims.

In order to squeeze back onto the preferred-vendor list of corporate MIS, HP must change the perception of its being an engineering-driven company that fails to understand general business needs. In many quarters, that perception is already diminished, and HP is gearing up to expunge the reputation completely. The company is planning to expand on its successful "What if . . . ?" ad campaign and bolster its sales and marketing with a major push this fall.

"We are making the transition from being product-oriented to market-driven," Alberding states. "Our marketing skills have been fine for the test and measurement arenas, but over the last decade we've needed to pay more attention to being market-driven on the computer side."

HP says it will leave the host environment to IBM and sell to the regional or branch operations or departmental work groups of the Fortune 1,000. Though more than 40% of the installed 25,000 HP 3000s are in manufacturing, HP is not necessarily a manufacturing-oriented vendor.

HP's John Young

According to Patricia Seybold's Office Computing Report, the HP 3000s in these companies are often used outside of manufacturing operations to perform general business computing. "Nevertheless, HP is not perceived as an integrated office system provider across all industry sectors," the report concludes. Analysts, in fact, have questioned HP's commitment to the office, raising ire at corporate headquarters.

While Alberding admits that "we didn't meet our promises in the office," he and others are quick to point out that things have changed dramatically. "We've made tremendous progress in the office," Chance counters. "We weren't even in that market four years ago, and now our HP Deskmanager product has almost caught up with DEC's All-In-1."

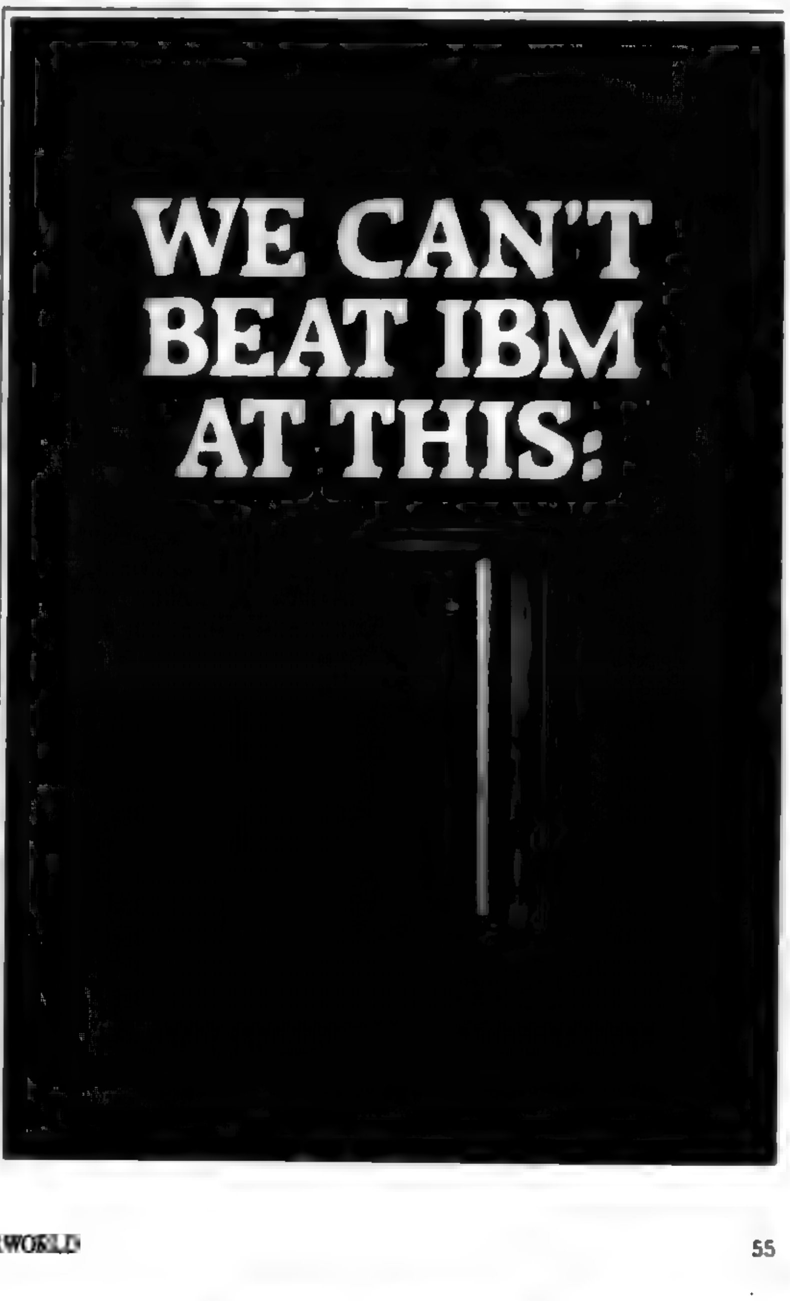
As the commercial Spectrum begins to ship, HP's office strategy is beginning to turn some heads. Under the umbrella term of Personal Productivity Center (PPC), HP has fashioned what IDC calls "a broad and realistic view of the marketplace."

According to the Seybold report, HP's PPC plan encompasses seven elements:

- **Scalable systems.** Organizations of any size can either migrate from a low-end HP 3000 to the new high-end Spectrum systems or grow through networking systems. The Series 930 and 950 expand on HP's MPE operating system and allow transparent migration

Continued on page 57

Rifkin is a senior editor at *Computerworld*.



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[illegible] $599 [illegible] made, serviced, and [illegible] pany that ships more [illegible] but IBM.

Wyse. When it comes to [illegible] in terminals, we wrote the book. F[illegible] information [illegible]

HP probation

CONTINUED FROM PAGE 55

from the lower level 3000s.

- **PC integration.** The PC, as the workstation of choice, is supported as a standalone device or integrated with HP 3000-based office software.
- **Information access and control.** PPC provides transparent access to data sources on the local PC, on a departmental system or on a corporate mainframe. The user is protected from having to understand the intricacies of data structures or data format conversion.
- **Transparent network services.** HP's PPC plan is built on peer-to-peer communications across the HP 3000 family of processors.
- **Industry standards.** More than perhaps any other major vendor, HP is committed to international industry standards, specifically the International Standards Organization's Open Systems Interconnect model, to provide communication with other vendors' networks.
- **IBM coexistence.** HP is committed to protecting and complementing its customers' investments in IBM Personal Computers and IBM mainframe office systems through support of strategic IBM connections.
- **Customer consulting, service and support.** HP is committed to maximizing its customers' success through a wide range of support services.

PC-based announcements

In the past 12 months, HP has made numerous office software announcements, including Advancemail for the PC, an electronic-mail companion to its host-based E-mail package, along with new file and library services and a scheduler. Chance insists that HP's strategy for the office is superior because it is based on PC integration and industry standards. HP Deskmanager (known internally as "the All-In-1 killer"), for example, goes beyond the DEC product in that it is PC- rather than terminal-based. "We off-load half the processing to the PC, while All-In-1 is a serious power drain on the VAX," Chance contends. "And if the PC is important as an office workstation, which we believe it is, we simply integrate it better into a distributed computing environment."

Just last month, HP announced two Vectra portable PCs. Later this year, the firm is scheduled to unveil a line of Vectras designed to match all performance levels of the IBM Personal System/2 series. The machines will be fully IBM PC compatible and incorporate HP's commitment to Microsoft Corp.'s Windows.

Chance points out that HP provides extensions to Windows, including an upcoming object-management facility extension that provides seamless integration of applications, regardless of which third-party supplier they come from. "We are quite pleased that IBM has come around to support Windows as the front end of their Systems Applications Architecture [SAA] strategy, because we made that decision 2½ years ago," Chance says.

According to Chance, HP will pour forth its New Wave software this fall based on the Spectrum series as well as firm up its commitment to Windows, which will further enhance its standing as an office supplier.

Although HP has come a long way from its Touchscreen personal computer fiasco (despite its claims that Touchscreen continues to sell well in certain markets), the PC strategy has yet to generate much excitement. "Their PC strategy is no big deal," Gartner Group's Kutnick says. "They've done a nice job integrating PC clones into their minicomputer environment, but they offer no competitive advantage with the personal computer."

In fact, one longtime HP customer was forced to switch to another vendor for PCs because of continuing problems with HP products. "HP's PC crowd is a different bunch than the 3000 group," he says. "They are simply not as customer-oriented. I had 25 hard-disk failures in one month, and they told me to hang in there. I couldn't wait."

RISC-y business

Meanwhile, HP has effectively bet the house on its transition to the RISC architecture, and the long delay has been both frustrating and educational. The wait for Spectrum (an internal project name that cannot be formally used because of copyright problems) provided some ironies, as well as angst, for HP.

The company, for example, offered the HP 3000 Model 70 to customers in 1986 as an interim high-end machine, and that $30,000 single-board upgrade became a highly profitable, high-performance engine. While the industry grumbled about the Spectrum delay, HP 3000 sales actually increased by 20%, and HP's loyal customer base remained content.

"The Model 70 performs as well as a processor with two to three times the MIPS," claims John Doyle, HP's executive vice-president of the systems technology sector, referring to a million instructions per second (MIPS) rating.

"What would concern me is how little the customers were grumbling because of how far they were from being maxed-out with their current 3000s," says IDC analyst Rich Mikita. "That certainly doesn't bode well for future revenues." IDC, in fact, estimates that the market for the 930 and 950 models makes up only about 2,400 of the 25,000 installed HP 3000s.

Nonetheless, there is little that can dampen the enthusiasm at HP now that Spectrum, in both its technical and commercial versions, is out the door.

"The advantages of RISC are several," Doyle points out. There is the size and longevity of the investment. RISC does not give up any functionality but provides "a lower level of investment at any particular performance point of a complex architecture," Doyle says. The products are simpler — the 930 and 950 models, for example, house their entire processors on one very large-scale integration, or VLSI, card that uses one chip, as compared with a VAX 8000 processor, which requires eight emitter-coupled logic-based cards — making maintenance costs lower and reliability higher, according to Doyle.

In addition, scalability is virtually unlimited, a potent argument when rumblings are heard that both IBM's and DEC's architectures are old and close to topping out. Indeed, DEC has acknowledged that it is at work on RISC technology. "Both DEC and IBM face a struggle with their architectures," Alberding says. "What is IBM's SAA? Nobody really knows yet. And the VAX will run out of gas. That gives us a window."

Doyle trumpets the benefit of a high-performance architecture to which third parties can write. "Third parties won't have to rewrite applications to three or four different HP architectures as in the past," he says. He claims that what delayed Spectrum was that HP "underestimated the complexity of writing the new MPE/XL operating system to perform up to the level of this highly tuned, decade-old transaction processing system. We didn't realize how good old MPE is."

Until the Models 930 and 950, due to ship in December, go out in volume, the jury will be out on the real value of the Spectrum advances. However, HP must know the system works because the technical versions did ship on time. In fact, according to IDC's Mikita, the Unix-based 800 models, designed to consolidate HP's 1000 and 9000 series, are getting good reviews. The Unix version was so successful that HP added a commercial Unix 800 model that puts HP into the Unix supermini market for the first time. Gartner Group's Kutnick adds, "Five or six years down the road, HP could be a major Unix champion."

Some consultants wonder whether HP is risking too much with RISC. HP's Young dismisses such a notion. "If you can't take better products and make them work, you certainly can't have a strategy that used poorer products and catapulted that into a giant success," he states.

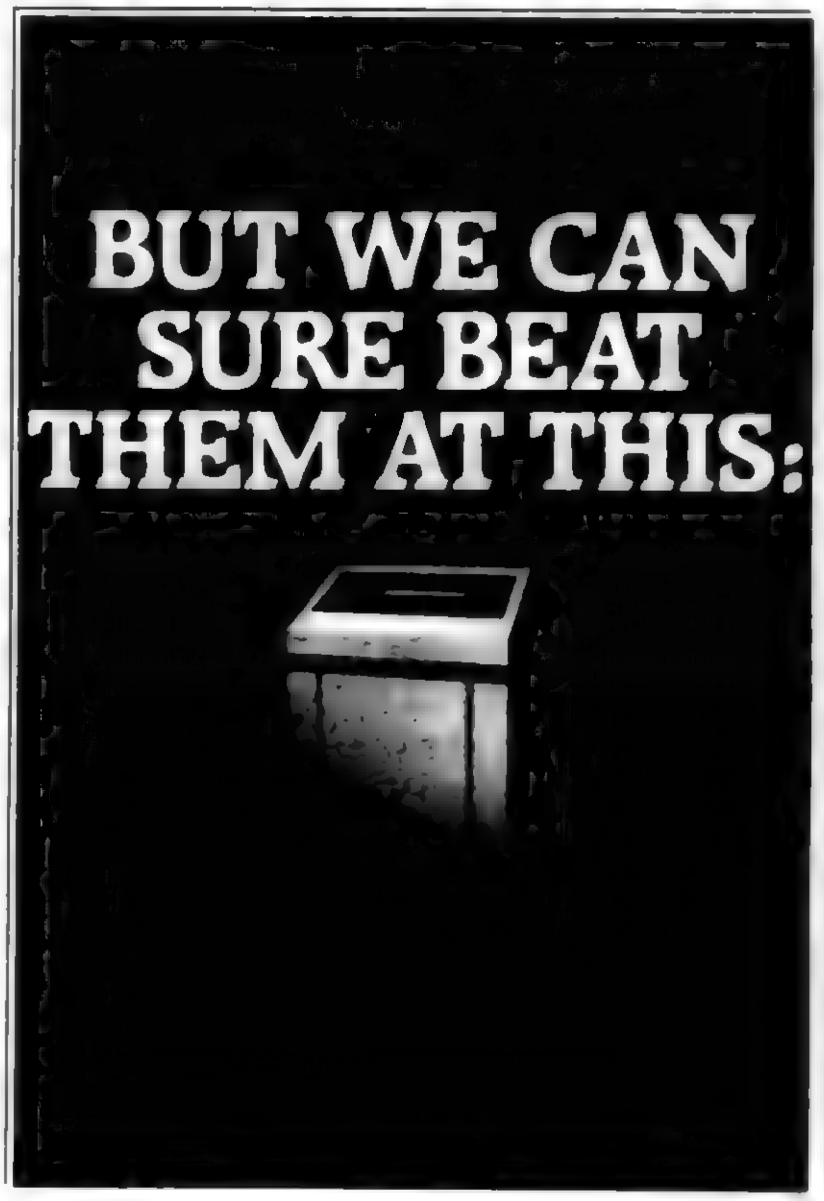
"Plus, we've already succeeded with it," Young continues. "We introduced four machines into the technical arena, a place we never competed in before. We have probably the most exciting business opportunity for HP in that arena, and we would never have gotten that without this kind of investment. Whether we can capitalize on this in the commercial market is yet to be demonstrated. But without having done it, we wouldn't even be in the position to go out and make the attempt." •

At A Glance

HEWLETT PACKARD

Headquarters: Palo Alto, Calif.
Chief executive officer: John Young
1986 revenues for fiscal year ending Oct. 31, 1986: $7.1 billion (approximately 80% in the computer business). **Earnings:** $516 million.
Employees: 82,000
Outlook: Long-awaited commercial Spectrum reduced instruction set computing machine is finally shipping; company continues to have unblemished reputation in service and support; extremely loyal customer base provides solid foundation from which to grow; highly regarded networking scheme and good products set the stage for a strong 1988.

CW CHART



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Data General: The slump continues in Westboro

BY MICHAEL SULLIVAN-TRAINOR

Once a small company skyrocketing to the top, Data General Corp. is now a midsize company struggling to avoid a disabling crash.

While its revenue grew from $806 million in 1982 to $1.2 billion last year, DG's net income fell from a high of nearly $80 million in 1984 to a loss of $29 million in 1986. The Westboro, Mass.-based company reported the worst news of a 2½-year downward spiral last July, announcing a $65 million third-quarter loss and layoffs for 950 workers, as well as the closing of three major facilities. Rumors abound that DG is a takeover candidate. An apparent merger with Prime Computer, Inc. reportedly fell through, and the latest word is that Siemens AG, the giant West German firm, is interested in acquiring the company.

Company officials are optimistic, however. In fact, on the heels of the most recent cutbacks, Edson de Castro, DG's president and founder, predicted the company will show a profit in the next quarter. While analysts agree with this assessment, they say that DG still must prove it can sustain long-term profitability by virtue of product sales, not cost reductions.

"They downsized to earn money," says Thomas Rooney, vice-president of Donaldson, Lufkin & Jenrette, Inc. in New York. 'But the question they face now is, can new products, new salespeople and a profitable image come together and allow this company to grow? This is one of their final rally attempts. If they don't rally in a year, the installed base starts to go away."

Currently, large commercial users are voicing support for DG, despite the turmoil. "We don't have any fears that Data General is going out of business," says Vin Gangi, manager of technical systems at Armstrong Rubber Co. in New Haven, Conn. "They are in some rough times with the marketplace, but they have excellent products. I can't understand why they're in that position."

The keys to DG's recovery and future success, according to company officials, are to implement the following:

- Add significant value-added reseller (VAR) customers who can complement DG's hardware with applications and provide increased market share.
- Increase sales to vertical markets by creating a new division combining sales and marketing personnel.
- Hire more staff members for sales and systems engineering.
- Continue research and development investments to produce new communications and systems products.

DG began working on these objectives this year by adding 57 VAR customers to its roster and increasing its sales force by 18% and R&D expenditures by 10%. For the long term, the most crucial of these efforts will be the company's ability to shift its marketing emphasis from large commercial accounts to the VAR side.

"The moves they are making are positive from the investor's standpoint, but they've dragged their feet on it," Rooney says. "The mid-range vendors have to face the reality that they have to become niche players and stop trying to compete head-on against DEC and IBM. DG is the last one to do that."

Data General's new strategy proves to be less of an exclusive focus on niche markets and more a realistic view of its target customers. Until this year, the company was competing alongside Digital Equipment Corp. and IBM for the high-risk, one-shot Fortune 50 commercial contracts, and losing. Now DG is aiming its sales force — through direct and VAR and OEM channels — at smaller organizations and the divisions of large companies.

"We are focusing on where we stand the best chance of winning," says Ward MacKenzie, DG's new vice-president for the VAR market. "We're not defocusing on large companies; we're just less focused on the $30 million, one-time, high-investment and high-risk buy."

MacKenzie is the current best hope for Data General. After 18 years at DEC — where he ran the VAR business — he was chief executive officer of Lisp Machines, Inc. for one year. His job is to nurture DG's current VAR and OEM relationships and build new ones with significant companies that can help the company increase its market share.

Nonetheless, the company is not abandoning user commercial sales. Such sales are now part of a complementary focus, MacKenzie says, along with the VAR business. Currently, 50% of DG's systems business is on the VAR side.

To help win new VARs and maintain those currently on board, DG this year established conversion centers in Los Angeles and Westboro. It also simplified its discount schedule, MacKenzie says.

Communication between the VARs and DG's commercial sales division is also being improved, MacKenzie claims. Regional VAR councils have been established to allow VAR customers to air their views. "We have addressed the bad feelings of the past and made clear that this channel is a critical one to DG strategically," he remarks.

DG will likely gain ground against DEC, its traditional rival, with VARs and small customers because DEC's success is leading it more to direct sales and large accounts, Rooney says.

Unlike the late 1970s, however, when DG was on top of the VAR market, there are now many new competitors, particularly in the workstation area.

"Changing the strategy doesn't mean it will be successful," a former employee says. "They gave up on this strategy four years ago. Now it may not be appropriate. When I was there, DG always bid in the technical marketplace, slugging it out with DEC. Now we don't see DG."

Proliferation continues

In the midst of the cost reductions and market maneuvers, Data General continues to generate new products. In 1986, the company revamped its mainline processor family, the 32-bit Eclipse MV.

Subsequently, DG also introduced the MV/15000, expected to be delivered in the second half of this year, aimed at price/performance gains attained by DEC and the announcement of IBM's 9370. According to DG, the MV/15000 is 50% faster and 37% less expensive than a comparably scaled DEC system. The system is also 12% faster and 29% less expensive than the IBM 9370 series, the company says.

Improvements were also made in 1986 to DG's communications products, particularly in the areas of connectivity with IBM and industry-standard architectures. Data General is the only vendor, apart from IBM, to implement Systems Network Architecture Distributing Services, and the company followed DEC in supporting the CCITT X.400 communications standard for Open Systems Interconnect networking.

DG addressed IBM Personal Computer-to-MV networking weaknesses by announcing the DG/PCI personal computer integration series of products last June. The hardware and software series allows the MV family to connect with IBM PCs using industry-standard networks, such as Starlan and Ethernet, and is eventually expected to support IBM's Token-Ring network as well.

On the software side, DG's Comprehensive Electronic Office (CEO), the market's oldest integrated office automation package, is as important to the company as the Eclipse. Competing with DEC's All-In-1 offering, the product was enhanced last year with an interface to IBM's Distributed Office Support System and access to the Teletext public network. DG's office automation product is aging,

Continued on page 62

At A Glance

Data General

Headquarters: Westboro, Mass.
President: Edson D. de Castro
1986 revenue for fiscal year ending Sept. 30, 1986: $1.2 billion. **Earnings:** $29 million loss.
Employees: 15,000
Outlook: After reducing overhead by laying off 950 employees, closing three facilities and rededicating itself to the value-added reseller (VAR) market, DG must perform well for several quarters to salvage its image; price/performance strengths of its latest processors bode well for early 1988, but the competition is fierce in both the commercial and VAR arenas; because of the cutbacks, DG will show a profit in '88, but beyond that period, there are many hurdles the company must overcome.

CW CHART

Sullivan-Trainor is a senior writer at *Computerworld.*

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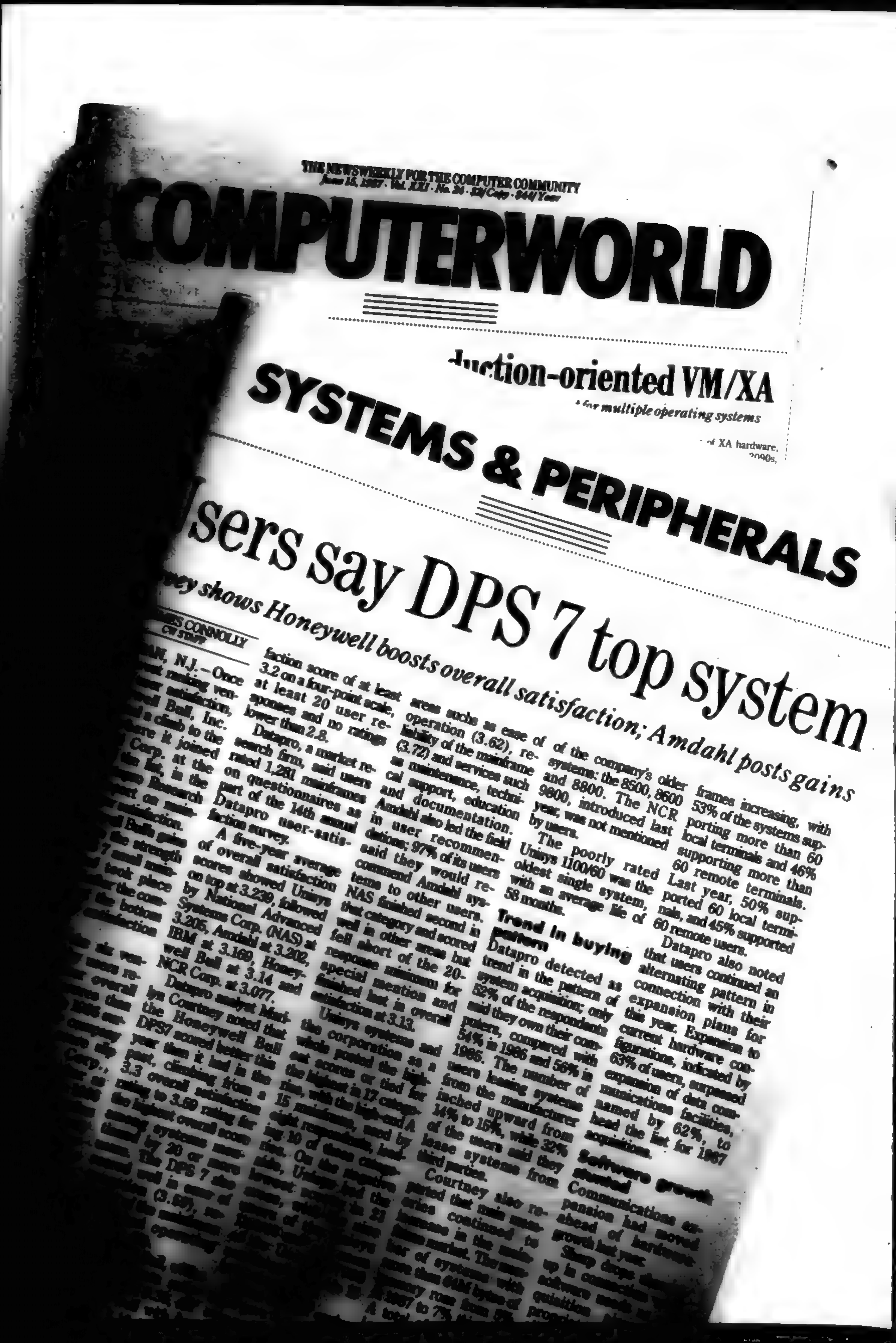

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COMPUTERWORLD

…uction-oriented VM/XA

…for multiple operating systems

…of XA hardware,
…2090s,

SYSTEMS & PERIPHERALS

…sers say DPS 7 top system

…vey shows Honeywell boosts overall satisfaction; Amdahl posts gains

…ES CONNOLLY
CW STAFF

…AN, N.J. — Once … ranking ven… …user satisfaction, …well Bull, Inc. … a climb to the … where it joined … Corp. at the … the list, in the … Research … on main… satisfaction. … Bull's gains … the strength … 7 and main… took place … the com… the bottom … satisfaction … faction score of at least 3.2 on a four-point scale, at least 20 user responses and no ratings lower than 2.8.

Datapro, a market research firm, said users rated 1,281 mainframes on questionnaires as part of the 14th annual Datapro user-satisfaction survey.

A five-year average of overall satisfaction scores showed Unisys on top at 3.239, followed by National Advanced Systems Corp. (NAS) at 3.205, Amdahl at 3.202, IBM at 3.169, Honeywell Bull at 3.14 and NCR Corp. at 3.077.

Datapro analyst Madelyn Courtney noted that the Honeywell Bull DPS7 scored better this year than it had in the past, climbing from a 3.3 overall satisfaction rating to 3.69 rating for the highest overall score among systems mentioned by 20 or more users. The DPS 7 also scored well in ease of [illegible] … areas such as ease of operation (3.62), reliability of the mainframe (3.72) and services such as maintenance, technical support, education and documentation.

Amdahl also led the field in user recommendations; 97% of its users said they would recommend Amdahl systems to other users. NAS finished second in that category and scored well in other areas but fell short of the 20-response minimum for special mention and finished last in overall satisfaction at 3.13.

Unisys systems and the corporation as a whole posted the highest scores or tied for the highest in 17 categories, with the high-end A 15 mainframe, used by eight respondents, leading 10 of those categories. On the negative side, Unisys had the lowest [illegible] in 23 [illegible] … of the company's older systems: the 8500, 8600 and 8800. The NCR 9800, introduced last year, was not mentioned by users.

The poorly rated Unisys 1100/60 was the oldest single system, with an average life of 58 months.

Trend in buying pattern

Datapro detected a trend in the pattern of system acquisition; only 52% of the respondents said they own their computers, compared with 54% in 1986 and 56% in 1985. The number of users leasing systems from the manufacturer inched upward from 14% to 15%, while 32% of the users said they lease systems from third parties.

Courtney also reported that main memories continued to increase in the mainframe market. The number of systems with more than 64M bytes of memory rose from 5% [illegible] 1987 to 7% [illegible] A total [illegible] … frames increasing, with 53% of the systems supporting more than 60 local terminals and 46% supporting more than 60 remote terminals. Last year, 50% supported 60 local terminals, and 45% supported 60 remote users.

Datapro also noted that users continued an alternating pattern in connection with their expansion plans for this year. Expansion to current hardware configurations, indicated by 63% of users, surpassed expansion of data communications facilities, named by 62%, to head the list for 1987 acquisitions.

Software growth stunted

Communications expansion had moved ahead of hardware growth last year.

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Honeywell Bull

Customers are more important than computers.

DG slump

CONTINUED FROM PAGE 59

and the company must face the challenge of refining the product in the face of All-In-1's success in order to continue to support the tool's 165,000 users.

In the workstation arena, where DG faces tough competition for VAR customers from Sun Microsystems, Inc. and Apollo Computer, Inc., as well as from DEC and IBM, the company introduced the DS/7500 engineering workstation last year and Technical Electronic Office, the equivalent of CEO for technical office automation, in addition to applications for design automation and computer-aided engineering.

DG also offers an IBM PC AT compatible — the Dasher 286 — and a laptop, the Data General One.

Making up for lost time

With a well-conceived product line in place, what lies behind Data General's inability to take part in the general industry recovery?

"Our first 32-bit machine was scheduled to come out in 1978," says one of the designers of DG's first 32-bit processor. "It was late. That's why DEC is where they are now. When we sold our machine into the market, DEC had a two-year lead." Nevertheless, in 1983, Data General was able to take advantage of DEC's difficulties in introducing new VAX models. In April of that year, the firm announced the MV/10000, reclaiming a price/performance advantage over DEC for the first time since the early 1970s.

At the same time, DG experienced a great success with its CEO software, largely because none of its competitors had a fully developed product on the market.

Data General moved to capitalize on its gains, particularly with this office automation product, by refocusing its market direction away from VARs and toward large commercial users.

As the company grew, managers were required to direct the thrust into large commercial accounts. Former IBM employees David Chapman and Robert Miller were brought in to manage the transition and use their experience to sell to large accounts. Another result of the changeover in management was that many of those who helped the company's drive to success in the technical and VAR markets left for greener pastures.

"It was a very entrepreneurial company," the 32-bit processor designer says. "Decisions were made fast, mistakes were fixed quickly, and we grew rapidly. The move to the commercial market and office automation didn't work. Decisions that had been made in an hour took three months to become final."

Refinding itself

Data General barely had time to absorb these changes before hard times were upon it. In November 1985, DEC introduced the first of a new family of VAX systems. By January 1986, the industry slowdown began. On top of that, DG was having trouble selling into the large commercial market because of its own deficiencies.

"The IBM-style marketing and sales focus never came across," says Ralph Jordan, former director of DG's software development. "Also, DG is hardware-oriented. Not having the software hurt them with the end users."

DG's Edson de Castro

In the last two years, the company has settled an antitrust suit and retired two debts. In that same period, DEC's success cut into DG's market share. Today, Data General's cash position is a solid $150 million, and its debt is only $32 million. However, profits have suffered in the meantime.

The failure of the large-account strategy was followed by the exodus of many DG managers, including Chapman, who went to Cullinet Software, Inc., and Miller, who headed for MIPS Computer Systems, Inc.

In their stead, de Castro has put MacKenzie in charge of implementing the push toward the future. Ronald Skates, the new chief financial officer, was brought in to manage the bottom line. The cutbacks alone will ensure that the new managers have a profit to work with. "Even without optimistic revenue assumptions, the earnings momentum is most likely positive," says Susie Peterson of First Boston Corp. in New York.

To develop momentum, DG must overcome a negative public perception caused by layoffs and management turnover. "The only way this can be overcome is through the passage of time," Jordan says. "There is no way you can just talk about it and say it's going to be better. The only thing you can do is show people." •

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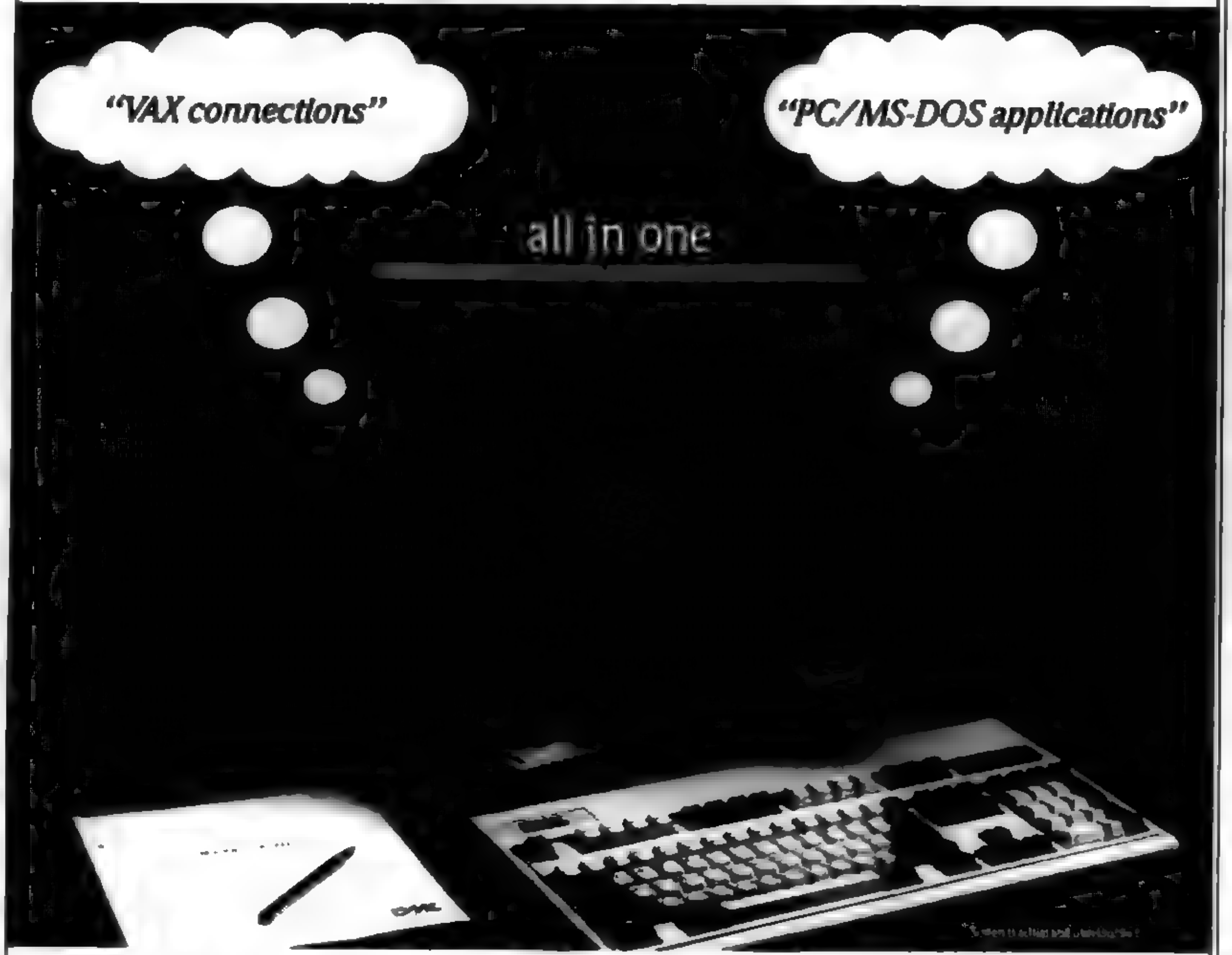

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Wang Labs: New management team works to stir the troops

BY GLENN RIFKIN

Markets change, tastes change, so the companies and individuals that choose to compete in those markets must change.
Dr. An Wang, from
his autobiography, *Lessons.*

Despite the Doctor's sagacious view of business, change has not come easily to Wang Laboratories, Inc. The $2.7 billion Lowell, Mass., company, like any international corporate giant, has discovered the painful realities that tough times bring to an industry. Wang's trials of cutbacks, layoffs, product delays and political infighting are well documented, and problems remain. But the Doctor is not prone to brooding, and he has quietly set about returning the shine to his legacy.

After a three-year test, Wang is poised to turn the corner to renewed profitability and prosperity. Although short-term skepticism still abounds, the long-term prospects for the company seem bright, even if somewhat dimmer than the glory days of the early part of this decade.

"They have indeed turned the corner," says Casey Stern, vice-president of research for Altman, Brenner & Wasserman, Inc., a New York financial analysis firm. "They've performed well in the last half of the last fiscal year and the first quarter of this one. They project a $700 million first quarter, and that is $100 million better than any quarter they've had."

Fred Wang

"If dedication, hard work, enthusiasm, improved morale and teamwork can get the job done (and we think it can), then Wang can" turn it around, states a recent Patricia Seybold's Office Computing Report on Wang.

What happened at Wang may turn out to be either a Harvard Business School case study or a script for television's "Dynasty." After John Cunningham departed unceremoniously as president in 1985, Dr. Wang himself tried to straighten out the layers of management and confusion that permeated the company. In the meantime, any pretenders to the throne were wise to look elsewhere, as eldest son Fred was being groomed for the job.

Doomsayers played on the obvious nepotism issue and claimed that Fred, just 36 and not a hardened former IBM employee, would be swallowed alive, particularly if he took over in the midst of Wang's worst financial year. But Fred, who became president in November 1986, has surprised critics and supporters alike. He has coolly taken control, made some tough decisions and calmly steered the company back toward profitability. Unlike the Doctor, who believes strongly in centralized control, Fred has doled out responsibility to his new cast of leaders.

Fred brought in Ian Diery from Wang's European operations to head up and restructure U.S. operations [CW, May 18]. Together, Fred and Diery have pushed the profit-and-loss (P&L) responsibilities down to the regional levels, cutting through much of the frustrating, multilayered morass that Wang had become.

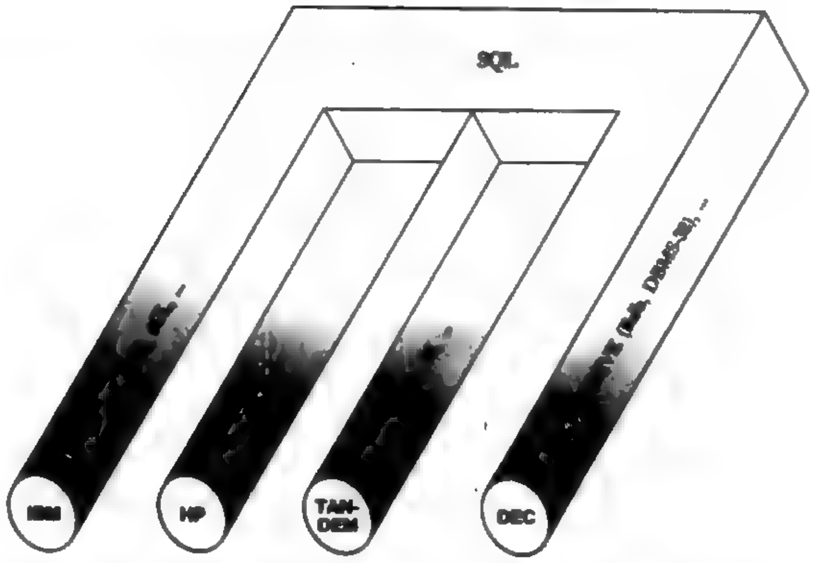
"For the district and regional people at Wang, this is the first time they are quite clear on what they are doing and which direction they are going in," says Linda O'Keeffe, an analyst with Dataquest, Inc. in San Jose, Calif. "They're real happy to have the P&L responsibility; it's a big motivator."

Keeping the peace

While Diery and Fred Wang's dynamic-duo act is receiving favorable reviews throughout the trade and business press, there remain questions about Wang's internal harmony.

"Wang's problems go to the core, the foundation of the company," says John McCarthy, director of Professional Automation Services at Forrester Research, Inc. in Cambridge, Mass., and a former Wang employee. "It's not people or products. The systems for internal accounting, order tracking, billing — the very way they do business — take a long time to change.

"They've always had people at the top making decisions and people at the bottom carrying out orders — there was very little middle management," McCarthy continues. "There were no systems for holding people accountable. It takes a lot of patience to change that, and Wang is a company that has never shown much patience. Fred has a real management



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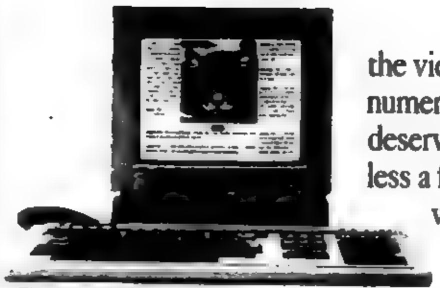

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challenge ahead of him."

Wang Labs, which Fred admits has never been an easy company to do business with, is in fact replacing its 27 internal operations data bases with a Professional Application Creation Environment (PACE)-based single data base to generate its internal administrative tasks. The new systems should be up and running by early next year and should make a major difference within 12 months, according to the Seybold report.

At A Glance

WANG

Headquarters: Lowell, Mass.
Chairman: An Wang
President: Fred Wang
1986 revenue for fiscal year ending June 30, 1986: $2.63 billion. **Earnings:** $70.7 million loss.
Employees: 30,000
Outlook: The worst appears to be over; major cost cutting and new internal organization are taking effect; Fred Wang is getting high marks as new president; 1988 should be profitable, but quest to be among top three information system suppliers still remains open to question.

CW CHART

Wang's golden egg

Consultants and analysts agree that Wang possesses the arsenal it needs to meet its challenges and actually holds a few weapons that neither DEC nor IBM has.

Wang, for example, has a highly regarded electronic publishing offering and has strongly embraced imaging technology. "Wang has a super imaging product," Stern says. "As the world starts to find out about the importance of imaging, Wang will find itself with a goose that lays the golden egg."

Stern predicts image processing will be a $10 billion industry by 1990, and he puts Wang a full 18 to 24 months ahead of the competiton with its VS-based Wang Integrated Image System. Although image processing is currently a slow growth market — only a total of 130 systems were shipped in 1986 according to Dataquest — analysts say the ability to store and retrieve the volumes of paper-based information that are currently bogging down America's offices will be the next major computing trend. In fact, varied reports estimate that only 5% to 9% of all information is currently computerized, leaving upward of 400 billion paper documents in desks and file cabinets with another three billion generated daily.

Wang is betting big that image processing will be a foundation product for the company. "MIS managers who aren't looking seriously at how they are going to apply image processing in three to five years are going to have all sorts of problems," Diery says.

As promising as imaging may be, it does not address Wang's current concerns. The company, after some serious software problems in its early VS 300 shipments, has apparently put its core product line in order.

McCarthy says he believes Wang can enter the top tier inhabited by Digital Equipment Corp. and IBM, but it must answer the challenges of unveiling a dual-processor machine at the high end and providing an alternative to DEC's Microvax at the low end. Wang can ill afford another slew of software problems.

"Another round of operating system bugs, and they are cooked," McCarthy says, referring to the angry customer response to the VS 300 debacle. Wang, in fact, rolled out its recent VS 7000 series, which is based on the VS 300 architecture, without a hitch.

Wang's biggest challenge may be to alter the negative images that persist both within and outside the customer base. The company, with its strong VS line of processors, offers far more than word processing, yet the image of Wang as a word processing vendor continues to haunt the Lowell office. Fred Wang is resigned to this for now but points out that an aggressive advertising and marketing campaign, scheduled to launch after Labor Day, is targeting that issue. Wang has also set up Executive Briefing Centers in eight cities to offer sophisticated product demonstrations to potential customers.

Disenchanted Wang users have also given up looking for support and service from a company that consistently experienced problems in that area. In fact, Wang has devoted large amounts of resources to correcting this deficiency, and consultants say the early fruits are ripening.

"They've really revamped their service and support and are working on it all the time," says Iris Polaski, an analyst with Dataquest. "Support, at least in the office environment, is always among the top three issues for companies looking for a vendor. I've heard, though, that field service has improved dramatically."

Fred Wang says he is determined to change the support image. In fact, he says his top priority is to become No. 1 in customer satisfaction in three to five years — no easy task with the likes of Hewlett-Packard Co. and IBM ahead of him. Under Diery, Wang has implemented a major standards-of-excellence program for training and educating the field service

staff as never before.

Although there are isolated reports from consultants of stalled growth and disaffection at scattered Wang sites, the response to Wang remains surprisingly loyal. A recent survey of Wang users by Martin Simpson & Co., a New York brokerage house, found that 87% planned to continue to buy from Wang, that no VS users were planning to defect to another vendor and that overall satisfaction with Wang rated an 8.4 on a scale of 10. Despite these statistics, the most frequently cited complaint about the company remains weak service and support.

Wang has a long list of advantages to offset its problems. The VS line, from the low-end VS 5 to the dual-processor VS 7000, is seen as a strong competitor to DEC's VAX. "The VS has a lot of applications that the VAX can't touch," McCarthy says.

Wang is also strong in IBM connectivity, perhaps better than any competitor, according to the Seybold report. Wang delivered its Distributed Office Support System (Disoss) gateway in March 1986 and LU6.2 in July of that year. "Wang's VS Disoss interface can reach any Disoss host on a Systems Network Architecture network," the report says, referring to IBM's standard, "while DEC's Disoss interface can only interface with the hosts with which it is directly communicating."

Wang Office, Wang's answer to DEC's All-In-1, has done well in the company's traditional office market, garnering 16% of the total of integrated office system users in 1986, according to a survey by International Data Corp. (IDC), a Framingham, Mass.-based market research firm. Wang had an installed base of 3,225 Wang Office customers, just a few less than DEC, according to IDC. IDC also estimates 17% of Wang's user base has Wang Office installed, which points to a continued market opportunity for the product.

Both Diery and Fred Wang point out that for Wang to grow outside the office market, it must target specific industries and markets. So far, according to Fred, it has not seen DEC as a major threat. The company is targeting places of traditional strength, such as the federal and state governments, financial and insurance companies, law firms and the hospitality industry. Manufacturing is also a target.

"We see IBM in practically every deal; we don't always see DEC," Fred says. "We feel [DEC] has done well in its traditional marketplace and not in the office. We are actually gaining market share in the office at the expense of some others, notably IBM."

Fred is also undaunted by IBM's 9370 push in the departmental processing arena his firm covets. "The 9370 is a half-baked box that they rushed out because they were getting so much pressure from other departmental system vendors," he states. "The performance is not there."

For Wang to make inroads outside the office, it must encourage users to take advantage of its strengths, such as the PACE relational data base offering.

Wang Labs has also shown surprising strength in its personal computer integration strategy, using its own PC 280 and PC 380 IBM compatibles, as well as IBM Personal Computers. In addition, the company has recently been a strong draw to third-party software vendors writing to VS.

"Vendors and customers are starting to realize that it is easier to create an application on a Wang VS than it is on anything else, including an IBM mainframe," Fred says. "You have more tools available, and it is a faster, more programmer-conscious machine."

Networking connections

For Wang to take on DEC and IBM , however, it must establish itself as a strong networking and communications vendor, a reputation that has thus far eluded the company. Wangnet, introduced in 1981, is a broadband proprietary solution that creates problems for Wang in an Ethernet, token-ring, twisted-pair world.

Based on the assumption that its local-area network would need to carry all forms of communications — such as video and voice — Wang stuck to the broadband strategy. Now it is tougher to sell Wangnet into sites that have committed to wiring closet-based LANs using twisted-pair wiring.

Fred says he believes that as the company pushes toward international standards with Wangnet, the combination of broadband and those standards will make the product a more open choice than either IBM or DEC.

"Both IBM and DEC are starting to make comments that interconnectivity and networking are all great as long as you go proprietary IBM or proprietary DEC," Fred says. "We tell people that if they are building a new facility, they're not going to want to put in 15 different wires. If you put in Wangnet, it will handle all of your protocols. In an existing building, we'll conform to the standards already there."

As Wang heads around the proverbial corner, the future is certainly brighter than it was when Fred took over 10 months ago. Financial analysts agree the company is poised to take off — if the pieces can all be put in place. For Fred Wang, the challenge looms large, especially when he views the plight of such competitors as Data General Corp.

"That's not sobering to us, because we should have sobered up a year ago with our own problems," he says, referring to DG's continuing financial woes. "It just tells me that this year is not going to be a cakewalk — it's going to be a challenge. But we have more control of what we want to do and how we're going to do it than in the past." ●

Prime: Traveling to the beat of a different drum

BY CLINTON WILDER

When Prime Computer, Inc. reports its 1987 financial results next January, it is likely to become the industry's newest billion-dollar computer vendor. Prime's route into that elite group has been very different from the path followed by its traditional minicomputer rivals, but it is a route that many analysts believe has Prime better positioned for success than many larger competitors.

Instead of billing itself as a full-service computer supplier, Prime, based in Natick, Mass., has focused heavily on specific markets. In an industry rampant with mistrust of not-invented-here components, Prime receives all of its peripherals and an increasing number of its hardware platforms from outside suppliers. Where many competitors have lived and died through OEM channels, Prime's beefed-up sales force brings in more than 80% of Prime's revenue through direct end-user sales.

In addition, while Data General Corp., Digital Equipment Corp., Wang Laboratories, Inc. and Hewlett-Packard Co. are all run either by their founders or by a hand-picked successor who spent his entire career at the company, Prime's Chief Executive Officer Joe M. Henson is a relative rookie, with six years at Prime and 27 years of tutelage at a training ground called IBM.

Analysts say that Prime's management, by not being saddled with a founder's vision forged in the 1950s or early 1960s, has been quicker than its competitors to react to changes in the industry.

"Henson deserves credit for recognizing that the computer industry was entering a new phase of lower revenue growth," says John Rutleoge, an analyst with Dillon Read & Co. "He focused on computer-aided design and manufacturing [CAD/CAM], beefed up alternative marketing and European penetration, all of which helped ensure Prime's survival in the industry's consolidation phase."

Consistency

Prime's strategies have paid off in steady revenue growth, relatively stable profits and a loyal customer base that gives the vendor fairly high marks for service and product satisfaction.

Although Prime's net income declined in both 1985 and 1986, the company remained profitable throughout both slump-plagued years. While its revenue growth rates of 12% in 1986 and in the first half of this year pale beside those of DEC, Prime has been a quietly consistent performer in an industry that is riddled with unpredictability.

"The companies that get the higher profiles have either done dramatically well or dramatically poorly," says Stephen Dube, computer industry analyst for Shearson Lehman Brothers, Inc. "Prime has a very good record relative to most of its competitors, partly because it has avoided across-the-board confrontations with IBM and DEC."

Prime's Joe M. Henson

Under Henson, Prime has shown a remarkable sense of its limitations. As the smallest of the general-purpose minicomputer vendors — at one-tenth the size of DEC — Prime's strategy in manufacturing and marketing reflects the conviction that it can neither make nor offer it all.

Prime's outside sourcing of components, highlighted by recent OEM agreements with firms like Sun Microsystems, Inc., MIPS Computer Systems, Inc. and Silicon Graphics Computer Systems has led many observers to call Prime a systems integrator rather than a manufacturer. The strategy has been a key to Prime's success, according to Henson.

"When we look at the relative size of Prime vs. some of our competitors, we know we have to be cost-competitive," Henson says. "The way to do that is not to invest large sums of capital in new technologies but to ride on the technology developments of the merchant component suppliers. That has more than offset the lower unit volumes of a young company competing against larger competitors."

A key example is that Prime, as

Wilder is *Computerworld's* senior editor, computer industry.

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opposed to nearly every one of its key competitors, resisted the temptation to build its own personal computer.

"That makes sense," says Richard Shaffer, a principal with Technologic Partners, a New York-based high-tech consulting firm. "In this business, who cares who built it? There are plenty of people out there who can build a box. The question is, do you have a sales force that knows the customer and can sell it?"

Outside sourcing enables Prime to spend about 60% of its research and development funds on software to maximize its hardware capabilities. "We haven't found a single instance where we would have done better making our own peripherals, for example," says Gale Aguilar, Prime's vice-president of business development and strategy.

Users agree that outside sourcing strengthens Prime's product offerings. "They don't have a lot of R&D expense built into products that they have to hold on to," says Robin Pearse, executive director of administrative information systems at the University of Southern California. "Some of the bigger companies feel they have to get their money out of some older products." USC, for example, uses an 800M-byte NEC Corp. disk drive sold by Prime to store data from its Prime 9955 II and 6350 superminis.

Specific market focus

On the marketing side, Prime's focus on specific markets and the technologies to address them has reduced its vulnerability to the general-purpose computer spending cycles that have hit IBM, Wang, DG and many others. Prime's specialization particularly contrasts with the strategy of its Massachusetts neighbor DG, which recently admitted its mistake in attempting to slug it out across the board with IBM and DEC.

This year has been Prime's busiest ever for product introductions, led by the high end of the 50 series. Now shipping in volume, the 11.8-million-instructions-per-second (MIPS) 6350 and the dual-processor, 23.6-MIPS 6550 are targeted first and foremost at current Prime customers who have outgrown their systems. Paine Webber analyst Stephen Smith estimates Prime will ship 200 6350 processors this year and between 400 and 500 in 1988.

"We found we always had someone pressing the upper edge of our systems," says Stephen Kiely, Prime's vice-president of systems marketing and development. "[The 50 series] is now in really good shape to carry the company for quite a long time."

The 50 series accounts for more than 50% of Prime's revenue and more than half of its R&D expenditures, which last year totaled $92 million.

The 50 series is top-to-bottom compatible and based on Prime's proprietary operating software, Primos. Prime says its challenge in each of its target markets is to offer better 50 series-based solutions in both hardware and software. Those products can range from Prime Information fourth-generation language tools for developing trust-management software at Bank of America to high-resolution graphics workstations used by Ford Motor Co.

In that sense, Prime views itself less as a specialist than as a full-service DP supplier that has carefully picked its opportunities.

"If you look at [Prime's new workstations] by types of boxes, it looks like we're going in a different direction, but we're not," Aguilar says. "In reality, technical and scientific users spend less than 30% of their computing time on engineering applications. They're using business applications like scheduling, documentation and electronic mail."

Wang Vice-President of Worldwide Sales W. L. Brubaker says that Prime's target customers are in manufacturing, financial services, education, government and, its oldest base, scientific and technical computing. Even in its most dramatic new directions, such as minisupercomputers, Prime's goal is to solidify and expand in those markets with a richer product line.

At A Glance

Prime

Headquarters: Natick, Mass.
Chief executive officer: Joe M. Henson
1986 revenue for fiscal year ending Dec. 31, 1986: $860.1 million. **Earnings:** $46.9 million.
Employees: 8,621
Outlook: With its product line bolstered by a record number of new systems introduced this year, Prime should reach its goal for $1 billion in revenue in 1987; long-term potential as a top-tier vendor depends on continuing to expand within its chosen niches, possibly with the help of a major acquisition or a series of smaller buy-outs.

CW CHART

"We're trying to offer a mix in each area where we're focused," Kiely says. "But it's a heterogeneous world, and a single architecture will not satisfy all those needs. We have to integrate workstations and superminis, and that means a revision of culture here. We've been a

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>
> DAVID BURDICK
> DATAQUEST, INC.

one-hardware, one-architecture, one-software company for 15 years."

Some say Prime's product line must leverage its traditional market lead in processing speed with improved peripheral interfaces. "The 6350 is a tremendously fast machine, but the peripherals have remained unchanged," USC's Pearse says. "The bread and butter of the business environment is I/O. If they want to be more successful there, they have to focus on faster disk and tape subsystems."

Another critical area for Prime's success in the commercial market is much-improved connectivity with IBM, says George Colony, president of Forrester Research, Inc. in Cambridge, Mass.

"Prime does not really have an IBM connectivity project under way, as do DEC, Wang, HP and DG," Colony says. "Prime doesn't overlap much with IBM , but strategically they want to be a top-tier vendor, so it becomes a much more germane issue. The 9370 will make a strong bid in the mid-range," he continues, "and for Prime to keep those accounts, they must offer bridges to the 9370 and to IBM's mid-range architecture."

The most prominent specialized market for Prime is CAD/CAM, in which the firm has carved out a niche as a profitable turnkey systems supplier. CAD/CAM installations using Prime's Medusa software account for some 25% of the company's revenue, and that business has grown faster than the overall industry.

In this market, Prime competes not against fellow minicomputer makers but firms like Computervision Corp., McDonnell Douglas Corp. and General Electric Co.'s Calma subsidiary, as well as IBM. Prime is the seventh-largest player in the overall CAD/CAM market and aims to be third or fourth in the next years, says Robert Fischer, president and chief executive officer of Prime's CAD/CAM and workstation group.

The emergence of the high-powered, high-resolution workstation, often running applications on the Unix standard, has been a major revolution in CAD/CAM. To bolster its product line against Sun and Apollo Computer, Inc., Prime this year introduced the PXCL 5500, a high-end three-dimensional graphics workstation based on reduced instruction set computing technology from MIPS Computer Systems. During the summer, Prime signed a three-year $75-million OEM deal to offer the Sun 3/60 workstation bundled with Medusa as the Prime WS 3600.

"There had been a significant lack of a CAD/CAM workstation from Prime until now," says Shao Wang, analyst for Smith Barney, Harris Upham & Co. "They're a little late, but they have a good strategy that should grow that business."

David Burdick, who follows the CAD/CAM industry for Dataquest, Inc., expects a fourth-quarter announcement of next-generation CAD software that utilizes distributed data base capabilities. "The challenge is to have a seamless workstation strategy," he says. "Pieces of it are in place now."

However, most analysts say they feel Prime now has strong product cycle momentum, augmented by a worldwide sales force that Prime increased by 63% between 1983 and the beginning of 1986. In large part, the increased expense accounted for Prime's drop in profits in 1985 and 1986, despite revenue gains of 20% and 12%, respectively.

The virtue of patience

As for growth, Prime has made no secret of its intention to make acquisitions, possibly very large ones. Thanks to a highly successful debt offering earlier this year, Prime now has some $500 million in cash under its belt, and Henson says that figure is not the upper limit of his price range if the opportunity is right.

But patience is the watchword as Prime considers buy-out candidates that will help reach Henson's goal of $2 billion in annual revenue by 1990.

"The money's not burning a hole in our pocket," Henson says. "Our foremost goal is internal growth. But we're in a consolidating industry, and we recognized some time ago that there are great opportunities for a well-financed company."

Henson stresses that Prime will not acquire to diversify but to enhance its existing position and market share in its current markets.

As it enters the billion-dollar club, Prime's growth path will largely depend on how well it can meet the increased computing needs of the types of users it already serves. Evolving applications such as computer-integrated manufacturing, computer-aided software engineering and three-dimensional design tools point to the company's future direction.

"[Prime, HP, Wang and DG] all face a common challenge — to take a position and grow it in the face of much larger competition," Kiely says. "IBM and DEC are setting the pace of the market, but each of us will try to do the best we can against them in the markets we've chosen." ●

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IN DEPTH

Why data administration fails

Don't let delays in the payoff for this function leave you discouraged

BY GEORGE TILLMANN

Though their concept shows much promise, the majority of data administration organizations fail to live up to MIS expectations. This is not so much because they cannot work; rather, it is because the new data administration organizations can easily fall into one of the many traps that lead management to mistakenly conclude that data administration does not work.

Many of the problems to which the new data administration organization falls prey are no different from those any new department in a large and mature MIS organization encounters. A survey of a number of data administration groups reveals that organizations usually fail for one or more of the following reasons:

- Lack of a clear understanding of the role of data administration.
- No organizational identity.
- Insufficient management support.

Let's look at each reason in detail.

Who wants to be first?

It is a well-known MIS principle that the first to use a new technology invariably pays the most and benefits the least.

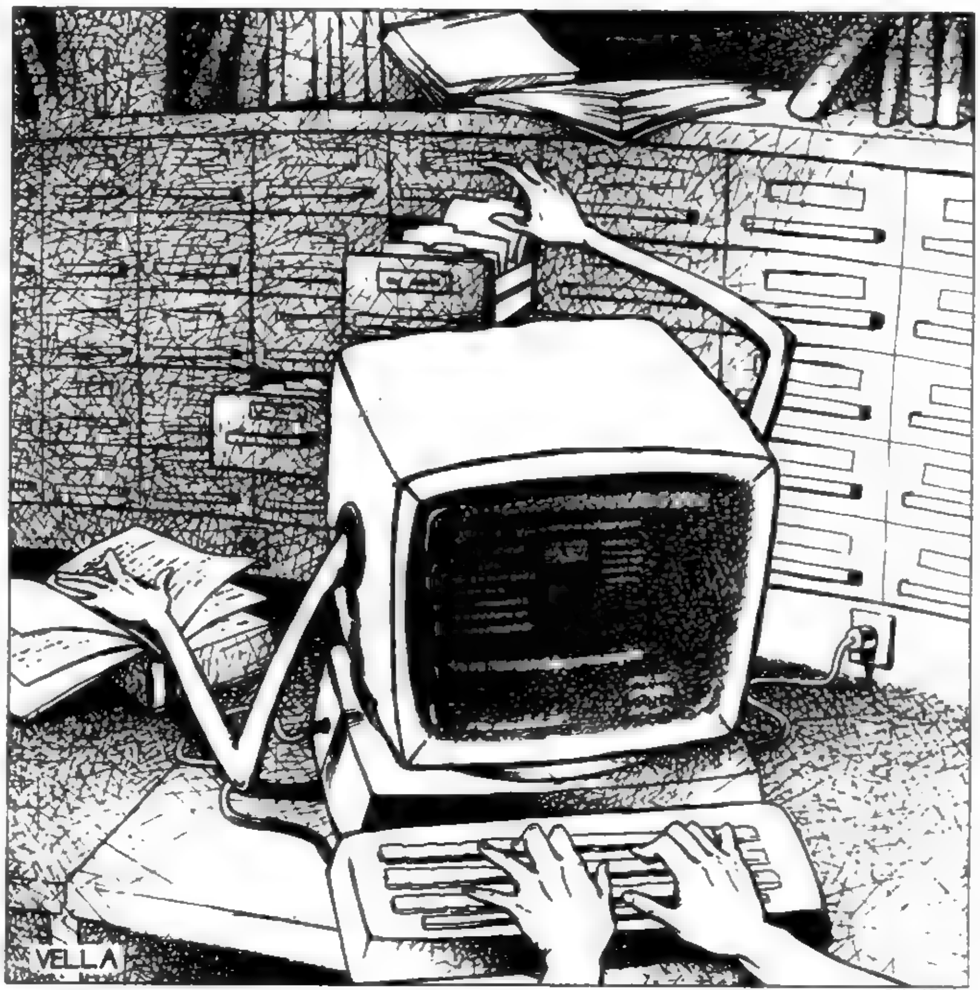
Data administration can be both beneficial and cost-effective. Inevitably, however, it faces start-up costs and learning curves. Since a prime benefit of data administration comes from multisystem sharing, there is a limited advantage to the first project. Major benefits will not accumulate until later. Unfortunately, the enthusiasm that sparked the creation of data administration often wanes rapidly before these benefits are realised. A discouraged management, wanting to cut back on what it perceives as unproductive expenses, discontinues data administration.

This problem was faced by the new data administrative group at a large insurance company. A rewrite of a financial reporting system was the first project to use data administration techniques and procedures. However, problems were encountered in fitting the new procedures into the existing design methodology. Also, the time required to identify, categorize and record the numerous data elements in the system was greatly underestimated, a problem compounded by the nature of the application.

Tracking these elements required large blocks of time from even the most application-knowledgeable personnel. The development team that once supported data administration came to see it as a large burden with little immediate benefit. As the deadline approached, data administration was put under tremendous pressure to finish its work and release valuable staff members who were needed elsewhere.

A postimplementation review blamed data administration for delays, questioned the benefit of participating in the data administration program and created a resentful environment that the new data administration organization had to endure for years.

Data administration is often expected to perform a variety of conflicting roles. As experts



RAY VELLA

• Management may believe it cannot work

• Start-up costs and learning curves

• Conflicting roles: enforcer, supporter

Tillmann is a senior associate in the management information systems group at Booz, Allen & Hamilton, Inc. in New York. He has consulted in data base management systems for ETA International and was a data administrator for McGraw-Hill, Inc.

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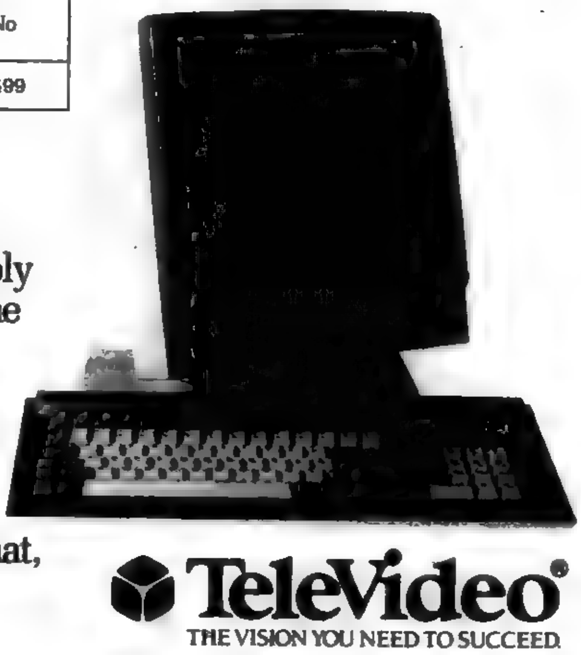

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in information usage, data administrators are frequently given the responsibility of developing and enforcing corporate information management policies. Yet, these very organizations also find themselves in the role of supporting development and user organizations.

This support can range from answering questions about data dictionary use to aiding in the design of data flow and data structure diagrams. Naturally, this requires the full trust and confidence of the users and developers. This trust and confidence is jeopardized, however, if data administration must also enforce corporate standards. The two functions are simply incompatible.

In one recent case, a large publishing company tried to use internal data administration consultants to enforce standards at remotely located subsidiaries. The data administration consultants found that the staffs of the subsidiaries were not receptive to data administration concepts or to consultants. It was only after the data administrator forced a review of the policy and relieved his staff of the enforcement role that the internal consultants could perform their primary data administration functions.

Not a panacea

Like many other products, data base systems have fallen short of their promises. Throughout the years, MIS has been presented with a host of solutions to systems problems from vendors, academicians, users and others. Often, the difficulty lies not with the technology but with MIS's expectations. Structured analysis, design and programming techniques, information centers, fourth-generation languages and prototyping have all been helpful and equally disappointing. Instead of learning from our mistakes, we look to the next cure-all to make everything right. When the data base management system and data base administration did not give MIS everything it wanted, it often bundled up the unrealized expectations and pawned them off on a new concept: data administration. In such a situation, data administration could not help but fail.

> IF PEOPLE were not required to pay taxes, they probably wouldn't. Likewise, if system developers were not required to have their work reviewed by quality assurance, they probably wouldn't.

Data administration can also suffer from improper positioning within the MIS organization. It could conceivably be part of application systems development, business systems development, technical services, quality assurance, data base administration or another group.

In general, it can function reasonably well in any of these organizations. Yet, as soon as it is designated as part of one group, it runs the risk of becoming isolated from other organizations, particularly in companies in which interdepartmental squabbling is common. The neophyte data administration function can become a casualty of organizational conflicts before it has even unwrapped its data dictionary.

For example, a newly centralized service firm established a data administration group after it found itself with three DBMSs, virtually no information sharing and a considerable amount of redundant data. Both data administration and data base administration reported to a budget development and monitoring unit working directly for the vice-president of MIS.

The first group had little success. Considered part of "corporate," it was viewed as uninvolved in divisional matters — a relationship favored by divisional personnel. Amazingly, some project managers did not even know a data administration organization existed. The director of the budget unit, who never really understood what data administration was all about, lacked the enthusiasm necessary to champion the data administration unit in the corporate world. As a result, data administration had minimal influence on divisional units and thus provided little benefit to the corporation.

Politics, politics

If the MIS organization is at all political, and many are, then the new data administration group can become the center of an ownership struggle. In the most political shops, a DP group's initial encounter with data administration is an effort to control it — at least before, as they believe, it tries to control them. And if data administration cannot be controlled, its power must be limited.

In this difficult situation, one can sometimes find people who supported data administration when it was just a concept but now fight it when its authority is to be tested. The problem is compounded by a data administration group that struggles to assert itself among other organizations out to protect their own autonomy.

This can create a situation particularly confusing if we forget the real purpose of data administration: to provide a service. Unfortunately, political battles early in its life can limit its effectiveness, if not permanently maim the fledgling group.

Lack of support

There is no better way to kill an organization than to ignore it. If people were not required to pay taxes, they probably wouldn't. Likewise, if system developers were not required to have their work reviewed by quality assurance, they probably wouldn't. The same is true of data administration. The system developer might agree with the goals of data administration, but when it comes to the reality of running a project, the less one has to do with an outside organization, the better.

What usually happens is that, though management agrees with the goals of data administration, a particular user or developer succeeds in getting permission to skip the data administration requirements. The argument usually centers around schedules, although sometimes cost issues creep in. The result is the same: Once one group gets a dispensation, others want it too, thus rendering data administration impotent.

In the case of the insurance company, a project encountered serious delays in its logical design. To catch up, the project manager convinced the users to complain to their management that the data administration requirements, which were "just for MIS's benefit anyway," were the cause of the delay. The complaint moved up the user organizational ladder, eventually to the senior vice-president of operations. The result was that the data

Continued on next page

Data administration's roots

Data administration grew out of a need to provide MIS with information about the corporation's data resource. This need became apparent when the data base management system, managed by the technically oriented data base administrator, failed to foster the data independence, redundancy control, system integration and information sharing that MIS expected.

Data administration differs from its data base administration counterpart in that it supports and fosters the use of corporate information. Its job is to understand who uses what data where and why. The major functions of data administration are the following:

- To promote data sharing by making information available to users in numerous departments through any relevant applications within the organization.
- To provide a central information reference source, ensuring that end users, analysts, designers and programmers know where to obtain information about any data used or stored by the company.
- To reduce redundant data while ensuring it will be synchronized where redundancy cannot be avoided. Where duplicate data is required, such as for performance reasons, data administration will guarantee that all instances of that data are updated.

The information about the organization's data, called "metadata," is kept in a data dictionary. The data dictionary — be it a sophisticated data base system or a loose-leaf binder — is the central repository for information about the corporation's data, just as a card catalog in a library stores information about the materials in the stacks.

Using the data dictionary enables system designers to avoid creating certain data elements more than once, or, if those elements must exist in more than one place, to be sure all are modified accordingly.

Properly used, data administration can help in the following areas:

- Reducing maintenance costs by controlling the spread of redundant data and code and by identifying the location of elements and programs.
- Improving programmer productivity by reducing the time spent determining where changes are needed.
- Adding to the value of the corporation's information resource by increasing the timeliness and accuracy of data.

GEORGE TILLMANN

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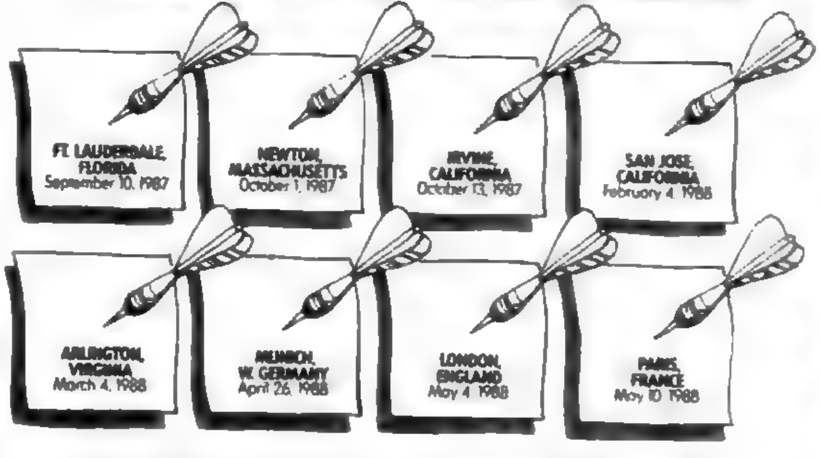
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Why it fails

FROM PREVIOUS PAGE

administration components were removed from the project. The problem did not stop there, however. Users of subsequent development efforts, citing this precedent, complained they could not afford the data administration expense and should also be exempted. In no time, the entire data administration function was brought to a halt and eventually disbanded.

Avoiding the pitfalls

The impact of these problems has been considerable. They are responsible for the failure of many data administration organizations and have affected the performance and success of most. But the problems are neither unavoidable nor unsolvable. Careful attention to the following three steps can do much to eliminate the problems of starting and running an effective data administration organization:

- Define data administration's role.
- Establish an organizational identity.
- Ensure management support.

Few people understand the overall purpose of data administration, though many understand at least one of its goals. An explicit statement is most beneficial in explaining to users the purpose, functions and reasons for creating data administration.

Data administration should create a plan, charter, statement of direction or some other document outlining its purpose; a similar plan for fulfilling its purpose; and the criteria on which to judge its success. The plan should describe the following aspects of data administration in detail:

- Goals.
- A program that specifically shows how data administration will achieve these goals, such as through education, participation in development and maintenance projects, consulting services to be provided and so on.
- The criteria by which to evaluate data administration programs.
- Service-schedule implementation.

If data administration believes it can reduce the maintenance costs of projects developed using data administration techniques, then some way of measuring the outcome should be identified, and goals should be established. The purpose of such a plan is to establish an agreed-upon objective evaluation criteria to measure data administration's value to the corporation. It should be a document widely circulated between MIS and user organizations. If the expertise does not exist in-house to create such a document, outside help should be considered.

Realistic expectations

A new data administrator should not paint an overly rosy picture — unfulfilled promises will come back to haunt him when other organizations begin to question data administration's accomplishments and its value to the corporation. Conservative projections of the benefits and a realistic appraisal of the cost in establishing the function — both in time and in dollars — will give the data administrator more time to prove the worth of his organization.

Data administration should function not as an enforcement or control organization but as a service provider to its users, mainly developers, programmers, analysts and end users. This does not mean data administration cannot have a hand in developing corporate standards. On the contrary, there is probably no better source for information standards.

However, while data administration can write standards, its service relationship with its users does not allow it to function as an enforcement body. Users simply will not open up to a service group that will be policing their activities as well. Enforcement of standards should be left to quality assurance or a similar organization that can continually monitor a project to ensure that all the corporate standards and, hopefully, the corporation's objectives are met.

Most successful data administration organizations are founded as part of the central MIS development unit and report either directly to the MIS vice-president or his immediate subordinate. This lets data administration function independently of any of its users while still retaining the authority of the director's office.

Although many MIS organizations have, as a rule, some general staff group reporting to the vice-president, this is not a good location for data administration for a number of reasons.

First, it turns out that the organization is viewed as a staff or support group rather than as a leading-edge technology-oriented line function. Second, the director of this group will usually neither understand nor care about the data administration function.

Finally, experience indicates new technology groups work best when independent of predominantly administrative organizations, where they tend to languish and eventually fail.

Service philosophy

Staffing data administration is a critical factor for its success. Data administration personnel should possess the following qualities:

- Knowledge of technical issues of data administration, such as data modeling, enterprise administration and data base theory.
- An understanding of the company's business — major functions, issues, trends, markets and organizational structure.
- System development skills, particularly in the communication of business requirements to technical people.
- Interpersonal skills, such as the ability to work with, motivate and persuade individuals, teams, formal groups, management and so on.

This last factor cannot be overemphasized. Data administration staff must be adept not only in technical skills but also in diplomacy. They are internal consultants, and ideally they should appear as technically competent counselors who will aid users in the development of their systems.

Don't let them walk away

Some management organizations suffer from the "bon voyage" syndrome. They create an organization, give it a send-off and walk away, believing the organization's survival will be determined by some Darwinian principle. If management is not going to give data administration a fair chance to prove itself, then the function probably should never be attempted. Management must support data administration's position in the organization, its charter and its status in functions such as system development and decision support.

An effective way to gain management support is to cultivate a data administration champion or sponsor. This would be a senior management mentor who will counsel the data administrator and work with senior management to ensure data administration support. The champion should be a senior manager no lower than the chief information officer, though he need not be directly connected with MIS. He should believe in the goals of data administration and be willing to go to bat for the function.

There is often a perception in MIS organizations that management is single-minded and cannot be influenced by subordinates. Usually, nothing is further from the truth. Rather, MIS will present management with worthwhile ideas and then fail to follow through with showing how they can be implemented, managed and monitored.

The most effective way to convince management of a course of action is to present a detailed picture of its use, benefits, costs and function within the organization. When a proper long-term plan is presented, management will usually consider the proposal more seriously.

"Managing the managers" must continue even after they have accepted and implemented data administration. One of the major failings of data administrators is the perception that once they have sold management on the idea of data administration, no more selling is required. Successful data administrators are those who periodically update and represent to management their strategic plans.

Note that the strategic plan is different from the previously presented data administration charter or plan. The charter is a public document outlining data administration's relationship with its users. The strategic plan communicates to senior management the long-term benefits data administration hopes to contribute to the corporation.

The corporate waters can be cold and hazardous for the fledgling data administration group. Careful attention to detail, climate and corporate philosophy, however, can improve data administration's chances of survival and provide an opportunity for users to gain a better understanding and to reap the rewards of data administration. •

Evaluation criteria

One of the best ways to communicate the reasonable expectations of data administration — both to that department and to its users — is by creating a plan, charter or statement of purpose. Any such document should include goals, an implementation plan with schedules, a description of the users data administration will serve, data administration's organization and measurable evaluation criteria.

Particularly in the absence of short-term payback, meeting these evaluation criteria can help keep a data administration department alive. These criteria fall into three categories:

- Quantifiable success factors.
- Qualitative success factors.
- Achievement schedules.

Examples of quantifiable success factors would be the amount of data registered in the dictionary, the degree of system integration, the number of data bases designed or the number of system development teams trained and aided.

Harder to pin down but just as important are qualitative success factors. These include user satisfaction and system performance.

The schedule for achievement should be a realistic schedule for judging the progress of data administration. For example: A data dictionary is installed and operational within nine months, half the system development staff is trained in the use of data administration techniques within two years, two systems are up using data administration within three years and order-entry systems are integrated within five years.

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MANAGEMENT

TAKING CHARGE

Anthony Reed

MIS needs good writers

As complaints about high-priced low-quality systems increase, data processing departments are seeking the wisdom of system design gurus, vendors and consultants. But they're getting the right answers for the wrong questions and continually making the same mistakes.

The DP managers want to know what products or services will help build better systems in less time. They should ask what really caused their old problems and how they can be solved.

The vendors and consultants are solving the short-term problems, but one of the main ones remains: Programmers and analysts have developed very bad writing skills. They write documents to get them out of the way rather than to convey messages. This contributes to the downfall of many DP projects, system life cycles and careers.

Bad prose is very expensive. The user requirements document is the foundation of a project. A poorly written, 1-inch document will usually result in production cost overruns and high maintenance expenses.

After making several attempts to understand the first few pages of a document, users get frustrated. If they're high enough up the corporate ladder, they'll tell a subordinate to summarize the document for them; or they'll ask him to explain it, page by page, during a marathon walk-through.

Frequently, users find them-

Continued on page 87

Contingency groups spring up

BY DAVID A. LUDLUM
CW STAFF

After Judith Hinds learned that one of her colleagues had persuaded his company to produce a videotape on preparing for data processing disasters, she was able to convince her own managers to do the same thing.

Hinds points to the incident as an illustration of the value of the Contingency Planning Exchange of New York, a local professional association through which she got word of her colleague's success.

"If any of us has a problem, we call one another. We encourage one another to do so. It's a good way to share models," says Hinds, head of the group's program committee and a contingency planner at the Depository Trust Co., a clearing house for securities transactions.

The New York group is one of more than a dozen local organizations that have been formed in the last five years to provide information systems contingency planners with presentations and informal networking on professional concerns.

"They're sort of springing up all over the country," says Jack Bannan, manager of information security at RCA Corp. and a founder of the Delaware Valley Disaster Recovery Information Exchange Group, which serves the Philadelphia area.

Most of the established groups are local, independent organizations. However, the Association of Contingency Planners, which originally served the Los Angeles area, has grown to include four active chapters and nine more in the process of formation.

"We're rapidly becoming national in scope and, in fact, international with a Canadian organization," says Dianne C. Smith, chairwoman of the 4-year-old association and assistant director of management and office technology services at American Savings & Loan Association in Whittier, Calif.

"It's really growing rapidly. The inquiries come in on almost a daily basis," Smith says of the association, which has active chapters in Los Angeles County, adjoining Orange County, Dallas and the Minneapolis-St.Paul area.

The association's chapters charge members dues of $60 a

Continued on page 78

Hutton names new systems chief

Epstein retires after 25 years; president taps Merrill Lynch protege

BY DAVID A. LUDLUM
CW STAFF

NEW YORK — Melvin B. Taub, a 15-year veteran of Merrill Lynch & Co., has been named executive vice-president for corporate operations and systems at E. F. Hutton & Co., succeeding Norman Epstein, who is retiring.

Epstein, 52, headed E. F. Hutton's data processing activities for more than 25 years and is recognized for establishing the firm as a technological leader on Wall Street as well as for his outspoken advocacy for controlling the use of personal computers.

The change in systems leadership at the brokerage giant took effect six weeks before the start last week of beta-testing of 10,000 new PCs tied into a four-tier, nationwide architecture developed by Epstein.

Reached by telephone while on vacation, Epstein suggested that his departure from the company in part reflects disagreement with Hutton's recently appointed president and chief executive officer, Robert Rittereiser, over systems strategies. One such strategy includes Epstein's emphasis on tight corporate controls.

Melvin B. Taub

"Honorable people can disagree," Epstein said, "[although] that doesn't mean that honorable people have to compromise."

Asked to elaborate, however, Epstein said he is not even sure Hutton's strategy will change markedly. "If there's a change, it's not going to be implemented by Norm Epstein. Its going to be implemented by Robert Rittereiser," he said.

Epstein said it was his decision to leave and that Rittereiser "definitely wanted me to stay." Calling the transition civilized, he said he would remain at Hutton for a month or two and then retire to pursue "public service," which he says he has long planned to do before reaching the age of 60.

Taub, 43, is a protege and former Merrill Lynch colleague of Rittereiser, who, after 25 years, left Merrill Lynch & Co. in May 1985. In June 1986, he recruited Taub as Hutton's executive vice-president for capital markets operations and systems development.

Before joining E. F. Hutton, Taub was Merrill Lynch's senior vice-president for consumer markets securities operations and systems.

He has a bachelor's degree in mathematics from Brooklyn College and a master's degree in operations research from New York University.

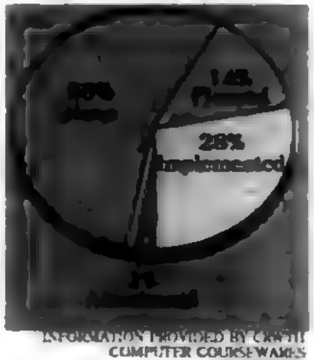
Taub also succeeds Epstein in representing E. F. Hutton's systems and operations on its nine-member management committee, which is made up of the senior officers who establish the company's operating policy.

Continued on page 84

Data View

Chargeback

Use of chargeback for hardware, software and services at 450 information centers, 61% of them Fortune 1,000 companies



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Contingency

CONTINUED FROM PAGE 77

year and hold monthly meetings, while most of the independent groups charge no dues and meet quarterly, usually at a member's company.

The organizations' activities are essentially the same, however — presenting speakers and providing an opportunity to share insights.

"The basic idea is an information exchange, rather than reinventing the wheel," says John Toigo, president of the Disaster Avoidance and Recovery Information Exchange Group in Largo, Fla., a statewide organization with chapters serving Tampa, Orlando, Miami and Jacksonville and membership representing more than 600 companies.

Like many of the groups, the meetings of the New York organization tend to feature presentations by contingency planning or disaster recovery practitioners or consultants. While vendors have appeared, Hinds says, "we aren't interested in being a vehicle for a marketing assault."

Topics of the group's presentations have included vital records programs, fire safety, setting up a decision command center, protecting personal computers, network backup and site restoration.

Spokesmen for several groups say they try to emphasize presentations by practioners or others with firsthand accounts of disasters.

"These are very real situations that the people have an opportunity to listen to and learn and ask questions about," says Rod Cross, manager of information systems security at Guaranty Trust Co. in Toronto and president of that city's Disaster Recovery Information Exchange.

In Connecticut, at the Hartford Area Local Disaster Recovery Information Exchange Group, members like to share experiences they have had with vendors, says Lewis Vasquez, a consultant at Aetna Life & Casualty Co. and a leader of the group.

Changing minds

"We can steer someone toward a good one or away from bad one," Vasquez says. "I know a couple of members that changed direction."

The founding of the New York group in 1985, like that of several others, was prompted by the success of the Delaware Valley organization, which was formed in July 1982 by Bannan, now its president, and Andrew Logan, who worked for Cigna Corp. at the time and is now with Reliance Insurance Co.

"It was very obvious to Andy and I that this was the kind of thing that would take off," Bannan says. They were right. The group grew from nine members to more than 700 by its fifth anniversary. "We're constantly adding members," Bannan says.

Its meetings, supported by donations and "the kindness of corporations,"

Continued on page 90

Contacts

For information on Association of Contingency Planners chapters, write P.O. Box 73-149, Long Beach, Calif. 90801.

Independent groups include the following:

Boston — Contact: Jim Stempleski, contingency planning consultant, Bank of New England NA, P.O. 2197, Mail Code M03OSG, Boston, Mass. 02109.

Hartford, Conn. — Hartford Area Local Disaster Recovery Information Exchange Group. Contact: Lewis Vasquez, Aetna Life & Casualty Co., Mail Stop C-12E, 151 Farmington Ave., Hartford, Conn. 06156.

New York — Contingency Planning Exchange. Contact: Mark Haimowitz, Irving Trust Co., One Wall St., New York, N.Y. 10015.

Philadephia — Delaware Valley Disaster Recovery Information Exchange Group. Contact: Jack Bannan, General Electric Corp., Building 205-1, Cherry Hill, N.J. 08358.

Florida (Tampa, Orlando, Miami and Jacksonville chapters) — Disaster Avoidance and Recovery Information Group. Contact: John Toigo, P.O. Box 5214, Largo, Fla. 34294-5214.

Cleveland/Akron, Ohio — Association of Contingency Planners of Ohio. Terry Hunek, American Greetings, 10500 American Road, Cleveland, Ohio 44114.

Seattle — Contingency Planning and Security Information Exchange Group. Contact: John O'Donnell, Data Base, Inc., 307 S. 140th St. Seattle, Wash. 98168.

Toronto — Disaster Recovery Information Exchange. Contact: Rod Cross, information systems security, Guarantee Trust, 121 Bloor St., Toronto, Ontario M4Y2G1.

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Where you work

CONTINUED FROM PAGE 1

paying markets, the government paid its MIS/DP professionals slightly more than transportation companies and educational institutions, which paid the lowest salaries overall.

- The highest salaries are found in New York, the city with the highest cost of living. Companies in San Francisco, San Diego and Los Angeles pay the next highest salaries, while those in Minneapolis pay the lowest.

Paying a mean salary of $44,024 overall for MIS/DP positions, companies in New York top those in other metropolitan areas by more than $2,000 a year for comparable positions. Cost of living aside, the concentration of companies in New York encourages higher salaries.

> "THE proximity of firms [in New York] forces competition. People can change jobs several times going from company to company without changing their car pool."
>
> TERRY EBERT
> MORGAN STANLEY & CO.

"New York is one of the most densely populated areas for employers," says Terry Ebert, director of training and recruiting for finance, administration and operations at Morgan Stanley & Co. in New York. "The proximity of firms forces competition. People can change jobs several times going from company to company without changing their car pool."

New York vice-presidents of MIS make a mean salary of $84,416 a year, while MIS executives in Washington, D.C., Minneapolis/St. Paul and Denver earn mean salaries no higher than $65,985.

This compares with more than $79,000 for executives in San Diego/Los Angeles and San Francisco.

Best industries in metro regions

The best paying industries in these regions are utilities, banking and finance, insurance and manufacturing. The single highest mean salary for any one position — $85,391, according to the survey — is for the vice-president of MIS for a manufacturing facility. This topped vice-presidents of financial services by $7,853 and insurance executives by a whopping $19,360. Both are information system-intensive and, traditionally, high-paying industries.

One reason manufacturers pay so highly may be that their shops require a greater level of integration and automation than other industries. In addition to this, there is a scarcity of professionals who are experienced with new methods of manufacturing scheduling and process control.

"Companies are looking for the head person in MIS to spearhead the updating of manufacturing processes," says Henry Buckland, DP manager for Rowe Furniture Corp. in Salem, Va.

"They want people to act as catalysts bringing all the resources together. There aren't too many people like that around," Buckland says.

Although banking and financial services do not tend to pay the highest for the top MIS position, they do pay consistently high salaries overall.

"The banks have been trying very hard to update and automate," says Bob LoPresto, managing vice-president at the Palo Alto, Calif., office of Korn/Ferry International, a management recruiting firm.

"But more importantly, today's large financial institutions need information systems to keep them competitive," LoPresto adds.

"In financial services, the delivery of information is paramount to a firm's strategy in terms of how it can compete — not only nationally but internationally," says Henry Hamilton, senior vice-president and director of information system services at Shearson Lehman Brothers, Inc.'s Tribeca, N.Y., office.

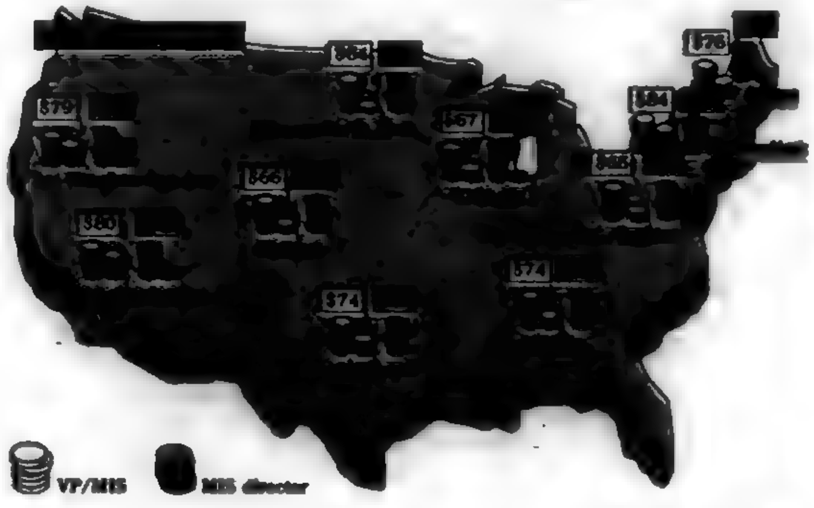
Large vs. small

Not unexpectedly, the survey also showed that professionals in large organizations earn more than those in small

Continued on page 80

Top dollars

Vice-president of MIS and director of MIS salaries by metropolitan area



CW CHART: AMY J. SWANSON

DP compensation

Average salaries and incentives by job title

[illegible]	Average annual salary 1986	Average percent salary increase 1986 to 1987	Bonus: Average percent of salary 1986	Stock options Y/N Percent
Vice-president MIS	$71,936 (290)*	6.7 [illegible]	14.9 (232)	Yes — 32 No — 68 (337)
MIS director	$55,104 (857)	6 (813)	6.7 (579)	Yes — 17 No — 83 (842)
Information center manager	$46,757 (360)	5.7 (357)	4.5 (230)	Yes — 13 No — 87 (361)
Information center specialist	$36,232 (224)	5.6 (218)	2.6 (123)	Yes — 7 No — 93 (247)
PC manager	$37,333 (230)	5.8 (217)	4 (130)	Yes — 8 No — 92 (253)
SYSTEMS AND PROGRAMMING PERSONNEL				
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	6 [illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
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[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	5.7 [illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	5.7 [illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
TECHNICAL SERVICES				
Technical services manager	$49,496 (267)	5.7 (270)	5.8 [illegible]	Yes — 13 No — 87 (278)
Senior operating systems programmer	$43,487 [illegible]	5.7 (279)	4.1 (127)	Yes — 8 No — 92 (287)
Junior operating systems programmer	$33,573 (211)	5.8 (204)	2.7 [illegible]	Yes — 5 No — 95 (204)
[illegible]				
Data base manager	$48,227 (140)	5.6 (140)	4.8 [illegible]	Yes — 6 No — 94 [illegible]
Data base administrator	$42,104 (174)	5.5 (174)	3.5 (91)	Yes — 7 No — 93 (175)
Data base analyst	$37,006 (124)	5.5 (127)	3.7 [illegible]	Yes — 5 No — 95 [illegible]
COMMUNICATIONS				
Communications manager	$46,372 (154)	5.6 [illegible]	5.2 [illegible]	Yes — 8 No — 92 (158)
Communications specialist	$35,346 [illegible]	5.6 (193)	3.5 [illegible]	Yes — 6 No — 94 (196)
OPERATIONS PERSONNEL				
Data center or operations manager	[illegible] (578)	6.7 [illegible]	3.9 (307)	Yes — 7 No — 93 [illegible]
Data center shift supervisor	[illegible] (401)	[illegible]	2.6 [illegible]	Yes — 4 No — 96 [illegible]
Word processing supervisor	[illegible] [illegible]	5.4 [illegible]	2.6 [illegible]	Yes — 4 No — 96 [illegible]

*Number of respondents in parentheses

CW CHART

Benefits packages lacking

BY MICHAEL
SULLIVAN-TRAINOR
CW STAFF

MIS professionals who rated their salaries as fair or poor say they want better insurance coverage and bonus plans to improve their benefits packages.

About 30% of the nearly 1,500 respondents to the *Computerworld* salary survey ranked medical and insurance benefits, including fully paid disability, and better bonus and incentive programs as the top aspects of their benefits packages that need improvement.

Overall, nearly 1,500 respondents reported that the bonuses they receive are 10.4% of their base salaries. Bonuses in banking tended to be higher — 13.5% of the base salary — while those in government were a miniscule 2.6%.

Atlantans happy

Regionally, the best bonuses were given by companies in Atlanta, 13.4% of base. Companies in the Minneapolis/St. Paul area, which ranked lowest in the salary comparison, gave the second highest bonuses, 12.8% of base. The lowest overall bonuses, 7.4% of base, were given by organizations in the Washington, D.C./Baltimore area, the second lowest paying region.

"I'd rather have an increase in base salary than a bonus," says Tom McCullough, a lead data base analyst for Riggs National Bank in Washington, D.C. McCullough says he is currently satisfied with his salary. "But a bonus would be No. 1 over other benefits because I would have the option to choose how to spend it. It would also provide feedback on my performance," he adds.

While 19% of the professionals who gave their salaries low ratings selected insurance and bonus plans as the benefits that need improvement, 18% said they want more vacation days and holidays.

Currently, the respondents said they are allowed 16.4 vacation days overall. One of the compensations for working in the low-paying education field is longer vacations. Professionals in that area reported 21.6 vacation days.

Stock options were chosen by another 16% of the respondents. Only 32% of the MIS executives with vice-president titles surveyed reported that they received stock options. However, this percentage far exceeded those in other categories. For example, only 17% of the MIS directors, the next highest category, reported receiving stock options.

Profit sharing was not far behind as an important area of the benefits package, with 15% of the respondents selecting improvements in that area.

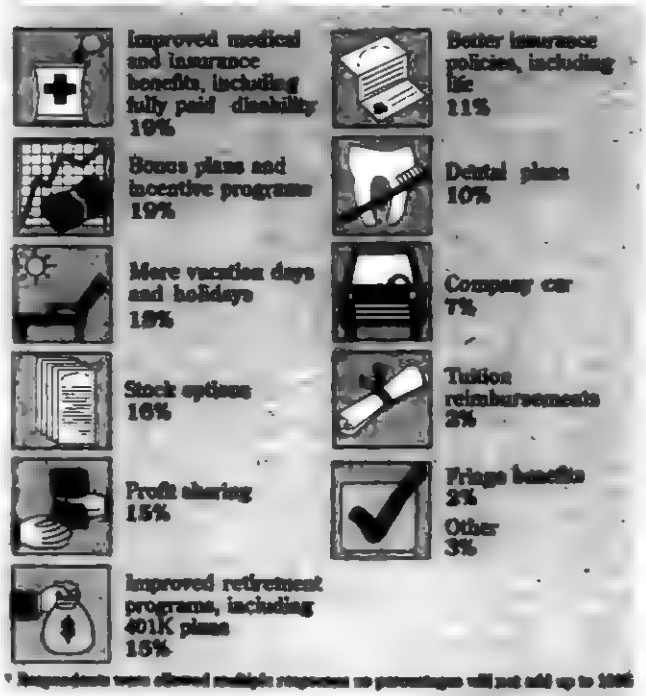
Too poor to retire?

Of equal importance was improved retirement programs, including 401K plans. But without sufficient income, such plans are not useful. "If they offered me a 401K, I wouldn't have enough money to put into it," McCullough says.

Life insurance and dental plans received nearly equal rankings as areas for improvement. A small number of respondents, 7%, said a company car would boost their benefits ratings.

Lowest on the benefits list was tuition reimbursement, cited by only 2% of the respondents. With the high demand for educational opportunities in MIS, companies are providing sufficient support for course work, according to the survey.

Boosting the compensation package rating
What MIS wants



* Respondents were allowed multiple responses so percentages will not add up to 100%

CW CHART: AMY J. SWANSON

You work

FROM PAGE 79

ones. For example, MIS directors make from $59,000 to more than $73,000 in companies that range in size from $100 million to $5 billion or more in revenue. Salaries of $41,014 to $53,385 are typical in companies that range from $500,000 to $99 million in revenue.

The exception to this rule is that small companies pay more than mid-size ones. MIS directors at firms with less than $500,000 in annual revenue make a mean salary of $54,756. That's $13,742 more than their counterparts at companies with $500,000 to $999,000 in annual revenue, who earn a mean of $41,014.

Regardless of size, the lowest paying organizations are educational institutions. For MIS professionals there, the beauty of the compensation is very much in the eyes of the beholder. Professionals in education, which ranked the lowest in 23 of the 25 positions covered, rated their salary and benefits favorably by a 7-to-3 margin, even though they make $6,500 less than the national mean of $55,104.

Environment is one of the factors that causes Donald Owings, director of administrative computing at the Pratt Institute in Brooklyn, N.Y., to rate his job highly. When Owings takes a break, he can relax by playing with the office cat. "I don't think Merrill Lynch would let us have a cat," he says.

The diversity of working in education outweighs the relative low salaries, says William Seeley, senior systems programmer for the University of Maryland Baltimore County.

Bureaucracy frustrating

As expected, government competes with education for the low end of the salary spectrum, according to the survey. While government employees make slightly more than MIS professionals in education and transportation, the effects of budget cuts, bureaucracy and low salaries leave workers frustrated.

"The U.S. government does not recognize the importance of our work," says Carlos Calberon, DP manager for the U.S. Postal Service Federal Credit Union in Washington, D.C. "They are always trying to cut back wherever possible."

According to one MIS veteran and government employee, who requested anonymity, the lack of competitive salaries makes hiring for all levels except entry positions very difficult. And chances are that when Uncle Sam does hire someone, that person will leave to join a commercial firm, where the pay is most often significantly higher.

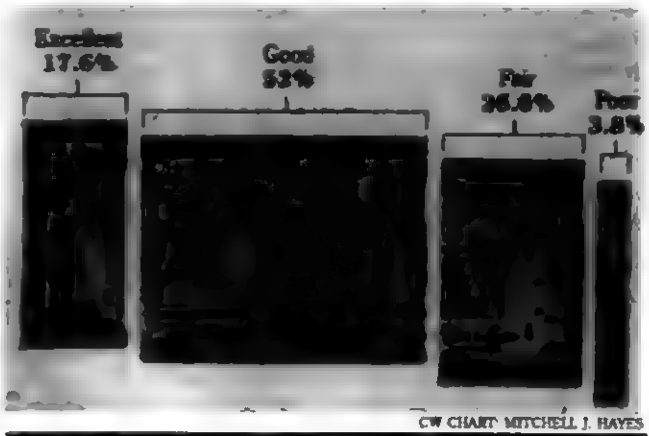
"We hire people out of college, give them lots of good training and experience, only to lose them a year or two later to the Beltway bandits: the contractors," the government employee says.

Low salaries and cutbacks are not the only issues that this group faces. Government workers expect to receive the lowest raises of all the industries queried. For example, data base managers working for the government report a mean increase of only 3.8% per year.

Fully 88% of the respondents in government and 91% of those in education would choose a raise over a bonus. Similarly, in setting an ideal salary increase, professionals in education set 21% as the necessary amount to bring their salaries in line with other markets, and government MIS professionals set 16% as the mean amount necessary to achieve parity.

Next week: MIS professionals rate their satisfactions and frustrations on the job.

Are you compensated fairly?
Of the 1,426 Computerworld salary survey respondents, 69.6% rate their compensation and benefits packages as good to excellent



CW CHART: MITCHELL J. HAYES

Personal preference

The *Computerworld*/DPMA salary survey revealed interesting employment profiles for MIS/DP professionals, among them the following:

- If it is high monetary rewards, status and a high-risk environment that you seek, aim for the top jobs in large manufacturing, banking and financial services or insurance firms. To earn the most money, head for the cities of New York, Los Angeles or San Francisco.
- If the fast track is not your idea of the good life, money is not your primary goal and you like a flexible work environment with varied and interesting responsibilities, work in education and live in Minneapolis.
- If you are seeking a low-risk, stable work environment that does not pay extremely well but has great benefits, live in Washington, D.C., and work for the government.

The *Computerworld*/DPMA salary survey, conducted by the research division of IDG Communications, Inc.'s marketing and communications group, was designed to explore trends in MIS/DP compensation packages for a variety of industries in 10 major metropolitan areas.

Those surveyed included *Computerworld* subscribers and members of the DPMA. IDG received a 21.3% response rate from its mailing of 7,060 questionnaires. A few of the questions attracted only a minimal number of responses. Readers should exercise caution when interpreting results in areas where the base is less than 20.

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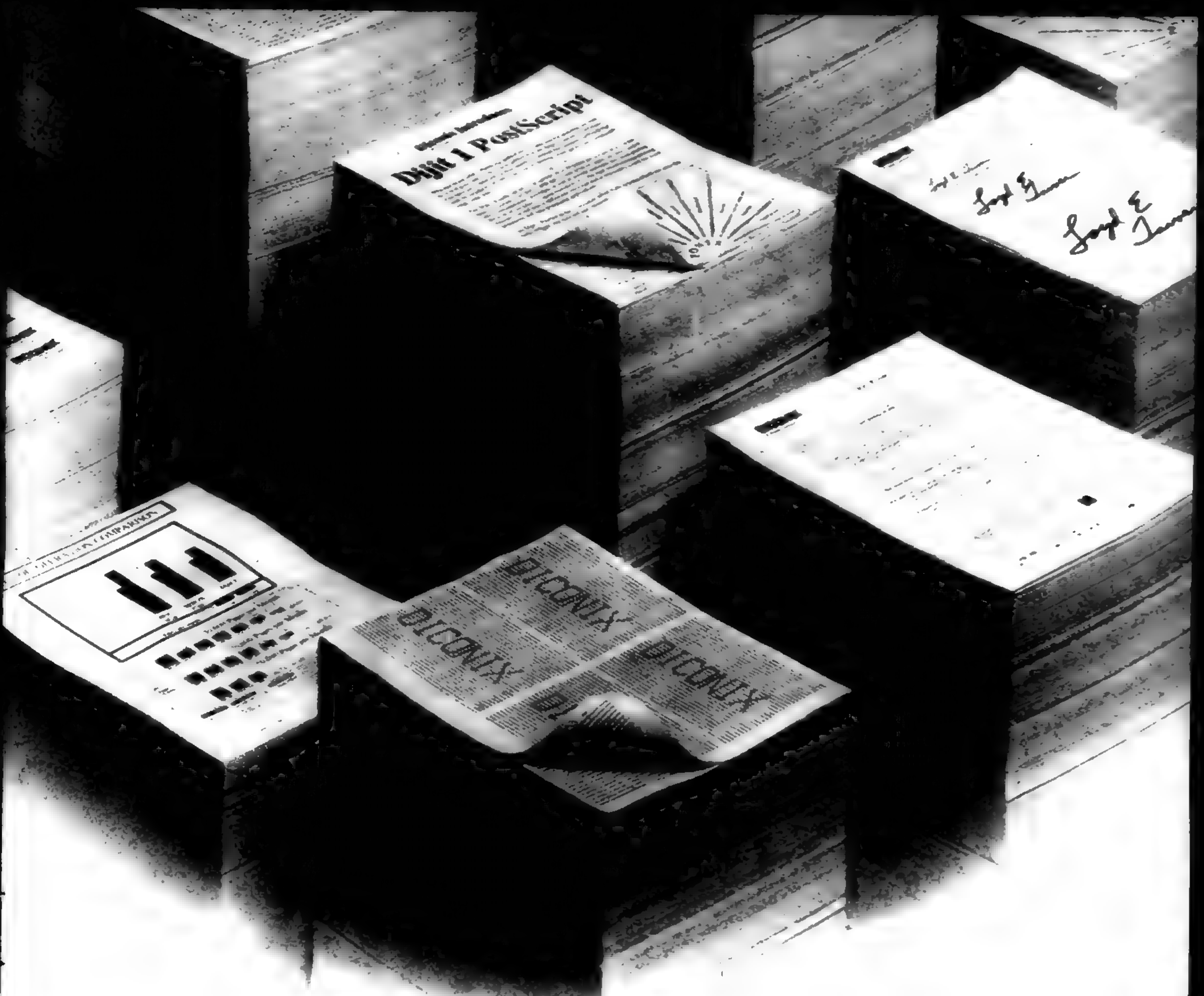

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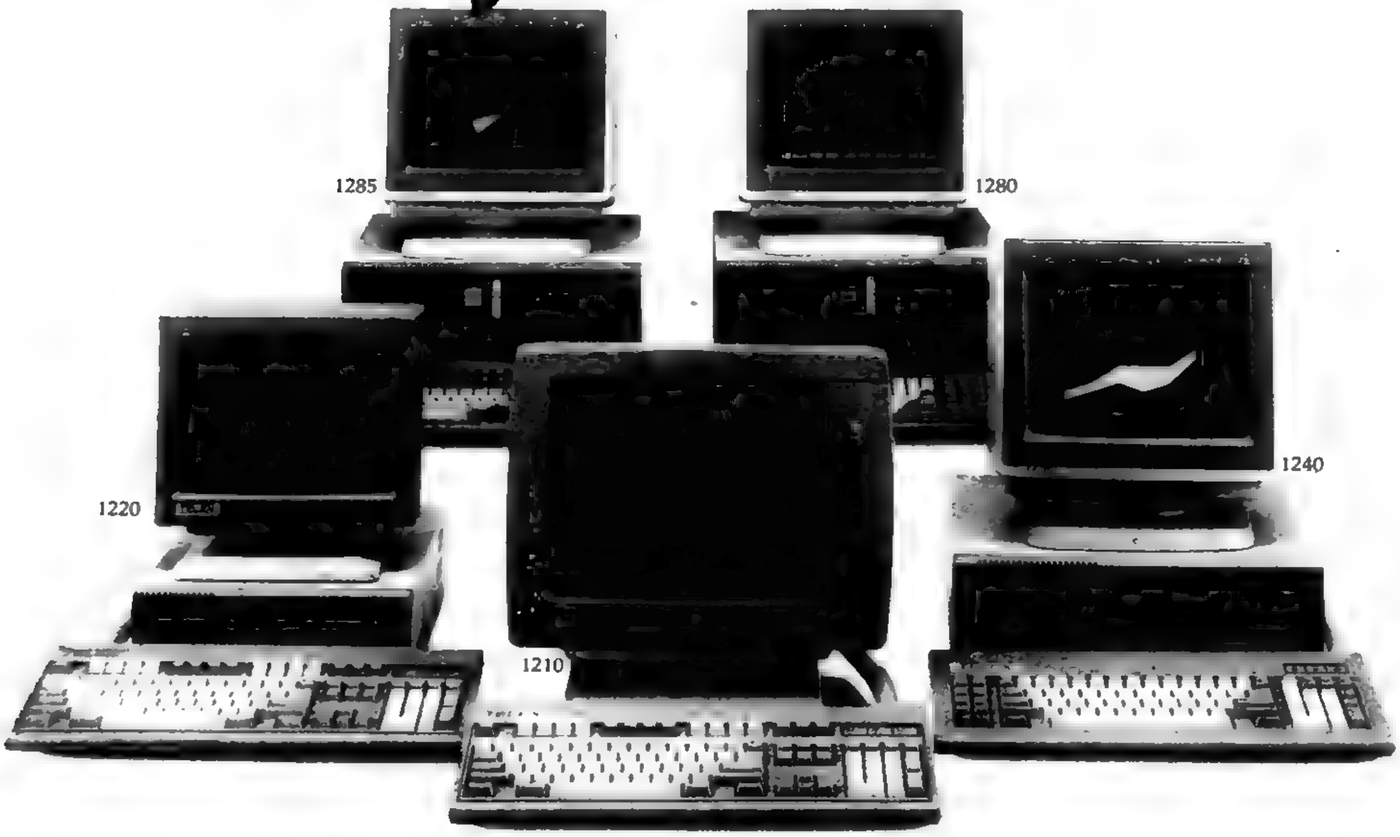

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Mean scores of MIS personnel by metropolitan region

CORPORATE STAFF	Total	Atlanta	Baltimore, Washington, D.C.	Boston	Chicago	Dallas, Fort Worth	Denver	San Diego, Los Angeles	Minneapolis, St. Paul	New York	San Francisco, Bay Area
VP/MIS *Average salary*	$75,155 (295)[1]	$73,636 (11)	$64,823 (21)	$75,718 (22)	$67,033 (48)	$74,269 (13)	$65,985 (13)	$79,786 (36)	$63,518 (11)	$84,416 (80)	$79,130 (23)
Percent of average increase	6.7 (290)	6 (12)	7.6 (21)	6.9 (22)	6.2 (46)	4.7 (14)	5.8 (12)	6 (34)	5.9 (11)	7.7 (77)	7.4 (23)
MIS director *Average salary*	$55,104 (857)	$50,802 (47)	$49,259 (46)	$54,304 (75)	$54,444 (147)	$52,858 (53)	$50,104 (45)	$54,868 (122)	$49,020 (49)	$60,829 (180)	$56,190 (61)
Percent of average increase	6 (813)	5.8 (45)	5.4 (46)	6.7 (72)	5.5 (143)	6.3 (50)	4.5 (44)	5.5 (115)	5.8 (48)	6.9 (167)	6.3 (53)
Information center manager *Average salary*	$46,757 (367)	$44,845 (15)	$42,923 (21)	$43,951 (22)	$48,930 (48)	$42,217 (13)	$44,682 (13)	$49,397 (36)	$42,157 (11)	$48,808 (80)	$45,890 (23)
Percent of average increase	5.7 (357)	4.9 (16)	5.7 (21)	5.7 (32)	6.1 (56)	5 (27)	5.6 (16)	5.2 (56)	4.4 (20)	6.5 (69)	5.6 (31)
Information center specialist *Average salary*	$35,232 (224)	$32,944 (10)	$32,421 (21)	$36,325 (20)	$33,384 (38)	$35,370 (10)	$37,312 (14)	$35,914 (32)	$33,156 (10)	$39,921 (43)	$37,783 (18)
Percent of average increase	5.6 (218)	4.3 (11)	5.2 (22)	6.3 (19)	5 (36)	5.4 (10)	4.8 (13)	5.2 (31)	4.8 (10)	7 (40)	6.4 (18)
PC manager *Average salary*	$37,333 (226)	$34,585 (11)	$36,666 (16)	$36,938 (16)	$35,688 (29)	$35,475 (16)	$38,881 (15)	$36,184 (32)	NA[2] NA	$40,496 (56)	$37,622 (18)
Percent of average increase	5.8 (217)	4.7 (12)	4.8 (16)	6.7 (16)	6 (29)	3.7 (16)	4.3 (13)	5.9 (31)	NA NA	6.9 (53)	5.9 (16)

SYSTEMS AND PROGRAMMING PERSONNEL	Total	Atlanta	Baltimore, Washington, D.C.	Boston	Chicago	Dallas, Fort Worth	Denver	San Diego, Los Angeles	Minneapolis, St. Paul	New York	San Francisco, Bay Area
Systems and programming manager *Average salary*	$48,290 (605)	$45,003 (34)	$44,085 (37)	$47,416 (48)	$47,210 (95)	$44,300 (40)	$47,046 (29)	$49,809 (88)	$42,906 (31)	$52,639 (139)	$47,737 (39)
Percent of average increase	5.9 (587)	5.3 (37)	5.4 (36)	6.8 (47)	5.6 (92)	5.4 (38)	3.9 (27)	5.6 (86)	5.2 (30)	6.8 (137)	5.7 (37)
Project manager *Average salary*	$44,946 (299)	$44,624 (19)	$38,960 (19)	$43,536 (25)	$43,070 (43)	$40,851 (19)	$43,447 (17)	$45,365 (37)	$42,354 (11)	$49,457 (74)	$44,480 (22)
Percent of average increase	6 (293)	5 (20)	5.3 (19)	7.1 (23)	6.1 (41)	6.7 (18)	4.1 (16)	5.8 (37)	5.3 (11)	6.9 (74)	5.9 (22)
Project leader *Average salary*	$41,252 (268)	$37,999 (19)	$37,057 (14)	$41,570 (27)	$42,239 (41)	$39,951 (11)	$40,523 (14)	$42,369 (35)	$38,639 (14)	$42,672 (64)	$40,375 (16)
Percent of average increase	5.7 (267)	5.2 (20)	5.7 (15)	6 (26)	5.3 (39)	4.9 (12)	3.5 (13)	5.6 (35)	4.8 (13)	6.7 (64)	6.2 (17)
Senior systems analyst *Average salary*	$38,908 (457)	$36,781 (30)	$34,417 (23)	$39,826 (33)	$39,012 (74)	$36,472 (26)	$38,915 (27)	$40,697 (67)	$35,136 (22)	$40,248 (97)	$40,124 (38)
Percent of average increase	5.6 (443)	5.2 (31)	5.4 (23)	6.1 (32)	5.2 (70)	4 (24)	3.7 (26)	4.7 (64)	5.7 (21)	6.6 (97)	5.6 (36)
Junior systems analyst *Average salary*	$32,447 (225)	$29,533 (13)	$25,883 (14)	$33,079 (19)	$35,912 (36)	$29,367 (11)	$35,058 (11)	$32,134 (32)	NA NA	$31,922 (55)	$34,588 (17)
Percent of average increase	5.9 (226)	5.6 (14)	5.7 (15)	5.8 (19)	4.9 (35)	4 (12)	4.4 (11)	6.7 (30)	5.7 (7)	7 (57)	5.9 (17)
Senior programmer/ analyst *Average salary*	$35,678 (686)	$33,999 (38)	$32,433 (41)	$34,327 (63)	$34,876 (111)	$33,300 (42)	$34,975 (36)	$37,365 (97)	$33,766 (40)	$37,726 (136)	$37,561 (55)
Percent of average increase	5.7 (670)	5.2 (38)	5.3 (39)	6.4 (61)	5.2 (108)	4.9 (40)	4.7 (35)	5.2 (95)	5.3 (39)	6.7 (132)	6.3 (54)
Junior programmer/ analyst *Average salary*	$27,892 (482)	$25,774 (31)	$24,632 (27)	$28,385 (39)	$29,304 (76)	$26,107 (36)	$29,147 (28)	$28,256 (70)	$26,352 (34)	$27,799 (89)	$30,539 (37)
Percent of average increase	5.9 (482)	5.8 (31)	6.1 (27)	6.2 (37)	5.6 (72)	5.1 (33)	4.4 (26)	5.6 (65)	6.4 (31)	6.7 (89)	6.1 (36)
Senior programmer *Average salary*	$32,313 (409)	$28,087 (27)	$29,229 (29)	$30,861 (37)	$30,754 (64)	$29,159 (20)	$33,696 (19)	$33,619 (54)	$27,651 (24)	$34,743 (93)	$34,756 (25)
Percent of average increase	5.7 (401)	5.5 (28)	5.9 (28)	6.1 (36)	5.7 (63)	3.9 (19)	3.7 (17)	5.8 (53)	5.4 (23)	6.4 (93)	5.5 (24)
Junior programmer *Average salary*	$24,743 (444)	$21,906 (21)	$21,307 (30)	$24,542 (40)	$26,301 (78)	$22,746 (23)	$25,985 (27)	$24,565 (56)	$22,043 (30)	$24,770 (97)	$27,343 (26)
Percent of average increase	6.3 (434)	5.7 (22)	5.9 (28)	6.8 (38)	5.6 (71)	5.2 (23)	4.6 (26)	6.1 (54)	5.7 (29)	7.9 (93)	6.2 (25)

COMMUNICATIONS AND OPERATIONS PERSONNEL TECHNICAL SERVICES/ DATA BASE GROUP	Total	Atlanta	Baltimore/ Washington D.C.	Boston	Chicago	Dallas/ Fort Worth	Denver	San Diego/ Los Angeles	Minneapolis/ St. Paul	New York	San Francisco Bay Area
Technical services manager *Average salary*	$49,494 (287)	$46,045 (20)	$43,093 (21)	$46,290 (31)	$47,329 (44)	$48,012 (22)	$47,478 (18)	$50,078 (37)	NA NA	$57,649 (55)	$48,115 (17)
Percent of average increase	5.7 (278)	5 (19)	5.5 (21)	6.7 (29)	5.5 (44)	4.2 (22)	3.9 (17)	5.7 (36)	NA NA	7 (54)	5.8 (15)
Senior operating systems programmer *Average salary*	$43,467 (286)	$41,279 (14)	$40,165 (19)	$41,188 (26)	$42,361 (51)	$41,041 (23)	$41,172 (20)	$43,423 (39)	$38,600 (10)	$47,561 (51)	$45,160 (20)
Percent of average increase	5.7 (279)	5.8 (15)	5.6 (19)	6.5 (25)	5.4 (48)	5.2 (20)	4.1 (19)	5.3 (38)	5.9 (10)	6.9 (51)	6 (19)
Junior operating systems programmer *Average salary*	$33,573 (211)	$31,874 (12)	$27,324 (15)	$33,624 (21)	$35,952 (35)	$31,778 (18)	$36,112 (13)	$32,025 (26)	NA NA	$33,896 (34)	$35,448 (15)
Percent of average increase	5.8 (204)	4.4 (13)	6.2 (15)	6.3 (19)	5.8 (34)	5.4 (17)	4.2 (12)	5.4 (26)	NA NA	7.1 (33)	5.8 (16)
Data base manager *Average salary*	$48,227 (149)	NA NA	$45,908 (12)	$47,893 (14)	$47,636 (22)	NA NA	NA NA	$45,937 (19)	NA NA	$54,162 (29)	NA NA
Percent of average increase	5.6 (148)	NA NA	5.3 (13)	5.2 (13)	5.6 (22)	NA NA	NA NA	5.5 (19)	NA NA	6.8 (29)	NA NA
Data base administrator *Average salary*	$42,164 (173)	NA NA	$41,778 (16)	$37,219 (16)	$42,905 (22)	$40,854 (10)	$43,730 (14)	$36,558 (19)	NA NA	$47,087 (33)	$44,100 (18)
Percent of average increase	5.5 (174)	NA NA	5.2 (17)	5.9 (15)	4.8 (23)	4.3 (10)	4.3 (13)	5.8 (20)	NA NA	6.5 (33)	5.3 (17)
Data base analyst *Average salary*	$37,606 (124)	NA NA	$35,500 (12)	$33,667 (12)	$37,703 (18)	NA NA	NA NA	$36,758 (19)	NA NA	$39,696 (23)	NA NA
Percent of average increase	5.5 (127)	NA NA	6.3 (13)	5.6 (12)	4.3 (18)	NA NA	NA NA	5.8 (20)	NA NA	6.5 (23)	NA NA
Communications manager *Average salary*	$46,371 (154)	$44,235 (10)	$42,900 (10)	$41,500 (14)	$47,595 (20)	$44,006 (10)	$46,343 (12)	$46,140 (15)	NA NA	$50,861 (36)	$40,692 (12)
Percent of average increase	5.6 (153)	4.3 (11)	5.5 (11)	6.5 (13)	5 (19)	NA NA	4 (11)	5.8 (16)	NA NA	6.8 (35)	6.9 (11)
Communications specialist *Average salary*	$35,346 (200)	$33,935 (17)	$33,250 (14)	$34,706 (16)	$34,788 (25)	$32,740 (15)	$32,879 (18)	$36,895 (27)	NA NA	$37,945 (32)	$37,000 (15)
Percent of average increase	5.6 (199)	4.7 (18)	5.5 (14)	7 (16)	5.2 (25)	5.1 (15)	4.2 (17)	5.4 (26)	NA NA	6.5 (32)	6.2 (15)
Data center/Operations manager *Average salary*	$38,629 (578)	$36,311 (35)	$36,246 (32)	$39,020 (56)	$37,827 (86)	$34,486 (42)	$38,538 (29)	$37,624 (91)	$35,350 (26)	$40,933 (118)	$42,805 (39)
Percent of average increase	5.7 (550)	5.7 (35)	5.6 (31)	6.4 (34)	5.2 (85)	4.7 (40)	3.7 (28)	5.3 (87)	5.2 (25)	6.6 (114)	5.5 (37)
Data center shift supervisor *Average salary*	$28,944 (400)	$30,420 (24)	$24,680 (28)	$28,656 (37)	$28,961 (64)	$25,764 (25)	$32,551 (20)	$29,261 (58)	$27,519 (24)	$30,355 (74)	$28,822 (30)
Percent of average increase	5.5 (388)	5 (25)	5.8 (27)	5.9 (34)	4.9 (61)	4.8 (25)	4.1 (19)	5.3 (56)	5.3 (24)	6.4 (74)	6.1 (29)
Word processing supervisor *Average salary*	$28,040 (184)	$23,162 (10)	$22,811 (12)	$29,459 (17)	$30,490 (21)	NA NA	$30,326 (13)	$28,487 (28)	$30,158 (12)	$27,580 (44)	$28,313 (13)
Percent of average increase	5.4 (177)	4.6 (11)	5.7 (12)	5.5 (15)	4.5 (20)	NA NA	3.1 (12)	6.7 (26)	4.6 (12)	6.2 (42)	5.4 (13)

¹Respondent base provided in parentheses
²Not available due to insufficient information

Hutton

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Besides Rittereiser, other members include E. F. Hutton's chief financial officer, general counsel and director of strategic development and marketing and representatives of its corporate finance, public finance, bond trading and retail investment areas.

Taub shifts focus

While Epstein has concentrated on back office processing of transactions, Taub chiefly has focused on decision support systems, investment banking applications, financial controls and some specialized back office support for clients.

Taub said he will now devote more time to the back office as well as information on customers and customer service. "It is extremely important to emphasize marketing strategy and promotion," he said.

Taub credited Epstein with making E. F. Hutton "a technological leader on Wall Street," particularly in managing the tremendous growth of back office processing, installing a new communications system and developing the firm's new PC-based workstations for account executives.

Epstein is also known for leading development of on-line home brokerage information services and companywide desktop communications as well as on-line information services and portfolio analysis.

He joined E. F. Hutton in 1961 as director of data processing and headed the firm's development of information systems and telecommunications until July.

Epstein earned a bachelor's degree in economics from the Community College of New York, served in the military and later joined RCA Corp., where he developed a DP service bureau on Wall Street, whose major client was E. F. Hutton.

PC control advocate

Epstein drew attention at a 1983 Future Computing, Inc. personal computer forum when he publicly advocated tight control over proliferation of personal computers despite surging demand from users [CW, March 28, 1983].

"My view on that has not changed one bit," Epstein said in a telephone interview. "The misuse of PCs is more dangerous than time-sharing at its worst. It allows users a vehicle for bypassing controls. To me, a manager has an obligation to control the environment.

"It's costly because you can't share the resources," Epstein continued. "The perfect world would be one enormous computer and dumb terminals attached to it that provide all the information the user needs instantaneously. Any deviation from that would be a compromise. When you deviate from that, you should understand the deviation, and you should understand what the risks are."

Last week, E. F. Hutton began beta-testing a network of 10,000 NCR Corp. personal computers that are part of a four-tier, nationwide computer architecture linked via a high-speed satellite communications system.

The PCs are tied to previously installed Data General Corp. Eclipse and MV minicomputers in branch and regional offices, respectively, and with IBM 3090 mainframes in New York [CW, Aug. 11, 1986].

"Any terminal can speak to any terminal anywhere in the system in living color. It is the most advanced system that I am aware of," Epstein said.

"It's a quite complex environment we're putting in place," Taub remarked.

Industry variations

Mean scores of MIS personnel by industry

CORPORATE STAFF	Total	Banking/ Financial	Insurance	Government	Wholesale/ Retail	Education	Utilities	Manufacturing	Other
VP/MIS *Average salary*	$75,155 (295)[1]	$77,536 (81)	$66,031 (42)	$66,937 (16)	$76,513 (31)	$67,972 (18)	NA[2] NA	$85,391 (44)	$70,189 (52)
Percent of average increase	6.7 (290)	7.2 (82)	7.7 (41)	3.6 (16)	7.2 (32)	6.1 (19)	NA NA	5.8 (44)	6.7 (48)
MIS director *Average salary*	$55,104 (857)	$65,485 (62)	$60,254 (35)	$51,393 (83)	$52,840 (131)	$48,598 (107)	$60,194 (16)	$57,171 (288)	$53,794 (125)
Percent of average increase	6 (812)	7 (59)	7.1 (34)	4.9 (82)	6 (122)	6 (97)	4.8 (13)	5.8 (281)	6.3 (118)
Information center manager *Average salary*	$46,757 (367)	$55,186 (47)	$53,490 (20)	$43,327 (33)	$44,710 (42)	$36,928 (30)	$54,081 (18)	$48,152 (117)	$41,403 (57)
Percent of average increase	5.7 (357)	6.1 (47)	6 (20)	5.1 (33)	6.8 (41)	5.4 (27)	4.5 (15)	5.3 (115)	5.8 (56)
Information center specialist *Average salary*	$35,232 (224)	$36,606 (35)	$38,571 (14)	$33,256 (29)	$31,840 (20)	$30,410 (20)	$42,346 (13)	$36,494 (58)	$33,914 (33)
Percent of average increase	5.6 (218)	6.4 (36)	8.7 (13)	4.2 (30)	5.8 (18)	6.1 (20)	3.8 (10)	5.5 (54)	5.8 (33)
PC manager *Average salary*	$37,333 (226)	$39,583 (43)	$44,315 (12)	$37,438 (26)	$34,154 (13)	$29,871 (28)	NA NA	$38,926 (55)	$34,868 (38)
Percent of average increase	5.8 (217)	6.8 (44)	6.9 (13)	5 (26)	6.7 (11)	5.4 (26)	NA NA	5.5 (53)	5.3 (36)

SYSTEMS AND PROGRAMMING PERSONNEL	Total	Banking/ Financial	Insurance	Government	Wholesale/ Retail	Education	Utilities	Manufacturing	Other
Systems and programming manager *Average salary*	$48,290 (606)	$52,686 (88)	$50,430 (40)	$46,186 (48)	$46,921 (77)	$39,892 (57)	$52,560 (17)	$49,340 (181)	$47,421 (92)
Percent of average increase	5.9 (587)	6.8 (87)	7.1 (39)	4.4 (47)	6.2 (73)	5.9 (52)	4.7 (16)	5.3 (177)	6.2 (91)
Project manager *Average salary*	$44,946 (299)	$45,752 (67)	$51,875 (16)	$41,504 (26)	$42,125 (32)	$34,185 (13)	$49,980 (12)	$45,874 (77)	$45,000 (53)
Percent of average increase	6. (290)	7.3 (68)	6.8 (15)	4.8 (25)	6.4 (30)	4.7 (10)	4.3 (11)	5.5 (80)	6.1 (51)
Project leader *Average salary*	$41,252 (268)	$41,921 (43)	$43,675 (20)	$38,752 (28)	$39,838 (32)	$30,427 (11)	$44,888 (12)	$43,665 (84)	$38,369 (36)
Percent of average increase	5.7 (267)	6.4 (44)	6.6 (20)	5 (28)	5.9 (32)	5 (11)	4.3 (10)	5.3 (84)	6.1 (35)
Senior systems analyst *Average salary*	$38,906 (457)	$38,467 (66)	$41,897 (28)	$36,048 (51)	$37,608 (35)	$34,940 (44)	$43,089 (14)	$40,327 (152)	$39,622 (60)
Percent of average increase	5.6 (443)	6.7 (65)	6.4 (27)	4.7 (50)	5.5 (34)	5.8 (42)	4.2 (13)	5.2 (148)	6 (57)
Junior systems analyst *Average salary*	$32,447 (235)	$31,217 (42)	$32,631 (16)	$29,506 (28)	$31,933 (15)	$26,643 (14)	$38,454 (10)	$35,035 (67)	$31,116 —
Percent of average increase	5.9 (226)	6.2 (43)	7.2 (15)	4.7 (25)	6.7 (15)	6.2 (13)	4.2 (10)	5.5 (69)	6.4 (33)
Senior programmer/analyst *Average salary*	$35,678 (686)	$37,083 (84)	$38,196 (48)	$34,501 (68)	$33,961 (94)	$30,392 (56)	$40,000 (16)	$37,596 (224)	$34,571 (87)
Percent of average increase	5.7 (670)	6.4 (83)	6.8 (46)	4.8 (67)	5.9 (93)	5.6 (53)	4.5 (15)	5.4 (219)	6 (86)
Junior programmer/analyst *Average salary*	$27,992 (482)	$27,785 (67)	$28,256 (37)	$27,826 (42)	$25,274 (53)	$24,013 (38)	$32,924 (16)	$28,951 (163)	$28,170 (61)
Percent of average increase	5.9 (462)	6.5 (68)	7.5 (36)	4.7 (42)	6.3 (48)	6.6 (32)	4.6 (16)	5.5 (158)	5.7 (58)
Senior programmer *Average salary*	$32,313 (409)	$32,211 (53)	$32,512 (28)	$29,421 (46)	$31,792 (54)	$27,384 (37)	$35,252 (13)	$34,989 (122)	$31,663 (52)
Percent of average increase	5.7 (401)	6.6 (53)	6.7 (27)	4.9 (46)	6.2 (53)	5.3 (34)	4 (12)	5.3 (121)	6.1 (50)
Junior programmer *Average salary*	$24,743 (444)	$26,212 (61)	$24,839 (41)	$22,988 (42)	$23,373 (62)	$20,667 (32)	$27,080 (15)	$26,249 (130)	$23,818 (57)
Percent of average increase	6.3 (424)	6.7 (60)	8.1 (38)	5 (43)	7.8 (59)	5.5 (26)	4.1 (14)	5.5 (126)	6.4 (54)

COMMUNICATIONS AND OPERATIONS PERSONNEL, TECHNICAL SERVICES, DATA BASE GROUP	Total	Banking/ Financial	Insurance	Government	Wholesale/ Retail	Education	Utilities	Manufacturing	Other
Technical services manager *Average salary*	$49,494 (287)	$55,425 (47)	$54,420 (20)	$46,209 (25)	$50,554 (26)	$34,418 (22)	$52,453 (12)	$49,351 (87)	$48,899 (42)
Percent of average increase	5.7 (278)	6.4 (48)	7.1 (19)	4.2 (25)	6.6 (26)	5.4 (20)	4.3 (10)	5.3 (84)	6.3 (40)
Senior operating systems programmer *Average salary*	$43,467 (288)	$47,022 (46)	$43,811 (29)	$39,913 (29)	$41,396 (28)	$34,776 (17)	NA NA	$44,333 (91)	$42,528 (39)
Percent of average increase	5.7 (279)	6.2 (45)	6.4 (28)	4.7 (27)	6.1 (28)	6.1 (15)	NA NA	5.1 (90)	6 (36)
Junior operating systems programmer *Average salary*	$33,573 (211)	$34,805 (37)	$35,111 (18)	$30,779 (21)	$29,180 (21)	$27,350 (14)	NA NA	$36,866 (62)	$32,346 (28)
Percent of average increase	5.8 (204)	6 (36)	7.4 (17)	4.8 (21)	6.4 (20)	5.4 (12)	NA NA	5.3 (61)	6.5 (26)
Data base manager *Average salary*	$48,227 (149)	$53,260 (25)	NA NA	$43,529 (15)	$46,142 (12)	NA NA	NA NA	$47,561 (46)	$44,711 (23)
Percent of average increase	5.6 (148)	6.8 (25)	NA NA	3.8 (16)	5.5 (10)	NA NA	NA NA	5.7 (48)	5.5 (23)
Data base administrator *Average salary*	$42,164 (173)	$45,954 (26)	NA NA	$44,709 (17)	$38,356 (18)	$31,414 (14)	$45,022 (11)	$42,083 (52)	$38,862 (23)
Percent of average increase	5.5 (174)	6.4 (28)	6.2 (10)	3.9 (18)	5.1 (17)	4.9 (13)	3.8 (10)	5.3 (53)	6.8 (22)
Data base analyst *Average salary*	$37,606 (124)	$39,747 (19)	NA NA	$38,779 (12)	NA NA	$28,940 (10)	NA NA	$36,680 (41)	$36,875 (19)
Percent of average increase	5.5 (127)	6.2 (20)	NA NA	4 (13)	NA NA	4.7 (10)	NA NA	5.6 (43)	5.9 (18)
Communications manager *Average salary*	$46,371 (154)	$46,763 (38)	NA NA	$45,531 (13)	$46,245 (11)	$36,846 (13)	$50,206 (10)	$46,549 (39)	$45,344 (19)
Percent of average increase	5.6 (153)	6.3 (38)	NA NA	4.3 (14)	5.8 (10)	5.7 (10)	NA NA	5.5 (41)	5.8 (18)
Communications specialist *Average salary*	$35,346 (200)	$34,656 (41)	$43,315 (13)	$32,590 (22)	$36,281 (16)	$25,638 (23)	NA NA	$37,067 (52)	$35,801 (23)
Percent of average increase	5.6 (198)	6.1 (42)	7 (13)	4.7 (23)	5.6 (16)	4.6 (20)	NA NA	5.5 (53)	6.1 (22)
Data center/Operations manager *Average salary*	$38,639 (578)	$45,237 (73)	$41,309 (41)	$38,790 (44)	$35,874 (85)	$29,236 (46)	$46,421 (19)	$39,189 (177)	$36,878 (83)
Percent of average increase	5.7 (558)	6.7 (72)	6.6 (39)	4.6 (44)	5.8 (83)	5.6 (44)	4.4 (18)	5.4 (173)	5.6 (78)
Data center shift supervisor *Average salary*	$28,944 (400)	$30,220 (58)	$30,686 (35)	$27,817 (35)	$25,591 (55)	$24,902 (21)	$38,080 (15)	$29,968 (120)	$27,715 (56)
Percent of average increase	5.5 (388)	6.3 (53)	6.6 (33)	5.5 (34)	5.4 (55)	5.3 (21)	3.7 (14)	5.2 (115)	5.4 (53)
Word processing supervisor *Average salary*	$28,040 (184)	$26,880 (25)	$31,672 (18)	$25,663 (22)	$23,423 (13)	$23,610 (18)	NA NA	$30,723 (42)	$27,813 (35)
Percent of average increase	5.4 (177)	6.2 (25)	7.5 (17)	4.1 (22)	5.2 (12)	4.7 (17)	NA NA	5.8 (42)	4.4 (32)

[1] Base of respondents in parentheses

[2] Not available because of insufficient information

CALENDAR

SEPT. 13-19

Vaulting the Barriers to EFT Success. Washington, D.C., Sept. 13-15 — Contact: Linda Munday, Electronic Funds Transfer Association, Suite 1000, 1726 M St. N.W., Washington, D.C. 20036.

13th National Conference of North American Honeywell Users. Cincinnati, Sept. 13-17 — Contact: Les Pacca, NAHU, P.O. Box 2037, Willingboro, N.J. 08046.

Software Contracts. Boston, Sept. 14-15 — Contact: Registrar, Batelle Seminars Program, P.O. Box C-5395, 4000 N.E. 41st St., Seattle, Wash. 98105. Also being held Oct. 5-6 in Chicago.

The First Annual Conference on Expert Systems in Financial Institutions. New York, Sept. 14-15 — Contact: Conference Administrator, Institute for International Research, Inc., Suite 600, 9301 Wilshire Blvd., Beverly Hills, Calif. 90210

Atre Annual Forum on Data Base. New York, Sept. 14-16 — Contact: Atre International Consultants, Inc., P.O. Box 727, 16 Elm Place, Rye, N.Y. 10580.

Data Storage 87. Santa Clara, Calif., Sept. 14-16 — Contact: Forum Management, Cartlidge & Associates, Inc., Suite M-259, 1101 S. Winchester Blvd., San Jose, Calif. 95128.

7th Annual Conference on Control, Audit & Security of IBM Systems. Chicago, Sept. 14-17 — Contact: MIS Training Institute, 4 Brewster Road, Framingham, Mass. 01701.

Integrated Manufacturing Solutions '87. Long Beach, Calif., Sept. 14-18 — Contact: Intertec Communications, Inc., Building 33-34, 2472 Eastman Ave., Ventura, Calif. 93003.

1987 Electronic Printer and Publishing Conference. Miami, Sept. 14-18 — Contact: Jean O'Toole, CAP International, Inc., One Snow Road, Marshfield, Mass. 02050.

Project Management Expo '87. Arlington, Va., Sept. 15-16 — Contact: Project Management Conference, U.S. Professional Development Institute, Suite 221, 1734 Elton Road, Silver Spring, Md. 20903.

ICCC-ISDN '87 . . . Evolving to ISDN in North America. Dallas, Sept. 15-17 — Contact: International Council for Computer Communication, c/o Bell Communications Research Corp., Room 1B349, 290 W. Mount Pleasant Ave., Livingston, N.J. 07039.

CAM-I Industrial Automation Standards Conference & Workshop. Chicago, Sept. 15-18 — Contact: Annette Van Hauen, Computer Aided Manufacturing-International, Inc., Suite 1107, 611 Ryan Plaza Drive, Arlington, Texas 76011.

The National Association of Bank Servicers' Annual Meeting. Seattle, Sept. 15-18 — Contact: NABS, Suite B, 5008 Pine Creek Drive, Westerville, Ohio 43081.

Workshop on Computer-Assisted Map Analysis. Corvallis, Ore., Sept. 16-17 — Contact: School of Forestry and Environmental Studies, Yale University, 205 Prospect St., New Haven, Conn. 06511.

Information Systems Consultants Association's Second Annual Conference and Consultants Market. Atlanta, Sept. 18-19 — Contact: ISCA, Inc., P.O. Box 467190, Atlanta, Ga. 30346.

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Good writers

CONTINUED FROM PAGE 77

THE COST of poor specifications is a low-quality product, decreased productivity, poor time management and increased development and maintenance expenses.

selves between the proverbial rock and a hard place. They need the system by a certain date; the requirements document is incomprehensible; there isn't enough time for a complete English translation; and if they don't sign off, the project will be late and more expensive. Usually, they'll approve the document but with great reservations. Several months later, a costly system that fails to meet their expectations is delivered.

The development programmers also get frustrated. They receive verbal program specifications rather than written ones because the analyst doesn't want to write. Despite inadequate specifications, the programmers must provide a completion date.

After additional discussions with the analyst, the programmers discover that the program is far more complex and time-consuming than expected. However, the deadline remains unchanged, and they are pressured to complete the undocumented program. Inevitably, the programmers spend more time getting verbal instructions than it would have taken to write the specifications. The same problem occurs with poorly written program specifications.

When this undocumented program goes into production, it becomes another nightmare for the maintenance programmer. The cost of poor specifications is a low-quality product, decreased productivity, poor time management and increased development and maintenance expenses. These scenarios are played over and over for the detailed design, user guide, operations guide and test plans. Developers want to bypass prose and go straight to programming.

Unfortunately, DP managers tend to support this methodology. They feel that a project isn't making progress until they can count lines of code. People expect to develop high-quality systems without well-written documentation. This is like making a movie without a script — very risky.

Reverting to prehistoric practices

This fear of writing has led to pictorial user requirements and specifications. We've progressed from the green templates and special forms of the 1970s to PC-based computer-aided software engineering (CASE) tools. We still use functional decomposition design methods, but instead of writing prose, we use boxes, bubbles, braces, brackets and other diagrams to communicate. It's as though we've gone back to prehistoric times, when humans drew pictures on the cave walls.

Some consulting firms will use joint application design teams to develop requirements. The teams consist of a gatekeeper, an interrogator and a scribe. The gatekeeper locks the users and DP staff in an off-site dungeon. The interrogator hammers the requirements and specifications out of the users and DP staff, while the scribe records the confessions.

The price of poor writing skills is the cost of CASE products and consulting services. Furthermore, CASE tools and joint application design may help satisfy short-term solutions, but the fundamental problem remains: Most of the DP staff is professionally illiterate.

Companies should invest in writing courses. These courses should encourage the staff members to accept criticism about their writing and to accept the fact that good writers will produce several drafts before the final version.

The training cost for the DP staff would be less than a CASE tool and would help build management skills and self-confidence. Building good writing skills requires management support.

The lack of a good management trainee pool becomes apparent when DP shops try to promote programmers and analysts into nontechnical or managerial positions. These positions require good writing skills, but many programmers don't want to write. If a company wants to promote from within, it must continuously train the nonmanagerial staff to become better writers.

If colleges want to better educate students, they should incorporate more business writing or technical writing courses into their DP curricula. The acceptance of a project depends on how well one can write the user-requirements document.

Writing should be placed on the same level of importance as programming. A DP staff unable to write quality documentation can't design quality systems. Managers should support and reward good writers as they do good technicians. This will encourage people to write better documentation and, subsequently, design better, less expensive systems.

Reed is a quality assurance consultant with the data services department of the Federal Reserve Bank of Dallas.

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MEMOREX

Continued from page 86

SEPT. 20-26

The Eighth Annual Data Design Users Conference. San Francisco, Sept. 20-23 — Contact: Data Design Associates, 1279 Oakmead Pkwy., Sunnyvale, Calif. 94086.

Interex North American Conference of Hewlett-Packard Co. Business Computer Users. Las Vegas, Sept. 20-25 — Contact: Interex Conference Department, 680 Almanor Ave., Sunnyvale, Calif. 94086.

Management Information Systems for Strategic Advantage. Philadelphia, Sept. 20-25 — Contact: Registrar, Office of Executive Education, 200 Vance Hall, The Wharton School, University of Pennsylvania, Philadelphia, Pa. 19104.

Systems Integration in Multivendor Environments: Dataquest, Inc.'s Business and Office Systems Conference. Littleton, Mass., Sept. 21-22 — Contact: Dataquest, 1290 Ridder Park Drive, San Jose, Calif. 95131.

Integrated Services Digital Networks. San Francisco, Sept. 21-22 — Contact: Customer Service, Frost & Sullivan, Inc. 106 Fulton St., New York, N.Y. 10038.

CD-ROM Expo. New York, Sept. 21-23 — Contact: IDG Conference Management Group, Box 9171, 375 Cochituate Road, Framingham, Mass. 01701.

Office Technologies Conference. Los Angeles, Sept. 21-23 — Contact: Corporate Expositions, Inc., P.O. Box 3727, Santa Monica, Calif. 90403.

Engineering Workstations Conference. Los Angeles, Sept. 21-23. Contact: Corporate Expositions, Inc., P.O. Box 3727, Santa Monica, Calif. 90403.

CSM '87: Conference on Software Maintenance. Austin, Texas, Sept. 21-24 — Contact: The Computer Society of the Institute of Electrical and Electronics Engineers, 1730 Massachusetts Ave. N.W., Washington, D.C. 20036.

10th National Computer Security Conference. Baltimore, Sept. 21-24 — Contact: Irene Isaac, B266 Technology Building, National Bureau of Standards, Gaithersburg, Md. 20899.

MAP/TOP Users Group Meeting. Dallas, Sept. 22-23 — Contact: The MAP/TOP Users Group, P.O. Box 930, One SME Drive, Dearborn, Mich. 48121.

Corpcon Corporate Microcomputer Exposition and Technical Conference. Los Angeles, Sept. 22-23 — Contact: Corporate Expositions, Inc., P.O. Box 3727, Santa Monica, Calif. 90403.

1987 Lawson Associates User Exchange Conference. Minneapolis, Sept. 22-25 — Contact: Lawson Associates, Inc., 2021 E. Hennepin Ave., Minneapolis, Minn. 55413.

5th Annual 1100 Data Center Management Conference. San Diego, Sept. 22-25 — Contact: Datametrics Systems Corp., 5270 Lyngate Court, Burke, Va. 22015.

Network Management Systems Expo '87. San Diego, Sept. 24-25 — Contact: Telestrategies, Inc., Suite 100, 1355 Beverly Road, McLean, Va. 22101.

Fifth Annual NCR Users Eastern America Conference. Fort Washington, Pa., Sept. 24-25 — Contact: Frank Whalon, c/o Tinius Olsen Testing Machine Co., P.O. Box 429, Willow Grove, Pa. 19090.

SEPT. 27-OCT. 3

Information Systems Perspectives Symposium: Managing Information Systems in the 1990s. San Francisco, Sept. 27-30 — Contact: Guide International Corp., Suite 600, 111 E. Wacker Drive, Chicago, Ill. 60601.

Contingency

CONTINUED FROM PAGE 78

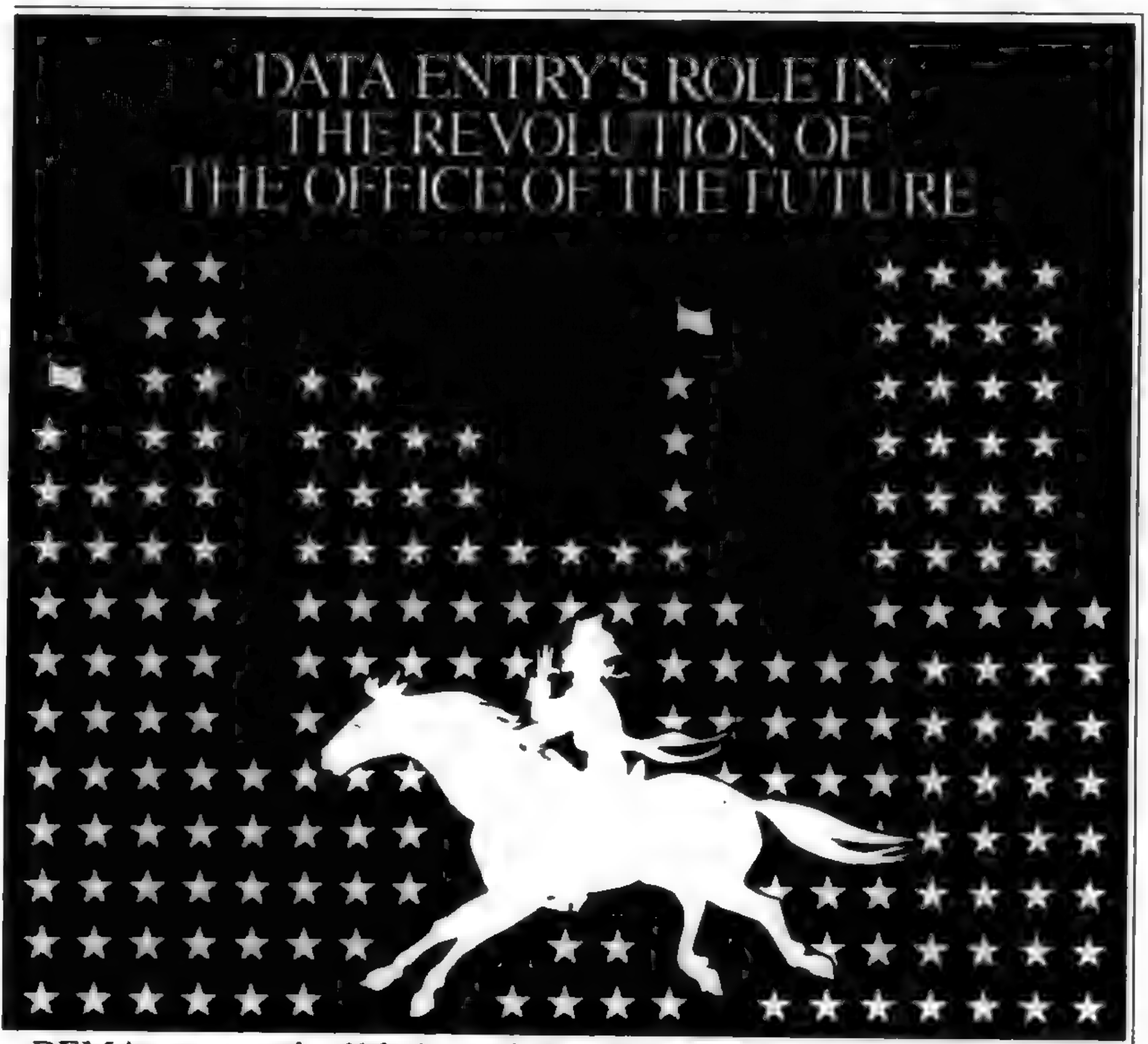
generally draw 250 to 300 people, making it difficult to find places to hold them, he says.

The organization produces a directory of disaster recovery service vendors and has conducted a survey of members' activities. Along with the New York organization, the Delaware Valley group helped start those in Hartford and Florida and one in Seattle. In addition to Toronto, there is an independent group in northeastern Ohio, and one is being formed in Boston.

Chapters of the Association of Contingency Planners are being formed in New York City, upstate New York, Connecticut, Delaware, Ohio, Georgia, Denver, Phoenix and Ontario.

The association held national conferences in Los Angeles in the spring of 1986 and again this year, each drawing about 125 members. This year, about half of the members were from states outside of California, according to Smith.

She says in the future she would like to see the organization help establish national standards for contingency planning and disaster recovery that might be adopted by federal government agencies.



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COMPUTER INDUSTRY

INDUSTRY INSIGHT

John Pistacchi

Long live time-sharing

Say the words "computer time-sharing," and most people will conjure up images of electronics engineers seated before dumb terminals that are linked to an off-site host mainframe.

Most will also declare that scenarios of this nature are dead and gone, along with the days when remote data processing was the only kind of processing available to the majority of computer users.

And they would be right — at least about the latter point. The terminal-to-mainframe hookups that characterized the first two decades of the time-sharing industry are indeed a thing of the past.

Still kicking

But computer time-sharing, and the requirement for it, remains very much alive.

The fact is, time-sharing has evolved right along with the era of distributed data processing on the one hand and the advent of supercomputing capability on the other. Time-shared access to the right machine for the right task is part of the integrated solution computer users need to do their jobs productively and cost-effectively.

Consider the distributed data processing environment typical of most companies today. Sooner or later, personal computer users need to tap into

Continued on page 98

Emulex wants out of DEC bind

Firm emphasizes R&D in attempt to break away from one-vendor focus

BY ALAN J. RYAN
CW STAFF

COSTA MESA, Calif. — In a spacious three-building complex here, Emulex Corp. executives are busy implementing a new strategy, one they say will help the company go beyond the constraints of the crowded Digital Equipment Corp.-compatible marketplace.

Soon after its inception as a partnership in 1978, Emulex became profitable as a vendor of DEC-compatible equipment; its first product was a disk controller. But the limited focus of the DEC market soon restricted the company's growth, and profits tumbled.

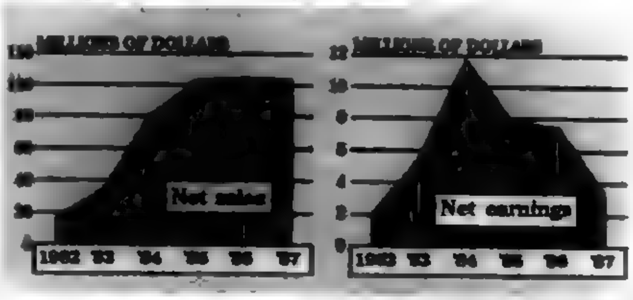
For its fiscal year ended July 1, 1984, Emulex reporting earnings of $11.8 million on sales of $80.2 million. In fiscal 1987, with sales at $103.8 million, earnings had dropped to just $3.5 million.

"Clearly, we intend to break out of that pattern" in fiscal 1988, says Stephen Frankel, company president, chief operating office and director. "What will bring about the change is the culmination and the completion of a very substantial research and development effort that we've been working on for over two years." Emulex spends approximately 11% of its revenue on research and development, Frankel says.

Emulex's Frankel

Emulex's seesaw ride

After flat sales and decreasing earnings, Emulex says its focus is expanding beyond the DEC-compatible market



INFORMATION PROVIDED BY EMULEX CORP.
CW CHART

Currently, Emulex is experiencing an increase in orders and backlogs, according to analyst Gary Shields of L. F. Rothschild & Co. Shields says he has reduced his firm's estimates of Emulex's earnings per share from 76 cents to 62 cents "based on lack of momentum in the fourth quarter. I feel the company's earnings could strengthen down the road."

"The concept is to build some base technologies in the storage area and in the communications arena and then apply that technology to multiple markets," Frankel says.

For instance, Emulex has produced a multipurpose very large-scale integration chip set in the storage area, which will be applied to other growth areas, Frankel adds.

But Frankel makes it clear that Emulex will not abandon the market that launched it.

"Our attitude is that DEC has created a substantial market. We feel there is a need within that market to bring some new technologies in terms of storage and communications products into it," he says.

"The company has suffered in terms of sales productivity," Shields says. "However, the vice-president of sales has been reassigned, and [Frankel] has taken over the sales and marketing end. He comes from a strong sales background, so I would expect that would be a positive move."

While Frankel admits his company needs DEC and its installed base of customers, the

Continued on page 96

Fairchild agrees to $122M buy-out

BY JAMES A. MARTIN
CW STAFF

After nearly a year of thwarted merger attempts, Silicon Valley's pioneer chip maker, Fairchild Semiconductor Corp., has agreed to be acquired by its onetime rival National Semiconductor Corp. for $122 million in stocks and warrants.

If the plan progresses as expected, Fairchild, which was founded in 1957 and became one of the first major semiconductor concerns in the U.S., will be engulfed entirely into National Semiconductor rather than operate as a subsidiary, as did parent company Schlumberger Ltd.

The fate of Fairchild's 32-bit Clipper reduced instruction set computing chip is uncertain. Some analysts said they believe National Semiconductor might choose to discontinue or sell off the Clipper, since the company has its own family of 32-bit chips, the Series 32000. National Semiconductor declined to comment on the matter, explaining that the details of the acqusition have yet to be ironed out.

The Clipper is said to be a crucial product for Intergraph Corp. in Huntsville, Ala., which manufactures a line of AT&T Unix System V-based engineering workstations built around the chip.

"We expect to continue with the Clipper, and since we don't

Continued on page 94

IBM winning skirmishes in European leasing war

BY AMIEL KORNEL
IDG NEWS SERVICE

LONDON — IBM recently won another round in its trade dispute with European leasing companies when a British firm withdrew its antitrust complaint against the company.

Atlantic Computer PLC dropped a case it had filed with the Commission of the European Community earlier this year. The company withdrew its charges following "extensive clarification by IBM of its business practices in Europe."

Atlantic reportedly dropped the case because recent decisions in similar cases suggested that it had little chance of winning. The withdrawal leaves one complaint before the commission, filed by another British leasing company, IBL PLC. But sources suggest that IBL is ready to drop its charges, too.

IBM has been successfully fighting European leasing firms in court battles for several years. In April, IBM won cases brought

Continued on page 98

MITI grabs for superconductor edge

Seeks equal funding for materials research and device development

BY LORU VALIGRA
SPECIAL TO CW

TOKYO — Japan's Ministry of International Trade and Industry (MITI) recently asked the Ministry of Finance for some $22 million for superconductor research in 1988, 11 times more than the $2 million allotted for this fiscal year.

With provisions for special loans to private company research and development groups, MITI will become the benefactor of the research, owning the patents that companies obtain. Additionally, almost 40% of the budget will be for applications development, an area in which Japan leads the U.S., according to Japanese industry analysts.

While MITI has granted special conditional loans in the past — in which the company receives money and then hands over the patent to MITI if research is successful — the loans are taking on a special role in easing potential superconductor trade friction.

In the past, MITI has only been able to strongly recommend actions to the industry to reduce trade friction over supercomputers, telecommunications and semiconductors. Now, anticipating potential allegations of unfair trade practices in the future, MITI has gained control of potentially $16.6 million worth of patents from loans totaling that amount — should the proposed budget be approved as is.

Promotes cooperation

"We can cooperate with foreigners better because we have the patents," said Shinichi Nakayama, director for the development program and international cooperation at MITI's Moonlight Project. "We can of-

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Fairchild

CONTINUED FROM PAGE 91

know what exactly will happen after the buy-out, we can't comment further," an Intergraph spokesman said.

Schlumberger had been looking to sell the ailing chip concern since at least last fall, when it was announced that Japan-based Fujitsu Ltd. would acquire Fairchild.

Halt to merger plans

Because of the widespread opposition from both government and private sectors concerning national security, Fairchild and Fujitsu called off their merger plans last spring [CW, March 23].

Following that action, a Fairchild management team that included President Donald Brooks sought to acquire the company from Schlumberger.

National Semiconductor, however, was able to outbid the buy-out team's bids.

The $122 million purchase price is far less than the $425 million that Schlumberger had originally paid to buy Fairchild.

But the acquisition is a "great move" for both companies in complementing one another's product areas and strengths, according to Andrew Rappaport, president of The Technology Research Group, Inc. in Boston.

Fairchild has strengths in high-performance bipolar logic and semicustom chip products, while National Semiconductor is noted for its semicustom business as well.

National Semiconductor has not been an emitter-coupled logic — that is, a high-end bipolar gate array product — supplier, while Fairchild has made "some interesting developments in that area," Rappaport said.

Meanwhile, Fairchild has a family of logic products that is "among the fastest in the industry, with a speed capability that National does not have," Rappaport added.

Moves into No. 3 spot

The acquisition will catapult National Semiconductor into the No. 3 position in the U.S. semiconductor industry, behind Texas Instruments, Inc. and Motorola, Inc. and ahead of Intel Corp., according to Michael Boss, a semiconductor analyst with Dataquest, Inc. in San Jose, Calif.

As individual entities, Fairchild ranked sixth and National Semiconductor 11th in 1986 revenue, Boss said.

By the fourth quarter this year, the combined company's revenue could be $2 billion, placing it in "a very privileged club in the semiconductor business," Boss said.

National Semiconductor President Charles Sporck was associated with Fairchild from 1959 to 1967, when he departed as general manager. However, Sporck's past association with Fairchild is not expected to make a difference in the acquisition process. "He was there a long time ago, and it's a very different company now," Rappaport said.

The fact that Silicon Valley's original chip maker is about to become history is not symbolic of the chip industry's recent problems, Rappaport warned.

"It's tempting to make this into some kind of symbol," he said. "But in reality, it's simply an interesting case study."

MITI

CONTINUED FROM PAGE 91

fer foreigners the patents at the same price as domestic companies," he said in a private interview.

He added that patents will be cross-licensed on a cost basis — that is, the amount that it costs to develop each patent.

The Ministry of Finance reportedly will make its decision by the end of December, and the budget will be passed next March.

Approximately $5.1 million of the proposed budget is targeted for research on high-temperature and room-temperature superconductors as well as for research on new superconductive materials — a tenfold increase from last year's $473,300.

Another $5.6 million is set aside for developing computer and electronic device applications.

The biggest chunk of the budget — $11.3 million — is for the development of superconductivity electrical applications technology.

Not national yet

MITI has not yet made superconductors a national project, as it has done with other technologies in the past, such as fifth-generation computers.

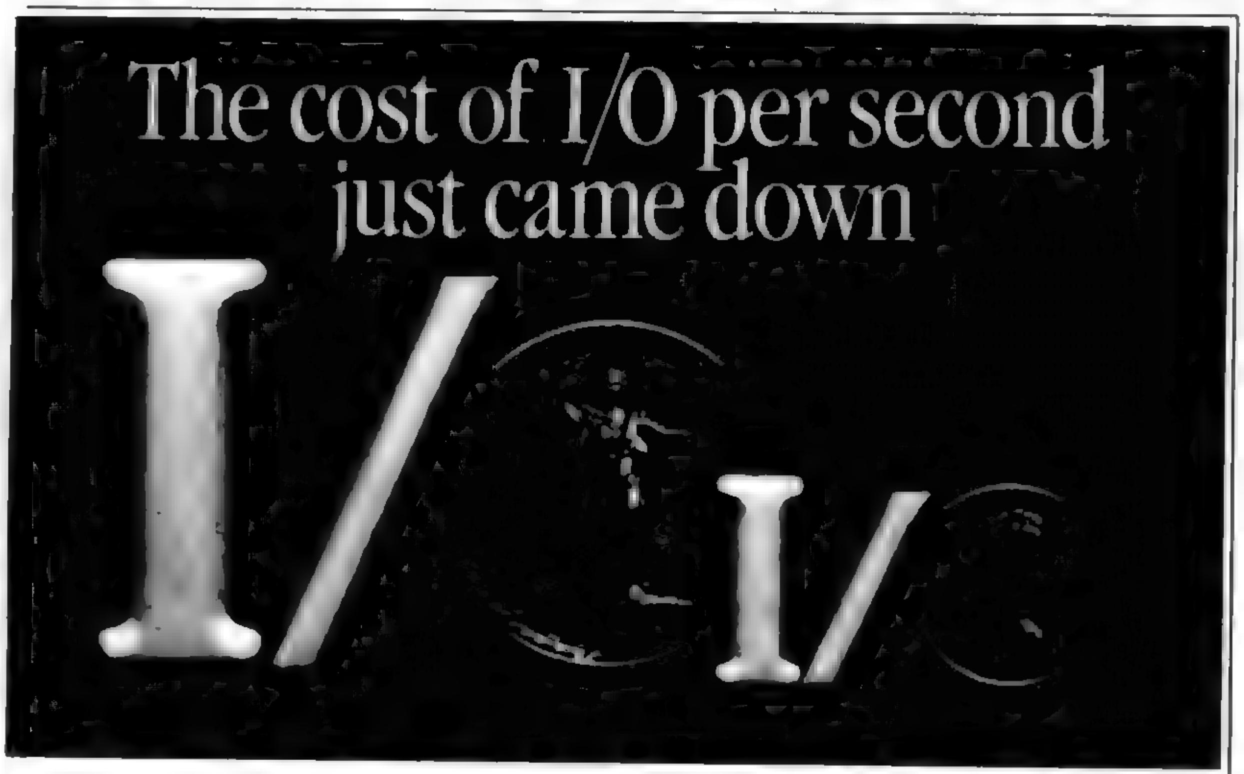
A MITI spokesman said he expects the government will plan such a project.

In addition to the $22 million budget, MITI requested $113,333 for international cooperation in superconductor research — the first time such a request has been made.

Shinya Hasuo, deputy manager of Fujitsu Ltd.'s exploratory devices laboratory, like others in the superconductor research field, said he realizes that actual applications are years away.

He said a one-chip computer, for example, will take a few years just to be documented in a laboratory report and then a few years more to be developed into commercial use.

Noting that many applications have not yet been conceived, one MITI representative said, "It's a bit like alchemy during the middle ages in Europe."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Mining DEC-compatible vein

Breaking through its DEC-compatible barrier is the challenge Emulex Corp. faces today, and the company's product line now reflects that strategy.

The company's communications product unit, headed by vice-president Ashok Dhawan, falls under the banner of price/performance products. While communications controllers once accounted for as much as 30% to 40% of Emulex's total revenue, currently they account for about 20%, Dhawan said.

Two years ago, Emulex saw a reduction in its DEC-compatible markets, so a plan to diversify the communications business was conceived, Dhawan said.

"We could have diversified by providing more solutions for the rest of the DEC market, but we decided to get beyond that and try to cover markets that are actually just generic communications markets rather than specific to DEC," he said.

New strategies include the company's 14.4K-bit facsimile modem announced in January, which reportedly allows facsimile transmission at a rate 50% faster than 9.6K-bit modems.

Emulex is also trying to make inroads into the high-speed leased-line modem market with a CMOS very large-scale integration chip that "allows us to provide modem pumps that operate at 14.4K bit/sec.," according to Dhawan.

Ashok Dhawan

Bill Mathrani, vice-president of the storage products unit formed in November, said his division will concentrate on chips for the OEM marketplace.

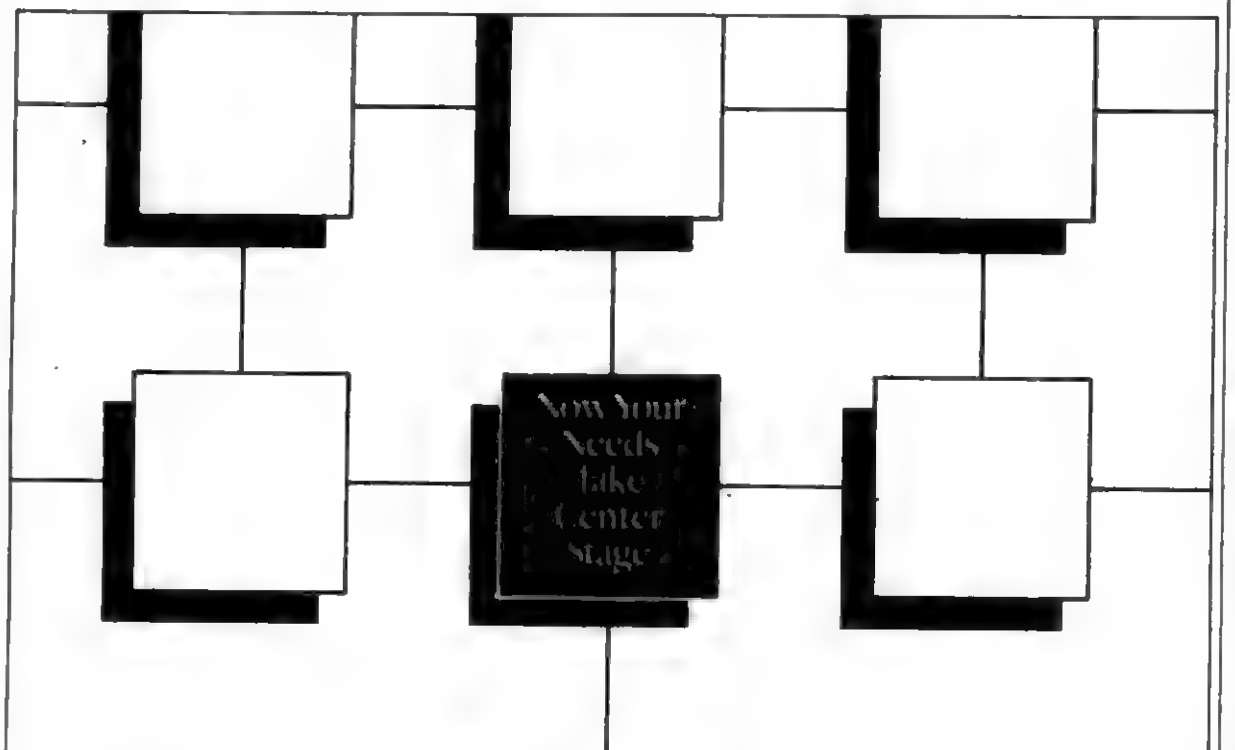
Emulex recently announced a licensing arrangement with NCR Corp.'s Microelectronics Division for the development and marketing of a small computer system interface (SCSI) chip for advanced storage technology systems.

As part of the agreement, both Emulex and NCR will individually market a new SCSI controller chip.

"The company has some strong SCSI products they've announced. I estimate these products could add incremental revenue of about $8 million this year," said analyst Gary Shields of L. F. Rothschild & Co.

In the personal computer graphics arena, Emulex recently announced its Intelligent Graphics Controller, an IBM Personal Computer AT-bus compatible product that has 1,024- by 1,280- pixel resolution, according to Jay O'Donald, vice-president of the storage product unit. That product is expected to be available this quarter.

ALAN J. RYAN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Emulex wants out

CONTINUED FROM PAGE 91

companies have not remained on friendly terms; litigation filed in 1985 has yet to be settled. Of the strained relationship, Frankel says, "We didn't initiate the antagonism of it."

One multimillion-dollar suit, filed in 1985, involves DEC's claim that Emulex induced a former DEC employee to hand over trade secrets. A second charge deals with patent infringement. Emulex filed antitrust suits against DEC in September 1985.

Meanwhile, DEC continues to service Emulex products in the field, Frankel says, adding that he believes the third-party market is healthy for DEC.

DEC does entertain some third-party relationships that involve the licensing of its technology, a DEC spokesman said. However, with its closely guarded VAXBI bus, DEC appears to be discouraging some third-party development.

But Frankel says Emulex has worked around the DEC technology with its Storage Module Disk Interconnect offering. "We've come up with a technology that allows storage peripheral devices, primarily disk drives, to attach to a DEC machine, be it a BI bus machine or a machine with a different bus or in what DEC calls a cluster environment, in such a way as it is bus-independent."

Frankel says the technology allows Emulex to "bring out new technology disk drives and make it compatible with the DEC environment, even though we're not physically attached to a DEC bus."

The Emulex president says another strategic change for his company is the introduction of products with longer life spans. "A couple of years ago, we produced a new product every week and a half or something," Frankel says. Now, "our focus has gone from quantity to quality." Frankel predicts the current fiscal year will show improved growth within Emulex, but costs will still be closely monitored. Whether or not Emulex can pull off its expanded product focus remains to be seen.

The company attempted change in early 1984 when it merged with California-based Personal Systems Technology, now known as the Persyst Division of Emulex, to enter into the personal computer market. Persyst was active in the retail channel. While Emulex continues to expand its offerings in the PC marketplace, it is concentrating its efforts in OEM business, according to a company spokesman.

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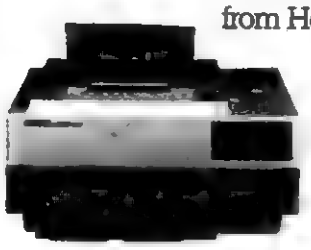

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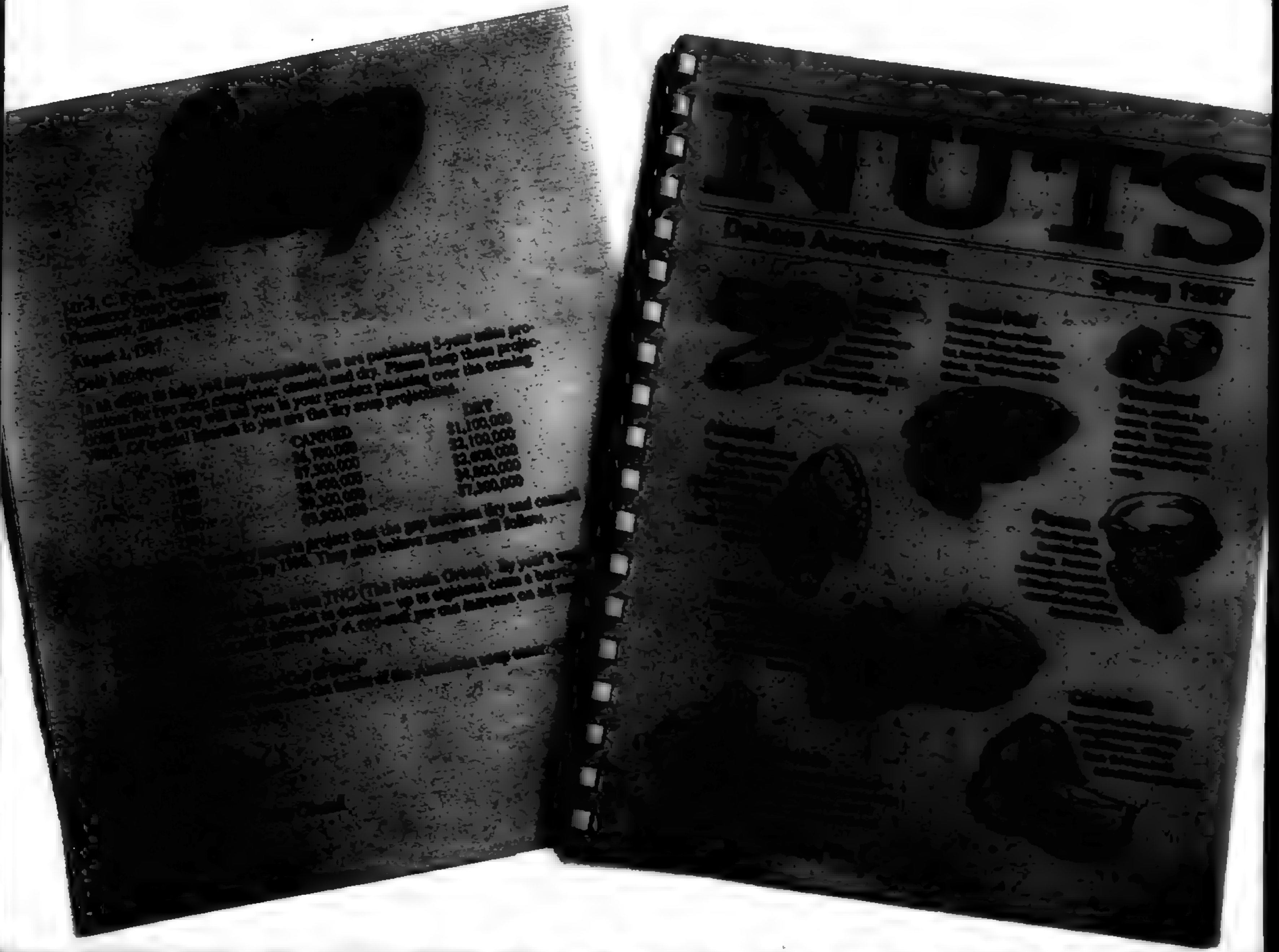

Time-sharing

FROM PAGE 91

a corporate data base. Single-user workstations no longer meet productivity requirements; upgrades to multiuser systems are in order. A departmental minicomputer would be most cost-effectively utilized as part of a communications network. All these ways of saving time and money are in-house time-sharing solutions.

Consider next the increasingly compute-intensive applications that are typical of most scientific and engineering firms. Sooner or later, an engineering model or software simulation and analysis task grows too large for an in-house computer. To complete the job in a timely fashion, these firms need the processing power provided by Cray Research, Inc., Control Data Corp. or ETA Systems, Inc. supercomputers.

Until recently, computer users in need of a time-sharing solution could look to one of the large computer service bureaus for help putting one in place. Yet today, that help is more difficult to come by. Faced with the advent of the affordable desktop machine, the slowdown in demand from the energy industries and the huge overhead associated with running data centers, many traditional providers of large computer services have been closing down their data centers and reducing support staff. In the process, they've left their clients to fend for themselves.

In that way, they've also left room for younger, more visionary companies to take up the slack. A new breed of time-sharing suppliers has emerged that is dedicated to providing the integrated solutions needed by today's computer users.

Their offerings include flexible access to a network of supercomputers and other large computer systems, with the aim of meeting customers' price/performance requirements — not force-fitting clients into a particular hardware or software environment. These new firms also provide the communications tools that enable a desktop computer to talk to a supercomputer.

It's not over yet

These companies have recognized a crucial fact: The era of distributed data processing doesn't mean the end of computer time-sharing. It means a growing need for a whole range of time-sharing solutions. By responding to that need, these firms are changing the nature of the time-sharing business.

The point is that time-sharing is here to stay. Just as desktop computers will gain in horsepower to become supercomputers in their own right, supercomputers will expand their ability to solve ever larger and finer engineering problems, while corporate data bases will continue to grow.

Time-sharing is dead. Long live time-sharing.

Pistacchi is president and chairman of Opticom Corp., a San Jose, Calif.-based provider of supercomputer services and applications consulting.

IBM

FROM PAGE 91

by leasing companies in the Netherlands and East Germany. In the Dutch case, an Amsterdam court rejected three lessors' allegations — including IBL's — that IBM engaged in predatory pricing.

A similar complaint filed earlier with West Germany's federal cartel office, the Bundeskartellamt, by the Association of European Computer Leasing and Trading Companies was thrown out in early May. In its case, the association also questioned IBM's volume pricing practices and bill-back provisions in volume procurement amendments that it viewed as unfair.

Those decisions paved the way for Atlantic's withdrawal. They have also encouraged IBM to make efforts in Europe to soften its position. In West Germany, the company has upped leasing rates to bring them in line with the association's own. Even if IBM drops its charges, the commission could continue investigating on its own.

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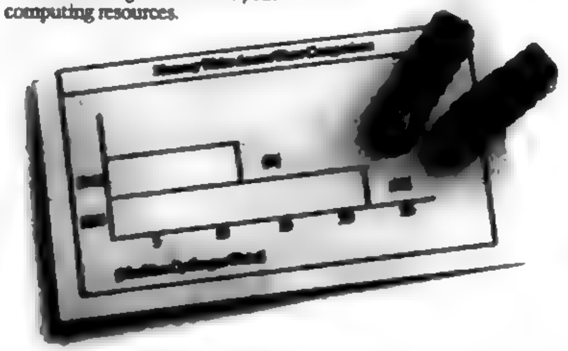

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COMPUTER CAREERS

Law firms bring MIS in-house

Legal offices seek broad systems background, accounting knowledge

BY NANCY
BLUMENSTALK MINGUS
SPECIAL TO CW

To stay competitive with other legal firms, Hodgson, Russ, Andrews, Woods & Goodyear in Buffalo, N.Y., this year invested $1 million to expand its data processing support. The firm created four positions, including an opening for an MIS manager. The number of minicomputers used in-house was increased from one to eight, and a network of terminals was implemented, replacing centralized word processing.

"We are under pressure to get documents out faster and make them more accurate," says Edward Githens, the firm's administrator. "Our attorneys want access to commercial data base retrieval systems, and we need to transmit documents to offices in Washington and Boca Raton."

Modernizing legal DP

The drive to bring DP support in-house and add personnel to run new minicomputers and networks at Githens' firm is an example of a trend that is bringing DP in law firms out of the Dark Ages. Once, DP support for legal firms required only a word processing supervisor and someone to review accounting data being sent to a service bureau. Today, DP is moving out from under the control of administrative and accounting functions, particularly in the larger law firms, creating openings for managers of MIS and telecommunications.

"No major firm can afford to stay with the service bureau approach any longer," Githens says. "The equipment is so cheap, they can't afford not to have their own."

At Hodgson, Russ, Andrews, Woods & Goodyear, Githens hired a telecommunications manager to run the word processing network, which operates over standard telephone lines, and to manage a microwave link between the firm's two buildings in Buffalo. He also hired a training coordinator to manage distributed word processing among the office personnel and a third-shift computer operator who writes reports and performs backup for the network, which runs 24 hours a day.

But Githens is still looking for an MIS manager whose strength is in management and technology planning rather than pure technical capability.

"The partners here will go to this individual and say, "This is the direction we're going in the future. How do we get access to this information to get there?' " he says. "He will not be a person at the administrative department level but will, instead, play a major role in the firm. People like that are hard to find. You can get talented people to take care of the hardware, but we need a manager."

Besides management capability, law firms are seeking DP people who also possess accounting experience because of the complexity of establishing new accounting procedures when the processing is moved in-house from the service bureau.

> BESIDES management capability, law firms are seeking DP people who also possess accounting experience because of the complexity of establishing new accounting procedures when the processing is moved in-house from the service bureau.

"Accounting is critical in a law firm," says Nancy Gurwitz Sambul, director of finance and administration at Richards O'Neil & Allegaert in New York. "Without traditional bookkeeping skills and an understanding of tracking billed and unbilled time, DP professionals are worthless to a law firm."

On the technical side, the larger law firms usually want their DP managers to possess a varied background because they run several types of applications on both minicomputers and personal computers. Candidates for the top positions need a broad systems background, spanning distributed processing and PCs.

Other positions require some DP background, but it is not as important to legal firms as it is to other types of companies. The belief among law firms is that it is easier to teach someone DP than it is to teach them the necessary legal or accounting skills.

Also, since DP professionals often wear many hats in these firms, interpersonal skills are essential for dealing with everyone from partners to paralegals to computer vendors.

Although they are seeking a different set of qualifications from those sought by other businesses, law firms tend to pay competitive salaries because they demand a lot from their DP people. "Law firms pay more than other companies," Sambul says. "Law firms are loyal to their employees, and they give more cross-training because data processing tends to be smaller. If you're good, you keep getting promotions."

Working for perfectionists

There are disadvantages to working in a law firm, however. "Lawyers — particularly in large firms, which attract the best and the brightest — tend to be perfectionists," says Brad Felton, telecommunications manager at Hodgson, Russ, Andrews, Woods & Goodyear. "There is a lot of money involved, and deadlines tend to be tight."

Elaine Pauley of Barrister Information Systems Corp. adds, "Decision making is tedious. Several people have to be involved, and it's difficult to get a fast decision. With no presidents, you really have to sell your ideas to the whole firm."

Traditional DP managers accustomed to mainframe environments will have trouble finding positions in legal firms, Githens predicts, because distributed processing with minicomputers and personal computer networks are better suited to the demands of the law firm.

"I don't see much room for the traditional DP manager who managed the large installation and controlled the flow of everything," Githens says. "The aura that once surrounded DP has been diffused with the advent of the minicomputer."

Blumenstalk Mingus is a free-lance writer based in Buffalo, N.Y.

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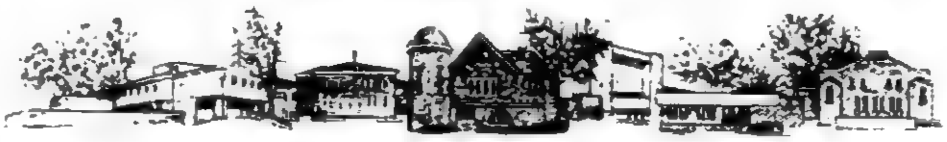

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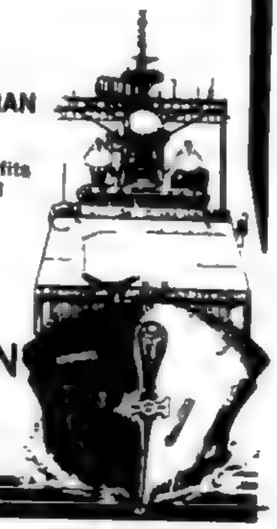

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SENIOR ENGINEER: To dvlp functional specifications for new proprietary real-time, state-of-the-art financial imaging system for banking mkt. Assure meeting needs of European customers by providing technical input on application of document processing equip relative to the European mkt. Dvlp real-time code for systems & applications software to implement new imaging sys & design software systems to integrate work stations w/imaging systems utilizing S3000, S8000, B800/B80 equip. Req's: Bachelors Degree in either Business Administration, Computer Science or Electrical Engineering + 3 yrs in job or 3 yrs as Systems Support Representative. Must have 3 yrs of hands-on professional exp dvlping software applications for European banks, incl readers, scanners, & document sorters utilizing S3000, S8000, B800/B80 equip. 40 hrs/wk M-F 8AM-4:30PM. $37,173/annum salary. Send resumes to 7310 Woodward Ave, Rm 415, Detroit, Mich. 48202 Job Reference #39787, Employer paid ad.

INVENTORY SYSTEMS ANALYST. Opening for Inventory Systems Analyst to modify, augment, develop and then maintain and enhance hierarchical concept inventory and management IDS-II Database Management System by designing and developing system modifications, specifications and software based upon relational database concepts, including order entry, customer invoicing, purchasing, scheduling and all related inventory management functions. Position is with processor and distributor of steel piping for industrial and structural use situated in St. Louis, Missouri. Qualified applicants must have B.S. or equivalent degree in MIS and be thoroughly proficient in Hierarchical and Relational system design concepts and a full range of inventory management functions. Starting salary $25,800 per year plus company benefit plan for 40 hour week. Send resumes accompanied by details of required proficiency to: Ms. Kathryn Gooch, JOB SERVICE ID#057932, 505 Washington Avenue, St. Louis, Missouri 63101. An Equal Opportunity Employer

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Systems Analyst - Analyze users needs; design, develop and implement commercial and financial applications; interface hardware/software; write program specifications using videotex systems, C, DEC, VAX and VMS. BS in Computer Science. 2 years experience. $50,000 per year. 40 hours per week. Send resume: NYS Job Service, 97-45 Queens Blvd., Rego Park, NY 11374. JO # 8006606.

SYSTEMS ANALYST: Analyze client needs & translate them into data processing terms. Design, develop & implement computer applic's w/analyses & implementation of systems related to invst systems, acctg systems & group/personal insurance systems for co's major client. 3 yrs exp req'd. Bachelor's w/major or minor in computer sci. Must know: COBOL, Assembler, BASIC operating systems: MS/DOS, OS/MVS, CP/M; hardware: IBM large mainframe series - 30xx, 43xx, 370 & IBM-PC. Must have knowledge of acctg. $36,000/yr, 40 hrs/wk. 230 East 44th Street, Suite 9A, NY, NY 10017. Send resume.

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Systems Analyst (NYC): Systems design, write program specifications, encoding, testing, debugging and verification of all programs, documentation; instruct and supervise client professional computer staff. System implemented on large scale IBM hardware for IDMS DB/DC software, COBOL; supervise 1 senior programmer/analyst and 3 programmer analysts. Bachelor's in computer science, math or statistics and 2 years experience; 5 days, 40 hours, $44,000/year, authorized to work in United States. Resume or letter in duplicates to: B.D. #11, Room 501, 1 Main St., Brooklyn, NY 11201.

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Quality Assurance Analyst

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For confidential consideration, please forward your resume and salary requirements to **FEDERAL EXPRESS CORPORATION, Personnel Services, P.O. Box 727, Dept. 9311, Memphis, Tennessee 38194-9311, Attn.: R. Beech.**

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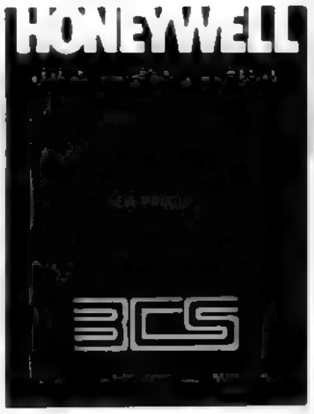

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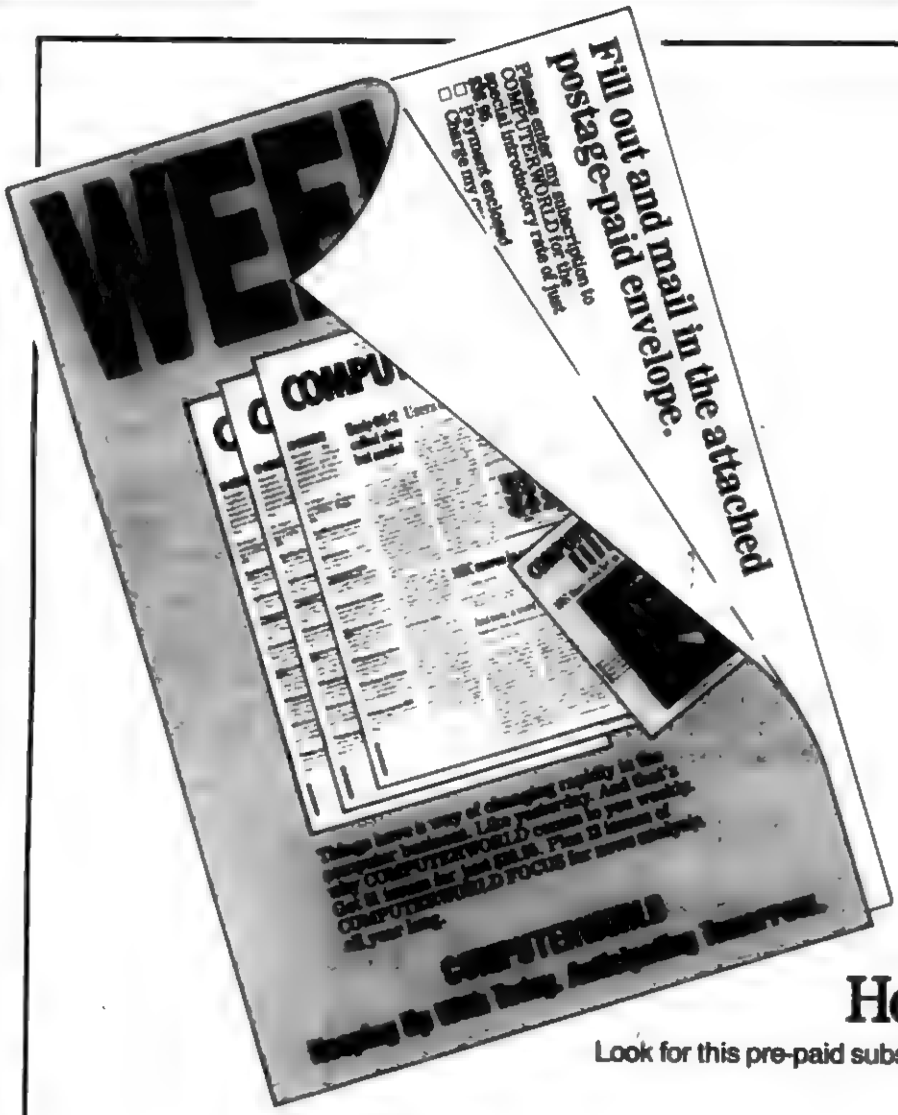
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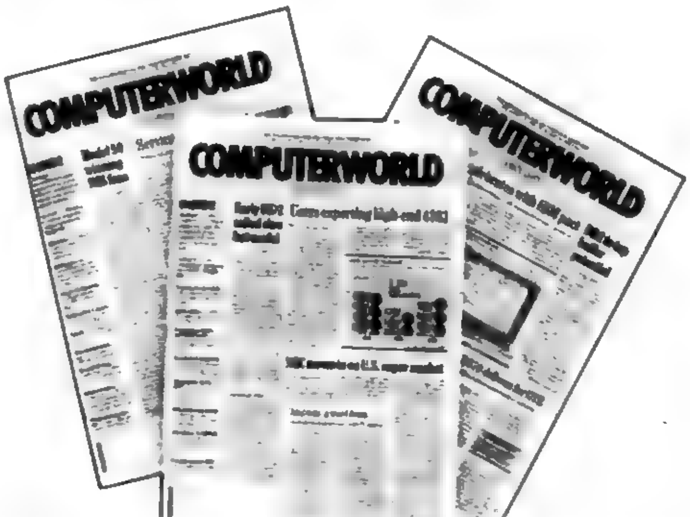

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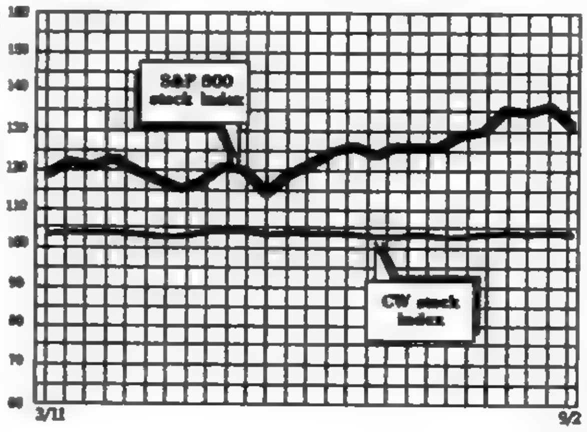

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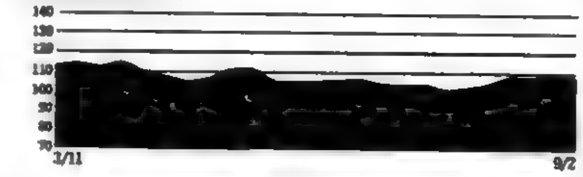

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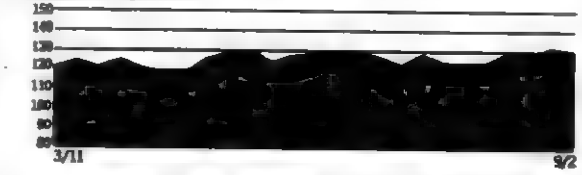

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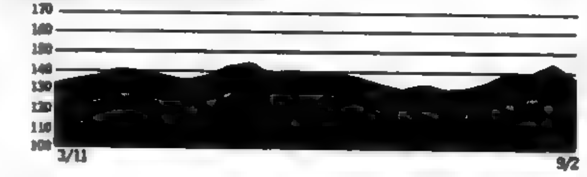

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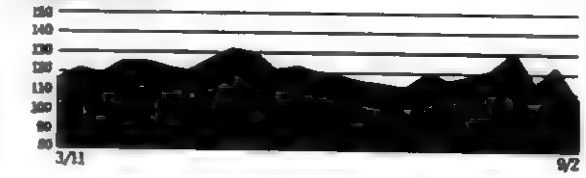

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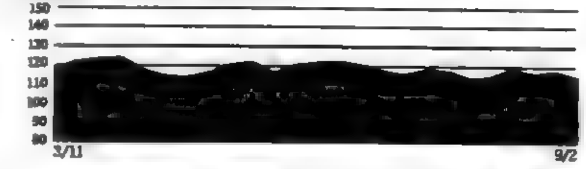

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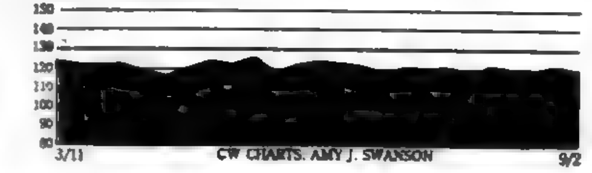

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Q	ANDREW CORP	19	14	16.00	-1.0	-5.9
Q	ARTEL COMM CORP	5	2	2.50	-0.1	-4.8
N	AT&T	38	22	33.13	-1.3	-3.6
Q	AVANT GARDE COMP INC	7	3	5.38	+0.1	+2.4
Q	AVANTEK INC	19	13	14.88	+0.3	+1.7
N	AYDIN CORP	38	18	32.13	-2.0	-5.9
N	BELL ATLANTIC CORP	77	62	73.50	-3.3	-4.2
N	BELLSOUTH CORP	45	35	40.25	-2.4	-5.6
Q	BRIDGE COMMUNICATION	27	11	25.50	+2.3	+9.7
Q	COMPRESSION LABS INC	12	4	5.50	+0.0	+0.0
Q	COMPUTER NETWORK TECH	6	3	3.38	-0.3	-8.9
Q	CONTEL CORP	40	27	36.75	-1.1	-3.0
Q	DATA SWITCH CORP	9	5	7.00	-0.5	-6.7
Q	DIGITAL COMM ASSOC	49	18	39.50	+1.0	+2.6
Q	DYNATECH CORP	44	27	30.75	-1.3	-3.9
Q	EQUATORIAL COMM CO	6	2	3.13	+0.0	+0.0
Q	GANDALF TECHNOLOGIES	11	5	7.25	-0.1	-1.7
Q	GENERAL DATACOMM INDS	14	8	8.13	+0.1	+1.8
N	GTE CORP	45	34	41.38	-1.1	-2.8
Q	INFOTRON SYS CORP	12	7	9.00	-0.3	-2.7
N	ITT CORP	66	47	63.00	-0.9	-1.4
N	M A COM INC	16	12	15.00	+0.0	+0.0
Q	MCI COMMUNICATIONS CORP	10	5	8.88	-0.6	-6.6
Q	MICOM SYS INC	18	10	13.38	+1.4	+11.5
Q	NETWORK SYS CORP	19	9	10.75	-0.8	-6.5
N	NORTHERN TELECOM LTD	24	14	22.63	+0.1	+0.6
Q	NOVELL INC	27	10	21.50	-1.8	-7.5
N	NYNEX CORP	77	59	70.88	-4.9	-6.4
N	PACIFIC TELESIS GROUP	32	23	28.88	-2.1	-6.9
N	PARADYNE CORP	9	4	7.63	-0.6	-7.6
A	PENRIL CORP	6	4	4.50	-0.1	-2.7
N	PLESSEY PLC	41	24	31.50	+1.0	+3.3
N	SCIENTIFIC ATLANTA INC	20	9	18.25	-0.3	-1.4
N	SOUTHWESTERN BELL CORP	42	33	38.25	-3.4	-8.1
Q	3COM CORP	24	9	18.63	+1.4	+8.0
N	TIMEPLEX INC	41	15	30.00	-0.3	-0.8
Q	UNGERMANN BASS INC	16	7	9.63	-0.1	-1.3
N	U S WEST INC	61	45	55.38	-3.1	-5.3

EXCH		PRICE 52-WEEK RANGE (1)		CLOSE SEPT. 2 1987	WEEK NET CHNGE	WEEK PCT CHNGE
Q	ALLIANT COMPUTER SYS	37	15	17.75	-0.3	-1.4
Q	ALPHA MICROSYSTEMS	7	3	5.00	+0.1	+2.6
Q	ALTOS COMPUTER SYS	17	10	13.00	-0.4	-2.8
A	AMDAHL CORP	45	18	42.50	+0.3	+0.6
Q	APOLLO COMPUTER INC	25	11	20.63	-0.4	-1.8
Q	APPLE COMPUTER INC	55	16	52.00	+0.0	+0.0
N	BOLT BERANEK & NEWMAN	30	19	21.25	-1.1	-5.0
Q	BRITTON LEE INC	5	3	3.88	+0.6	+19.2
N	COMPAQ COMPUTER CORP	60	14	58.25	+2.1	+3.8
Q	COMPUTER AUTOMATION INC	17	2	13.25	+0.5	+3.9
A	COMPUTER CONSOLES INC	12	6	6.50	-0.5	-7.1
Q	CONCURRENT COMP CORP	24	13	21.50	+0.3	+1.2
N	CONTROL DATA CORP DEL	37	24	35.63	+2.3	+6.7
Q	CONVERGENT TECH	12	4	7.75	-0.4	-4.8
Q	CONVEX COMPUTER CORP	22	8	14.38	-0.5	-3.4
N	CRAY RESH INC	136	69	104.50	-13.0	-11.1
Q	DAISY SYS CORP	13	7	7.00	-0.3	-3.4
N	DATA GEN CORP	39	25	31.63	-2.4	-7.0
N	DATAPOINT CORP	9	4	8.63	+0.4	+4.5
N	DIGITAL EQUIP CORP	199	89	187.88	-2.1	-1.1
N	FLOATING POINT SYS INC	17	8	9.38	-1.0	-9.6
N	GOULD INC	25	16	22.50	-1.4	-5.8
N	HARRIS CORP	43	27	37.00	-1.8	-4.5
N	HEWLETT PACKARD CO	69	37	65.13	-2.0	-3.0
N	HONEYWELL INC	91	58	84.50	2.5	-2.9
N	IBM	178	116	162.50	-5.4	-3.2
Q	INFORMATION INTL INC	17	13	13.50	+0.0	+0.0
Q	IPL SYS INC	3	2	2.75	+0.0	+0.0
Q	MASS COMPUTER CORP	12	5	10.75	-0.8	-6.5
Q	MATSUSHITA ELEC INDL LTD	178	93	161.00	-9.0	-5.3
Q	MEGADATA CORP	7	2	5.75	+0.5	+9.5
Q	MENTOR GRAPHICS CORP	37	13	34.50	-0.5	-1.4
N	NBI INC	14	8	11.38	-0.8	-6.2
N	NCR CORP	87	42	81.50	-3.8	-4.4
N	PRIME COMPUTER INC	31	16	27.38	-2.0	-6.8
Q	PYRAMID TECHNOLOGY	12	4	8.25	+0.3	+3.1
Q	STRATUS COMPUTER	41	18	29.25	-0.5	-1.7
Q	SUN MICROSYSTEM INC	46	13	38.00	+3.4	+9.7
Q	SYMBOLICS INC	7	4	4.38	+0.4	+9.4
N	TANDEM COMPUTERS INC	38	16	30.00	-2.6	-8.0
N	TANDY CORP	56	31	47.25	-1.5	-3.1
N	ULTIMATE CORP	33	13	31.13	-1.0	-3.1
N	UNISYS CORP	48	22	43.50	-1.3	-2.8
A	WANG LABS INC	19	11	18.13	+0.4	+2.1

EXCH		PRICE 52-WEEK RANGE (1)		CLOSE SEPT. 2 1987	WEEK NET CHNGE	WEEK PCT CHNGE
Q	ADVANCED COMP TECH	5	3	3.38	-0.3	-8.9
N	ADVANCED SYS INC	20	12	27.50	+0.1	+0.5
N	AGS COMPUTERS INC	22	8	19.75	+0.4	+1.9
Q	AMERICAN MGMT SYS INC	19	7	16.63	-0.8	-4.3
Q	AMERICAN SOFTWARE INC	22	8	14.00	-3.5	-20.0
N	ANACOMP INC	11	3	9.38	-0.4	-3.8
Q	ANALYSTS INTL CORP	9	3	8.00	-0.3	-3.0
Q	ASHTON TATE	30	12	24.25	+0.9	+3.7
Q	ASK COMPUTER SYS INC	17	10	14.63	-0.1	-0.8
Q	AUTODESK INC	34	10	27.00	-1.5	-5.3
N	AUTO DATA PROCESSING	55	30	49.38	-3.4	-6.4
Q	BOOLE & BABBAGE INC	12	4	10.00	-0.5	-4.8
N	COMPUTER ASSOC INTL INC	33	10	29.88	-1.4	-4.4
Q	COMPUTER HORIZONS CORP	15	10	11.38	1.0	-8.1
N	COMPUTER SCIENCES CORP	66	30	61.25	-3.1	-4.9
N	COMPUTER TASK GROUP INC	18	11	13.25	+0.0	+0.0
Q	COMSHARE INC	28	11	25.00	-0.3	-1.0
N	CULLINET SOFTWARE INC	14	6	13.50	+0.6	+4.9
Q	CYCARE SYS INC	12	7	9.50	-0.3	-2.6
Q	DUQUESNE SYS INC	33	12	16.25	-1.3	-7.1
Q	ENDATA INC	15	5	14.13	+0.1	+0.9
N	GENERAL MTRS (CLS E)	49	24	47.00	-1.1	-2.3
Q	HOGAN SYS INC	17	9	11.00	-0.1	-1.1
Q	INFORMIX CORP	23	7	20.50	1.3	-5.7
Q	INTELLICORP INC	11	4	7.00	-0.8	-9.7
Q	KEANE INC	10	5	7.13	+0.1	+1.8
Q	LOTUS DEV CORP	37	11	31.13	-2.4	-7.1
Q	MANAGEMENT SCI AMER	21	11	13.38	+0.8	+5.9
Q	MICRO PRO INTL CORP	8	2	5.44	-0.4	-6.5
Q	MICROSOFT CORP	128	26	115.00	-0.5	-0.4
Q	NATIONAL DATA CORP	34	17	32.25	-0.9	-2.6
Q	ON LINE SOFTWARE INTL INC	22	6	20.63	+1.0	+5.1
Q	ORACLE SYS CORP	30	7	26.50	+1.8	+7.1
N	PANSOPHIC SYS INC	23	12	20.50	-1.3	-5.7
Q	POLICY MGMT SYS CORP	30	15	24.75	+0.0	+0.0
Q	PROGRAMMING & SYS INC	13	8	12.00	-0.6	-5.0
Q	REYNOLDS & REYNOLDS CO	39	27	36.50	-1.5	-4.1
Q	SEI CORP	18	8	16.00	-0.8	-4.5
Q	SHARED MED SYS CORP	53	23	28.13	-0.5	-1.7
Q	SOFTWARE AG SYSTEMS INC	20	10	13.38	+0.1	+0.9
Q	SOFTWARE PUBG CORP	17	5	9.63	-0.5	-4.9
A	STERLING SOFTWARE INC	18	9	9.88	+0.3	+2.6
Q	SUNGARD DATA SYS INC	21	10	17.75	-1.3	-6.6
Q	SYSTEMATICS INC	30	14	27.00	-1.5	-5.3
N	UCCEL CORP	52	20	0.00	-48.8	-100.0
N	URS CORP	20	12	19.75	-0.1	-0.6
O	VM SOFTWARE INC	45	15	17.50	-1.0	-5.4

EXCH		PRICE 52-WEEK RANGE (1)		CLOSE SEPT. 2 1987	WEEK NET CHNGE	WEEK PCT CHNGE
N	ADV MICRO DEVICES INC	25	13	20.63	-1.9	-8.3
N	ANALOG DEVICES INC	24	14	20.75	-0.9	-4.0
Q	ANALOGIC CORP	13	10	11.88	-0.6	-5.0
Q	INTEL CORP	56	18	52.00	-3.0	-5.5
Q	LSI LOGIC CORP	17	8	12.63	-0.1	-1.0
Q	MONOLITHIC MEMORIES INC	19	10	0	-10.0	-100.0
N	MOTOROLA INC	72	34	64.25	-7.1	-10.0
N	NATL SEMICONDUCTOR	17	8	16.63	+1.0	+6.4
N	TEXAS INSTRS INC	78	35	71.50	-5.1	-6.7
A	WESTERN DIGITAL CORP	33	13	26.38	-1.6	-5.8

EXCH		PRICE 52-WEEK RANGE (1)		CLOSE SEPT. 2 1987	WEEK NET CHNGE	WEEK PCT CHNGE
N	AM INTL INC	9	5	7.63	-0.1	-1.6
Q	AST RESH INC	23	11	17.00	+0.6	+3.8
Q	AUTO TROL TECH CORP	9	3	6.00	+0.0	+0.0
Q	BANCTEC INC	16	6	12.13	-0.6	-4.0
Q	CIPHER DATA PRODS INC	18	9	10.13	+0.0	+0.0
A	COGNITRONICS CORP	5	2	4.00	-0.3	-5.9
N	COMPUGRAPHIC CORP	28	16	24.50	-0.5	-2.0
N	COMPUTERVISION CORP	23	12	14.63	+0.4	+2.6
N	CONRAC CORP	30	12	0.00	+0.0	+0.0
A	DATAPRODUCTS CORP	16	10	11.13	-0.5	-4.3
A	DATARAM CORP	9	7	7.25	-0.3	-3.3
N	DECISION INDS CORP	13	7	11.25	-0.5	-4.3
N	EASTMAN KODAK CO	104	52	98.50	-3.5	-3.4
Q	E M C CORP MASS	29	7	27.00	-12.8	-32.1
Q	EMULEX CORP	10	6	7.63	+0.0	+0.0
Q	EVANS & SUTHERLAND	40	20	30.75	-2.5	-7.5
Q	ICOT CORP	13	5	6.00	-0.5	-7.7
Q	INTERLEAF INC	20	8	18.50	+2.4	+14.7
Q	IOMEGA CORP	10	2	2.88	+0.0	+0.0
Q	LEE DATA CORP	10	6	5.50	+0.3	+4.8
Q	MASSTOR SYS CORP	6	3	4.69	-0.2	-3.8
Q	MAXTOR CORP	34	12	13.00	-0.6	-4.6
Q	MICROPOLIS CORP	44	14	35.25	+1.6	+4.8
Q	MINISCRIBE CORP	18	5	13.63	-0.4	-2.7
N	MINNESOTA MNG & MFG CO	84	50	78.13	-4.4	-5.3
A	MSI DATA CORP	23	10	21.50	-0.5	-2.3
Q	PRIAM CORP	6	2	3.13	-0.4	-10.7
Q	PRINTRONIX INC	14	10	11.13	+0.1	+1.1
N	QMS INC	25	11	22.63	-0.9	-3.7
Q	QUANTUM CORP	35	15	17.75	+0.3	+1.4
Q	RAMTEK CORP	6	4	5.13	-0.8	-12.8
N	RECOGNITION EQUIP INC	27	12	17.50	+0.5	+2.9
Q	REXON INC	14	5	9.00	-0.1	-1.4
Q	SCAN TRON CORP	17	11	12.63	-0.4	-2.9
Q	SEAGATE TECHNOLOGY	46	13	30.13	+1.8	+6.2
N	STORAGE TECH CORP	5	2	3.00	+0.0	+0.0
Q	TANDON CORP	7	2	3.75	-0.3	-8.3
A	TEC INC	7	3	4.50	-0.1	-2.7
N	TEKTRONIX INC	43	30	37.75	-1.8	-4.4
Q	TELEVIDEO SYS INC	3	2	2.88	+0.3	+9.5
N	TELEX CORP	102	55	69.50	-2.0	-2.8
Q	WYSE TECH	36	13	32.88	-0.3	-0.8
N	XEROX CORP	86	51	78.75	-3.0	-3.7
O	XIDEX CORP	19	11	11.13	-1.3	-10.1

EXCH		PRICE 52-WEEK RANGE (1)		CLOSE SEPT. 2 1987	WEEK NET CHNGE	WEEK PCT CHNGE
N	COMDISCO INC	36	18	33.13	-1.0	-2.9
N	CONTINENTAL INFO SYS	14	7	10.88	-0.4	-3.3
Q	PHOENIX AMERN INC	8	3	4.38	-0.1	-2.8
Q	SELECTERM INC	7	5	5.25	+0.3	+5.0
N	US LEASING INTL	55	40	49.75	-2.9	-5.5

EXCH: N—NEW YORK; A—AMERICAN; Q—NATIONAL;
O—OVER-THE-COUNTER; S—SPLIT

O-T-C PRICES ARE BID PRICES AS OF 3 P.M. OR LAST BID
(1) TO NEAREST DOLLAR

Midweek plunge

Cray, overall market head south; National Semi bucks trend

One of the stalwarts of the technology stocks, Cray Research, Inc., took a plunge last week following designer Steve S. Chen's departure and the cancellation of Chen's key development project, the MP supercomputer.

As Chen made plans to leave the Minneapolis company and seek other investors for his MP supercomputer, which was expected to be Cray's high-end supercomputer, Cray stock dropped slightly more than $15, while 7.2% of Cray's shares traded in two days.

Overall, stocks started off strong last week with the Dow Jones industrial average up more than $23 on Monday. The average plummeted more than $51, however, on Tuesday and nearly $9 on Wednesday before the dive slowed later in the week.

IBM and Digital Equipment Corp. were among those suffering at midweek and stabilizing later. Tuesday trading saw IBM fall 5½ and DEC drop 4⅛ points.

National Semiconductor Corp. made the most active trading list late in the week, after the firm announced plans to acquire Fairchild Semiconductor Corp. from Schlumberger Ltd.

JAMES CONNOLLY

Tandem hones net line with central control

BY JEFFRY BEELER
CW STAFF

Tandem Computers, Inc. tomorrow is expected to enhance its existing system and network management capabilities with a suite of centralized-control software products that correspond to IBM's Netview.

Known collectively as Distributed Systems Management (DSM), the products reportedly allow network control center operators to collect status information from multiple-processing or communications modules in the field and route that information to a central operations console.

For large banks and other organizations that maintain many remote user sites, the centralization of network management functions will reduce customers' need to distribute their technical personnel, Tandem said. "Companies have a hard time finding good network managers and operators," said Gary Haars, data processing manager for Georgia Interchange Network, Inc., a Tandem user that operates a regional electronic funds transfer service.

But, Haars said, "they can more easily hire those kinds of people for one central site than for lots of remote ones."

Busy operator

Until now, the vendor's communications management capabilities were limited in the sense that no operations console in its users' network control centers could collect event messages and other information from more than one remote module.

"At service multiple sites, operators had to assign a different console to each system or device in the field and then move from terminal to terminal," said Roger Mathews, one of Tandem's networking product managers.

The result, he explained, was that "users were unable to expand their networks beyond a certain limit because of the high cost and difficulty of managing them."

With DSM, however, the one-terminal-per-machine relationship that characterised Tandem's existing network management scheme has been broken, Mathews said.

Out with the old

DSM also consolidates systems and network management, according to Mathews. The integration of these two complementary activities marks a departure from the company's existing approach, which required that dispersed systems, devices and applications be managed independently of communications lines and modems.

The network control facility's constituent software modules form an Operations Management package that is slated to be incorporated into the next release of Tandem's Guardian 90 operating system. Availability of the revised Guardian release is scheduled for the fourth quarter.

Even before tomorrow's expected announcement, Tandem had already surpassed IBM and most other major systems vendors in its communications management prowess, according to Bear Stearns & Co. analyst Jonathan Fram.

"Networking is built into its operating system, and the company's equipment uses a peer-to-peer instead of a hierarchical style of communication," Fram said. Introduction of the DSM software product set will merely "reaffirm Tandem's position as the premier supplier of backbone networks," he said.

Making a statement?

Longtime Tandem watcher Omri Serlin, head of Los Altos, Calif.-based Itom International Co., echoed Fram's conclusions. DSM, Serlin said, "is an important statement of the firm's strategic direction and will be the first in a whole series of network management products" that will eventually address multivendor, especially IBM, environments as well as Tandem's own.

Included among the product's software components is a Subsystem Programmatic Interface that expresses event messages in a form that allows many of them to be handled automatically. The ability for information about remote computing and communications modules to be processed automatically by a program is a prerequisite for another of DSM's constituent modules, the Event Management System (EMS).

Through EMS, Tandem users can route error or status messages from "any node to any operations console." Once a message reaches a network operator, another DSM software component known as Viewpoint presents the collected data in a meaningful format for its intended viewers. In particular, Viewpoint distinguishes various kinds of messages from each other and uses assorted highlighting techniques to call operator attention to suspected communications problems.

Depending on the Tandem processor model, each Operations Management package sells for an initial license fee of $1,600 or $3,200 and a monthly charge of $160 or $320 per CPU.

Turner Hall 'reports' on 1-2-3 links

BY DOUGLAS BARNEY
CW STAFF

CUPERTINO, Calif. — Turner Hall Publishing last week increased its presence in the Lotus Development Corp. 1-2-3 aftermarket with the debut of 4Views, a $99 data base add-in for 1-2-3.

The firm also announced a joint development agreement with Lotus under which Lotus will market 4Word, a Turner Hall word processing add-in, to the Japanese market.

4Views, a report writer specifically designed to work with 1-2-3 data, is aimed at a market in which Lotus failed with its Report Writer package.

In addition to a report writing capability, 4Views provides cross-tabulation, similar to that of Reflex from Borland International, and provides forms capability for data entry. 4Views is set to be available next month.

The product resides in random-access memory (RAM) and, as such, can only work with data sets small enough to fit in RAM.

The product is compatible, however, with the Lotus/Intel/Microsoft Expanded Memory Specification. This specification allows for data sets larger than the 640K-byte limit that is imposed by Microsoft Corp.'s MS-DOS.

Not a Dbase clone

4Views does not include a full programming language and is not aimed at the high-end data base market. "It is not a Dbase clone," explained Tom Byers, general manager of Turner Hall, referring to Ashton-Tate's market-leading microcomputer data base.

Turner Hall, a division of Symantec Corp., is providing a free runtime version of 4Views so that corporate applications developers can distribute custom and defined reports to a variety of end users.

Under the royalty-based agreement for 4Word, Lotus will translate the Turner Hall word processor into Japanese and market the product under the Lotus name.

Turner Hall is scheduled later this month to announce a version of 4Word that eliminates many of the original product's weaknesses. The upgrade will include the ability to easily combine text and graphics, a Symantec source said.

3Com backs PS/2

Enhanced operating system supports entire line

SANTA CLARA, Calif. — 3Com Corp. last week announced a version of its 3+ network operating system that it said supports all IBM Personal System/2 computers, both as network workstations and as servers.

According to 3Com, 3+ Version 1.2.1 is compatible with IBM's Token-Ring Micro Channel adapters, Microsoft Corp.'s MS-DOS 3.0 and higher and IBM Netbios-compatible applications running on PS/2 Models 30, 50, 60 and 80 in a Token-Ring environment.

Upgrading from 3+ Version 1.2 did not require any modifications in the software code, 3Com said. Instead, Version 1.2.1 was implemented by removing copy protection and adding drivers for the Micro Channel and Netbios enhancements.

Using 3+ Version 1.2.1, network managers reportedly can combine older personal computers and the new PS/2 line on the same network.

Appletalk connection

Combined with the recently introduced 3+ for the Apple Computer, Inc. Macintosh, 3+ Versions 1.2 and 1.2.1 also give IBM Token-Ring work groups the ability to communicate and share applications with Ethernet and Apple's Appletalk networks, 3Com said.

3+ Version 1.2.1 is available immediately for $1,050 per server.

Each package comes with 3½- and 5¼-in. disk formats for use on PS/2s and IBM Personal Computers and compatibles, respectively.

Customers using 3+ Version 1.1 or 1.2 can purchase the 3+ upgrade to Version 1.2.1 for $30.

IMS gateway

FROM PAGE 1

cated that such support will follow. The adapter is the first bridge between IMS and the peer-to-peer communications environment that is a key component of IBM's Systems Application Architecture.

It also significantly broadens IBM's mainframe support of LU6.2, which until now included only CICS. "It's a step in the right direction," said Leon Smith, a vice-president at Bankers Trust Co.

Bridge not taken

The bank has been using LU6.2 extensively as a common communications system for its installed base of IBM and DEC computers but has been waiting approximately two years for IBM to announce LU6.2 support for IMS, Smith said. In the meantime, Bankers Trust has been working on two alternate ways to bridge the environments, which it hopes to have ready by year's end, he added.

"We're not really happy with either of the alternatives, but meanwhile, I do have some IMS applications that have to communicate with the rest of the world," Smith said. "We don't want to spend a lot of money, since we expect IBM to announce full LU6.2 support for IMS."

IBM's recently announced adapter "could simplify our problem" over the short term, Smith indicated. "We could use it for connections coming toward the IMS application."

The adapter lacks two important capabilities that would be provided by full IMS support of LU6.2, IBM's IMS planner Rod Murchison noted. First, he said, IMS applications cannot use LU6.2 verbs directly to initiate peer-to-peer exchanges with LU6.2 systems. An IBM PC or other LU6.2 device must act as the initiator, sending in LU6.2 calls, which the adapter translates into LU6.1 Intersystem Communications commands used by IMS applications. Secondly, LU6.2 devices communicating with an IMS application can use only a subset of LU6.2 base verbs for which there is a corresponding LU6.1 verb.

What it's good for

However, this subset covers a wide range of verbs, and the adapter should be useful to the majority of companies that want to use IMS as a server for other systems, according to Donald Czubeck, president of Saratoga, Calif.-based consulting firm Gen2 Ventures. "The product is not ideal, but it's a useful first step. IMS is a traditional environment that is difficult to implement communications on," he said.

A hopeful sign to IMS users such as Bankers Trust is a statement in the announcement that "applications written to use the IMS LU6.2 Adapter are expected to be upwardly compatible with any LU6.2 support provided in the base IMS product."

This statement points to future direct LU6.2 support for IMS, Czubeck said. It also means that MIS managers can begin writing applications that can be ported to IBM's future implementation of the peer-to-peer protocols under IMS.

Available now, the IMS LU6.1 Adapter for LU6.2 is priced at $3,900.

Bell investment lands in court

Southwestern Bell responds to queries over 80% stake in R&D firm

BY KATHY CHIN LEONG
CW STAFF

WASHINGTON, D.C. — Southwestern Bell Corp. last week denied any attempt to circumvent deregulation constraints through an $11.8 million majority stake in a mysterious start-up company.

In a disclosure statement demanded by U.S. District Judge Harold H. Greene, Southwestern Bell declared last Friday that an 80% stake in Tsunami Technologies Corp., held by its Southwestern Bell Telecommunications, Inc. subsidiary, was not intended to evade the manufacturing prohibitions that had been placed on the regional holding companies.

Greene, author and overseer of the Modified Final Judgment that deregulated the former Bell system and prohibits regional Bell holding companies from manufacturing, demanded the disclosure statement in mid-August, following questions raised during the summer about the previously undisclosed relationship.

Although Southwestern Bell said in July that it would dispose of its stake in the small company, Don Marquart, a former Tsunami official, charged in a letter to Greene that the holding company was seeking to dismantle Tsunami in order to cover up questionable activities that may have violated the court's strictures.

Last week, Southwestern Bell said in its filing that Marquart is attempting to prompt the court to order the company to continue funding Tsunami in order to protect Marquart's substantial investment in Tsunami.

Sunnyvale, Calif.-based Tsunami is a research and development company working on a broadband local-area network that offers digital private branch exchange features, according to Tsunami President Robert Shatzer.

That technology was an exclusive arrangement with Southwestern Bell, which planned to market it later, according to a Southwestern Bell spokeswoman.

Shrouded with secrecy

There has been a cloud of secrecy surrounding the entire deal. Marquart claimed in his letter that investors, employees and their spouses had to sign nondisclosure statements about Tsunami and Southwestern Bell Telecommunications investments.

Until this year, Southwestern Bell Telecommunications had kept the 1985 investment quiet. Tsunami had an unlisted telephone number and no company name on its offices. It had also warned its employees not to disclose company information to anyone.

"This is such a competitive industry that we didn't want to draw attention to our company," Shatzer said. "This was the way we wanted to approach the business when we formed in 1983."

In his Aug. 20 letter, Marquart questioned Southwestern Bell's conformity to Greene's restrictions, noting that Southwestern Bell originally failed to approach the U.S. Department of Justice with the legality of its investment.

The company had also failed to inform Tsunami founders of the possible adverse implications that the court prohibitions could have on it, according to Marquart's letter.

Last week, however, Southwestern Bell responded that Marquart had, in fact, educated Tsunami employees on Greene's Modified Final Judgment. Attached to the filing was a May 1985 letter writtes by Marquart to the California State Employment Development Department that read, "Tsunami has never been and does not intend to be a manufacturing organization."

Eyebrows raising

Greene is not the only one raising his eyebrows. The Justice Department is also investigating the matter and is poring through an 11,000-page document from Southwestern Bell detailing its original intentions to invest in Tsunami.

But Southwestern Bell and Tsunami maintain they have not done anything illegal. "We are here to create the technology and not manufacture the equipment," Shatzer said.

He added that Tsunami's relationship with Southwestern Bell was kept confidential because it was "nobody's business." The main reason for the secretive actions was to "guard Tsunami technology," he said.

Marquart charged that Southwestern Bell was attempting to erase the entire controversy by cutting off funding. In its filing, however, Southwestern Bell claimed that the decision was "based on sound financial and business reasons" after concluding that the Tsunami project no longer met its objective of producing a "financial return consistent with the financial risk involved."

Added distractions

Early this month, Marquart also filed a $6.1 million wrongful-termination suit in California's Santa Clara Superior Court. In the suit, he claimed that Tsunami officials fired him on Aug. 6, 1986, after he openly voiced that Southwestern Bell and Tsunami policies were contrary to the requirements of state and federal law. Marquart, who is representing himself in the case, could not be reached for comment.

Shatzer called the lawsuit extremely distracting and said the entire investigation has "caused a great deal of consternation around here."

Meanwhile, Tsunami is seeking other investors to help fund its development.

Last month, Tsunami suffered a 40% layoff of 24 employees and reorganized the company. Shatzer said the company has enough cash in the bank to last a few more months. "It's too early to tell what's going to happen. I'm still pretty optimistic," he said.

INSIDE LINES

In a Galaxy far, far away. Lotus, which has yet to ship nearly 10 announced or talked-about products, will not be soaring through the atmosphere any time soon with its latest product for Apple's Macintosh. According to some of the crew, the firm will comment this fall on plans for Galaxy, a successor to the less-than-stellar Jazz. Galaxy joins the roster of unshipped Lotus products that include Speed-Up; Learn, a special project from Mitch Kapor; Lotus/DBMS; Lotus 1-2-3/M; Lotus 1-2-3/G; Lotus 1-2-3, Release 3; Symphony, Release 3; and the Networker.

Ban lifted in Boston. The much-anticipated "Microvax III," set to be announced at this week's Decworld show in Boston, will come in two models, the 3500 and 3600, a source at DEC revealed. The facility in the to-be-announced Decnet V that will unite Decnet with IBM's Profs, Disoss and SNADS, will be called Mailbus, according to the source. Meanwhile, big-business nemesis Ralph Nader, the famed consumer advocate, will appear at the show to assist the multibillion-dollar computer vendor in promoting educational computing solutions, a DEC source indicated.

Judge Wapner needed down South. A divorce action filed by Dennis Hayes, founder of Atlanta-based Hayes Microcomputer Products, may force the normally tight-lipped Hayes to reveal previously undisclosed details about his financial holdings. It has been charged that the reticent Hayes has managed to keep information about his benefits and earnings even from his wife. Lawyers for Hayes' wife have estimated the value of the privately held company between $200 million and $400 million. Court papers filed by Mrs. Hayes allege that Mr. Hayes owns 100% of Hayes Holding Co., which owns all but 5% or 10% of Hayes Microcomputer Products. The other owner, or owners, is unknown. An Atlanta reporter covering the story said Mr. Hayes has denied his wife's allegations and estimations.

Quiet thunder from down under. Persistent talk swept the recent Share conference in Chicago about an Australian bank that had so much trouble with IBM's latest IMS release that they had to take it off-line. The Westpac bank in Sydney, Australia, confirmed the reports last week. Users there switched from IMS 1.3 to 2.2 in June under an early-support program — and ran right into a wall. "IMS 2.2 was a little unstable in production," said Arthur Travers, manager of on-line systems software at Westpac. After a week when the bank's automated teller machine transactions were improperly updated, IMS 2.2 came off the IBM 3090 Model 400 — and 1.3 went back on. Now, after a series of fixes from IBM engineers — and a little rewriting of the bank's ATM application — the bank is going to try 2.2 again, but only after two more months of phased-in testing. Meanwhile, IBM's Federal Systems Division last week announced a contract to develop a consolidated banking system, including ATM transactions for Westpac.

How quick can something so Basic get? Microsoft will fire another volley in its ongoing war with Borland International for dominance of the languages market. In a month or so, Microsoft will release Quickbasic 4.0, a new version of its inexpensive package with vastly increased compile time and programming step-saving features, such as being able to edit and compile at the same time. Further out is a new language from Microsoft geared for Intel 80286 machines and higher. This language, which probably won't be released for at least a year, will work with a variety of packages and will serve as a step beyond both macro languages and batch commands found in MS-DOS.

Que sera sera. Doris D. Bencsik, acting chief executive officer when Datapoint Corp. cut its work force by one-third in March, resigned last week as chief operating officer. Although Bencsik's harsh actions are credited with Datapoint's turnaround — the company posted a profit last week of $8.1 million on revenue of $87.6 million, cutting earlier losses in the fiscal year to $57.7 million — she was passed over for the permanent chief executive officer's spot in favor of former Northern Telecom official Robert J. Potter. Bencsik will become a consultant to Datapoint's chairman and lead investor, Asher B. Edelman.

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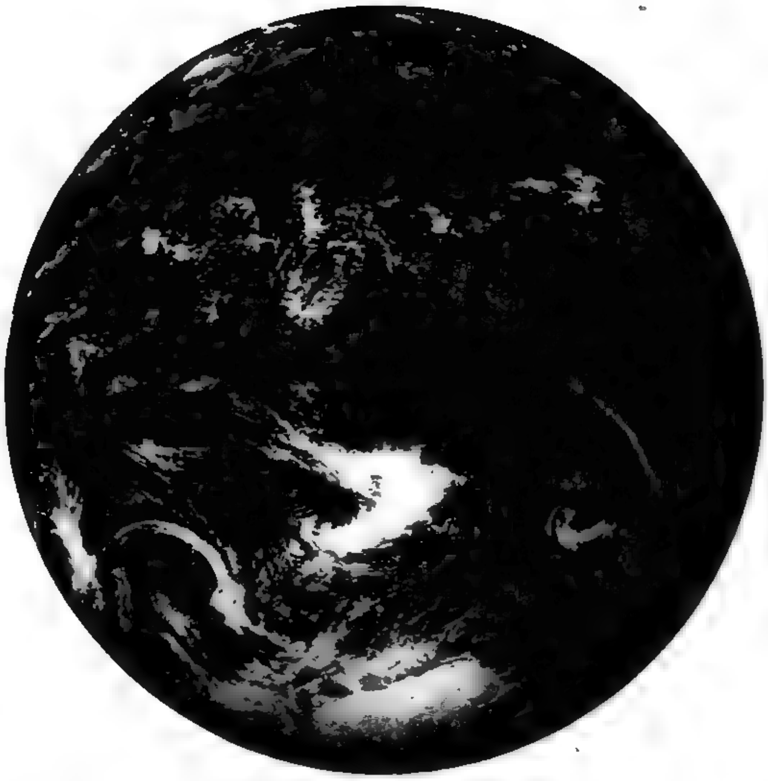

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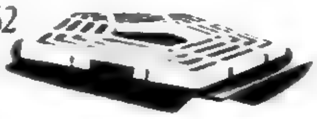
Codex develops its first data communications product for secure government applications

1967

Codex announces the first commercial 9600 bps modem. In 1976, our technology is adopted as the international standard by the worldwide CCITT committee

1975

Codex announces the first statistical time division multiplexer and pioneers the concept of network control

1984

Codex introduces breakthrough technology and architecture that transforms its new generation of high speed modems into a "network systems resource." In 1986, the first software option – a complete communications test package is announced

1985

Codex introduces gateways that allow separate networks to be combined

1985

Codex introduces the first 19,200 bps modem with built in network control as a standard feature to optimize throughput and minimize downtime

1987

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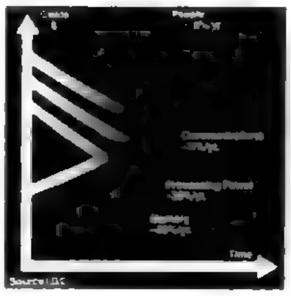

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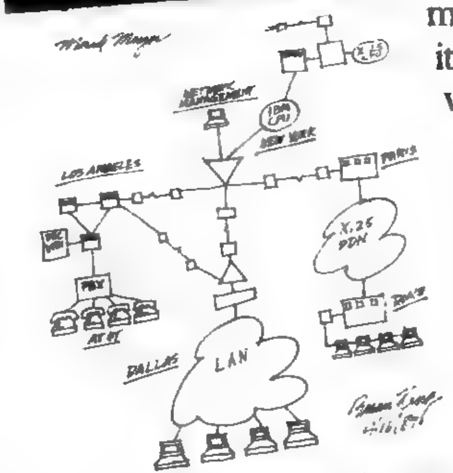

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NETWORKS IN A STRANGE LAND Setting up an international data network can be a trying venture. Where technology and equipment take precedence in domestic links, politics and regulations are the biggest headaches when data goes overseas. See what the experts advise and how others have fared in getting information to foreign places. By Avery Jenkins. Page 25.

SHEER POWER! For today's office applications, the Intel 80386 will find its most widespread use in network servers. But can a PC network utilizing these servers rival networks using minis as servers? This analyst looks at the powerful 386-based offerings out now and future solutions that will take advantage of OS/2 and the OS/2 LAN Manager. By Michael D. Millikin. Page 21.

A LAN strategy

By Rebecca Hurst. Product and standards are only two components of a network strategy. Corporate goals, users' needs and financial demands must also be taken into account for local-area network success. This article outlines how to plan the best network for your organization. Page 31.

Communications at Warner

By Rebecca Hurst. Warner Communications is associated with the glamour of rock stars like Madonna, movie stars like Jack Nicholson and cartoon stars like Bugs Bunny. But behind all this glitz sits the director of corporate information services, making sure the multinational company's processing systems work and communicate as effectively as possible. Page 41.

PCs and IOS

By Stan Kolodziej. Integrated office systems play a key role in those installations reflecting an MIS concern for control. The author shows how IOS have evolved and what users are accomplishing with this technology. Page 45.

ISDN in an SNA world

By John Pickens. Because of IBM's pervasive presence in the corporate marketplace, acceptance of ISDN may hinge on solutions to connecting with IBM systems. And IBM's Systems Network Architecture may just be that solution. Find out how well IBM equipment and ISDN connect. Page 47.

Telephony

A new breed of phone is on the market now. The area of telephony consists of machines that range from simple hand-held systems to full-fledged videophones. Whatever their form, these voice/data products can be valuable tools for firms. Features Editor Michael Tucker examines the current generation of phone technology. Page 35.

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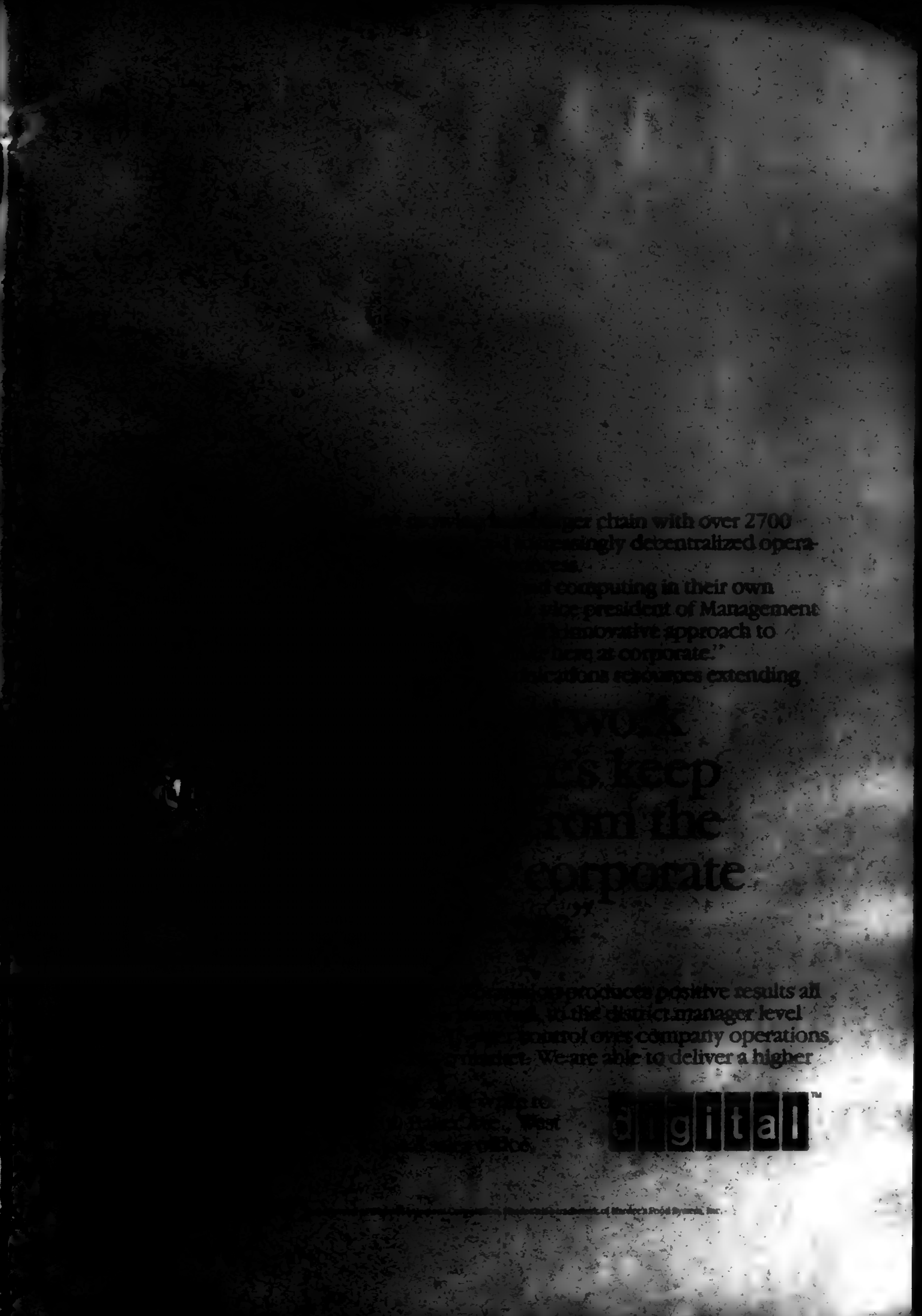

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19	39	59	79	99	119	139	159	179	199
20	40	60	80	100	120	140	160	180	200

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FROM THE EDITOR

Connection hungry

Sometimes you only have to hear a phrase once to know it's destined to be the up-and-coming buzzword. "Networked computing" appears to be just that kind of nouveau phrase. A cousin to connectivity, networked computing places its emphasis on connections and communications links. Without usurping the functions of the mainframe or the stand-alone personal computer, networked computing treats processors as indistinguishable units on the network. Digital Equipment Corp. has been a proponent of this kind of thinking for several years.

This push toward companywide integration and connectivity can be seen as one reason for the abundance of mergers occurring in the communications industry. As competition for connectivity dollars has heated up, vendors are forming strategic alliances or merging in order to offer a more complete line of communications products and technology alternatives to connection-hungry customers. As these vendors unite to broaden their offerings, products will become less proprietary because users will expect more from a single vendor or product line.

However exciting these trends may be, MIS managers should step back and take a cold, hard look at their companies' connection needs. Complete connectivity may not be in many companies' best interests. MIS should not be too easily swayed by pressure from eager end users and top management or by vendor claims. Traditionally, vendors have offered only their own proprietary systems that did not share a common system environment. The existence of these diverse communications standards has made integration among systems difficult and unwieldy. Only recently, due largely to overwhelming user demand, have vendors started to provide hybrid solutions. The process, however, is not a simple one and will take time to implement.

In addition to the potential technical problems, the benefits of integration have not always been clear-cut, either. MIS cannot always justify costs, oftentimes because the need for users to communicate is not always immediate enough to warrant a major system changeover. Although connectivity and networked computing are worthwhile long-term goals, MIS should be aware of all the aspects and assess potential trouble spots before wholeheartedly embracing these concepts in the short term.

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VAR finds IBM's PC actions unjust to customers, industry

The *Computerworld Focus* August editorial about the PS/2 was so impressive that I felt compelled to congratulate you for having the foresight to write it.

As a value-added reseller for AT&T products, The Bud Co. has long been aware of the need for national standards within the industry. We feel that Big Blue has done its customers and the industry an injustice. As for us, we are going to support those companies, both software and hardware, that are striving to settle on a national personal computer standard we can *all* live with. Let competition start *after* that, because the cream will rise to the top — it always has!

W. F. Hampton
President
The Bud Co.
Pensacola, Fla.

Fortune 10 user claims PS/2 'dog' is well bred

Having just placed an order for 50 IBM Personal System/2s for my office, I was interested in *Computerworld Focus*'s views on this item. Frankly, I was slightly taken aback by the negative viewpoint on the PS/2s in the August editorial, "A dog of a deal."

I understand that a large percentage of corporate America does not have the means or desire to upgrade every time IBM makes a change, especially one that means no more IBM Personal Computer XTs and ATs. However, as an employee of a Fortune 10 company, I have had the opportunity to experiment with all types of PCs. Once I got my hands on a PS/2, I was converted forever. The machine will be an integral part of the future and the new wave of PCs.

As an advocate of the latest and greatest, I would strongly recommend that corporate America keep an open perspective in its approach to this "dog;" it seems to be very well bred.

Tracy Sharp
Darien, Conn.

Hot commentary on a cool technology

In reference to the News & Analysis article "Superconductors: Hot Times for a Cool Technology" in the August 12 issue of *Computerworld Focus*, I think the author should be a bit more careful in reporting units of measure for temperatures. In the article, he refers to "oxides that were superconductive at a 'warm' -98 degrees Kelvin." Because Kelvin is used as the absolute scale (that is, 0 K is absolute zero), the temperature -98 K is theoretically impossible. The temperature should have been listed as 98 K, or -175 degrees Centigrade.

The July 1987 issue of *Popular Science* reported that a recently discovered yttrium-barium-copper oxide material had a transition temperature approaching 240 K (-27 degrees Fahrenheit). It is upon such materials that the hope for a superconducting computer is based.

Jimmy Vaughn
Chattanooga, Tenn.

As an electrical engineering student, I read the article on superconductors with interest. I would like to inform you, however, the grade of measure is just Kelvin, not degrees Kelvin.

Mark A. Logan
Indianapolis

Q AND A

David L. Nelson

A look toward 1990: Apollo exec promotes network computing concept

David L. Nelson is one of the founders, the vice-president of advanced technology and chief technical officer for Apollo Computer, Inc. in Chelmsford, Mass.

Last May, Apollo announced that it was forming a new organization, the Network Computing Forum, to promote the concept of network computing — the construction of networks that are themselves computing devices. The forum would include end users and software and hardware vendors, including Apollo's own competitors. Nelson served as the driving force behind the forum's organization. He recently spoke with *Computerworld Focus* Features Editor Michael Tucker regarding network computing and the forum.

What is the Network Computing Forum?

Briefly, the forum is an organization that currently has nearly 60 members. The group is composed of more or less four types of members: large end users like Boeing Corp.; equipment manufacturers like Apollo; software application developers; and finally, some university and government labs. They all have, as a common interest, the urge to explore the concept of network computing.

Are you a standards group, like the Corporation for Open Systems (COS)?

No. [The forum] is a member of the COS, and the members agree that standards are important. But our philosophy is not to get tied down in the rather cumbersome work of standards processor. The forum is, rather, a clearinghouse — an environment and a context in which we can exchange ideas about network computing as well as a place where end users can speak directly to vendors and vendors can speak directly to suppliers.

So the forum is a discussion group?

That's our charter. Except, of course, that we go beyond discussion. For instance, the forum promotes products that further network computing. The network queuing system developed by Cray Research, Inc. is being promoted by the forum. MIT's Netwindows system is being promoted by the forum. Apollo has developed a product called the Network Computing System, and we have submitted it to the forum.

What is network computing?

Network computing is rather strictly defined as executing single applications across networks of computers. Let me emphasize the word *single*.

If you're like me and most other people in the industry, you tend to think of an application as something that executes on a very specific machine. You might think of a budget as something that you prepare under Lotus Development Corp. 1-2-3 that runs on a PC. We associate data bases with IBM mainframes. And we associate various engineering applications with the [Digital Equipment Corp.] VAX.

Network computing challenges all that. It redefines the application as a program that runs on a network. It would be a single program running on multiple machines in a coherent, distributed manner.

This means that a developer could, for example, produce an application that would run on a single workstation or as a distributed application on a network of heterogeneous machines.

How is this possible?

Well, basically, software developers would organize their applications as sets of procedures. For example, you might have an application that would be composed of three sets of modules — one doing all your computational work, one doing your graphics and a third doing your data base work. Now, if you're selling a product to a customer who has one machine, you simply include within your installation procedures the instructions to link those three together into one application — which is what people already do today.

But let's say that you go to a much more sophisticated customer. Let's say this customer has a Cray supercomputer, four VAXs and several Apollo workstations. Now, let's further suppose that this customer would like to run the numerically intensive part of the application on the Cray or the VAXs or the Apollo, depending on environment or even the time of day. . . . Normally, the numerical module would run on the Cray, except when the Cray gets overloaded, in which case it shifts to the VAXs, unless they fail, in which case it shifts to the local Apollo.

So when you provide this user with instructions on how to load the application on the Cray, the VAXs and the Apollo machines, you also distribute [a system like] the Network Computing Runtime System, for example, which Apollo has developed.

The Network Computing Runtime System sits at each node, traps the procedure calls and sends them out to the appropriate foreign machine. This is all done in a manner that is transparent to the actual application.

When the application now makes calls to the numerical module, sometimes the calls go to the Cray and sometimes to the other machines, depending on the situation.

What are Apollo's objectives in being involved in the forum?

We have talked to several end users. Many of them were doing long-term planning, and they had run into a problem. Unless they considered IBM or DEC, they could not put together a coherent computer strategy. If they went to IBM or DEC, they would have to choose one vendor, and that vendor would tell them what their strategy was.

But most users don't have a single-vendor strategy. We recognized that this was limiting the growth of the entire industry, and more importantly, it was limiting the growth of that part of the industry that was neither DEC nor IBM — particularly our part of it and the people who build servers and various network components.

So, a big part of our motivation is that we want to provide customers with a vision of how multivendor, heterogeneous computing can be done in the 1995 time frame.

What haven't I asked?

You might want to know when users can expect to see real applications coming out of the forum. I'm looking to the fall of this year for some interesting results. But, again, we like to think of network computing in terms of the 1990s.

MANAGER'S
CORNER

Small changes for big results

Jim Young

Communications environments do not easily accommodate change because it affects standards, protocols, dissimilar devices and different media. Moreover, because organizations depend on communications on a day-to-day basis, top management is many times not likely to permit much experimentation.

One way to reconcile change with the status quo, however, is to approach technological innovations step by step. The first move to innovation can frequently reduce costs without major accommodations by an environment. Some communications examples help to illustrate this point.

IBM's recent announcement of its T1 strategy has renewed the promise of integrated voice/data communications. Products are available today that oversee the hardware and applications for voice and data transmission. Unfortunately, many companies are not yet prepared to embrace this degree of technology because of their equipment, priorities or lack of faith.

Yet technologies such as T1 will be essential in incorporating voice/data innovations. Keep in mind, too, that you need not make exhaustive use of a new technology. For example, several products, including IBM's T1 announcement, permit selective adoption of T1 for the simple expedient of transmitting voice over data, while never integrating the two. This option can make financial sense if your company's voice and data transmission costs between discrete locations are typically high. It may be a small but significant step toward technical sophistication.

Another area in which technological advances can benefit your company is wireless communications. There are products that, through the use of radio transmission, can replace costly links or deliver access to otherwise "unlinkable" nodes. These products range from one-way data transmission systems to fully functional two-way transmission systems. Operating over several miles, an advanced transmission system can lower your costs by avoiding direct wiring, modems, complicated networks and telephone usage. It can also permit product sharing in an office environment.

Best of all, once a technology like this is in place, its true advantages can begin to blossom. Rapid response to equipment moves, immediate and simple tie-ins to a network and even mobile networking are among the possible benefits.

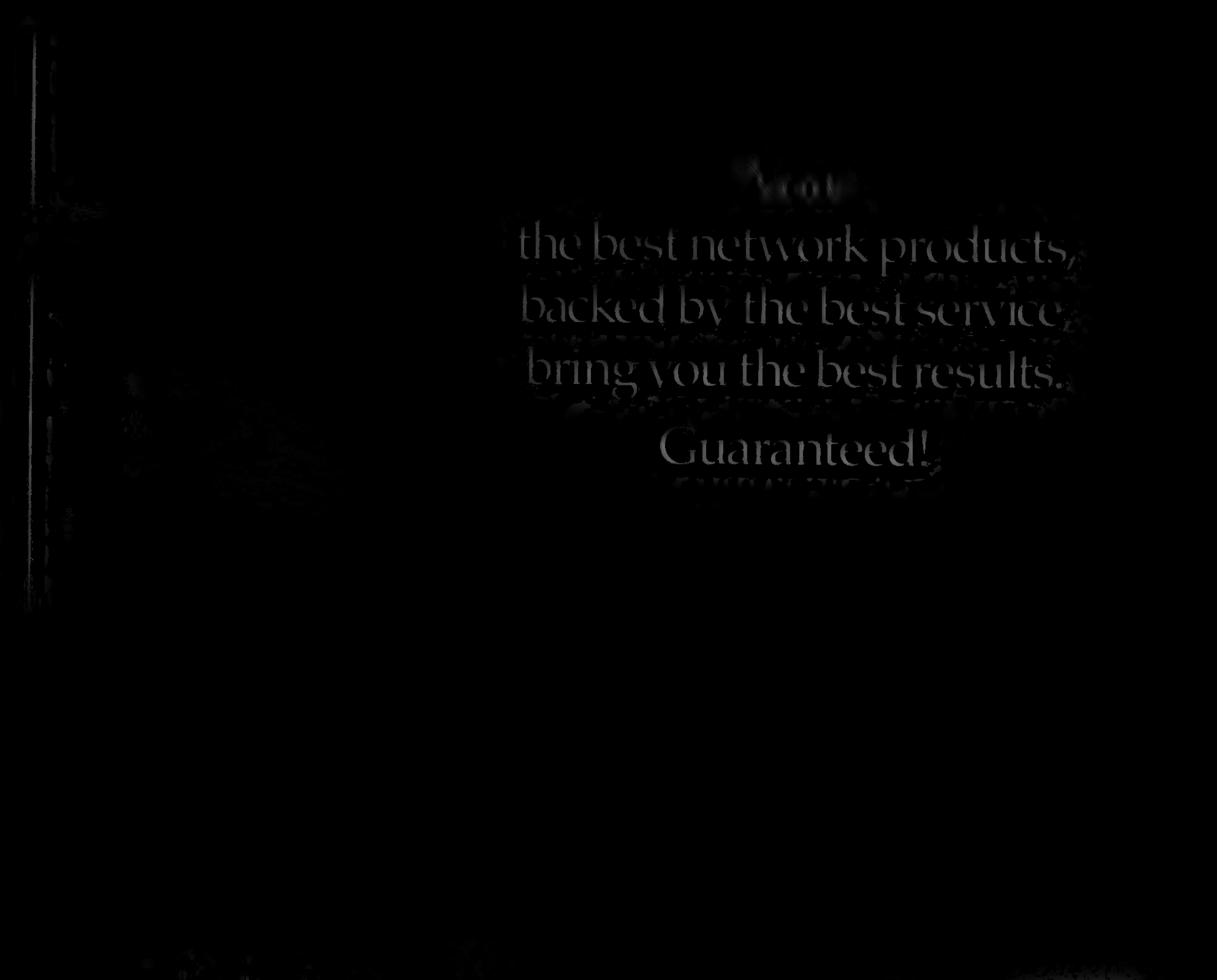
The local-area network (LAN) arena has also experienced certain technological leaps. LANs reorganize the way users share data and devices as well as how group work is accomplished. The management tasks are often significant when implementing a LAN, and DP managers are, therefore, often correctly hesitant to charge headlong after LAN technology. However, by reducing some easily eliminated printers or acquiring a site license for popular software, MIS can save enough money to make a LAN investment a good deal.

A final sector in which to look for technology improvements is electronic mail. Companies typically put off acquiring an E-mail system until they are ready to mount a full-scale changeover because of the fundamental changes such a system might force on workers. When the E-mail coup occurs, DP must deal with the challenges of promoting new behavior and learning how to manage the technology.

A more subtle approach is to examine routine but costly communications that electronic mail can reduce or replace, such as some overnight mail services, facsimile transmission, telephone costs and so on. A network may already be in place to serve other locations, and a simple software purchase could pay for itself by avoiding some of these costs. Once a system of such potential operates successfully for isolated uses, others with less quantified but equally valuable needs will be lobbying for its use. At this stage, E-mail can be expanded. It is a steady, reliable way to implement technology in a controlled manner.

These are only a few examples of ways to put costs up front when looking at investing in communications technology. Besides ensuring early payback, this approach allows MIS to assimilate the management responsibilities of new disciplines. Most importantly, this approach shows top management the benefits of technology while highlighting savings — an area many executives accuse DP managers of overlooking.

Young is managing director of MIS for the Wheeler Group, a division of Pitney Bowes in Hartford, Conn.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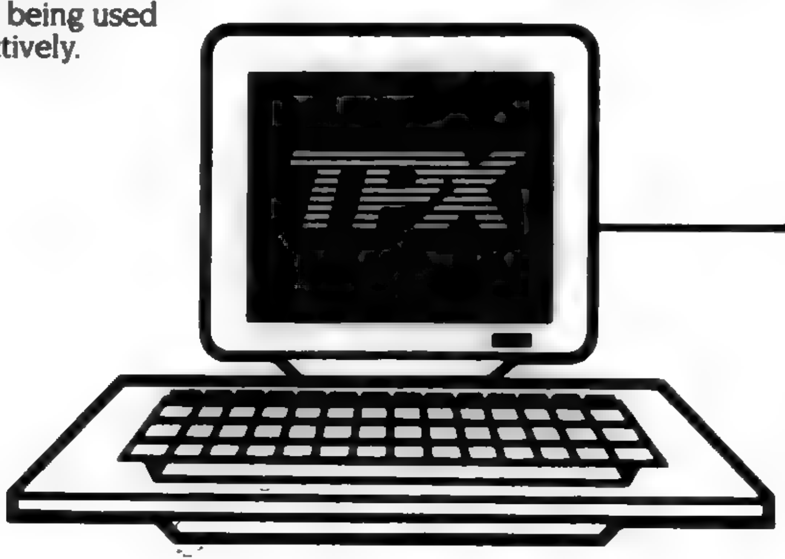

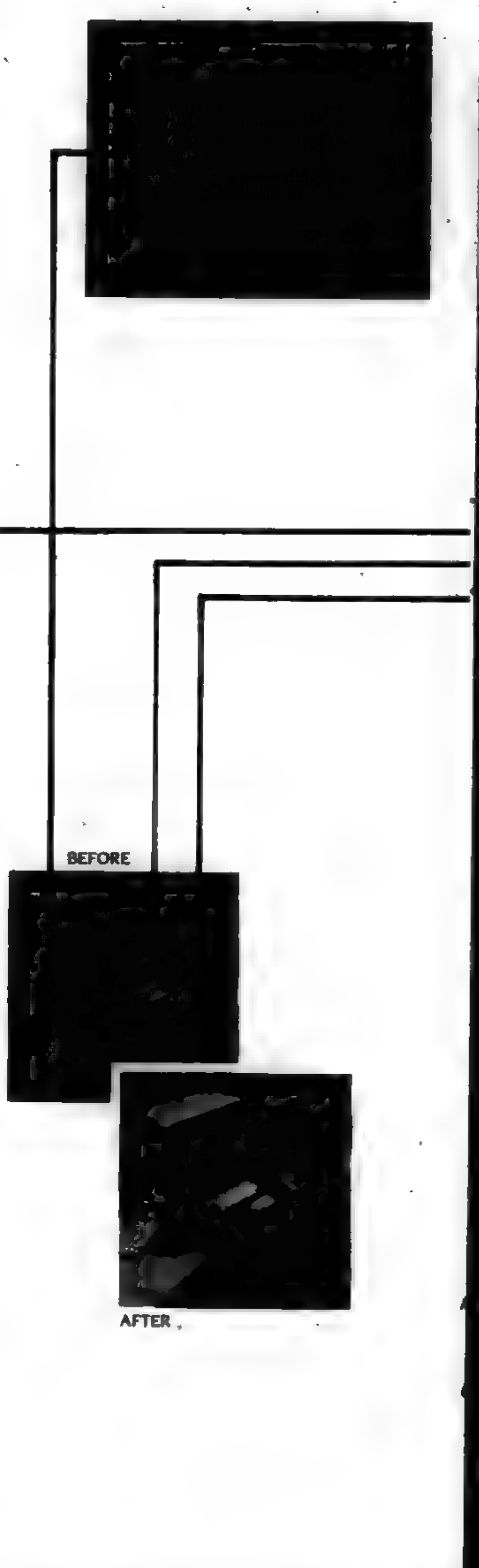

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Terminal Productivity

VTAM Monitoring
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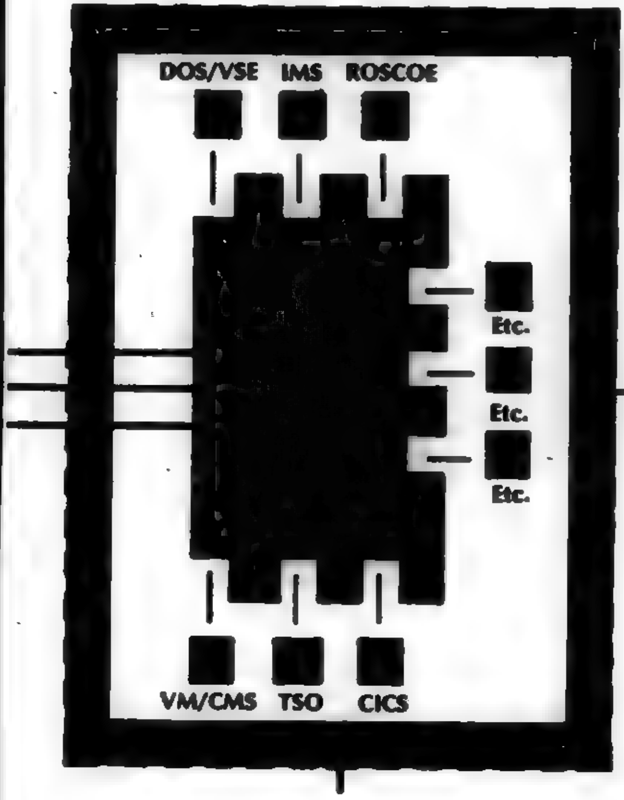

is being used most effectively. It gives you information that helps in the areas of network control, management, capacity planning, and systems programming.

When using a multiple session manager such as TPX, you can access many different applications from one terminal. NetSpy has interfaces to TPX to measure true "end-to-end" response time. This information is not available from any other source.

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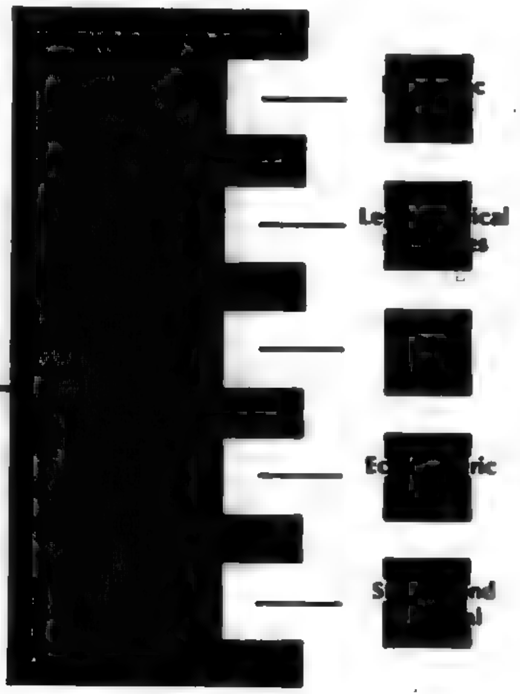
By giving the TPX user a session with STX, the ACL (Automated Conversation Language) feature of TPX can be programmed to connect to and access an external data network, perform a retrieval, journal the results, and then disconnect—all initiated with a single keystroke.



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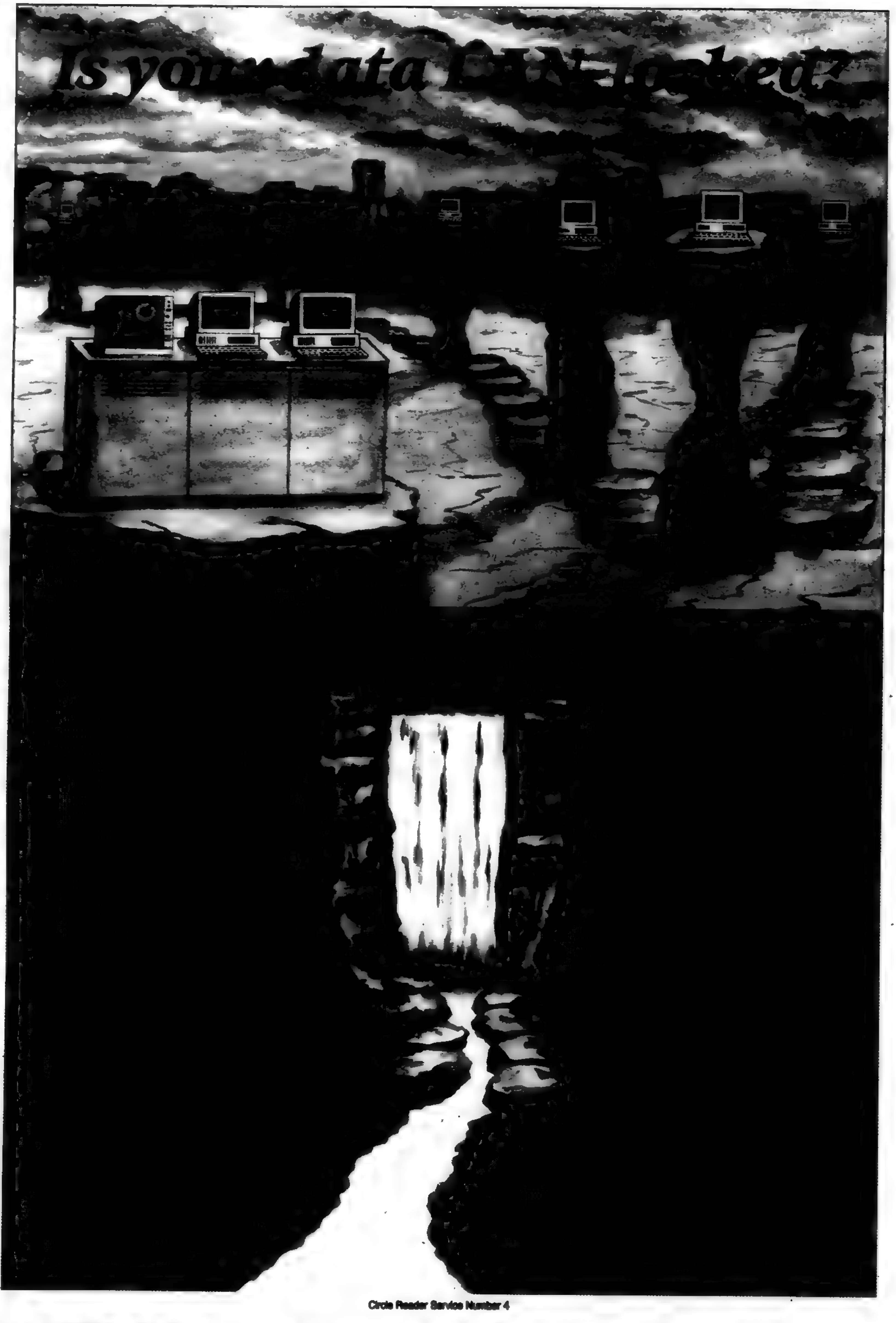
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news & analysis

UPDATE

NSF links supercomputers

Supercomputing has led to a super network for the National Science Foundation (NSF) in Washington, D.C. In late 1983, when the NSF began its supercomputer initiative to fund six supercomputing centers in the U.S. (see chart this page), it realized the need to network these centers, according to Dan Van Belleghem, associate program manager for the NSF network, called NSFnet.

"In the past, researchers who needed to access a supercomputer had to fly to the computer site and bring a tape to run," Van Belleghem explains. With the six centers and AT&T's Dataphone Digital Service (DDS) 56K-bit network in place to connect them, schools and research centers can network into the backbone to communicate with any of the six centers.

And many universities have done just that. Eight regional consortiums representing more than 150 universities have implemented or are in the process of implementing networks that connect into NSFnet. The NSF has awarded each of these consortiums between $300,000 and $1 million to help support the projects, Van Belleghem notes.

To keep the NSF networking scheme simple, the foundation chose AT&T's DDS as a backbone for a packet-switching network. "Using packet switching allows regional lines to route to a central regional center," Van Belleghem explains. "That center ties into one of the supercomputing centers and from there the data can go to any other computer on the network." Using this scheme means that universities do not have to finance communications lines to every supercomputer center, he says.

More importantly, the network is breaking down logistical barriers. "The network allows researchers to collaborate with each other and disseminate information much more quickly," Van Belleghem says.

Communications execs: Beware of wild boars

From the beginning of computing, animals have plagued information processing systems. In fact, the first "bug" discovered by computing veteran Grace Hopper actually was a moth that had entangled itself in the electromechanical relay of the ENIAC machine, notes Ira Cotton, a principal at Booz, Allen & Hamilton, Inc. of Bethesda, Md.

However, creature concerns are not limited to computers, Cotton warns. "Managers have to think about protecting their communications systems from external threats." Rodents or insects can destroy cable by chewing on it, he notes. Although such animals probably will not cause the damage in a single day, Cotton says, "they may attack [the cable] or cause it to deteriorate over time."

Larger animals can uproot cables that are not deeply entrenched, Cotton cautions. For example, he says, "a wild boar used its tusks to uproot cable at the Kennedy Space Center." Such attacks can lead to delayed or interrupted signals and electrical shortages.

There is no single rule of thumb for protecting cable from animals, Cotton says. "Managers just need to understand the cabling scheme and examine potential environmental threats."

For example, in populated areas, the biggest threat to trenched cables is people. "Post your cable on surveyor maps, and put up notices to warn anyone who is considering digging there," he suggests.

Unpopulated areas usually require shallower trenches, Cotton notes, unless there is abundant wildlife nearby. Other precautions include providing an extra-durable sheath for better insulated cable and regularly examining it for damage, he adds.

FCC may charge networks with phone line access fee

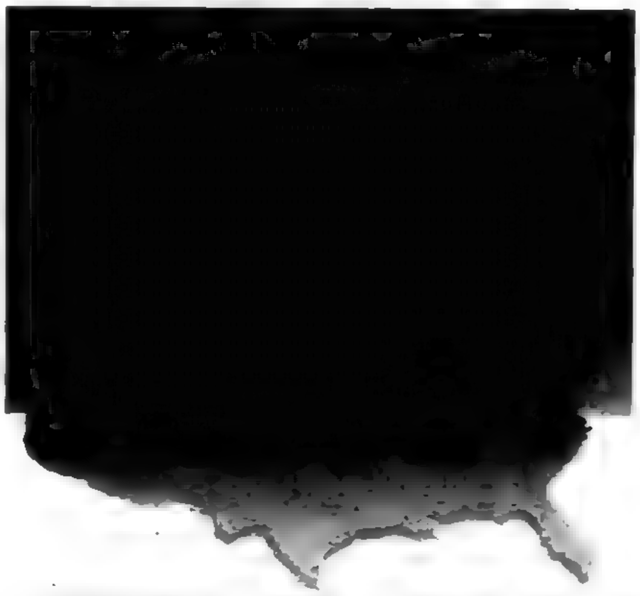
A new Federal Communications Commission proposal may spell trouble for on-line data base services such as Compuserve, Inc. and time-sharing firms such as Tymnet/McDonnell Douglas Network Systems Co.

The FCC proposal would

Continued on page 15

National knowledge network

National Science Foundation backbone net links six U.S. supercomputer centers



1. San Diego Supercomputer Center, University of California, San Diego 2. National Center for Atmospheric Research, Boulder, Colo. 3. National Center for Supercomputer Applications, University of Illinois, Urbana and Champaign, Ill. 4. Pittsburgh Supercomputer Center, University of Pittsburgh, Carnegie-Mellon University and Westinghouse Electric Corp., Pittsburgh 5. Cornell National Supercomputer Facility, Cornell University, Ithaca, N.Y. 6. John von Neumann National Supercomputer Center, Princeton University, Princeton, N.J.

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CHART BY BRUCE SANDERS

ISDN's fortunes may be changing for the better

Integrated Services Digital Networks (ISDN) are coming, although in many respects they still resemble the character in the "L'il Abner" cartoon strip who couldn't shake his cloud.

In recent years, ISDN's cloud has been lined more with controversy than silver. Born in a Europe conditioned to government involvement in the marketplace and where standards committees can throw around a lot of weight, ISDN has found a rough reception in the U.S., one marked by indifference and skepticism.

But that situation might be turning around. Because of some well-publicized ISDN pilot installations in the past few years — most notably the one for McDonald's Corp.'s headquarters in Oak Brook, Ill. — as well as backing from AT&T, ISDN has become more legitimate as an integrator of communications services. This trend is furthered by the apparent user climate of frustration and confusion caused by the sheer numbers of telecommunications vendors and services available.

"I think there has been a change in perception in the U.S. toward ISDN compared with a year ago," claims Victor Krueger, a vice-president in the telecommunications industry services division of San Jose, Calif.-based market research firm Dataquest, Inc.

"Indifference is being replaced by a closer look at more pragmatic issues. The success of field trials has drawn attention to what ISDN can do. More telecom equipment vendors are now concerned about how they will provide ISDN, how they will maintain it and what the costs will be. There is a lot of activity from people like AT&T, Northern

Continued on page 12

The executive information system networking trend, page 13.

ISDN's fortunes

Continued from page 11

Telecom, Inc., Harris Corp. and others about how they will get their non-ISDN terminals and other equipment to work with the ISDN standard," Krueger says.

IBM should provide another boost for ISDN. Although the company is a member of the Corporation for Open Systems, it has been very sketchy and noncommittal about its support of ISDN.

And for good reason. IBM's Systems Network Architecture (SNA) is the de facto standard in corporate mainframe networking, and at certain protocol levels it would clash directly with ISDN.

Krueger says not to worry.

"It's been played up too much as an either-or situation — either ISDN survives or SNA survives, but they cannot live together," Krueger says. "That is not going to happen. ISDN and SNA are truly incompatible only at the bottom three layers of the [International Standards Organization's] Open Systems Interconnect model.

"And IBM is practical," Krueger continues. "If there is enough ISDN interest from [IBM] users, the firm will support it and help third-party vendors develop links between SNA and ISDN," he says.

That user interest must indeed be evident to IBM, Krueger suggests, because one of IBM's top executives in the communications products area recently declared at a Dataquest forum that IBM would now fully commit itself to ISDN.

Krueger adds that he is expecting AT&T to announce tariff rates for ISDN services by the end of this year, followed by similar news from the regional holding companies in 1988.

"There's still a great deal to sort out with ISDN services, however. Will there be 800 service, direct in-dialing and packet switching?" he asks. "And at what bit rates and prices? When the users see these things finalized, there will be more money going into ISDN."

Maybe, but not from everyone.

"Don't hold your breath for ISDN connections. ISDN as the do-everything, be-everything communications facility was a fantasy from the start and will always be a fantasy. One size doesn't fit all, and one way of handling data communications isn't the best," concludes Will Zachmann, vice-president of research at International Data Corp., a market research firm in Framingham, Mass. — SK

dB

By Rick Tennant

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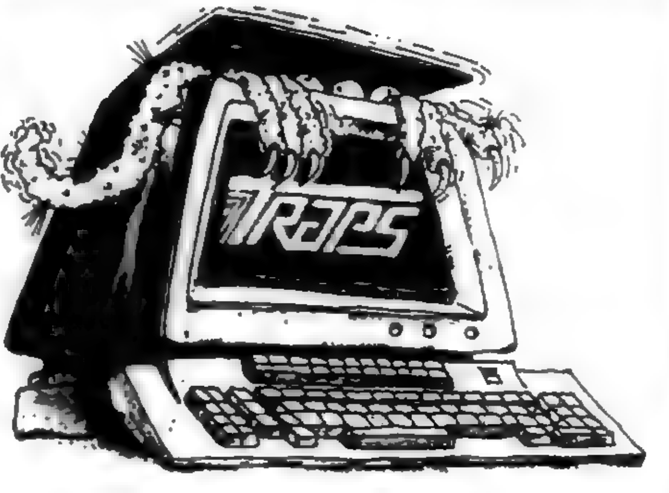

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Circle Reader Service Number 5

Distribution channels change face of LAN market

Could 1986 have finally been the year of the local-area network (LAN)? The answer appears to be yes. The tally is complete, and the figures seem to indicate that LANs were soaring last year.

"In 1986, the U.S. LAN market reached $1 billion in equipment and services," says Bill Redman, program director for local-area communications services at Gartner Group, Inc., a market research firm in Stamford, Conn.

As it grows, this burgeoning LAN market has been undergoing other changes. Distribution channels are being redefined, and there are new market players. Few would have guessed a couple of years ago that retail chains such as Computerland Corp. and Businessland, Inc. would be getting deeper into the LAN game.

Not total LAN integrators

"Retail chains are going to be selling more LAN add-in boards and competing directly with the smaller OEMs who can package smaller LANs for customers," Redman says. "[Both providers] are not going to become total LAN integrators, but they will provide 'subnet' services that the larger LAN vendors pass up. You have to sell customers on connectivity now, not just stand-alone systems."

There is a bigger LAN market forming that larger LAN OEMs and value-added resellers (VAR) are targeting. In the past few years, the LAN industry has been turned on its head. Instead of the large 50 or more user departmental LANs predicted to be the standard in corporate America, small LANs with 10 or fewer users and subnets, or LANs consisting of fewer than five or six people, are the reality.

However, the call for connectivity has been growing, and that call means "LANs are not local anymore," Redman says.

The big payoff could come in vertical connectivity. At this point, there are not enough vendors providing gateways into other networks.

"But there are other opportunities for LAN VARs," says Andrea McCurdy, a research analyst at Boston-based research firm The Yankee Group. "Users are demanding a lot more from network software, and many LAN vendors simply can't provide all the pieces. LAN VARs can give equipment integration, vertical software and a more customized end product. I think there will be an increasing dependence on LAN VARs."

Anne Ferrier, senior systems analyst at Sovereign Financial Corp., located in Norfolk, Va., says her company brought a VAR in to handle a LAN installation running Novell, Inc.'s Netware operating system. Sovereign chose the VAR because it could provide the necessary vertical accounting software and could also take care of the installation.

Ferrier says that IBM set up Sovereign's IBM Token-Ring network and AT&T installed its Starlan network at the organization, but the growing third-party activity surrounding Netware made it easy to get help from an outside VAR.

"OEMs and retail outlets are still the primary vehicles for getting LAN services and value added to users," Redman says. "But VARs are coming on." — SK

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INSIDE

OS/2 LAN pact lacks IBM seal

Multitask option on Mac menu

Competition thriving despite lessor buy-outs

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Networked EIS expedite group decision making

An enormous amount of software wizardry goes into executive information systems (EIS). The software remains hidden from executive eyes, working within EIS to pull, sift and sculpt many levels of data to create the kind of polished graphs that top-level executives demand from just one or two keystrokes.

That same software is finding its way onto EIS networks, which are now playing a bigger role in the EIS market.

"Networking is becoming a bigger issue in EIS because the important EIS ability to handle group decision making in corporations can be expedited through networking," explains Ted Jastraembski, director of the software and services information program at Framingham, Mass.-based market research firm International Data Corp.

The fact that EIS are moving beyond the first stage of automating just the top tier of executives and are entering their second stage of evolution is also bringing networking and EIS closer together, Jastraembski says. "The second stage is expanding EIS to tie in management at the corporation's midsection," he says. "It's beginning to look more like a pyramid structure."

In some cases, this top-down EIS approach is starting to merge with office automation systems, Jastraembski adds.

"This second stage means that instead of the original four or five executives on an EIS, there is now a whole new set of management users with different needs. Managers need analysis capability [from the system]; executives don't. Executives just use the system for accessing corporate status reports," Jastraembski says.

The top-down form of EIS can be seen at Atlanta-based Georgia Power Co., a subsidiary of The Southern Co.

Georgia Power has 120 executives and managers hooked into an IBM PC Network running Cadet EIS. Cadet is marketed by Southern Electric International, Inc., which is also a subsidiary of The Southern Co.

Cadet originally was conceived, programmed and installed by MIS at Georgia Power so that a few top-level executives could receive status reports and graphs.

"We put [the EIS] on a local-area network because it's fast," explains Ben McGimsey, supervisor of client services at Georgia Power. "We also knew that executives would not use micro-to-mainframe links. There had to be good response time [under one second,] ease of use and good software or else they wouldn't use it. We felt we could put all that on a local-area network," he explains.

Using IBM Personal Computer ATs as file servers, the Cadet installation has spread to include lower level managers who require different types of information from the system.

"They do more data analysis," McGimsey says. "We're going to put in some micro-to-mainframe links. These guys will use them."

McGimsey adds that the lower level managers will also want electronic mail, unlike top executives. "No matter how much new information goes on-line on the system," McGimsey says, "we have to keep it simple for top executives. If these guys want to discuss something with each other, they pick up the phone; they don't use E-mail."

Ron Ferrero, manager of personal computer applications at Southern Electric, claims Cadet drew so much interest from other firms they decided to spin the product off and market it jointly with Arthur Young, targeting Fortune 1,000 customers.

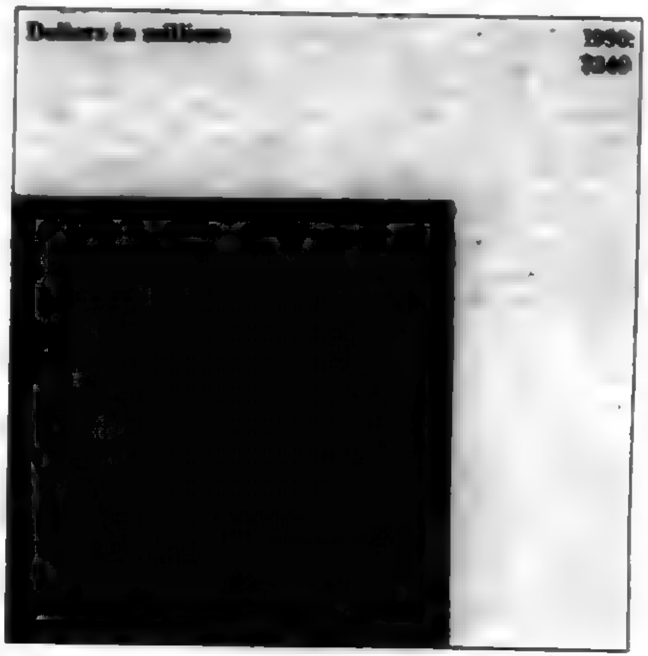
"Cadet runs on Ethernet. It can be stand-alone. We can plug Cadet into the IBM mainframe environment, into [Digital Equipment Corp.] VAX systems and into DEC's All-In-1 office system," Ferrero says. "But I think putting it on a network works best because it can distribute information quickly."

Other leading EIS vendors such as Comshare, Inc. and Thorn EMI Technology, Inc. are also reportedly planning to strengthen their EIS networking offerings.

"I think EIS vendors are realizing just how important networking will be in bringing EIS into its second stage," Jastrembski says. — SK

EIS explosion

U.S. revenues expected to double each year to 1990



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Apple Macintosh to run as node on Decnet LAN

Dove, Technology Concepts form joint venture

A joint marketing venture between two small companies could have a lasting impact on the data communications industry.

This year, Dove Computer Corp. of Wilmington, N.C., and Technology Concepts, Inc. of Sudbury, Mass., will beta-test an as-yet-unnamed product that reportedly will allow the Apple Computer, Inc. Macintosh to run as a node on Digital Equipment Corp.'s Decnet local-area network (LAN).

Technology Concepts will supply the software — a version of the company's Community LAN — while Dove will provide the Ethernet controller hardware, an attached peripheral known as Fastnet. Officers of both firms say the pricing will be in the neighborhood of $500 for Fastnet and $900 for the software.

What gives the agreement an importance far beyond that of the DEC and Apple worlds is Technology Concepts' ownership and the third-party use of its Community products. Technology Concepts was founded by Stuart Wecker, one of the principal architects of Decnet. Late last year, Philadelphia-based Bell Atlantic Corp. bought Technology Concepts. The purchase of the company could signal a direction for Bell Atlantic's development efforts to produce a common software environment for the organization's voice and data transmission operations.

Turning the tide

Bell Atlantic, as with all the regional holding companies, exited the breakup of AT&T without a research and development department because Bell Laboratories went with the parent company.

However, the regional holding companies have set out to change that situation. They have, for instance, jointly funded an R&D consortium. And, individually, they have all been acquiring small to medium-size communications-related companies. In effect, they are building their own Bell Labs piece by piece.

Since Bell Atlantic bought Technology Concepts, the Community product has been used within Bell Atlantic, although company officials decline to say for what purpose.

Meanwhile, Community is being sold under various private labels by several major computer vendors.

Sun Microsystems, Inc., for instance, markets the product as Sunlink DNI to those customers who want their Sun workstations to function in a DEC environment. Technology Concepts hints that similar agreements are in the making with other vendors of Unix-based workstations.

Dove Computer is a company of approximately 25 employees that got its start two years ago. The company's founders' intent was to enter the Macintosh and IBM Personal Computer aftermarkets.

However, as the company developed, it found the Macintosh market alone was rewarding enough. With the introduction of the new generation of Macintosh machines this year, Dove abandoned the PC for Apple products.

From 1985 to 1986, Dove was working with a major customer, which Dove declines to name, that wanted to link Macintosh machines with DEC products. The customer had heard of Community and arranged a meeting between Dove and Technology Concepts.

At that time, Technology Concepts was marketing Community for Unix systems and PCs. Discussion between the two firms resulted in the Community product for the Mac as well as a joint marketing agreement.

Community for the Mac is expected to ship by December of this year. — MT

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Circle Reader Service Number 6

The industry's urge to merge

Merge! Acquire! Consolidate! These are the battle cries resounding throughout the communications market. Within the last several months, vendors have been joining or consuming their competitors and cohorts in an attempt to become bigger, better and more diverse.

The economy has been a primary motivator behind this activity, claims Bob Newton, vice-president of telecommunications consulting for Gartner Group, Inc., a Stamford, Conn., research company. "Narrowing profit margins are driving the weaker players out of business or into consolidation," he says. "We've seen it in banking, manufacturing and marketing. The computer and communications industries have just joined the trend later."

Competition is another factor. Communications vendors make most of their revenues and profits from electronic hardware, Newton comments. "The hardware arena has become extremely competitive." Some of the competition comes from foreign vendors joining the market, but another aspect is the maturation of the communications industry, he says.

No room for small players

Particularly with digital communications technology, there was a tremendous latent demand in the early years of the industry, Newton recalls. This left room in the market for many players. "Some portion of that latent demand has been sated today," he says. "The market is not growing the way it was. There is no room for very small players to grow."

The market has also become more stable, Newton says. And that stability has attracted large players such as AT&T, IBM and Digital Equipment Corp. As a result, small companies are forming alliances in order to compete with these bigger opponents, he explains. "Network communications vendors have to reach about $100 million to gain the critical mass to compete with vendors such as IBM," Newton reports.

These smaller companies have a fairly short amount of time in which to create that critical mass, so many are turning to consolidation. "In a few years, the market may jell down to five or six major companies worth $100 million to $300 million," Newton suggests.

Most companies merge to expand. However, while some companies are seeking to extend their current product focus with related offerings, others are seeking to add diverse or complementary products and become a one-stop shop.

Digital Communications Associates, Inc. (DCA), which has acquired four companies in the last 18 months, is well on its way to becoming a one-stop shop. "DCA wants to be a complete data communications player," affirms Brad Baldwin, a networking industry analyst for San Jose, Calif.-based research firm Dataquest, Inc.

DCA originally concentrated on the low end of the communications market with its Irma IBM 3270 emulation products. It has since acquired companies that extend this low-end market focus, including San Jose, Calif.-based Forte Communications, Inc., which produces personal computers and communications products; Microstuf, Inc., which produces Crosstalk PC communications software; and most recently, Fox Research, Inc., which produces the 10-Net local networking line.

In addition, DCA has acquired Cohesive Network Corp., which produces T1 multiplexers, Baldwin notes. "The T1 multiplexers address the high-end wide-area networking market and complement DCA's local networking products," he says.

By contrast, the merging of 3Com Corp. of Santa Clara, Calif., and Bridge Communications, Inc. of Mountain View, Calif., will allow the companies to strengthen an already existing relationship. Bridge has been using 3Com's boards in its own products through an original equipment manufacturer's deal with 3Com, Baldwin notes.

Although they use similar equipment, the two vendors target different niches of the communications market. 3Com specializes in networking products for PCs. Bridge focuses on products that connect terminals to minicomputers and mainframes. With the merger, the two companies can share software source code and develop a greater level of integration between the products, Baldwin says. "Before merging, they could not divulge that code," he says.

The greatest impact of these mergers will fall on vendors, Newton says. However, users will feel some effects as well. The benefit is that users should gain better integrated products, Baldwin claims. The drawback is that the falling costs of networking equipment will level off.

"The price of hardware has been coming down at a phenomenal rate — about 20% per annum," Newton says. "As vendors consolidate and stabilize, they will arrive at reasonable price points." — RH

News section written by *Computerworld Focus* staff members Stan Kolodziej, Michael Tucker and Rebecca Hurst.

Update

Continued from page 11

require computer networks linking into rented private telephone lines to pay an access fee of up to $5 an hour per user as of Jan. 1, 1988.

The commission states that because network firms are currently exempt from access charges, they are being subsidized by business and home users. Companies like Compuserve and Tymnet/McDonnell Douglas argue that they may have to pass the costs on to users. They also claim that the plan gives companies that maintain their own networks an unfair advantage because these firms would not be required to pay the access charge.

The FCC is seeking comments on the proposal.

COS finds it hard to escape criticism on membership rules

The Corporation for Open Systems (COS), originally a vendor-driven standards organization, came under fire several months ago because it lacked user input. In response, COS has begun an earnest drive for user members, but the group is still being criticized.

The problem centers on COS membership requirements, says Robert Zeibig, senior manager and telecommunications practice leader at Nolan, Norton & Co., a Lexington, Mass.-based management consulting firm. The full-membership fee, which starts at $25,000 and requires several hours of employee time, is too high a price for users, he says. "Vendors can justify these expenditures as development costs," Newton remarks. "Users don't have similar justifications."

COS responded to the problem in January by developing an affiliate membership. Affiliate members pay only a $500 annual fee. However, these members cannot vote nor can they attend COS's bimonthly strategy sessions or user committee meetings.

To encourage greater participation, COS may need to reevaluate its requirements and devise a new category of membership with voting powers, Zeibig says. "Users need to have direct input into COS and the standards it is making. They shouldn't have to choose from whatever standards have fallen out," he says.

The vendor members of COS will benefit as well, Zeibig notes. "Vendors need to understand more accurately about real users' needs rather than perceived needs." — RH

Corporate nod boosts E-mail

After years of struggling for acceptance, electronic mail has begun its ascent to stardom.

Long credited with speed, convenience and cost-effectiveness, E-mail has finally gained acceptance among corporations this year, reports Barry Bartlett, a senior analyst for Market Intelligence Research Co. in Mountain View, Calif. This acceptance will contribute to a growth in revenue from less than $700 million in 1986 to $1.9 billion in 1992, a Market Intelligence study forecasts.

Predictions for E-mail are similarly optimistic at San Jose, Calif.-based research firm Dataquest, Inc., which forecasts a 50% compound annual growth rate during the next four years. Like Market Intelligence, Dataquest attributes this growth, in part, to corporate acceptance.

"One of the biggest driving forces in electronic mail is corporate culture," says Krystyna Filistowicz, a research analyst for Dataquest's Office Systems Industry Service. Without pressure from top management, users tend to ignore the E-mail functions available to them, she notes.

Everyone clamored for E-mail

For example, a large vendor that had been offering E-mail for years did not use it internally, Filistowicz recalls. "Then top-level managers began to communicate with E-mail, and everyone below began clamoring to get onto the network," she explains.

Another factor contributing to user acceptance is ease of use, according to Douglas Bott, vice-president of information systems for the Continental Illinois Bank & Trust of Chicago. Because Continental is a paper-based operation, Bott's group made E-mail more attractive to users by reproducing paper forms electronically. In this way, he says, users could work with a familiar format.

Electronic Form Systems, located in Carrollton, Texas, has taken the idea of electronic versions of forms and translated it into a general-purpose product called E-Form. The product contains predefined field attributes to help users create forms. Also, in places where the same data appears more than once, E-Form reportedly distributes the data into appropriate fields. The product runs on IBM Personal Computers, PC XTs and ATs and compatibles. Market Intelligence's Bartlett predicts that the electronic forms field will be a fast-growth area in three to five years.

Communications standards such as X.25 and X.400 will also boost E-mail acceptance in upcoming years, Bartlett and Filistowicz agree. "A major problem has been that different E-mail systems cannot talk to one another," Dataquest's Filistowicz claims. — RH

What ISDN is doing for McDonald's data networking capabilities is no small potatoes.

When McDonald's Corporation took a hard look at its telecommunications needs a few years ago, it saw 9400 restaurants in 46 countries, served by more than 20 networks. And a new restaurant opening every 17 hours.

McDonald's needed a telecommunications system that could grow with it, but one simple enough that the company could concentrate less on telecommunications and more on talking to customers.

The solution: the nation's first customer application of ISDN, the Integrated Services Digital Network, made possible by the cooperation of Ameritech's Illinois Bell and AT&T Network Systems.

McDonald's will use ISDN to send voice, data and video over ordinary telephone lines simultaneously. An AT&T 5ESS™ switch at Illinois Bell will support digital phones, integrated voice/data terminals, facsimile, voice mail, host access and modem pooling, giving McDonald's a real competitive advantage in its data networking capabilities.

"In business language, this means we're going to do an even better job for the 30 million customers that we serve every day," said Bonnie Kos, McDonald's Vice President of Facilities and Systems.

"ISDN provides an information outlet to every workstation, thereby eliminating time-consuming and costly wiring, as well as enhancing messaging and network control capability."

Thanks to ISDN, McDonald's will enjoy better customer service, more current market information, better tracking of product promotions, more efficient inventory control, and reduced administrative workloads.

Ultimately, higher level applications of ISDN on the public switched network will replace most of the company's myriad networks, linking all its offices and restaurants around the world.

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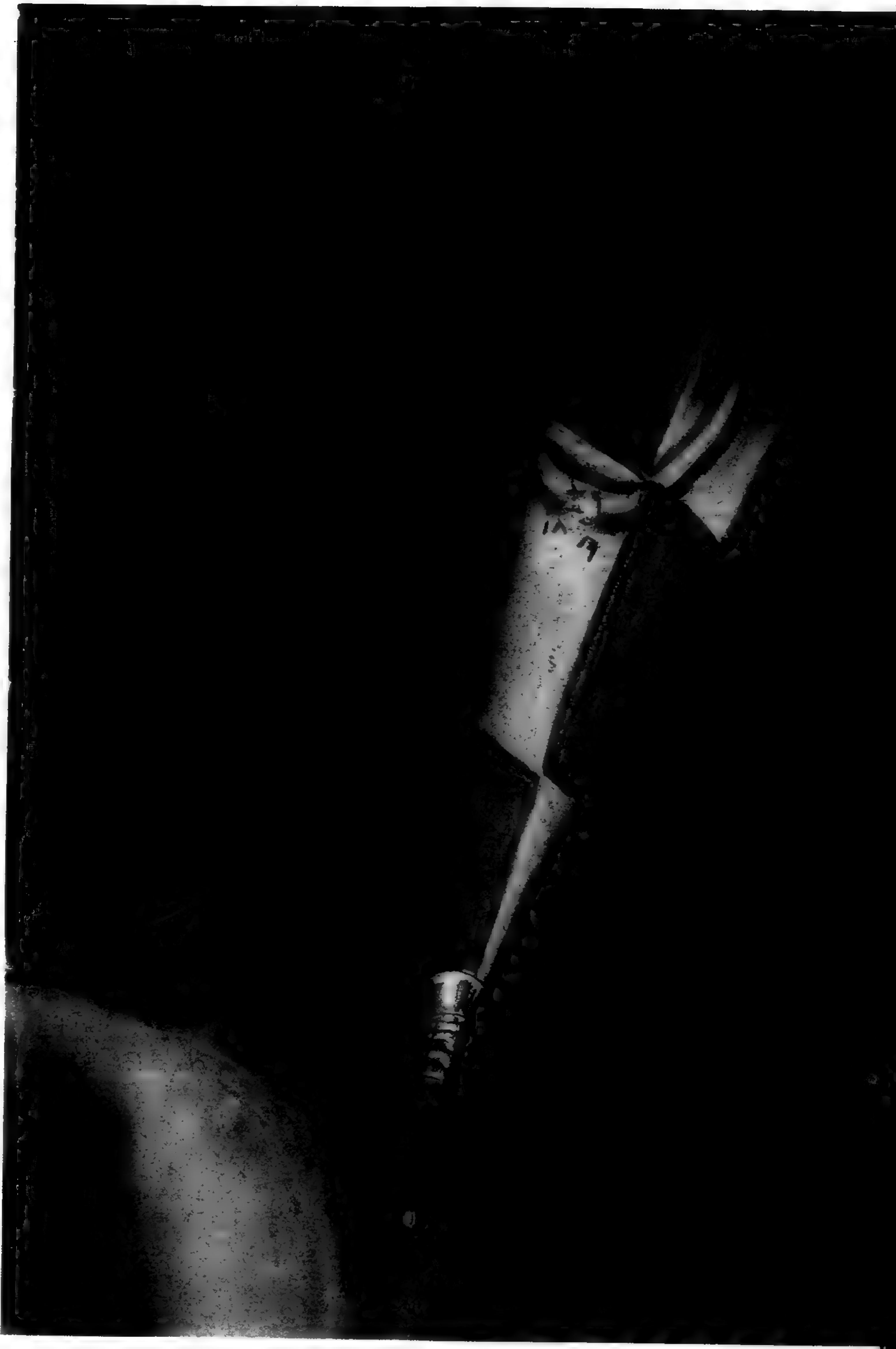

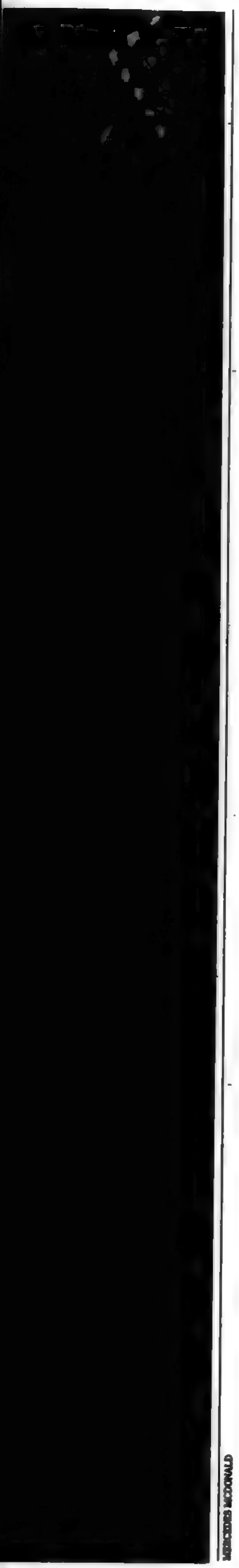

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The case for network management

BY STAN KOLODZIEJ

It's too bad, but data communications users are paying the penalty. Through the years, as users pushed vendors to supply networking solutions, data communications vendors willingly complied. But with few guiding standards in place, vendors became their own standard bearers. The result: multivendor networks, multiple protocols, proprietary equipment and a number of frustrated customers. But this situation makes for steady business for network management system vendors.

"Networks have tended to evolve over time without much planning," explains Scott McCready, senior industry analyst at CAP International, Inc., a Marshfield, Mass., research firm. "Most networks have been put in place as a reaction by users, without concern for future problems."

Those problems have reached the boiling point recently. As computers and networks become integrated, the series of protocols and proprietary devices found in each world have proved difficult to meld into coherent units. Protocol conversion across multivendor, dial-up lines is still cumbersome, slow and expensive, causing a great amount of software overhead. The same is true of network gateways and bridges, which act as go-betweens for networks and use different transmission techniques — such as carrier-sense multiple access with collision detect and token ring — or different media, such as broadband and baseband. Connectivity can be accomplished, but at a steep price.

With the push for networking connectivity, "there soon will be a point when the term 'local networking' will be outdated," claims Steve Price, data communications engineer at the Lyndon B. Johnson Space Center in Houston. "Networking expansion will be transparent across lines."

If Price is right, there is also a flip side to that expansion: control.

"Users want more centralized network control," McCready explains. "But people are becoming concerned with the number of protocols blocking that way. There's a dilemma. Because nobody knows the solution to network problems, vendors can't build products to match it."

A dilemma, indeed. That quest for control is why network management systems sales are on a roll.

Network management systems can do many things, but, in essence, they act as network traffic cops. Most systems integrate several important control features, such as a facility for defining alarm conditions, polling the network for alarm conditions and initiating procedures to restore a network in the event of failure.

Reacting to competitive pressure to consolidate as many net control functions as possible under one roof, more network management systems are also integrating performance measurement services — such as network monitoring of response times and traffic flow — and testing features, such as bit error-rate, loop-back and trouble-ticket reporting with summaries. (Trouble tickets enable network operators to log and track network outages.)

According to International Data Corp. (IDC), a Framingham, Mass.-based research group, network management systems, like most other technologies, have experienced growing pains.

In the beginning there was modem control, the first type of network management, which evolved in the 1970s. Early, intelligent modems containing some built-in diagnostics were used for basic network testing. Control was localized on each system.

The second stage came with the debut of centralized control systems, precursors to today's full-blown network management systems. Centralized modem control enabled users to monitor an entire network from a single location, possibly from a single terminal. Centralized control was expanding, and audio and

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Kolodziej is *Computerworld Focus*'s senior editor.

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Circle Reader Service Number 8

visual prompts helped alert operators to network problems. Printers reported network status. From a central location, users could also conduct such remote-line diagnostics as bit error-rate and loop-back tests.

Building on this base, many network management systems now provide the ability for network operators situated at central sites to actually reconfigure networks, something that until recently was done manually. Such systems can phase out a faulty modem or bypass a bad line. It's apparent that such services are going to pay their own way many times over by preventing network downtime and frustration.

And that's not all that is coming down the line. The software embedded in network management systems is becoming more versatile and programmable. There will soon be a push for systems that can channel network status data directly into the data bases of mainframes, or even personal computers, thus bypassing the bundles of hard-copy printouts typically produced by current net management systems.

> **"As a marketing strategy, Netview is great for IBM; as a tool, Netview is still limited. With Netview, IBM has driven network management into the ground of MIS and declared that it will fly on the MIS mainframe [but] not in telecommunications management."**
>
> JACK MUSGROVE
> DATAQUEST, INC.

"After a point it becomes too much to scan status reports in hard copy," Johnson Space Center's Price explains. He adds that Racal-Vadic, Inc., a San Jose, Calif.-based supplier of the space center's MDS-II network management system, has told him it will soon offer an interface that will move the data directly into personal computers. Programmable software riding on a network management system means that an operator with some programming know-how will be able to configure the management system to monitor only certain parts of a network at certain times, tailor report generation output, customize network alarm outputs to be visual or audio and so on.

It all sounds impressive, but not all network management system users are happy.

John McFarlane is an international gateway operations system engineer at Telenet Communications Corp., an international telecommunications carrier located in Reston, Va. McFarlane is in charge of monitoring five packet-switching sites, totaling about 100 switching circuits. McFarlane uses the Network Analysis and Management System (NAMS) from Digilog, Inc. of Montgomeryville, Pa., to monitor the circuits remotely. More Digilog systems are being used at other Telenet switching sites in the U.S.

"A big part of my job is to bring in network management systems, take them apart and find out what's wrong with them," McFarlane explains. "When I first brought the Digilog system in, I found eight or nine [software] bugs. From there, I worked closely with Digilog to help improve NAMS.

"I think the systems have changed a lot in the past two years," McFarlane adds. "They've gotten better. The fact is, the Digilog system was the only one on the market at the time that seemed to do the job. Even so, it needed work."

Some users are finding they don't need all of network management systems' bells and whistles. Despite NAMS's improvements, McFarlane says that he only uses part of the management features available with Digilog's system.

"We use [NAMS] mainly for circuit troubleshooting," he explains, "but for actual management functions, the system just isn't enough. We use other devices to handle bit error-rate testing and other means of pinpointing problems on the line. You have to know how to use the system, how to read it and how to use it in conjunction with trouble-ticket reporting and so on. All these things go into managing the network, and that's not that easy to do."

Price, like McFarlane, says the space center selected its network management system because, at the time, the MDS-II was the only modem pool management system that could do the job.

According to Price, the Johnson Space Center's 256 modems represent the world's largest centralized pool of modems.

A telecom manager at a large Southeastern telecommunications carrier says it would be nice if the diagnostics software on his network management system could be customized a bit. "Some of our operators are programmers, and they feel they can improve some points in the system," he says.

Not only is the user's search for simpler connectivity forcing suppliers to provide better solutions, but it is also making the vendors rethink some tried-and-true marketing ploys. Previously, many communications companies could coerce customers into remaining with their networking equipment. For most vendors, however, those days are dying.

"Vendors would sell corporations a lot of equipment that couldn't be expanded or wouldn't operate unless you purchased some more proprietary components from them," analyst McCready explains. "If you purchased, say, 20% of your equipment from one vendor, you were probably going to buy more from that vendor. The proprietary route was a good way of locking customers in. It was a good way to leverage sales."

The push for vendor loyalty as well as the lack of industry-wide standards has made for an odd melange of equipment and transmission software in user corporations. In the computer market, although IBM's monolithic presence has been a bane to some, its preeminence has provided a stabilizing element that has helped much of the industry thrive and progress.

On the other hand, there is little stability in the data communications market, especially since AT&T's divestiture. Unlike IBM, there were few market leaders, AT&T included, that could impose standards on the data communications industry. Instead, committees usher in official standards from the outside. This standards-making process is not without its problems; standards, for example, may still conflict with each other.

"I don't think anyone knows where the networking market is heading. It's changing so quickly," says Ray Grenier, product marketing manager for network management and services at Digital Equipment Corp. in Maynard, Mass.

"DEC sees networking expanding over a horizontal plane in clusters, but we offer both centralized and distributed networking. There are certain products that we can't ignore, such as [IBM's Systems Network Architecture (SNA)], but we also support the International Standards Organization protocols. We have to. Vendors have to give options," he says.

Superimposed on the official standards, however, and coming more into focus are the market standards that IBM has been slowly building.

In the mainframe area, SNA will be a formidable roadblock for Integrated Services Digital Network's drive for U.S. market share. IBM's Netbios is becoming a de facto protocol with local-area network (LAN) vendors.

In addition, IBM's Netview management system is slowly picking up speed and gaining vendor adherence. Ironically, Netview might be more important in the long run not for its network management capabilities but rather for what it represents.

Netview not great

"Netview is not a great product, but it's being enhanced," CAP's McCready says. "Originally, it was more suitable for controlling PC products, but now, by setting a [market] standard, more vendors will build interfaces to it that will allow users to cut through different layers of networking and handle deeper management functions."

McCready adds that Netview will provide a more centralized approach that will enable a firm to handle diagnostics and troubleshooting — from a distance.

"One of the biggest problems in network management today is trying to manage local-area networks from a location outside the network," McCready claims. "To monitor LANs, you now have to have the monitor sit right on the local network. It has to be physically close; otherwise, it just can't cut through the layers of networking protocol to do anything really useful. That doesn't give the kind of centralized control that users now want."

Although it does make for a brisk market in LAN management systems, most network management system software on LAN file servers is weak, giving only some network security and minor diagnostics capabilities.

"You have to remember, however, that network management capabilities at this level are usually built around the primary tasks of building a gateway, server or controller and providing things like file transfer and document translation," explains Robert Philips, a senior engineer at Fremont, Calif.-based Interlink Computer Sciences, Inc. "Network management features are just coming into their own at this level."

DEC's Grenier agrees. "We're going to try and make it easier for our users to expand into T1 lines and other types of broader networking, though LANs as a rule don't tend to see the performance problems that enterprisewide networks do. To begin with, LANs only use about 20% to 25% of their bandwidth capacity. There is a great need to keep certain LANs closely monitored and running, such as those in manufacturing, but many other LANs are not as crucial," he says.

IBM software push

Nevertheless, Netview could help make any point on networks open to the scrutiny of network management. Netview is part of IBM's strategic software push accompanying its 370 line, which it is now extending further into the reaches of departmental computing with its 9370 computers. Netview/PC is an extension of Netview that supports IBM Token-Ring, non-SNA and non-IBM communications devices.

It is important to note that both Netview and Netview/PC are part of IBM's Systems Application Architecture, a framework that will bridge several of IBM's systems and keep program interfaces consistent. What that means in market terms is a more homogeneous set of networks, big and small, carrying applications that will work closely together. In most of today's networking environments, that is wishful thinking.

"As a marketing strategy, Netview is great for IBM; as a tool, Netview is still limited," claims Jack Musgrove, associate director of telecommunications at Dataquest, Inc., a market research firm in San Jose. "With Netview, IBM has driven network management into the ground of MIS and declared that it will fly on the MIS mainframe [but] not in telecommunications management," he says.

"Users see Netview as a positive way to finally do away with a fragmentary IBM computer networking environment," Musgrove adds. "As a management tool, however, it has to be able to go out and do things like fault isolation on long-distance lines. That means Netview will have to work with individual network management systems already out there."

The competition's help

To accomplish this task, Musgrove says, IBM will require the cooperation and support of current network management system vendors. "But I don't see carriers like AT&T and the others supporting Netview for some time because of competitive reasons," he says.

However, Netview is starting to gather some market momentum behind third-party vendors of network management systems. Influential networking players — such as Ungermann-Bass, Inc., Timeplex, Inc., Racal-Vadic and MCI Communications Corp. — have designed products around Netview, and other vendors have expressed similar interests.

Netview also brings up an interesting management issue. IBM has structured Netview to place more network control in the hands of MIS. Will this lead to conflict between MIS and telecommunications managers?

"Not likely," Musgrove says. "Both MIS and telecom will be integrated under the corporate chief information officer soon, anyway. The question of control won't matter." ◆

Sheer power!

BY MICHAEL D. MILLIKIN

Since its introduction some 18 months ago, the Intel Corp. 80386 has excited the industry. Workstation developers see the chip as a powerful, inexpensive 32-bit computing platform that taps into both the Microsoft Corp. MS-DOS and Unix worlds. Artificial intelligence developers see the product as a processor with the horsepower, address space and price to carry their applications to a much broader market. Network vendors see the microprocessor as the chip at the heart of communications and network servers that will soon challenge vendors such as Digital Equipment Corp.

Indeed, for general office applications, the 80386 will find its most widespread application for the near term in network servers. Most certainly, there will be those power users and professionals who want an 80386 workstation on their desks as well as some value-added resellers, who will find that the 80386 provides a good Unix platform; but for the next few years, Intel 80286 workstations and network stations will satisfy the needs of most users.

A network of personal computers and network stations using dedicated and nondedicated 386 servers can potentially rival or surpass the networked work group solutions that use proprietary minis as servers.

In terms of raw power, for example, the 20-MHz 80386 is conservatively rated at 5 million instructions per second (MIPS) — a higher rating than that of the DEC VAX 8600 or the IBM 4381. Even the expected Microvax III chip set

The coming force of 80386 servers

Millikin is a senior editor and consultant with Boston-based Patricia Seybold's Office Computing Group.

is rumored to run at approximately 2.5 MIPS — fully half the power of the current 386s.

Of course, a system and a server require more hardware than just a CPU. To flesh out its 32-bit computing platform, Intel recently added three other processors to the family founded by the 80386: the 80387, the 82380 and the 82385.

The 80387 numeric coprocessor reportedly boosts performance of numeric applications by a factor of four to six times. A natural add-on to the line, the 387 is compatible with software written for its coprocessing predecessors, the Intel 80287 and 8087.

The 82380 integrated system peripheral incorporates a direct memory access controller that can use the entire 32-bit bus bandwidth through eight independently programmable channels.

Boosting I/O speed

Intel estimates that the 82380 can increase system I/O speed by a factor of five to 10 times.

The on-chip features of the 82380 can replace 20 to 30 large-scale integration and very large-scale integration components. The 16-MHz version of the chip supports a data transfer rate of 32M byte/sec.; the 20-MHz model handles data at up to 40M byte/sec.

The 82385 cache controller is said to eliminate wait states and reduce bus access to a system's main memory.

Craig Burton of Novell, Inc. noted last December that until a bus structure can match the power of the chip, the 80386 servers will add only about 20% perceivable throughput over the 80286's performance.

But even given a bus solution that can support the 80386 and its family members (the IBM Micro Channel is a good candidate), it is clear that hardware power alone isn't the only factor in selecting a system or server nor is it even the primary factor. Systems and application software is key.

Currently, 80386 servers function primarily as either beefed up MS-DOS machines or Unix servers.

Proprietary advantage

Even with the steady ramp up in demand for PC networks, present PC solutions cannot match the level of services provided by proprietary vendors in areas such as document and library management and transparent integration with the corporate architecture. This disparity in capability between PC nets and proprietary solutions will disappear in the near future with the coming of IBM's OS/2 and Microsoft and 3Com Corp.'s MS OS/2 LAN Manager.

Because the 80386 is compatible with existing MS-DOS software, MIS can always take a 386 box and load it with server software designed for a less capable chip. That configuration does not buy much beyond a slight increase in performance.

However, several vendors, including the following, have taken a more innovative approach by using the 80386 as a Unix machine and crafting a solution around such a setup.

- **Banyan Systems, Inc.** The company's Virtual Networking System (Vines)/386 is an implementation of the International Standards Organization (ISO) Open Systems Interconnect model that runs under Unix and allows users to build large transparent multisite multiserver networks with PCs.

One additional value incorporated into Banyan Vines/386 is Streettalk, a global distributed naming system. Users can connect to remote servers without first linking up through a gateway. Because Streettalk names all objects, such as file volumes, printers and host gateways, users can access these objects using plain English such as "glass house" or "bean counters," for example. Banyan also offers centralized network management tools.

Initially, Banyan produced its own proprietary Motorola, Inc. 68000-based servers, then followed up with a software-only version of its operating system designed for the 80286. Vines/386 is a logical extension.

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Vines/386 for the Compaq Computer Corp. Deskpro 386 costs $3,995.

• **Convergent Technologies, Inc.** The firm has unveiled an 80386 server configuration that could be a model for other current solutions. The Server PC uses the 20-MHz 80386 and, through Merge 386 from Locus Computing Corp., runs Ctix/386, Convergent's implementation of AT&T Unix System V Release 3, and MS-DOS simultaneously. In short, the Server PC integrates a PC server with a classic Unix multiuser system.

Convergent has been one of Banyan's primary OEMs. The Server PC offers Vines networking and supports up to 64 PCs, 32 terminals or a combination of both. As an example of what a vendor can build around the Intel platform, the Server PC uses an integral 64K-byte write-back cache with zero-wait states and a 32-bit data path. A small computer systems interface (SCSI) controller offers a 5M byte/sec. data rate. Two optional floating-point processors, the 80387 and the Weitek Corp. 1167 provide an extra boost. Convergent rates its 386 configuration at 5.7 MIPS.

The Server PC includes 4M-byte memory, an 80M-byte disk, an IBM Personal Computer AT-style floppy and three full-height SCSI bays. The system supports the 80386's 64M-byte memory and offers disk storage up to 1G byte. Ten expansion slots offer compatibility for AT-style cards as well as special 32-bit cards. Ethernet and IBM Token-Ring networks are the first to be supported.

> **Dividing applications into user-workstation-resident front ends and server-resident back ends makes a great deal of sense for networks mixing MS-DOS and OS/2.**

Currently offering AT&T's Remote File System under the Transmission Control Protocol/Internet Protocol, Convergent says it plans to add Sun Microsystems, Inc.'s Network File System (NFS) soon. Typical OEM pricing for the Server PC is $7,500.

Although attractive, the current 386 server solutions do not have nearly as much potential as future servers that will use OS/2 and the MS OS/2 LAN Manager.

The first releases of OS/2, the recently announced and as-yet-undelivered successor to MS-DOS, will cater to the 80286. But because of upward compatibility, the 386 will also benefit from OS/2 because it is the first mainstream MS-DOS-compatible, protected-mode operating system for the Intel family.

Aside from the OS/2's multitasking capability and ability to access vast amounts of memory, the operating system boasts Interprocess Communication (IPC) features. One of the primary attributes of OS/2 is that it is extensible and modular. The Presentation Manager, a windowing interface that will come with every release of OS/2 after Release 1.1, is one example of such an extension. IBM's own Extended Version of OS/2 is another. And the MS OS/2 LAN Manager from Microsoft and 3Com is a third.

The MS OS/2 LAN Manager offers an extension to interprocess communications across the network, support of MS-DOS 3.1 and above and OS/2 workstations on a network, improved security and administration features, remote device sharing, access to the 16M bytes of memory through OS/2 and an open architecture supporting customization.

The MS OS/2 LAN Manager will prove key to the development of the next generation of PC networks. Its chief attribute (other than resting on top of OS/2) is that it supports truly distributed applications, with front ends running on workstation clients and back ends running on servers in a PC local-area network (LAN) environment for the first time.

Current PC LAN applications run entirely on the client PC access files on the server according to MS-DOS 3.1 enforced file and record locking.

Interprocess communications

The MS OS/2 LAN Manager enables application developers to write a single version of an application that will be capable of running on a single machine or will be distributed between machines connected by the MS OS/2 LAN Manager. This action takes place via an IPC facility, which is another name for a remote procedure call (RPC). IPC is similar to but not compatible with Sun's RPC facilities. Like so many standards and interfaces in the MS-DOS and Unix worlds, this situation will take some sorting out.

As an attractive bonus, an OS/2 server will support both Microsoft Xenix and MS-DOS workstations on the same network. In other words, not everyone on the network needs to have OS/2 running on every workstation. An MS-DOS node (with the addition of some special extensions) will have access to the features of the OS/2 server.

Dividing applications into user-workstation-resident front ends and server-resident back ends makes a great deal of sense for networks mixing MS-DOS and OS/2. An Intel 8088-based PC running MS-DOS 3.1 and above will reportedly be able to take advantage of a 386-based

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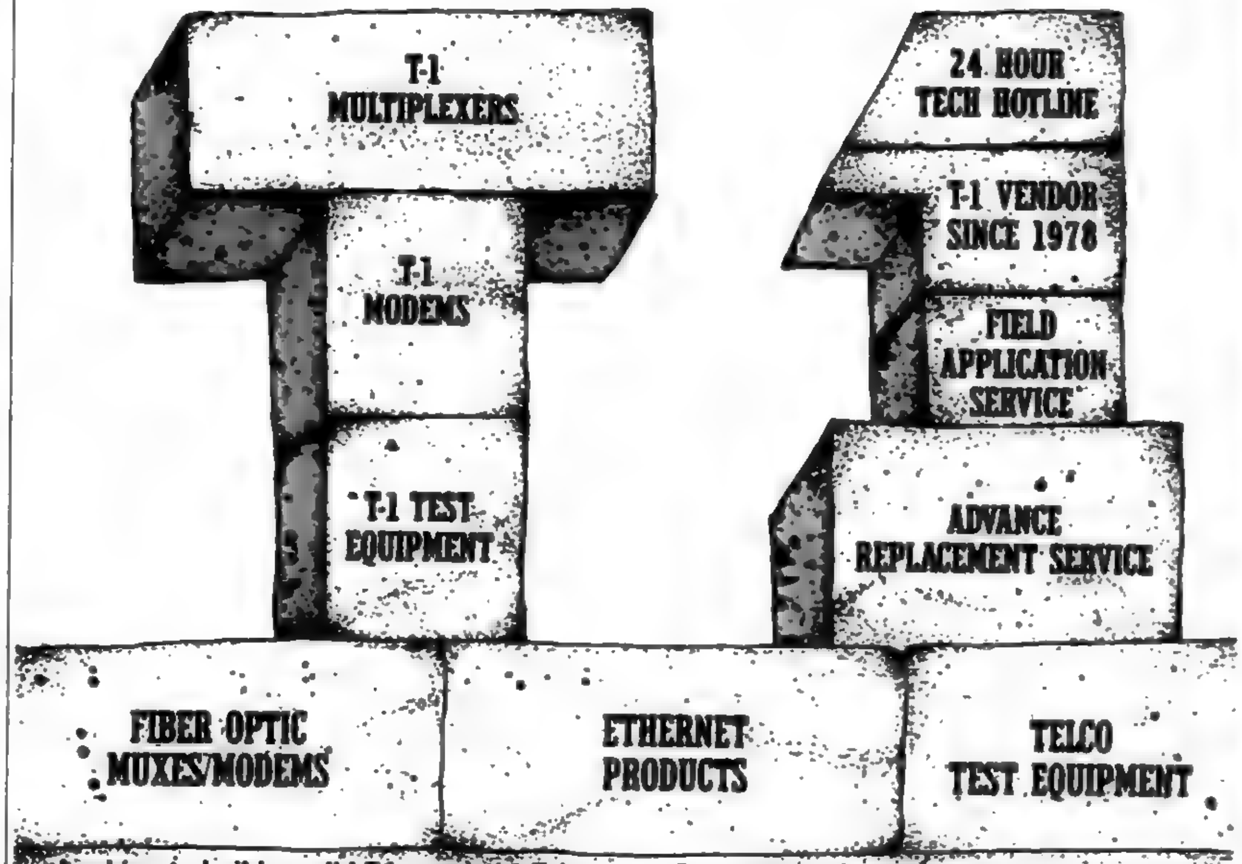

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server running OS/2 with its protected-mode access to process queries in a fraction of the time it takes to do so locally.

Likely first distributed applications for such a PC will be data bases in which a front end on the user's PC handles query processing, forwarding queries to a central data base application running on the server. Today, multiuser data bases, like Ashton-Tate Dbase III+, process all code in the user's workstation with the server overseeing only file locking and storage.

This central data base will often be something other than a PC running OS/2. Vendors of proprietary operating systems, such as DEC's VMS and IBM's VM, as well as third-party applications can use the MS OS/2 LAN Manager to build applications using this technique. In addition to being able to coexist comfortably with Microsoft MS-Net on the same network, Xenix systems will also be able to communicate with the MS OS/2 LAN Manager.

OEMs' extended offerings

The extensibility of OS/2 and the MS OS/2 LAN Manager is significant for OEMs — especially companies such as DEC, Wang Laboratories, Inc. and Hewlett-Packard Co. In theory, a company could create its own extended version of OS/2 and the MS OS/2 LAN Manager that would tie in the OS/2 and MS-DOS network more closely with the proprietary offerings.

Wang has already taken the lead by announcing support for OS/2 before any of its traditional competitors except IBM.

IBM, interestingly, is remaining mum on the subject of MS OS/2 LAN Manager support. (To confuse things, IBM also has a LAN Manager offering, but it is completely different from the Microsoft product). IBM has yet to endorse the MS OS/2 LAN Manager, but the company has not officially spurned the product, either.

Microsoft is not going it alone with the MS OS/2 LAN Manager. 3Com and Microsoft recently formalized their codevelopment agreement for the MS OS/2 LAN Manager component of OS/2. Under the terms of the strategic partnership agreement, both companies will distribute and sell the product. Microsoft will push OEM sales. 3Com, the first OEM to sign on, will offer 3+Open, a set of network systems software based on the MS OS/2 LAN Manager, to value-added dealers.

The alliance makes sense for both parties. Microsoft may be strong as a systems vendor, but it could use some help in implementing standardized protocols. On the ISO model, the MS OS/2 LAN Manager occupies Layer 7 — the applications layer. Microsoft wants to guarantee that lower level transports conforming to the model can run beneath MS OS/2 LAN Manager without problems.

The objective of this work is to establish a de facto standard for PC networking that is consistent with the larger industry movement to standards. Indeed, 3Com President Bill Krause says that he envisions his company playing a role with MS OS/2 LAN Manager comparable to the role that Sun Microsystems played with NFS. Farfetched? Not at all.

3Com took the opportunity of the public announcement of the MS OS/2 LAN Manager venture to unveil its next-generation products: 3+Open along with a 386 upgrade for its 3Server3. Around the third quarter of next year, then, users will reportedly be able to obtain from 3Com an 80386 server with the latest and greatest in OS/2 system software.

Compared with Novell's Netware, 3Com's 3+Open is a model of openness. Nevertheless, even 3Com had to resort to a proprietary multitasking kernel to get around the restrictions of MS-DOS. Except for that one layer, however, 3Com's 3+Open uses Microsoft's server message block file protocols and the MS-DOS disk format. With 3+Open, 3Com is moving completely away from the proprietary aspects of the 3+Open networking system software.

Not an immediate solution

The MS OS/2 LAN Manager solution is not an immediate one. Actual products will not be out for almost a year, and the wait for extended modules that intertwine with proprietary systems will be even longer.

Nor will the MS OS/2 LAN Manager combination be a requirement for small, isolated PC networks. But this duo can theoretically provide the following:

- A standardized platform for powerful distributed applications.
- A closer interlinking of PC networks with other network architectures.
- Enhanced network gateways into other communications architectures.

There is much work to be done to make the MS OS/2 LAN Manager duo competitive with proprietary offerings. For example, the combination lacks document and library services. Forward-thinking vendors will write their own extensions that will integrate the MS OS/2 LAN Manager and the 80386 boxes into their own architectures. OS/2 will prove to be an attractive lure for third-party application developers, especially once the minicomputer vendors start supporting it with their own offerings.

Which vendors will go after this opportunity? Wang, with its early support of OS/2, may be a good bet. HP, a firm with a strong integration of HP 3000s and PCs over a network and with excellent distributed library services may be another. An aggressive move toward the MS OS/2 LAN Manager from either of these firms could present DEC with an unexpected challenge at the work group level.

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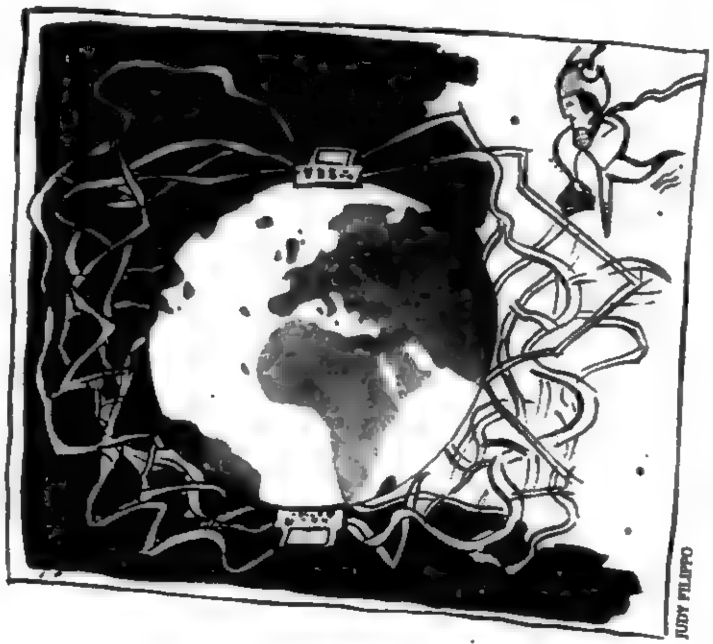

JUDY FILIPPO

Networks in a strange land

BY AVERY JENKINS

A company's quest for a functional, reliable international data network can lead it down strange paths.

Take, for example, the firm that wanted to establish a data link to its Taiwan offices. It found that the country's Postal Telephone and Telegraph (PTT) authority made it difficult to get approval, equipment and implementation of a data link between Taiwan and the U.S. So through midnight expeditions behind U.S. Customs' back, the company smuggled in modems, cabling and software to establish a surreptitious dial-up network.

Then there was the firm that built a microwave link in Mexico. After approval was granted and the site was under construction, the Mexican government told the firm to double the size of the station.

When the company had completed construction of the enlarged microwave station, the Mexican government "walked in and took over," according to a source, who wishes to remain anonymous. Officials told the manufacturer that it could use half of the station free.

Staving off acquisitive foreign governments and smuggling high-tech equipment are not the usual pastimes for telecommunications and data processing executives. But the requirements of an international data network are substantially different from that of a domestic link. Where technology and equipment usually take precedence in domestic links, it is politics and regulations that create the biggest headaches when data is going overseas.

An international network requires special expertise in order to deal with the political issues as well as the technical problems, and some companies have found that the most cost-effective route is to use a public packet-switched network — such as Telenet Communications Corp.'s Telenet, Tymnet/McDonnell Douglas Network Systems Co.'s Tymnet or Computer Sciences Corp.'s Infonet — all of which offer X.25 networks with nodes in European and Asian countries.

The international data scene is nothing if not fluid. Several years ago, the U.S. deregulated domestic telecommunications. At that time, many feared that this move would result in an international data war as foreign countries moved to protect their own communications facilities. But that prediction has not come to pass. Instead, in many cases, Europe has followed the U.S.'s lead and has begun a slow deregulation of its PTTs. This trend has been hailed by both network providers and multinational companies, which maintain their own private networks.

Jenkins is a Boston-based free-lance writer.

At the same time, regulations as to which types of data can be passed across the border have gotten more strict. This is the era of protectionism, not only in the U.S. but in many other countries as well.

Piece of the DP pie

In an effort to protect their own often fledgling data processing industries, companies have limited data flow to ensure that the home team gets a piece of the DP pie.

Perhaps the most confusing elements of international data networks are the rules and regulations that build up as data passes from country to country. While the Consultative Committee on International Telephony and Telegraphy and other organizations have made great strides toward standardizing the technical aspects, little has been done to standardize the regulatory scene.

A company with data links to three countries can now settle on a standard protocol and interfaces. But it must conform to three sets of laws. And, as many have found out, some countries are easier to deal with than others.

Reputation gets around

The country with the worst regulation reputation is said to be West Germany and its communications utility, the Bundespost, while the country with the best reputation is reportedly Great Britain.

Not surprisingly, the view U.S. organizations have of these two countries is affected by the level of deregulation they have achieved.

West Germany is terrible for companies attempting to set up an international data network, according to Allen Lopp, manager of corporate telecommunications for Racine, Wis.-based S. C. Johnson & Son, Inc., more commonly known as Johnson Wax.

Lopp recently established a private network using both Tymnet's international service and his own complement of transatlantic leased lines.

West Germany has strict requirements on what equipment can be used on a data network as well as on the software that a company chooses. And the government has established stringent restrictions on what data can be transmitted across it.

The Bundespost, Lopp says, is a "bureaucratic organization." Many of its rules are inflicted on companies "under the guise of security reasons," he adds, but its major interest is to protect its sources of income.

Need time and money

Tony Lash, president of Toronto-based value-added network firm TIL Systems, adds that in West Germany, the cost of leased lines has been increasing and the approval process for any lines and equipment takes a long time.

Great Britain, on the other hand, is lauded by many for having made great advances in the availability of data communications.

Under the Thatcher administration, the British PTT was unbundled, and a new firm, Mercury, was created. The lessening bureaucracy and increased competition has resulted in a much friendlier climate for multinational data communications.

> **The country with the worst regulation reputation is said to be West Germany and its communications utility, the Bundespost, while the country with the best reputation is reportedly Great Britain.**

'Stuff at a decent price'

"England is phenomenal," Lopp says. "It's really been great over there as far as getting this stuff at a decent price." Lopp has two leased lines to Great Britain that his firm uses for voice and data. And with the low telex rates Britain has set up, Lopp has been using his leased lines to transmit the messages overseas and then send them to third countries via Britain's telex facilities.

However, Lash notes that while the price for data communications may be right, the time it takes to get a leased line is too long. Lash says that in Great Britain a company may wait months for its facilities compared with an average of 20 days in Canada.

Even Sweden and West Germany take less time for approval, he adds.

The creation of Mercury as an alternative carrier "supposedly made it easier to get approval," says Kenneth Miller, founder and chief technical officer of Marlboro, Mass.-based Concord Data Systems, Inc., a communications company.

'Doesn't know beans'

Unfortunately, the government relinquished approval responsibility to the British Standards Institute, which, in Miller's words, "doesn't know beans about what is going on."

The comparative performance of both West Germany and Great Britain are related to the steps they have made toward deregulating telecommunications, according to Frank Urbany, associate

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Circle Reader Service Number 12

administrator and director of the office of international affairs for the National Telecommunications and Information Administration (NTIA).

He adds that the U.S. government is pressing its case for increased deregulation.

Overseas market constrained

West Germany, he says, "continues to be influenced by past practices," but "our Congress is rather concerned about the U.S. being an open market and yet, when we look at the overseas market, it is very constrained."

Protecting local markets is the key to most foreign countries' reluctance to deregulate.

For example, West Germany requires government-approved communications equipment — and Siemens AG is the vendor the Bundespost has chosen.

U.S. vendors vulnerable

The reason the U.S. is pressing for more open markets is because, through deregulation, it has left its own vendors vulnerable.

"The reason the U.S. administration is concerned is that our markets are quite open and accessible to foreign providers," Urbany says, but "overseas administrations tend to be extremely protectionist."

Protectionism creates a stumbling block of another sort when foreign countries attempt to protect the income derived by long-distance data services. Often, the extra money provided by higher priced international data access helps subsidize the local service. By allowing competition, the government would also lose that extra income.

Government loses revenue

"I think that's counterproductive," Urbany says. His point is that action forces organizations to move their communications operations to a less costly locale, and the government loses that revenue entirely.

Deregulation — in addition to lowering costs to the end user and allowing more rational equipment selection — would result in better service and extra income for foreign governments.

Urbany says the trend toward deregulation is just beginning in many parts of the world. But he predicts that during the next few years, the monopoly of national PTTs will change, allowing greater competition in the international market.

Company executives can avoid regulatory headaches by using a packet-switching network because the majority of the network is already in place. The company only has to worry about conforming its own site to the necessary regulations.

The problem of cost

But there is yet another factor contributing to the problems: cost.

Greg Riso, vice-president of MIS for Pharmacia, a pharmaceutical company, chose to go with Infonet to establish the U.S. company's link with its parent firm Pharmacia AB in Uppsala, Sweden.

He says that to establish a private network he would have had to spend too much money. "I don't feel I have the expertise in-house, and to acquire expertise would have been fairly expensive itself," Riso says.

He adds that, although Pharmacia investigated several other intercontinental carriers, Infonet appeared to provide the most service at the lowest cost — currently about $2,000 per month.

Pharmacia's applications consist mostly of the transfer of electronic mail among the company's various sites. But the primary justification for the pharmaceutical company's international network was to transfer research and development information between locations. Riso says this is a batch process, as test data for experimental drugs is passed between companies.

> **The trend toward deregulation is just beginning in many parts of the world. During the next few years, the monopoly of national Postal Telephone and Telegraph authorities will change, allowing greater competition in the international market.**
>
> FRANK URBANY
> NATIONAL TELECOMMUNICATIONS AND INFORMATION ADMINISTRATION

But Purolator Courier Corp. in Basking Ridge, N.J., had a different reason for choosing an outside vendor — reliability.

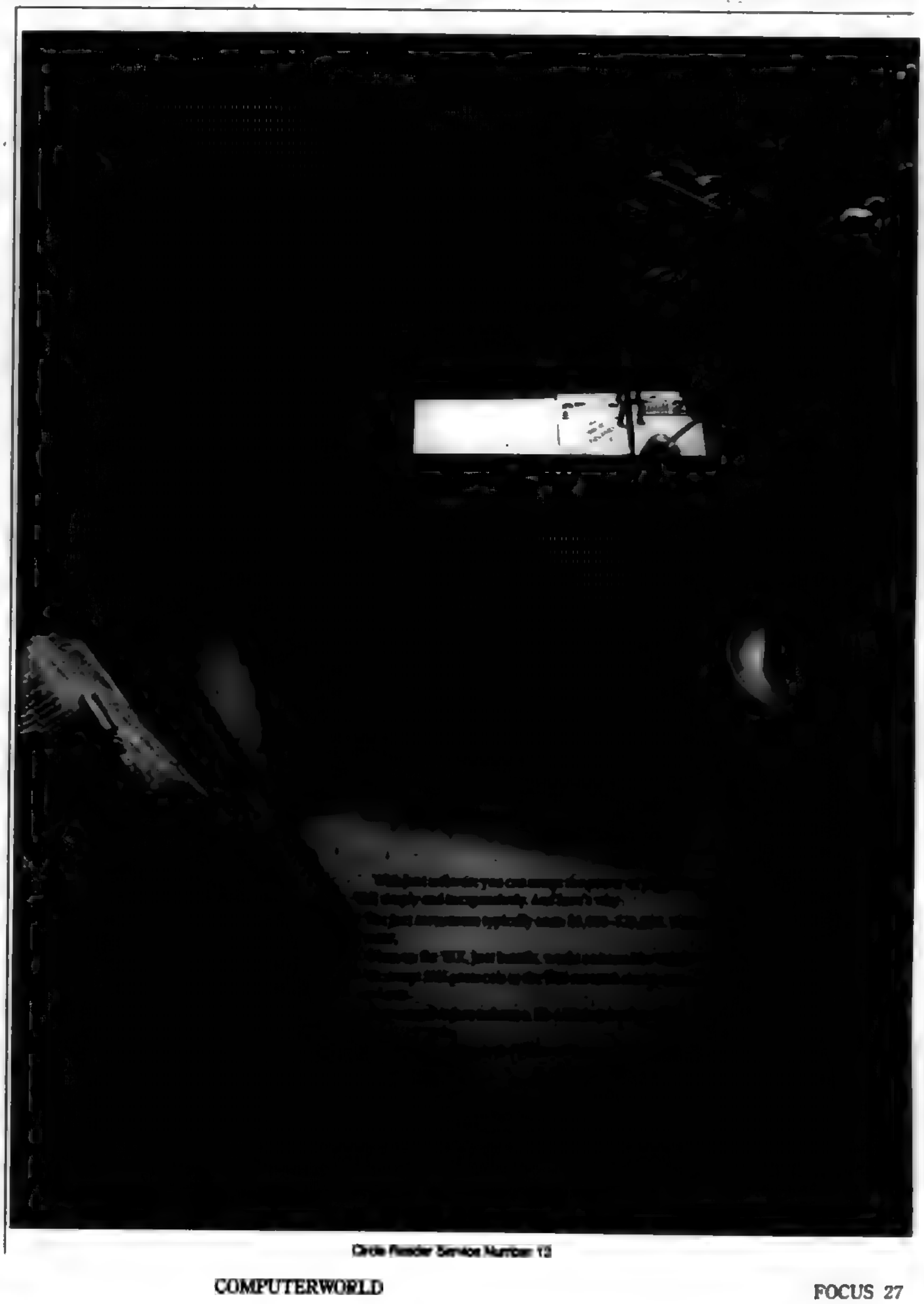
Barry Van Zile, Purolator's director of telecommunications, says that his company's network is used primarily for the exchange of data for tracking down lost packages.

Because Purolator's business is extremely time-dependent, the company cannot afford any downtime in its international network.

Purolator's backup

"We always need redundancy," Van Zile says, so Purolator uses Infonet's facilities as a backup control site, should the primary site in Hackensack, N.J., go down. The Infonet network itself contains built-in redundancy as well, assuring the express parcel carrier constant access.

But both Van Zile and Pharmacia's



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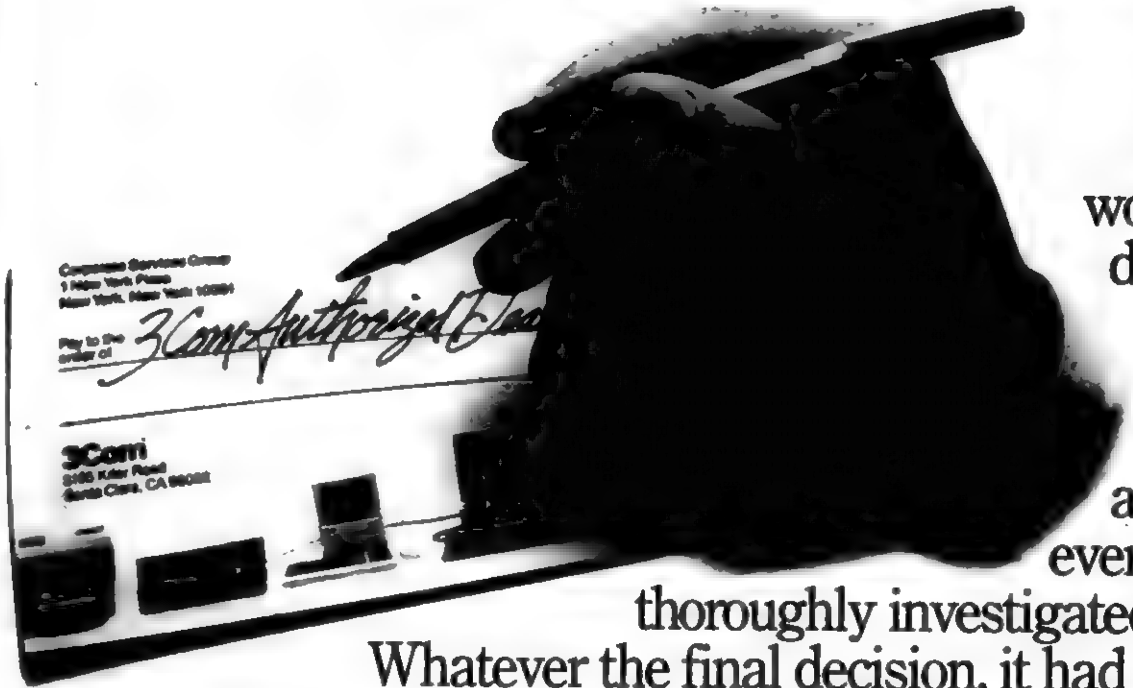

When one of the world's biggest banks decided to network its Corporate Services Group, the long term implications of such a decision meant that every option had to be thoroughly investigated.

Whatever the final decision, it had to be an investment that both the group and the bank could live with for a long, long time.

Rejecting mainframe/mini/terminal configurations for cost reasons, they decided a PC-based workgroup system was the answer.

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3System also allows network users entry to the bank's IBM mainframes via Bridge Communications gateways. Data can be downloaded to the 3Servers and then accessed by any member of the workgroup.

And because of 3System's security, managers and other administrative staff can share data and handle the most confidential of business transactions.

Like other 3System users, Chase Corporate Services Group found it could run an almost limitless choice of application software on its network.

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Since it has been installed, 3System has had no downtime. And because all data is backed up nightly, there hasn't been a single instance of lost data either.

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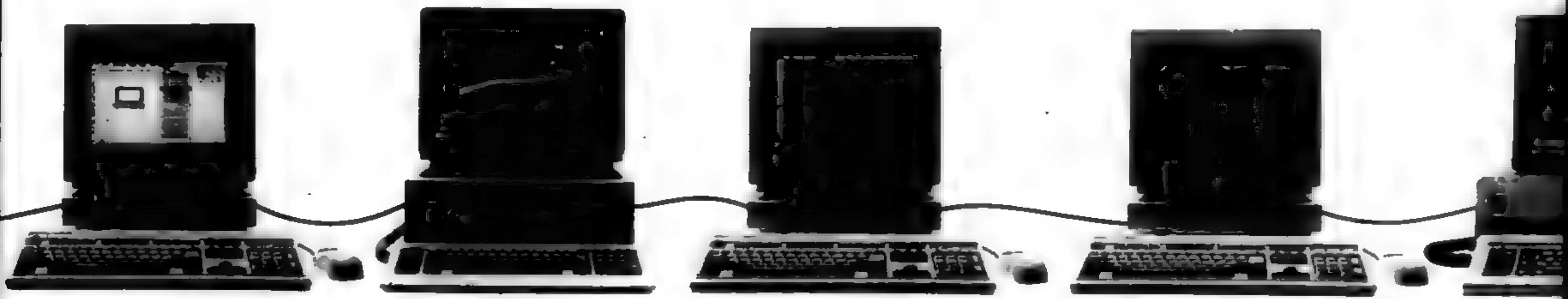

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Riso say that they would build their own international network should the economics of the situation change.

That phenomenon would occur primarily as a result of increased international data traffic. Riso, who is in the beginning stages of establishing his international network, says that he expects his overseas business to grow as the DP capabilities of the parent company in Sweden catch up with its North American counterpart.

> **Standards have long been a struggle in the international scene. But the widespread use of X.25 on both public and private networks has eased users' concerns about the technical end of linking dissimilar hardware in other countries.**

But Van Zile says he is not sure how much traffic on his network will increase. "We keep looking at the bills and the traffic on a monthly basis," Van Zile says. But because the network is used primarily to find lost or misdelivered packages, network usage will remain low as long as the company keeps doing a good job.

Riso says that Pharmacia also had a more technical reason for choosing a packet-switching network. Because the company has recently shifted over from Honeywell, Inc. systems to IBM mainframes and is also equipped with Digital Equipment Corp. minicomputers, the X.25 protocol was necessary, Riso says, to allow all of these different machines to communicate.

Standards have long been a struggle in the international scene. But the widespread use of X.25 on both public and private networks has eased users' concerns about the technical end of linking dissimilar hardware in other countries.

Another de facto standard that has now crossed international lines is the IBM Personal Computer. The widespread use of IBM and IBM-compatible personal computers permits standardization of software as well as hardware and offers the opportunity to take advantage of other communications protocols such as X.PC, users say.

X.400 still being defined

Another standard that has yet to be widely implemented is X.400, a standard format for electronic mail transfer. Parts of X.400 are still being defined. But Joe Mazzeo, vice-president of Infonet marketing, says that its completion and acceptance is very important to his business.

He says that 75% of Infonet's international business consists of E-mail. And although most users will not have to be aware of X.400, it will enhance his company's capability to transfer E-mail among the many different computers that are connected to the network.

In the long term, it is the Integrated Services Digital Network (ISDN) that everybody expects will become the standard backbone network. This combined voice/data standard, which provides digital pipelines with a variety of bandwidths, is expected to become commercially popular in about 10 years.

Due to its widespread use beyond the usual planning horizon and because the system is being designed so that existing X.25 networks will be able to interface with ISDN, few users fear that the growth of the ISDN standard of the future will make the capital investments of today outmoded.

While the technical standards for international data networking continue to evolve, political and regulatory issues will take the front seat in corporate planning.

Deregulation is allowing greater freedom in many countries. But to many countries still, the free flow of data outside of its boundaries represents a risk they are unwilling to take.

Many countries maintain strict rules about what data can and cannot be sent outside of the country. For example, in many countries, shipping personal or financial information is strictly forbidden.

Users and network vendors both say that countries in South America, Asia and Africa lag behind Europe and North America in unrestricted data flow.

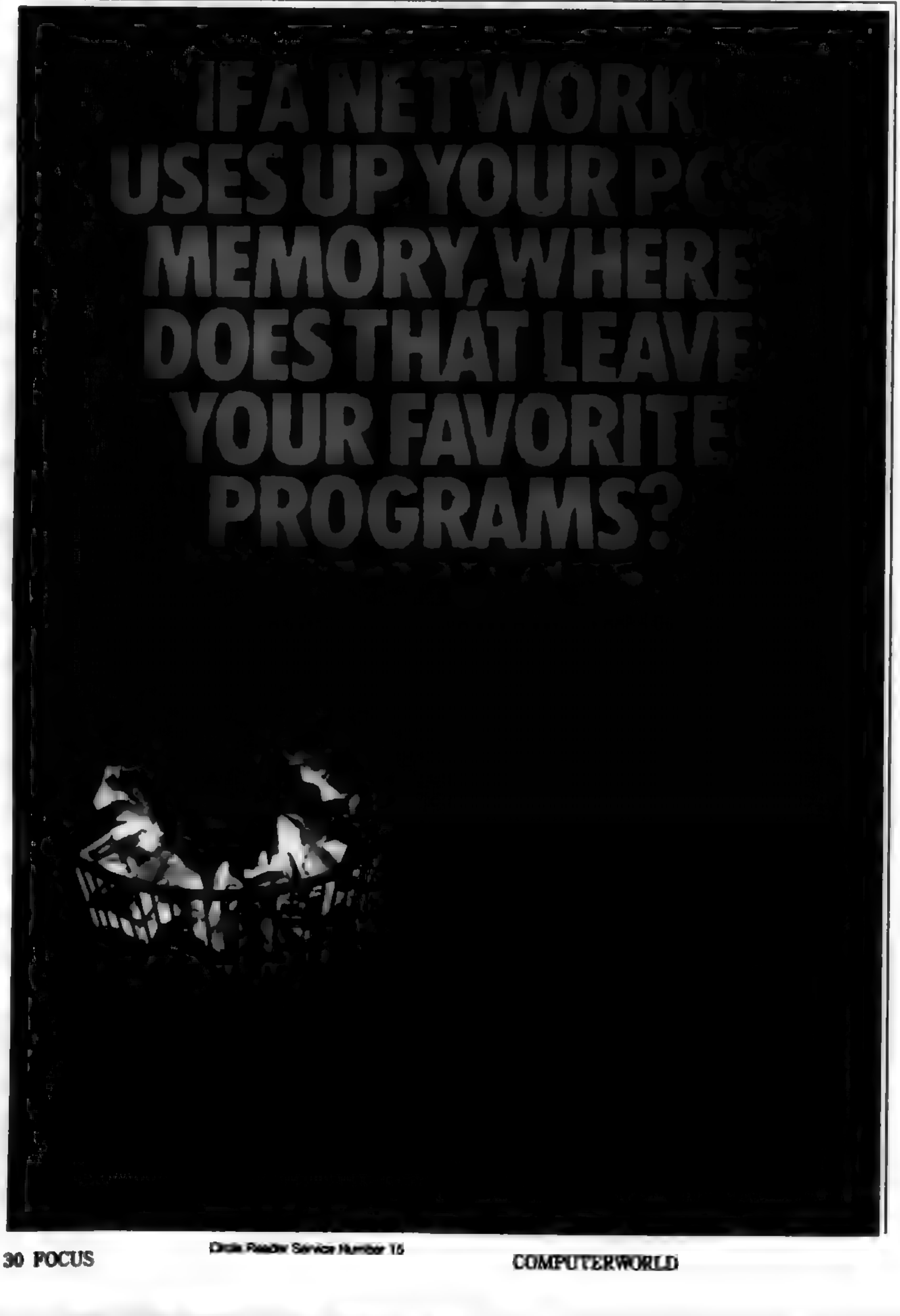
Reagan's guidelines

But even the U.S. is not free from security concerns. The Reagan administration recently established guidelines limiting the transmission of data it considers classified — such as Strategic Defense Initiative, or Star Wars, research information — outside of the country.

At first, many U.S. companies protested these guidelines, fearing that they were the first step toward the loss of control over data that they consider theirs as much as the government's. But the NTIA's Urbany says this concern has largely blown over.

One reason that nobody has strongly fought such limitations, either here or in other countries, is that they are virtually impossible to enforce.

And while nobody will admit that his company breaks the law by transmitting data prohibited by another country, several users suggest that it is done on a fairly regular basis. "A lot of places do that," one person said, "but who wants to be the first to be caught?" ◆



Circle Reader Service Number 15

Pulling together a LAN strategy

BY REBECCA HURST

A famous Chinese proverb claims, "A journey of 1,000 miles begins with a single step." That advice holds equally true for telecommunications or DP managers planning a network strategy.

"People who try to look at the whole project can get paralyzed by the size of it," explains William Harrison, director of new business development at Communications Management Systems, a McLean, Va.-based division of Cincinnati Bell Information Systems, Inc. Managers need to keep in mind the right moves to make in planning a network. "You need to take the steps that will preserve your options for unforeseeable change," Harrison asserts.

As a DP or telecommunications professional, you need to look at products and product standards, but these are only two components of a successful network strategy. You also need to consider your organization's corporate strategy, the users' needs and networking's financial demands. Taken together, these factors represent a structure around which you can build a network. However, this structure will not hold without an understanding of how to translate your networking ideas into a project that will produce tangible results.

Managers can provide many examples of how to make a networking project fail. "I've seen several project efforts costing more than $30 million that have nothing to show except multiple volumes of documentation," says Judy Schneider, director of government services at Advanced Technology Systems, a Vienna, Va., technical consulting firm. At the heart of many of these failures is a project management approach known as The Big Plan.

The Big Plan typically starts with a manager or committee that states that in five or 10 years, the company will have developed a large networking system, Schneider explains. One problem is that without a list of specific goals, the five- or 10-year project will produce nothing. If the network is actually completed, it may face almost immediate obsolescence. "If you plan a network based on today's requirements, then you have to assume that all technology stops, that company growth stops and that there will be no corporate reorganizations," Schneider notes.

Instead of following the Big Plan, managers need to break large projects down into segments. "Projects and people both need deadlines," Schneider asserts. As a manager, you should study a proposed project for six to eight months to decide exactly what goals you want to achieve, she suggests. "Then, look at the processes necessary to support it."

For example, a manager might decide that 24 users each need to have a personal computer connected to a local-area network (LAN). Instead of installing the whole system at once, the manager would develop a plan to add personal computers and application packages in increments, Schneider says. A first installation might include four PCs and two software packages. "A manager should not try to bring 24 PCs and 12 applications up at once, because there are too many variables," she warns. "That leaves too much room for error."

In addition to controlling quality, incremental project deadlines give managers a yardstick by which to measure progress and leave users with a sense of accomplishment, Schneider notes.

"If you go a month or two without being able to show something, people wonder what you're doing. People should seriously question what is happening with a network project anytime they do not see progress for that amount of time," she says.

KAREN STOLPER

Similarly, the individuals working on the project may question the importance of their work if they go to their terminals day after day without turning out a product, Schneider says. Therefore, managers should never let six weeks go by without something deliverable, she recommends. "From my experience, I have found that the six-week deadline is very real to people."

These deadlines can be tied to product installations or other aspects of the networking project, Schneider notes. For example, she says, "it can be a draft study document, data elements, coding or test plans." If certain components of the project — such as documentation — take several months to complete, managers should further break these into subcomponents that can be completed within four to six weeks, she suggests.

Armed with with a long-term project management strategy, DP and telecommunications professionals need to begin their networking projects by examining their company's current and future needs. These needs are determined by looking both at the corporate strategy and users' needs, Harrison says. "Which of the two steps comes first is arbitrary," he says. "You don't know the corporate strategic plan until you know what the users' needs are, and

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Hurst is a *Computerworld Focus* senior writer.

sometimes the future needs of users are governed by the strategic plan," he says.

To understand a corporation's strategic plan, technical managers should talk with upper management about planned acquisitions and divestitures and whether the company will maintain a centralized or decentralized system, Harrison says.

Plans may change

Next, he suggests, "telecommunications managers need to realize that those corporate plans may change drastically during the following five years." In addition, corporate leaders may rely on DP or telecom professionals to keep them abreast of evolving technology and its significance, Harrison notes. This, in turn, may affect corporate policy.

To understand users' needs, Harrison says managers need to ask users future-oriented questions such as, "What do you need to keep up with industry? What do you want to do that you can't do now?" Managers then need to go back to corporate management to find out who the future users will be. For example, upper level managers may state that a certain department is going to automate and will need access to the corporate mainframe. "Only by looking at both sides can you get a total view, because different people are aware of different technology needs," Harrison says.

Once you understand the users' communications or connectivity requirements, you must choose the technology that best fits those needs. This requires a solid knowledge of networking's strengths and limitations. Some people correctly identify a problem but then try to solve it using the wrong products.

"I have seen people add a network, thinking users could share resources using fewer processors," comments Ken O'Mohundro, president of Able Computer, a Costa Mesa, Calif., networking firm. Instead, the networking software causes the need for an extra processor, he says.

Less is more

Sometimes less technology is more. Short messages and electronic mail are perfect applications for a network, Advanced Technology's Schneider comments. These transmissions can save users time, and because they are short, they do not drag down the network response time. By contrast, "sending a large document across a network can be like trying to push an elephant through a straw," Schneider notes. The sheer volume of data overloads the network. If this data is traveling from one department to another in the same building, it may be more efficient for users simply to swap floppy disks, Schneider suggests.

Another important aspect of matching users' needs to the technology is listing needs by priority to determine the networking answer that most effectively fulfills those needs. "The solution you want is a network that is a specialist at handling your most critical needs and enough of a generalist to take care of your other ones," he says.

For example, a company may have several Digital Equipment Corp. VAXs installed in many different locations. "These computers may have no reason to talk to each other, but the users may need to talk to data bases located on different machines," O'Mohundro says. Such users do not need a network, he notes, they need a terminal that can access a number of VAXs.

Along the same network, workstation users may need high-speed file transfer between the VAXs and their desktop systems. "These users would require a network such as Ethernet that can support high-speed transfer," O'Mohundro notes.

Another group of users might need a great deal of access to a single data base. These users would require a high-speed bus, such as DEC's CI Bus, in order to group the VAXs into a cluster that supports high-speed data base transactions. "The CI is about seven times faster than Ethernet," O'Mohundro claims.

Determine the best solution

If the VAXs must address more than one of these scenarios, managers should categorize the situations in terms of frequency and importance to determine the best technology solution, O'Mohundro says. For instance, an Ethernet-type network will support the workstation users' file transfers adequately, but it will bog down under the heavy central data base transactions, he notes. However, if the data base transactions are usually sent together in batch mode at night, workstation users will not be affected by the slowdown during office hours.

In addressing users' communications needs, data processing and telecom managers also have to analyze the impact technology may have on the users. One example is the effect of electronic mail. "Unless handled properly, E-mail can be dangerous because it gives employees an opportunity not to talk to each other," O'Mohundro warns. "E-mail is one way to turn an introvert into a hermit," he says. A manager who establishes electronic mail should be careful to provide some replacement mechanism for social interaction, he adds.

After determining the networking or communications technology that best suits the users' needs, managers must confront the financial aspects of these solutions. Financial factors include not only the cost of equipment but also its impact on user cost-efficiency and corporate funds. "You have to factor everything into the total networking cost," according

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to Ronald Brown, manager of office automation and telecommunications management for Coopers & Lybrand in Boston.

For example, a business may be looking at the difference between twisted-pair wiring and fiber-optic cable, Brown explains. "Does the current twisted-pair wire meet the company's needs? If not, what is the cost to take it out and replace it with fiber?" he asks. If the company delays putting in fiber, the lower employee productivity may cost the firm more than implementing the new cabling scheme.

Comprehensive look

In terms of actual technology costs, managers need to look at the total network, Able Computing's O'Mohundro advises. "Know all the hardware and software you will need to have the network perform all the functions you require." Too many DP professionals only look at parts of the network, he notes. These managers quickly find their expenditures far exceeding their estimates. For instance, a user who requires Ethernet from DEC may not realize that DEC's price only includes the hardware. The user has to go to a network protocol vendor, such as The Wollongong Group, Inc. in Palo Alto, Calif., for the software.

A related problem lies in making price comparisons based on pieces of different technologies. An illustration of this mistake is when a user compares switches with local-area networks, O'Mohundro explains. "If a switch costs $100 per port and a LAN costs $400 to $1,000, does that mean the switch is more cost-effective?" No, he says. "You have not looked at the whole story." To function as a network, the switch also requires multiplexers and wiring, O'Mohundro says. By the time these items are factored into the cost, the switching solution may cost as much or more than a LAN.

Another factor to consider in financing is a company's ability to fund a networking project. Organizations have to decide whether they want to undertake heavy expenditures in the short term or moderate expenditures during a longer term, Harrison observes. Such factors can effectively give a financial manager, rather than the DP or telecom professional, the power to choose a communications solution, he says.

Many telecommunications managers may be angry about the financial constraints that manipulate their decision making, but they need to understand the reasoning behind these constraints, Harrison says. "The manager has to be aware of the corporation's need for financial planning and should help financial managers by giving them information on the communications options available." This financial responsibility is just as important as the technical manager's responsibility for taking into account the users' needs as well as the corporate strategy, he adds.

Corporate standards

A final concern in planning a network is determining who will decide corporate communications standards. Dividing the responsibility between the corporate center and departments offers the most flexibility, consultants agree. "If you have some central standards, you have the option of operating in centralized or decentralized control," Harrison says. "Without central standards, your control is always decentralized."

Centralized control provides several benefits, but few companies have the luxury of developing a companywide communications plan, says Eugene Buechele, vice-president of engineering for Communications Solutions, Inc., a networking firm based in San Jose, Calif. Centralized control allows managers to standardize on certain technologies and to provide uniform applications development and wiring, he notes. As a result, the network is easier to support. "The negative side of centralized network control is that it takes longer to implement strategies corporatewide, and the network will not exactly match the needs of local groups," Buechele adds.

Decentralized control allows departments to choose the technology that best meets their needs and to capitalize on technology investments they have already made. As a result, networks match departmental needs and interests, Buechele notes. The drawback is that it costs the company more to support the network. There also is a limited scope for applications development because there are fewer users.

The best of both worlds

A company that uses both centralized and decentralized control combines the best of the two approaches. With this strategy, departments adhere to a central core of standards, but the solutions they choose based on those standards may vary. The combined-control approach is cost-effective, addresses a broad spectrum of needs and preserves the company's applications investment.

In addition, departments can develop networking solutions at their own speed, rather than having to wait for others because of what Buechele calls "corporate communism."

Finally, while developing a network plan, keep focused on why you are implementing it, Schneider advises. "List your reasons in order of importance and let them guide the development of your network strategy." Some people go off on a tangent, she warns. "They end up in never-never land."

And that is a journey most managers do not want to make. ◆

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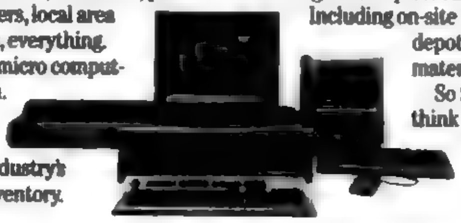

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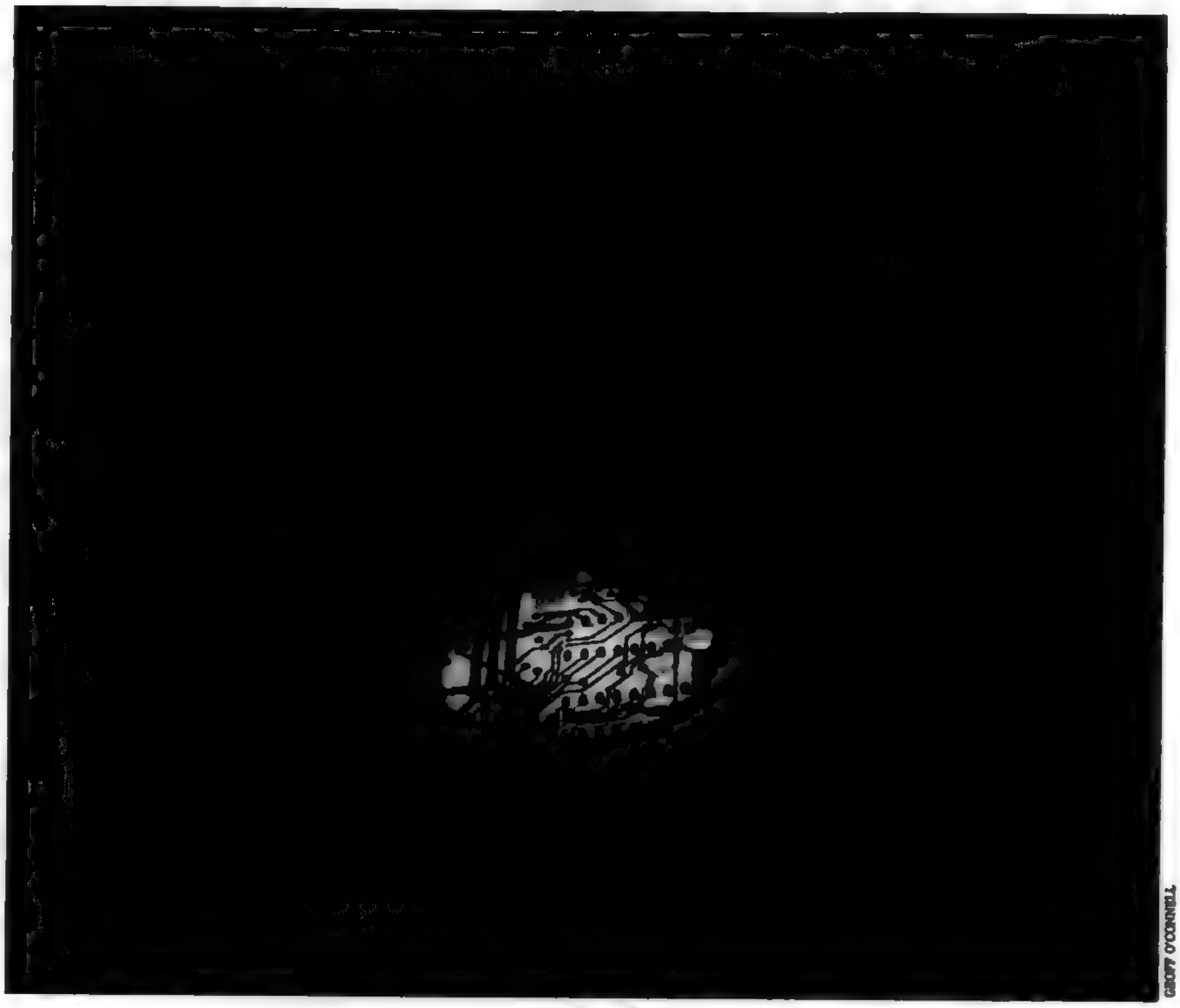


GEOFF O'CONNELL

Superphones

BY MICHAEL TUCKER
FEATURES EDITOR

Three years ago, everybody just knew that telephones and personal computers would merge. The evidence seemed overwhelming. Workstation vendors were coming out with computers that had telephone handsets built right into the keyboard. IBM was gearing up to purchase Rolm Corp., which had invented the idea of data phones in the first place. AT&T, newly divested of its local telephone service, was setting up AT&T Information Systems as its entry to the computer world. "Integrated voice/data" was the slogan of the age.

Even the industrial psychologists were getting into the act. Soberminded consultants were informing all who would listen that senior-level executives did not relate to keyboards. But telephones — those were another matter. The key to strategic systems, they said, was to make a personal computer look like a Touch-Tone phone.

Now, three years later, the industry is sadder and wiser, and none of the speculation seems to be true. AT&T's entry into the personal computer market looks like a full-tilt charge to disaster. The IBM/Rolm union has so far avoided divorce, but the couple has sought marriage counseling in the form of management shake-ups at both companies. You don't hear that much about integrating voice and data these days, and even the most technophobic executive seems to have learned to coexist with keyboards.

As for the computer with the built-in telephone, that idea is not so popular these days either, according to Will Zachmann, a vice-president of research at Framingham, Mass.-based International Data Corp. (IDC). He expresses it simply and bluntly: "The voice/data workstation was a ridiculous concept, nothing but a mass of inflated hype [that] no one needed."

So, does that mean the great merger of telephones and computers is off? Can MIS, with a sigh of relief, turn its back on private branch exchanges (PBX) and deal instead with traditional data networking solutions such as local-area networking (LAN) and terminal emulation?

Yes and no.

Telephony has turned into a science and an art. Telephones themselves have acquired a bewildering variety of forms, powers and abilities. They range now from simple hand-held systems to full-fledged videophones. As a result of those new forms and powers, the current generation of phone technology can provide valuable tools for MIS.

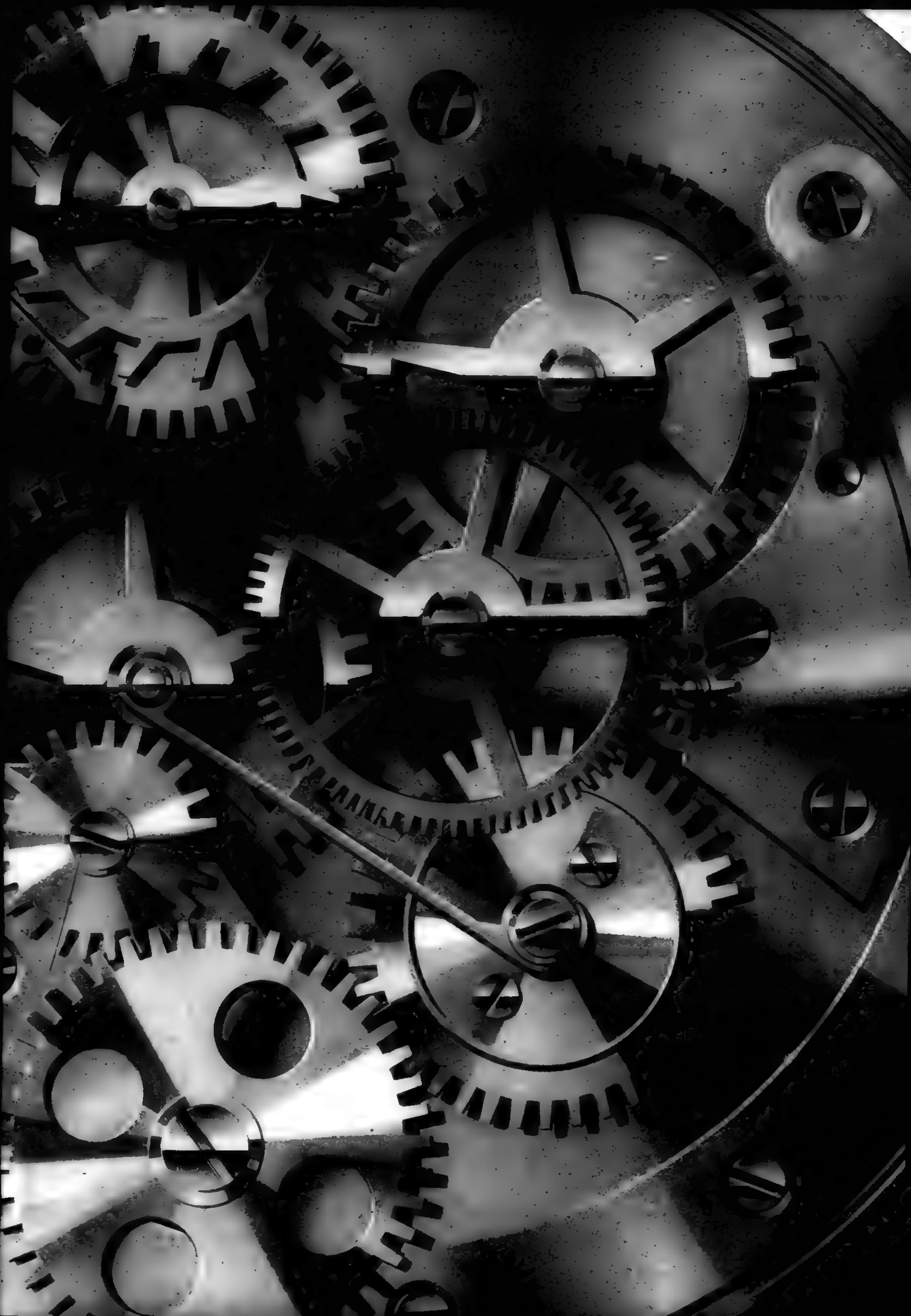
Very large PBXs — the kind that take and make millions of calls on a daily basis — usually have at least some data transmission capability. These devices are so powerful that there is an interesting philosophical question whether such devices are even still in the realm of what normally constitutes "telephony." Depending on the situation and the installation, MIS may indeed find such powerful "data PBXs" the best or even only choice for data transmission available.

However, what about smaller PBXs, devices that are clearly in the realm of traditional voice communications? Might those, too, have some role in data transmission?

Those smaller switches may actually give some aid and comfort to MIS. Not only can these units provide increasingly sophisticated voice communications to individual MIS departments, but they also can yield important data transmission capabilities in situations in which a LAN or a cable would not be cost-effective.

This ability is possible because small PBXs have recently started to take on some of the functions of large ones. In an effort to woo small businesses and the individual departments of Fortune 1,000 companies, vendors have introduced increasingly intelligent small departmental PBXs. In fact, the competition at the low end of the spectrum has become intense lately, with such big-name players as AT&T, IBM

Foreign vendors vie for a piece of the U.S. telecommunications market, page 39.



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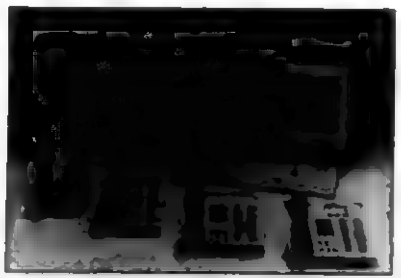
Circle Reader Service Number 18

and Northern Telecom, Inc. getting into the act.

Little PBXs can be useful to MIS officers for a number of reasons. The most obvious of these is the advantage of having real control over voice communications within their own departments.

For example, one of the many vendors of intelligent departmental PBXs is Isoetec Communications, Inc. in Darien, Conn. Isoetec is unusual in that it specializes in departmental voice products. The company's offerings range from the System 96/66, which supports from 13 to 36 telephones, to the recently introduced system/228, a digital system that can support at least 216 phones on 12 different lines.


Isoetec's *System/228*

The Isoetec systems provide the usual benefits for voice communications plus a few interesting extras. A representative user on the voice side of the equation is the Delaware Administration for Rapid Transit (DART), which is located in Wilmington, Del. DART represents public transportation for virtually the entire state of Delaware.

Early on, the organization found that to get people to ride its buses, it needed some way for customers to phone someone and ask questions about scheduling and routes. "We discovered that you need a 'humanistic' device," explains Stephen R. Welch, a DART officer. "People can be standing there with the literature in their hands — the route maps, the schedules — and they'll still be uncomfortable. They need someone to give them a personal reassurance that they have the right schedule or that they've interpreted it correctly. Which means, from our perspective, the telephone is vital to the success of DART."

But like most public transportation agencies, DART simply does not have the resources to dedicate a large staff to answering incoming calls. There are only three operators to handle some 800 information calls a day as well as regular business calls.

In 1986, DART decided to purchase the Isoetec System/228, an intelligent PBX, to help it handle the load. "Prior to our going with the system, we were losing 10% to 15% of incoming calls every day. People were getting a busy signal or being put on hold so long they just hung up," Welch says. "Now we're down to 5%."

The biggest test of the system came during a recent snowstorm. In a single morning, incoming calls swelled to 2,800. "The PBX was sufficently flexible that we could log seven other people into the system," Welch notes. "They could answer questions at their desks and go back to their usual work in between calls. We lost only 10 calls that whole day," he claims.

That's all well and good for voice communications. But does that situation have anything to do with the concerns of hardcore MIS people whose communications requirements have much more to do with data?

Yes. As hordes of hackers with modems have already demonstrated, the business of sending data via phone lines is neither technologically demanding nor even interesting. In the case of a digital system, like Isoetec's, it gets downright dull. According to IDC's Zachmann, "That you do data transfer over a phone line is pretty superficial."

But sometimes the route to success lies directly through superficiality.

Voice technology, however unexciting, can provide data transmission capacity at times and places when more sophisticated techniques are simply not available. The System/228, for instance, is clearly geared to voice rather than data. However, it can also provide data transmission in a pinch. For example, the California state Senate in Sacramento, another Isoetec user, orginally purchased its system to handle nothing but voice. But the Senate has gradually expanded the system's duties to include some data.

Andrew Flett, data processing consultant to the state Senate, explains: "Basically, we've got a couple of dozen users on a LAN. Each time we added a user, we'd have to tear up another carpet and run another cable into the computer room." And the Senate was running out of cable space.

"Then, along came the Isoetec people," Flett says. "They suggested we stop tearing up rugs and just use their System/228." The state Senate did install one in early 1986. Currently, the phone lines are supporting four network users. "As I understand it," Flett says, "the system was designed to be used lightly by terminals. We're not doing that at the moment. We've got people who are on it pretty much all day long."

There have been some problems, however, perhaps because the system is being used continuously. "We're not quite sure what's causing the effect, but occasionally users are getting dumped off the system. It could be in the software, it could be a faulty plug. Still, it's not a big problem, and, generally, we're happy," Flett says.

So, is the merger of data and voice on again? "Well, I haven't spent a whole of my time getting excited about [that question]," Flett says. "I see [our Isoetec system] as an interm solution. With the next upgrade, we'll probably switch to fiber optics."

However, in the meantime, he claims that "it takes one headache out of my life."

Phone fanfare

OK, maybe, if pressed, we can admit PBXs have their place in MIS. They can provide extra data transmission capacity at times and places when other, more traditional methods are "a headache." But how about phones themselves? Is there any reason that MIS people should concern themselves with those devices?

Probably not. Quite simply, the management of telephones is somebody else's job. After all, the purchase and control of office equipment has little to do with the corporate mainframe.

Yet MIS managers may still wish to be aware of what's out there in terms of telephone technology for two reasons: first, because they are phone users themselves; and second, because they may, on occasion, be asked to advise their employers on the purchase of telephone equipment.

Telephone selection can be hard because the devices are becoming increasingly sophisticated. They are beginning to sprout screens, keyboards and even

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Circle Reader Service Number 19

Just the fax, ma'am

USING THE PHONE LINES to transmit something other than voice is actually an elderly technology. Facsimile machines, after all, have been sending and receiving graphics for years.

The fax industry is undergoing a period of rapid transition. Companies are displaying color fax devices, faxes that link with computers and, now, desktop faxes.

For instance, Xerox Corp. in Stamford, Conn., recently unveiled a line of desktop faxes known as the Series 70. These are small, user-friendly machines that print on standard rather than thermal transfer paper.

One user of the Series 70 is Perkins Coie, a Seattle-based law firm. The firm purchased six machines to help link their central office with outlying local offices. Perkins Coie has more than 230 lawyers spread over five different locations. The firm is a high-volume fax user, with an average of 10,000 pages transmitted a month. The central office contains full-size fax equipment and a full-time staff of communications specialists. But the smaller offices require fax machines small enough to fit into a limited space and simple enough for novice users.

At least for the time being, the Series 70 fits Perkins Coie's bill. "Eventually, everything will be laser printers," notes Marsha Lash, who serves as communications lead for the firm. "But as we work on getting there, [the Series 70] is a good interim solution." — MICHAEL TUCKER

Foreign firms look to U.S. telecom mart

LOOKING FOR an international telecommunications carrier? Beyond domestic suppliers, several foreign vendors have recently begun to seek business in the U.S. These carriers include the following:

- **British Telecom International.** London-based British Telecom, the leading telecom vendor in the UK, not only offers access to European markets but also to a number of worldwide digital and analog services. For instance, its international packet-switching network can access 43 countries and 60 networks. Recently, Herndon, Va.-based Mitel Datacom, Inc. announced it would be remarketing British Telecom modems in North America.
- **Kokusai Denshin Denwa Co.** This Japanese telecommunications giant, headquartered in Tokyo, has only in the last few months begun a serious attempt to win American customers. Yet depending on the behavior of the Yen, the company could offer quite a bit to U.S. telecommunications officers in search of a link to Asian locations. In addition to international telephone, telegraph, telex, television and maritime satellite communications services, Kokusai also maintains a powerful research and development program.
- **Overseas Telecommunications Commission.** Japan is not the only path into Asia. This commission, based in Sidney, Australia, can provide telex, facsimile, video and more on an international level. The organization seems to be selling itself as a liaison between North American and Asian business, providing physical proximity to the Pacific markets but doing so while based in an English-speaking nation. — MICHAEL TUCKER

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microprocessors. Consider, for example, the EZ-Talk system from Harris/Lanier Business Products in Atlanta. This telephone looks like a small personal computer. It offers a keyboard, an LCD screen and on-board random-access memory (RAM). The RAM lets a user keep an online telephone directory of 100 names and numbers, an amount that can be upped to 300 with a memory expansion card.

You can also keep an appointment and meeting calendar on the phone. The vendor notes that you or an assistant can enter up to seven events per day for 60 days. There is also an attached alarm that reportedly notifies you if you somehow manage to forget to look at the calendar.

In short, EZ-Talk performs many of the same functions as a PC running a desktop organizer program. The resemblance to a microcomputer gets still closer in light of the fact that EZ-Talk has an electronic mail function. With it, you can send electronic memos to the screens of other EZ-Talk users. You can even talk to one person while exchanging text with another.

In fact, it is possible to argue that for some people a smart phone is a better tool than a PC or terminal. Some end users, after all, need E-mail and voice communications far more than local processing power or access to corporate data. For those users, telephones can be inexpensive alternatives to PCs.

Even if users do need access to a mainframe, telephones can still play a role. In fact, there is a whole class of terminal/phone hybrids — supported by sophisticated digital communications networks — that may be the best telephone instruments possible for MIS managers.

For example, Northern Telecom has marketed for some years the Meridian DV-1 system, which the company calls a "distributed data processing and communications system for work groups, branch officers and departments of large multilocation organizations." The DV-1 is effectively a Motorola, Inc. 68010-based microprocessor, running under Northern Telecom's version of Unix, that acts as both a communications controller and a small business computer. It is a hybrid because it manages telephones, terminals and PCs and runs Unix-based software at the same time.

The DV-1 system shows up on the desktop by interacting with any number of terminals and workstations. These range from simple telephones to a group of graphically oriented terminals to machines, such as the Meridian M6110, which are IBM Personal Computer compatible. All of these units can be terminals displaying up to six windows at the same time — displaying applications running on the DV-1, on a mainframe host accessed via a gateway and on the local workstation. Thus, an MIS officer could debug a Cobol program on a mainframe, examine a Unix-based graphics package on the DV-1, cast an eye on a co-worker's spreadsheet, read his E-mail and take a phone call from payroll, all on the same screen at the same time.

Northern Telecom isn't alone, however. AT&T maintains a large line of digital voice terminals. The smaller of these looks much like Lanier data phones. The AT&T 7406D, for instance, boasts an RS-232C port, 18 programmable features and, in an advanced version, an LCD screen that can display two lines of 24 characters each.

But AT&T also has a number of phone/terminals. The Personal Terminal 510 provides a touch screen, a telephone handset and a keyboard in one discrete package. It can be purchased as either an analog or a digital system. (AT&T has shown voice/data terminals that actually have two lines coming into them — one for data and one for voice.) The 510 also has its own unique application software, which actually comes in firmware cartridges. There are, for instance, a training cartridge to give users a tour of the system and a security cartridge to keep unauthorised personnel from getting the same.

You can link the 510 to just about anything via AT&T's communications processor, the System 85. This device is based on the Integrated Services Digital Network protocol — a single digital communications protocol that will reportedly support everything from phones to video to data.

A single System 85 can support up to 32,000 user stations. In the process, it can provide not only voice and data communications but also a gate to IBM Systems Network Architecture-based equipment.

Harris/Lanier's EZ-Talk system

Suppose, though, that still isn't enough. If that's the case, you might want to consider a full-fledged videophone.

During the 1960s, there was a lot of interest in video telephones. Working models were produced and displayed. However, they proved impractical because standard phone lines simply lack the bandwidth for full-motion video. Eventually, that situation will change as more and more systems adopt fiber optics, but the process will be a long one.

In the meantime, though, several firms are selling telephones that will transmit still pictures either as individual graphics or as part of a succession of photos that give a limited illusion of motion.

The former type of phone is probably the most well developed at the moment. Several products are already on the market. For example, Image Data Corp. in San Antonio sells the Photophone, which allows users to transmit both pictures and voice over standard telephone lines.

The Photophone is aimed at customers who have some need to transmit still photos from one place to another. A hardware engineer, for instance, might use the

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product to send the image of a malfunctioning board to a professional repair man. The images can then be stored on conventional floppy disks.

Similar in size to PC

The Photophone consists of a camera mounted on an extendible arm, a 9-in. display screen and an electronics enclosure. The total system has a footprint slightly smaller than that of a PC. It costs $8,500.

The latter type of phone — a videophone that transmits a stream of pictures — is the younger technology, and it is still suffering from growing pains. These systems offer a compromise between voice-only systems and videoconferencing via coaxial cable or satellite links. With the videophones, users can see one another over standard phone lines but not in real time. Instead, their screens show images that change every few seconds.

This presentation can disconcert the viewer. People on the other end of the line move in quick jerks and mysterious dissolves. Body language is essentially lost. In situations in which clear personal communication is vital, then systems are no substitute for full-motion video and still less for personal contact. But limited motion is sometimes better than none at all.

One of several firms marketing a videophone of this sort is Videocom International Corp. in Tokyo. Videocom is a specialised consulting and systems integration company that is partly owned by the Tokyo-based Japanese telecommunications corporation Kokusai Denshin Denwa Co. Among other things, Videocom sells the Invite 64, a desktop visual telephone invented and manufactured by Kokusai. Invite 64 will not only transmit voice in real time but will also send full-color video at 10 frames per second.

The clarity and color of Invite 64's picture has been judged to be among the best available on such systems. These features were made possible by sophisticated software. Kokusai produced a "predictive coding system" that compresses visual data by identifying variations in the movement of the subject and then transmiting those variations.

Invite 64 is expected to come to the U.S. market this year. Its price will depend greatly on the fate of the Yen.

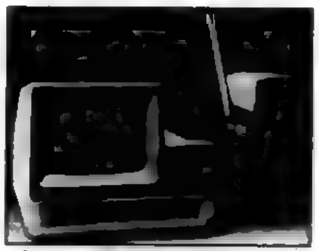

Image Data's *Photophone*

So, with video, voice and data transmission, the common telephone is a rather sophisticated instrument these days. That could, in the long run, be rather important to MIS, despite the fact that telephony has been the responsibility of voice communications managers.

Even in this age of specialization, MIS people are held accountable for an ever-increasing number of duties. Initially, for instance, MIS meant mainframes alone; personal computers and even data communications were outside the profession. Now, however, the microcomputer and the data network are as much a part of MIS as Cobol.

And there are signs that voice communications also are beginning to migrate into MIS. A recent survey jointly conducted by Pasadena, Calif.-based Office Technology Research Group, which is an association of senior-level executives in North America and Europe, and the Data Processing Management Association, a worldwide organization of DP executives, revealed some distressing facts. The survey showed that most MIS people are being called on by their employers to streamline office operations, using whatever technology is available.

In short, it may be that not only will MIS find itself involved with end-user computing but with end-user voice communications as well. ◆

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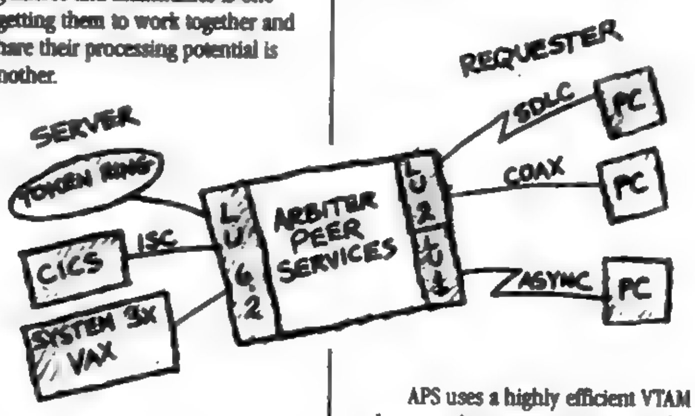

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Circle Reader Service Number 21

Directing communications at Warner

BY REBECCA HURST

What do Madonna, Bugs Bunny and Jack Nicholson have in common with Donald Winski? The three entertainers are associated with products from Warner Communications, Inc. To determine these products' success and modify marketing strategies, New York-based Warner and its subsidiaries rely on networks of computers communicating with each other.

That is where Winski comes in. As Warner's executive director of corporate information services, Winski is ultimately responsible for ensuring that the multinational organization's processing systems work and communicate as effectively as possible. The task is not a small one. Warner, which earned $2.23 billion in 1986, has 18 companies that operate worldwide.

Nor does it take long to see the implications of this responsibility. Minutes after entering his office, Winski takes a call from London and relays the contents of a telegram he received earlier from Japan. "This [activity] gives you a flavor of what I do," he says.

Warner's several international offices as well as its decentralized business units throughout the U.S. have created the need for different types of computers and networks. "Warner's policy is to put extremely capable executives in place to run our businesses," Winski says. These executives determine how technology is used in the business units.

When these business units need to cross-communicate, it is the corporation's role to set up an effective environment. "When appropriate, we act as the glue between the businesses," Winski comments. However, Warner is not imposing centralized projects on the units. Instead, the corporation works with the business units on a peer-to-peer basis, he explains.

Because telecommunications is considered an integral part of Warner's information systems, Winski has developed a communications strategy based on both short-term and longer range goals.

To represent this strategy, Winski invokes the image of two islands. One island is telecommunications services; the other is business management. Spanning the islands are the short-term measures, or pontoons, that serve to bridge the gaps until long-term connectivity plans, or bridges, can be implemented, he says. Any savings from these stopgap measures can then be applied to future projects.

Separating the islands is what Winski terms the "Sea of Credibility." In addition to providing cost benefits, short-term measures help corporate information services build credibility with Warner's business units, he says. "There have been experiences in the past in which people came up with corporate grand plans that never worked out," Winski notes. "The idea of the grand plan has left a bad taste in the mouths of the business units," he claims. As a result, these units want to know what the information services group is going to do for them.

In response, Winski has developed a pay-as-you-go policy, which has two components.

First, businesses pay for any company projects. These projects can occur within a single business unit or may consist of two or more businesses cooperating on a mutual project.

Second, businesses that participate in corporate projects pay a percentage of the costs only if they realize some savings from it.

An example of a corporate

YVONNE HEMSEY/GAMMA LIAISON PHOTO

Donald Winski *sets the stage for information services success.*

Hurst is *Computerworld Focus*'s senior writer.

project is one in which the corporate office may sponsor and invest in some new area of technology. "This puts the risk on the corporation rather than the business units," Winski explains.

Warner has made a list of 15 to 20 short-term projects aimed at reducing its telecommunications costs, Winski reports. From this list, he says, "Warner has identified an opportunity to save about $500,000 annually." Some of the projects are corporate plans; others are suggestions for company measures. One corporate project consists of using a long-distance carrier to take advantage of the discount structure that many telecommunications companies offer.

"You can get savings of 10% or higher with AT&T's Proamerica program," he notes. "I understand U.S. Sprint and MCI Communications Corp. provide similar discounts."

Other projects on the list, which has been distributed to Warner's business units, are issues for the units' management.

"There are ways to cut down on credit card abuse and to prevent employees from calling a Dial-A-Joke-type service," Winski comments. Also, a business unit can determine the extent to which employees can use company phones for personal calls. However, while this suggestion is included on the list, headquarters does not attempt to regulate policies on personal calls, he says. "We leave that up to the business units," Winski says.

Benefits of a common line

A more medium-term goal involves establishing common communications lines between offices on the East Coast and those on the West Coast, Winski says. "We have several businesses on both coasts, each with its own leased lines," he explains. "With a common line, we can benefit from economies of scale and get a higher bandwidth." The common line may also provide the business units with better backup and recovery because the corporate office can develop a contingency network plan that the individual business units would not be able to afford themselves.

Warner's long-term plan is to develop networks that conform to an acceptable international standard, Winski says. That standard will probably be the International Standards Organization's Open Systems Interconnect (OSI) model because all the major computer vendors will eventually comply with OSI, he states. However, he notes, "Where we wind up is easy enough to describe, but there is a question as to how we will get there."

Currently, Warner finds that batch processing is usually an acceptable method of communication among mixed information processing technologies, Winski says. "For example, we can set up an ASCII data file and just transmit using packet-switching networks." As Warner shifts from a batch to a more on-line processing approach, Winski foresees a problem unless there is a standard everyone involved can accept. "In effect, we have to wait for vendors to comply." Winski is not worried, though. OSI, which will support on-line transactions, will be available from vendors in a year or two, he says. "By the time OSI is here, we should be ready to use it," he explains.

In a multinational company such as Warner, some data communications will never require on-line processing, Winski says. "Worldwide, most businesses can't have all on-line transactions," he explains. "A company may split its computer time into 12 hours for on-line and 12 hours for batch."

Instead, a business unit in a country that is eight or 10 business hours away from corporate headquarters needs to use store-and-forward processing, Winski says. A processor captures the data online locally, stores it and then forwards it later in a batch transaction to the corporate computer system.

For such international communications, the parent organization needs cooperation between companies to use packet switching. Gateway standards are also important because many countries use information processing products from different vendors, Winski says. These gateways provide a solution to the problems caused by sundry data formats and hardware platforms, Winski says.

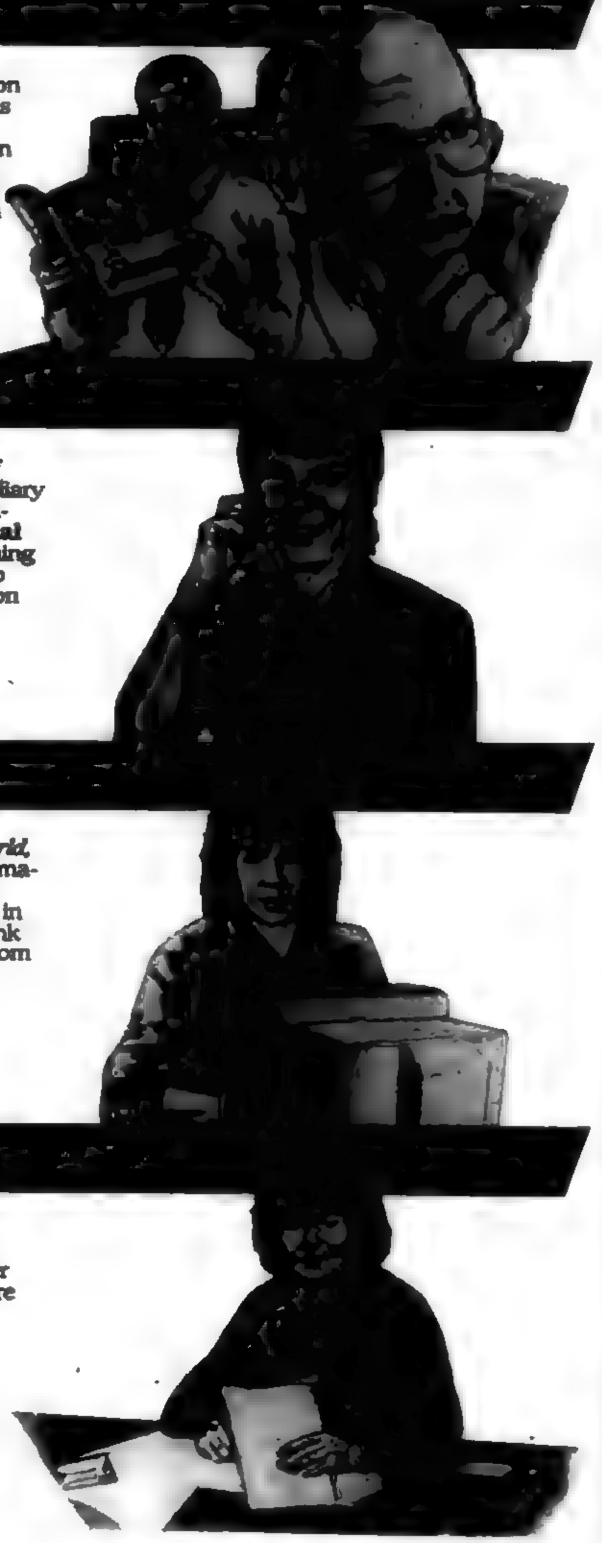
Management issues

Beyond the technical demands fostered by international offices, there are also management issues to consider, Winski says. One issue is language. Like many multinational companies, Warner uses English as a common language. For office communications, employees use their native language, but they use English to communicate to offices abroad.

Another management issue is understanding a foreign nation's business culture. "Unless managers have international experience, they should rely on people who do [have that experience] to negotiate transactions," Winski advises.

The classic image of the ugly American pervades in international business because some U.S. managers are not experienced in the thinking of other countries and may make a lot of mistakes, he says.

Even a manager experienced in foreign business practices can benefit by enlisting a local representative to set up an overseas network. Many European countries have Postal Telephone and Telegraph (PTT) authorities, a generic term for monopolistic telecommunications firms, Winski explains. Because these organizations lack competition, the lead time for implementing a network takes longer.



Getting a world of education

9:00 a.m.

The Minister of Education in a developing nation receives a large grant to install computers in his country's schools. Having read about an innovative use of computers in secondary schools in *Australian MacWorld*, an **International Data Group** publication, he contacts editor Osmund Iversen to find out about similar applications in other parts of the world. Iversen refers him to **Link Resources** in New York.

NEW YORK, NEW YORK • 11:00 a.m.

The Minister calls Link Resources, a division of **International Data Corporation** and a subsidiary of IDG. Ann Wujcik, a leading expert on educational computing and director of Link's **Personal Computing Program** responds by commissioning a 10-country study through the IDG network to identify the most successful computer application for schools.

LONDON, ENGLAND • 12:30 p.m.

Jane Lawrence, editor of IDG's *PC Business World*, receives an E-mail from Wujcik requesting information. She immediately organizes a task force to interview leading educational computer experts in England. Lawrence's flash report is faxed to Link where it will be coordinated with information from around the world.

RIO DE JANEIRO, BRAZIL • 1:30 p.m.

Sonia Aguiar, of IDG's Brazilian publication, *PC Mundo*, receives a report from her research group on computer use in Brazilian schools. Her recommendations on possible hardware/software configurations are E-mailed to Wujcik.

> **"Having run a business unit myself, I know what type of management turns me off and what turns me on. Business managers like the idea of information services providing value-added services rather than exerting control."**
>
> DONALD WINSKI
> WARNER COMMUNICATIONS, INC.

lowever, he says, "A foreign representative may have contacts in the PTT's 'old-oy' network and may be able to speed up he process."

With Warner's multinational, decenralized structure, "flexibility is key to managing the business," Winski asserts. he same principle holds true for managing technology. As the corporation's needs change, Warner divests or acquires different businesses. Acquired businesses generally have their own computer systems, and they need to communicate with Warner's offices, Winski notes. "As we acquire businesses, we normally don't ask what brand of computer they use," he adds, jokingly.

As a result, Warner's information services need to respond to changing communications needs.

Warner tries to avoid centralizing too much of its resources, Winski reports. "We develop alternative scenarios for setting up resources for business units," he says. By examining these scenarios, the firm tries to find solutions that will work in various situations. "We shy away from the solution that offers peak performance for one particular situation because that optimum is based on knowing where the company is going to be," Winski notes. To adapt to the changing corporate environment, he says, "we go for a broad plateau that offers a high return on investment for many situations."

For Winski, an important management issue is balancing the needs of the business units with those of the stockholders. The key to providing information services for working in a decentralized business is to remain nonbureaucratic. "The information services group emphasizes a collegial, partnership role. It's the only way to get things done," he says.

"Having run a business unit myself, I know what type of management turns me off and what turns me on. Business managers like the idea of information services providing value-added services rather than exerting control," Winski claims.

This advisory role accounts for 99% of corporate information systems' responsibility. "The flip side is that as part of corporate management, the other 1% is our responsibility to the shareholders." In this respect, Winski and the information services division function as overseers.

Winski's dual responsibility to the businesses and the shareholders governs his interactions with the units.

If a business unit is mature, Winski usually works with that organization's chief information executive (CIE), who is considered part of the management team, he says. "Warner also has senior corporate executives with oversight responsibilities to one or more business units, and I'm in continual contact with them as well," he notes.

In both corporate and business unit management, Winski says he acts as an ombudsman and advisor; he may tell one business unit CIE concerned about a problem how another CIE successfully solved a similar problem. "Sometimes I bring two CIEs together because I think they can work together," he adds.

If a business unit is still in the early stages of its technology evolution, Winski reports that he deals primarily with senior executives of that unit. "If there is a DP manager in this evolving organization, we'll try to grow the person to do the job of a CIE," he says.

Creating a CIE from a DP manager is easier if the person has a strong base of business experience, Winski notes. "We can teach someone who knows the business about the technology," he says. "It's harder to grow someone who only has a technical background, although it is possible."

Hiring from within

Finding experienced CIEs is generally not too difficult for Warner, however. "Our business units are very stable," Winski notes. "The senior executives have built their own staffs so we can normally find a DP executive from within who knows the business."

Another management issue for Winski is handling a power shift in information processing. "The biggest challenge to information executives is that telecom and MIS are becoming highly user-driven environments," he says. With the spread of user-friendly technology, users have found they no longer need a middleman, Winski explains. In addition, users have discovered that personal computer technology offers them a strategic advantage in business.

As a result, users are much more conversant with and are no longer fearful of the technology, Winski notes. "Before, the CIE was a high priest bringing religion down to the natives," he recalls. "Today, the natives know more than MIS." ◆

about computers in schools.

LONDON, ENGLAND • 3:00 p.m

Martin White, managing director of Link Europe, who heads the 10-country study for Link, receives reports from Yves Delacour, managing director of **IDC/France** and Roberto Masiero, managing director of **IDC/Italy**, giving valuable information on the recently installed educational computer systems in Paris and Milan. This is instantly faxed to New York along with the results of the European study.

NEW YORK, NEW YORK • 5:30 p.m.

Wujcik's assistant Natasha Thomsen compiles research from around the world and combines it with her findings on interactive video technology in the U.S. K-12 educational system. Based on these findings, Link makes a recommendation to the Minister on how the system can be set up and implemented most efficiently.

NEW YORK, NEW YORK • 6:00 p.m.

The Minister arrives at Link to review the IDG report by Wujcik. A four-man team of educational computer experts handpicked by IDG is also at the meeting to answer further questions. The Minister decides to act promptly on the recommendation and requests that IDG continue to act as advisors as the system is installed and put to use.

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PCs and IOS: Within arm's reach

MIS gains control in micro territory

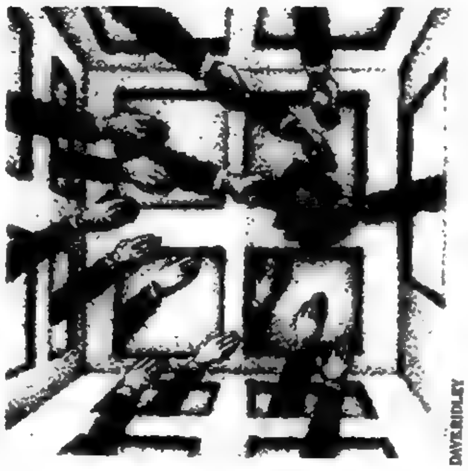
BY STAN KOLODZIEJ

No fuss, no muss. No more unauthorized micro software. No more unsightly, jerry-built micro-to-mainframe links. Smooth communications.

Picture systems like big vending machines, doling out software to users in an orderly, timely manner. Their applications are built in and generally safe from user tampering. No more headaches from updating personal computer software one machine at a time; all software can be updated simultaneously. Files can be automatically backed up. Security is part of the package. Communications are taken care of. No, these systems are not available sometime in the future. They're here now and have been for some years.

Integrated office systems (IOS) are the essence of controlled growth in corporate communications information systems. And that's still a refrain many MIS managers love to hear.

IOS integrate services that are normally found separate in the computer marketplace. According to Framingham, Mass.-based research firm International Data Corp., a typical IOS cross-section would consist of a configuration of hardware, software and communications that enable a user to gain access to and manipulate a variety of information types, such as text, spreadsheets, graphics and, eventually, voice and image, in an "organized and timely manner." A fair enough description but awfully generic.


DAVE RIDLEY

The IDC definition points out the problem that, although there is a lot working under the surface of IOS, the fact that they incorporate so many elements makes IOS hard to categorize. This shortcoming might be one of the reasons IOS have garnered such a small amount of press during the years. IOS have motored along, making corporate inroads, changing the face of corporate computing — but they have been doing it quietly.

However, IOS have not suffered from this lack of media attention. On the contrary, IOS surged ahead in 1986 and tallied a 76% gain in U.S. installations over 1985, which was also a good year for the technology. Despite analysts' positive predictions for this year and 1988, the palmy days of 1986 are unlikely to be matched in the short run, according to IDC.

The recent success of IOS is not shrouded in mystery. The years 1985 and 1986 were unique in U.S. corporate computing. In those days, several larger U.S. corporations were still reeling from the hand-to-hand combat they experienced with corporate micro users in the early '80s. In many locations, war-weary MIS tried to regroup and regain some information systems ground lost to users. At the very least, MIS was trying to place its signature on the blueprint of a fast-changing computing landscape that some information processing professionals felt was quickly slipping away from them.

IOS seemed ready-made for this environment. IOS were communications grids that could be slipped over corporations to link users and departments. Furthermore, these systems could also be controlled from a central minicomputer or mainframe source. But there was a trade-off. Where IOS offered MIS much in the way of convenience and economies of scale, it gave little in the way of individuality in personal computing.

To many in MIS, however, the price was right. What IOS forfeited in the way of creative, customized computing, they more than made up in stability. And this was during a period when the options underlining the growth of corporate personal computers were not as defined as they are today.

It should be made clear that IOS are not that new. Certain systems, such as Digital Equipment Corp.'s All-In-1 and Data General Corp.'s Comprehensive Electronic Office (CEO), two major IOS players, have been around for several years. Others are only a year old.

Kolodziej is *Computerworld Focus*'s senior editor.

But no matter what their age, IOS seem to fit most snugly within those installations reflecting an MIS concern for control.

"We have a large Wang Laboratories, Inc. Wang Office IOS," explains John Wheeler, director of MIS at W. R. Grace & Co. in New York.

"The whole idea of floppy disks and individually upgrading software is a pain. The power users like the IOS because they can get to the more powerful software on the system. Novices like it because the IOS eases them into computing and gives them a lot of Help keys. I like the IOS because it's standardized on certain communications hardware and software," Wheeler says.

"I think you really have to believe in a three-tiered [mainframe, mini and micro] processing theory to get these integrated systems to work," he claims. "Otherwise, you could be frustrated."

According to Mary Ellen Bradley, acting information systems manager at the Department of Game in Olympia, Wash., "We've always had a centralized concept of computing. Prime Computer, Inc.'s [Office Automation Center] system was an extension of that. We looked at the possibility of cabling users directly to departmental minicomputers but decided that we couldn't grow as fast as we could with the IOS."

Jo Ann Miller, assistant director of information services and planning at the Provident Mutual Life Insurance Co. in Philadelphia, says the firm will eventually expand its DEC All-In-1 pilot project to include all headquarters staff.

Starting from scratch

"We now have 45 people on the system," Miller says. "We were in a bit of a unique situation, however, because we didn't have a lot of machines from numerous vendors to start with. That enabled us to start from scratch, working from the top down, putting a corporatewide system into place right from the start. We feel this is going to make it alot easier later to incorporate smaller local-area network [LAN] systems into our overall plan. I think most corporations work from the bottom up. That would have been a mistake with us."

Another factor that Miller says swayed the company toward an integrated system is its future ability to provide for Provident Mutual's upper level management.

"We see DEC VAXs and All-In-1 as the platform to get future executive information systems to our management. If it seems we've done everything a little unorthodox, it's consistent with our [MIS] philosophy to control our growth," Miller explains.

IOS can be comforting because of their proven capability. "We looked at PCs and networking and decided we were growing too fast to try and put separate [LANs] in piecemeal," explains Robert Shaw, vice-president of MIS at Atlantic Recording Corp. in New York. "We also had reservations about the quality of software on LANs."

Instead, Shaw decided to install a 100-user DG CEO system, driven by the vendor's MV/20000 and MV/10000 minicomputers. "I think we're bringing all the departments around [to accepting the IOS]," Shaw adds. "They see the advantages of not having to jump around from machine to machine to update micro software."

To some extent, the IOS steam engine is being stoked by the litter left behind from the broken promises of LANs and PCs.

One of the biggest IOS functions and a growing factor behind the success of IOS is the increasing number of built-in communications links these systems bring to the table.

"An IOS can lower the cost of linking users together," explains Chris Stone, manager of the office software group at DG. "The cost per user increases substantially with LANs because you need a LAN server and networking software and hardware. Alot of overhead is created. You know that there are only an average of three to five users per LAN out there, only tiny pockets of users connected to small servers. IOS can provide a powerful server or gateway bus to mainframe data bases and, beyond that, outside to long-haul services. That's tough to do with LANs," he says.

According to Provident Mutual's Miller, "We just find that All-In-1 has everything we need. "We can hot-key to get a PC out of the system back into stand-alone mode. PCs and [DEC] terminals are connected through RS-232 ports over existing phone wires, so we haven't had to buy any new wiring. The DEC terminal servers sit on an Ethernet backbone network. From there, we use the micro-to-mainframe link to get into the IBM [Systems Network Architecture] network and to our IBM mainframe."

Lee Dillon, first vice-president of Sovereign Financial Corp. in Norfolk, Va., and an IBM Distributed Office Support System (Disoss) user, says the firm has all the IOS pieces with Disoss, except one important thing.

"Our people not only want to communicate but also want to manipulate information," Dillon says. "We can't do that with Disoss, so we're looking at some fourth-generation languages and artificial intelligence to build it ourselves."

The W. R. Grace Wang Office installation, which Wheeler envisions as having 16,000 users by 1991, is part of an intricate web of both short- and long-haul communications, servicing users ranging from support personnel to top executives.

"We saw all this coming," Wheeler says. "We knew we were going to expand quickly in information systems and communications, so we made sure our groundwork was solid. It came to a head; either we had to go with IBM's Disoss and [Document Interchange Architecture] using the mainframe as a gateway, or we had to go with Wang Office or some other IOS out there. We decided that Wang Office was a little easier to get into than some of the other systems. Also, Wang's top management assured us that a gateway to the IBM mainframe would be coming soon."

He says Disoss was excluded from consideration because the IBM System/38s at W. R. Grace had little office automation software to offer. He adds that one of the 13 W. R. Grace divisions did go with IBM's Professional Office System (Profs), but Wheeler says he feels that Profs appeared before the big push to integrated systems started and, as a result, lacked word processing.

Along the way, W. R. Grace has installed 24 Wang CPUs, ranging from the tiny Wang VS 6 to top-of-the-line Wang minis. Wheeler has tied all the divisions together with X.25 public packet-switching lines.

"I think X.25 is ideal for us," Wheeler says. "It's simple to use, much better than dial-up or private networks or going through a mainframe. I know a company in the UK that has to go through a mainframe to send a message from the third floor to the first floor. It's easy to produce communications overkill with an IOS. With our system, the 24 CPUs can be communicating with each other simultaneously. And they need to; we've figured W. R. Grace generates 8 million transactions a day."

IOS are not static. They change during the years. One big difference between early versions of IOS and current versions is the convenience with which users can both engage and disengage their IBM Personal Computers from the IOS networking scheme.

The early emphasis that saw IOS vendors trying to leverage their system sales by locking users into vendor terminals and proprietary networking and software was quickly overruled by MIS, which wanted PCs plugged into an IOS to keep them under hand and assuage user demands. IOS vendors scrambled to provide PC connections.

IOS have changed in other ways. Originally known for their common denominator approach to applications, in which they provided little in the way of customization for individual programs, most IOS now offer enough programming utilities for even power users to stretch out and experiment.

To some extent, however, the IOS steam engine is being stoked by the litter left behind from the broken promises of LANs and PCs.

Though the multiuser software most IOS offer is underutilized and often plagued by slow IBM Document Content Architecture (DCA) conversion methods, it is available and ahead of most LAN network multiuser software.

Though IOS data base access among PCs, minis and mainframes is inconsistent, it is still more transparent to the user than most stand-alone micro-to-mainframe links.

Though there is much room for improvement in the IOS integration of graphics, word processing, and spreadsheets, there is little available in the LAN arena that can match what IOS already offer. Many IOS also leave bandwidth for future image and voice communications.

Though IOS are coming slowly around to the 20th century with advances in graphics interfaces and good minicomputer-based windowing software, the standard input device is still the keyboard. Few IOS vendors offer mouse or touch screen. Lack of imagination with input methods, however, are countered by the ability of IOS to give users common interface and communications standards. That keeps users current and cuts training costs. LANs are not always so accommodating.

With the upswing in IOS sales and competition among IOS vendors increasing, there are more opportunities for third-party software developers to integrate their products with IOS. IOS vendors are throwing business to third parties to try and add value to their IOS and hopefully distinguish their products from those of competitors.

Third-party bonanza

One clear winner in the third-party sweepstakes is Natick, Mass.-based Access Technology, Inc., maker of 20/20, a multiuser spreadsheet modeling program.

Because of its portability and data import and export facilities, 20/20 can be installed over a range of micros and minicomputers. This ability to work in a networked multiuser, multivendor environment has made 20/20 a natural for IOS, a fact not lost on Wang, Prime, DEC and others that now offer the product with their systems.

In most cases, 20/20 is replacing generic IOS spreadsheets, which can be dreadful. The fact that 20/20 can be integrated with electronic mail also doesn't hurt the product. Some IOS vendors are finding that modeling spreadsheets are finally weaning users away from their beloved Lotus Development Corp.1-2-3 spreadsheets, which is not an easy task.

"Our users are jumping on 20/20," says Phil Dowlin, director of MIS at Midcon Services Corp., an energy resource firm in Houston. "Wang Office didn't have anything like it before."

Sometimes it is not just a separate IOS program that has third-party origins. Chances are if you look closely at Unisys Corp.'s Sperrylink IOS and compare it with a Hewlett-Packard Co. Personal Productivity System, for example, you might be able to detect a familiar flavor among the various integrated software packages.

IOS deja vu

It is no mistake. Quadratron Systems, Inc. in Sherman Oaks, Calif., has been busy the past two years becoming the primal element in the IOS Unix OEM market. The company's Q-Office series of integrated software packages are written in the C programming language. Quadraton has used the fluid portability of C to channel Q-Office into the Unix OEM market. The result is that parts of Q-Office are being used by several mainline IOS vendors to strengthen their own IOS offerings.

"Our Sperrylink contract provides Unisys with a version of Q-Office that extends Sperrylink services," explains Karl Klessig, Quadratron chairman.

Though Klessig confirms that Quadratron is under contract to provide the same services to other IOS vendors, he is also under obligation not to disclose details about those contracts. Klessig's point is that if you look under the hood of many current IOS vendor products, you will be looking at Quadratron software engines and probably not be aware of it.

Such arrangements can be lucrative. Teamed with Quadratron software, Unisys recently won a $250 million contract with the U.S. Army.

IOS must be doing something right, because more MIS managers are turning to them. As always, however, the proof for MIS is in the payoff.

"There is a point of mass criticality when the savings with IOS become apparent," Wheeler claims. "We now have 60% to 80% of our users on the IOS. It's a simple equation. People who have reached critical mass have also reached new productivity levels." ◆

ISDN in an SNA world

BY JOHN PICKENS

The Integrated Services Digital Network (ISDN) holds the promise of an all-digital network from the subscriber's premises through to the transmission network. In addition, ISDN provides the base for a family of advanced voice and data services.

For corporate users, ISDN technology offers a wide variety of benefits compared with conventional methods of voice and data networking. These benefits include increased integrity of data, higher transmission speeds, utilization of common transmission services and wider access to services. According to Tony Stanley, manager of ISDN applications development at Northern Telecom, Inc., a vendor that supplies ISDN products, "The unifying force of ISDN will permit more effective communication among companies, customers and suppliers."

Because of IBM's pervasive presence in the corporate marketplace, corporate users' acceptance of ISDN hinges on acceptable solutions to the connectivity problem with IBM systems. Considering the suite of Big Blue products, connectivity hinges upon support of IBM's Systems Network Architecture (SNA).

IBM has stated it intends to support ISDN in its computer products and has participated in ISDN field trials in the UK and Belgium, with trials scheduled for Germany this year. However, IBM has provided little technical guidance about how to support ISDN. Fortunately, effective ISDN access is possible today using pre-ISDN interfaces in existing IBM products.

The connectivity issue is complicated by the ambivalence of some manufacturers concerning how best to provide access to the IBM environment. Some vendors provide the cheapest alternative with minimum function. Others provide full-function access to IBM system services. Still others adopt a wait-and-see attitude or adhere to the International Standards Organization Open Systems Interconnect (OSI) standards.

Users struggle to unite the two schemes

LES KANTUREK

Rapidly advancing technology is another factor that complicates connectivity options. In the workstation area, for example, processor power is increasing with the existence of Intel Corp. 80286 and 80386 microprocessors, memory is increasing and operating systems are offering more functions. In addition to ISDN, an ever-growing array of local-area network (LAN) alternatives are becoming available.

Providing counterplay to the rapidly advancing technology trends are a collection of competing standards for operating systems, such as Microsoft Corp. MS-DOS, IBM's OS/2 and Unix, and intersystem networking protocols, such as SNA, Transmission Control Protocol/Internet Protocol (TCP/IP) and OSI. The new technologies provide greater opportunities for these competing standards; because of increased available memory capacity and bandwidth, these standards can coexist in many cases.

One of the most effective ways to support the IBM connectivity requirement is to implement SNA in all attaching devices as a native service. Several users are beginning to test this approach in ISDN field trials in the U.S.

Since early this year, U.S. West's operating companies, including Mountain Bell and Pacific Northwest Bell, have been sponsoring field trials of ISDN equipment. Although IBM has not played a visibly active role, the trials are testing various methods of achieving connectivity with IBM systems. Users include the Arizona Department of Transportation and Department of Administration, both located in Phoenix, and the U.S. National Bank of Oregon in Portland.

Pickens is director of communications architecture for San Jose, Calif.-based Communications Solutions, Inc., a manufacturer of IBM SNA-compatible data communications software for vendors and Fortune 1,000 companies.

The purpose of the U.S. West field trials is to test numerous configurations and connectivity approaches. The vendor equipment used in the trials includes switching and networking equipment from Northern Telecom, AT&T and GTE Corp.; SNA front-end communications controllers from IBM and NCR Comten, Inc.; IBM 3270 cluster controllers from AT&T and ITT Courier, Inc.; IBM PC-compatible 3270 emulation adapters and software from Northern Telecom and NCR Corp.; and ISDN terminal adapters from Northern Telecom, Amdahl Corp., AT&T, Fujitsu America, Inc., Codex Corp. and NCR Comten.

Users and planners are testing methods for obtaining interactive 3270 access to IBM mainframe systems. Some of the questions they are attempting to answer through the trials include the following: Can an economical and effective alternative be found to the traditional approach of coaxial cable and cluster controllers?; Can existing cluster controllers be linked via switched ISDN connections to corporate data centers?; And, can ISDN be used to provide switched connectivity between existing coaxial devices and remotely located cluster controllers?

What they're using ISDN for

In the Arizona field trials, users are utilizing ISDN for applications development, motor vehicle registration, drivers license information, records maintenance and data inquiry applications. The trials are testing both existing 3270-style cluster controllers and PC workstation connectivity. In the U.S. National Bank of Oregon field trial, users are using ISDN for electronic mail, word processing and customer balance inquiry applications. Currently, only PC workstation connectivity is being tested.

Of the connectivity alternatives tested in the U.S. West trials, two are generating the most interest from vendors and users. One alternative uses a stand-alone terminal adapter; the other uses two variations of an integral terminal adapter. Both options run SNA end to end.

Stand-alone terminal adapters, used to map the interface of an existing device into ISDN, can connect 3270 cluster controllers or PC workstations with synchronous adapter cards into ISDN. For example, in the Arizona Department of Transportation's Motor Vehicle Division, IBM 3270-type terminals attached to a 3274 cluster controller can access the ISDN network through one stand-alone terminal adapter. The terminal adapter provides circuit-switched service through to a second stand-alone terminal adapter connected to an NCR Comten 3690 communications processor at the transportation department's computer center.

On the other hand, integral adapters provide direct connectivity into the ISDN network's basic rate interface — or 2B + D — the standard interface to ISDN from customer premises equipment. This interface provides two 64K bit/sec. circuits plus a 16K bit/sec. X.25 signaling channel. Currently, there are no IBM products that support this interface, either for workstations, departmental processors or mainframes.

In the U.S. West trials, two vendors are demonstrating this direct connectivity capability. Northern Telecom features an X.25 packet-switching adapter running 3270 emulation software from Communications Solutions, Inc. NCR features a circuit-switching adapter with 3270 emulation software that it developed. The packet-switching adapter multiplexes multiple sessions onto a single link; the circuit-switching adapter utilizes a single session per link.

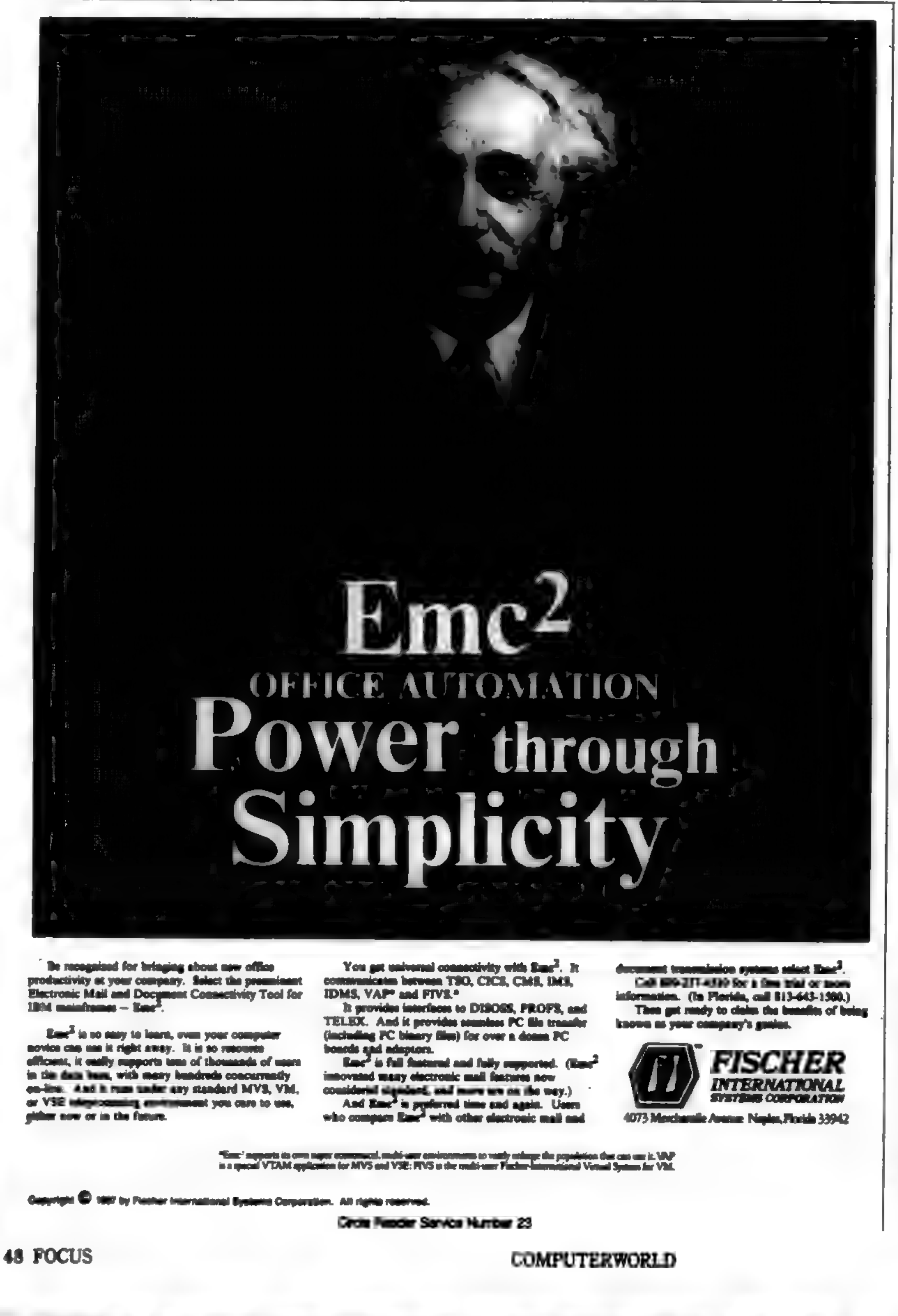
Exercising caution

On the host side, some of the trials' managers are exercising caution in switching to new technology in their production systems. In Oregon, for example, 5,000 non-ISDN users share the same facilities being used for the trial. So while the PC workstations are using X.25 to access a Northern Telecom X.25 packet switch, the X.25 inbound to the host, which transmits and receives at 64K bit/sec., is being converted into a 9.6K bit/sec. IBM Synchronous Data Link Control (SDLC) format before being fed to the IBM communications controller. Eventually, the communications controller interface reportedly will be upgraded to 64K bit/sec. using the IBM Network Control Program (NCP) Packet Switching Interface. The NCP Packet Switching Interface is already in production use in the Arizona trials.

The trials are also testing two other configurations. Coaxial cable eliminators are used to attach IBM 3278-type printers or PC workstations with coaxial emulation adapters to ISDN circuits. Asynchronous protocol converters provide access to 3270 services by asynchronous ASCII terminals or PC workstations running terminal emulation software.

Although the trials are in an early stage, users seem pleased with the service they have received. According to Steve O'Connell, a network consultant in the Arizona Department of Administration, "I was impressed with how fast ISDN went up." There are still some expected glitches and problems, however. For example, at peak hours, the Arizona trials reportedly sometimes encountered unexplained degradation in the NCP Packet Switching Interface software on the 3725. However, users say they are satisfied, if not excited, with the ability to run SNA directly over ISDN.

Despite the success of 3270 access



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during the trials, issues still exist regarding the preferred method of IBM connectivity.

Bandwidth issue

One such issue concerns bandwidth. In the trials, ISDN's full 64K bit/sec. bandwidth potential has not been utilized. Rather, through rate adaption, users' equipment is limited to 9.6K bit/sec. Users do perceive somewhat slower response times using an ISDN connection when compared with using a cluster controller directly attached to a mainframe channel. That difference could be reduced through access to the full 64K bit/sec. channel bandwidth. However, John Amidon, telecommunications manager for the Arizona Department of Transportation, maintains that the response time difference is not a major problem.

While users expect vendors to utilize the 64K bit/sec. bandwidth more effectively in the future, Amidon raises a question for the near term. "Who is going to be pushing 64K bit/sec.? That is a lot of bandwidth," he says.

Another issue concerns the utilization of the ISDN basic rate interface. The circuit-switching approach has the potential of accessing the full 64K bit/sec. channel bandwidth, but it requires a separate ISDN channel for each circuit. The X.25 packet-switching approach eliminates the need for multiple channel interfaces at the host end. Lee Bryant, ISDN project manager for Mountain Bell, explains that X.25 offers two important benefits: enhanced security through closed user groups and multiplexing of up to 4,095 logical connections on a single physical link.

IBM intentions

By examining where IBM is leading its customer base, one can begin to cull some order from the confusion in communications options and capabilities.

Historically, vendors have viewed supporting native-mode IBM data communications as a risky venture. IBM demonstrated a penchant for releasing incompatible versions of products and running undocumented protocols. Fortunately, that practice has been changing.

IBM is maintaining an increasingly well-focused strategy regarding connectivity and communications through SNA. To put teeth into the process, this strategy is propagated throughout the IBM product divisions via two methods: formalization of a centralized architecture review committee with representation from all product divisions; and sign-off authority within the product release process by corporate architects.

For applications development, IBM further strengthened its SNA strategy by incorporating it into its Systems Application Architecture (SAA). Initially intended for office systems use but eventually expanded for most other applications, SAA conformance is now required for all strategic IBM systems.

This formalization and standardization by IBM has resulted in concrete directions for users and vendors to follow. As a result, it is now practical to support the SNA services specified by SAA as a native-mode service.

In the past, access to IBM systems and applications required only 3270 and 3770 Remote Job Entry (RJE) emulation capability. Today, IBM has added significantly to its set of application requirements so that users now need IBM's Advanced Program-to-Program Communications (APPC), document distribution through Document Interchange Architecture (DIA)/SNA Distributed Services (SNADS) as well as file access through Distributed Data Management (DDM).

If systems utilizing ISDN do not support the full range of SNA services, their marketplace acceptance will be reduced. To assess the adequacy of a given connectivity solution, users and vendors should measure the solutions against the potential for implementing the complete package of architected SNA services.

However, physical connectivity is a lesser aspect of the ISDN connectivity challenge facing users and vendors. Requirements, such as direct attachment to the basic rate interface, remain imperative but must not push other connectivity issues aside.

A potential vendor or user of ISDN must determine what kind of service access is needed within the IBM environment. Access may be desired only to enhance the connectivity options for existing services, especially 3270, or it may be needed to provide full access to all IBM services.

If users require connectivity enhancement, then the vendor need only provide terminal adapters that convert an existing service interface into the ISDN interface. Examples include asynchronous adapters that provide access into 3270 or IBM 5250 protocol converters, synchronous adapters that provide access into SDLC interfaces in existing IBM products and coaxial cable adapters that provide access from 3270 terminals and printers into 3174 and 3274 cluster controllers.

SNA in native mode

If full access to IBM services is the goal, then the vendor needs to implement SNA in native mode. This solution is IBM's direction and is represented in its OS/2 Extended Edition operating system.

The native SNA approach supports SNA applications and architectures directly, with no translation or mapping. Native SNA can be provided either in a stand-alone or distributed implementation. The stand-alone implementation

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contains the upper application and lower network layers of SNA in a single system like a personal computer. A distributed implementation contains the application and network layers of SNA in more than one system, with one system supporting the local users and applications and one system acting as a gateway but not performing protocol transformation, such as a communications gateway in a LAN.

The native SNA approach adds one important benefit that all the other approaches lack — seamless integration into IBM's network management architecture. The ability to manage hardware and software from a central location is high on the list of end-user requirements.

There are alternatives to the native-mode SNA approach. Considering ISDN's genesis in the world of open systems, many would prefer ISDN to be based upon OSI protocols; others would prefer standards based on TCP/IP. However, to be based on one of these models would require transformation gateways into the IBM SNA world. Although it is a promising technology for the future, transformation gateways suffer from the information-loss syndrome. Incomplete access to SNA-based services would likely result, leaving users dissatisfied.

Of the multiple connection alternatives available to the ISDN trial sites, the native-mode method generates the most excitement among users. Only through the native mode can users maintain compatibility with both current and future applications in the IBM environment. According to Daryl Newberry, ISDN project manager for Pacific Northwest Bell, "Our focus is on the transport architecture. It is key that transport services be transparent to the applications." By supporting application transparency, the ISDN trials are able to measure the real benefits of ISDN: lower costs and increased flexibility.

ISDN and IBM net management

Surrounding architected SNA applications is a strong requirement for network management. IBM has defined a formal network management architecture and has supported it with the Netview product family.

The ISDN story misses a big piece in the connectivity puzzle in its method of working together with IBM's network management strategy. It is on this point that the worlds of the common carrier and computer manufacturer collide. Who should provide the overall network management function? IBM's network management strategy is to provide a method of managing systems from one or more centralized locations. As evidence of its commitment to that strategy, IBM introduced in June additional applications running under Netview that permit remote management of systems, from turning the power on to software downloading to operational overview.

If users require centralized net management and if ISDN is to be a major component of those networks, then IBM and ISDN systems require a management interface between them. However, that interface has not yet been defined. But when such an interface is available, it will likely be implemented as a network management application running under Netview. ISDN vendors will have the option of either using IBM's hardware and Netview/PC software or implementing the service point function for network management with SNA as a native-mode service. It is unlikely that IBM will modify its network management architecture to come under the control of ISDN network management.

Plans for the future

Even with only preliminary results available, users and vendors are beginning to plan the next steps for IBM system connectivity. In the near term, many say they will support more IBM terminal emulation products, with 3770 RJE and System/36 and 38 access using 5250s high on the list. The 3770 RJE provides access to IBM's batch processing services and serves as a form of bulk file transfer, while the 5250 provides access to System/36 and 38 departmental processors.

One area of additional experimentation will be in utilizing X.25 packet switching. On the host link, for example, X.25 can be used to support access not only from ISDN equipment but also from other X.25 equipment attached to pre-ISDN networks. Mountain Bell says it plans to test a combined 3270/3770 SNA package for a PC workstation that accesses a host through an intervening Siemens AG of North America, Inc. packet-switching network, X.75 gateway, Northern Telecom DPM-50 packet switch and NCR Comten front end running X.25 boundary node software.

If the trials are successful, the path will be cleared to test other IBM applications. APPC/LU6.2 would provide access between applications on workstations, departmental processors and hosts. DIA and SNADS would provide document distribution and electronic mail. DDM would provide file and data base access. These applications will all require native-mode SNA in the attached devices.

For IBM connectivity, ISDN is purportedly a way of eliminating coaxial cables and achieving wide-scale data distribution. According to Arizona Department of Transportation's Amidon, "ISDN is here to stay. Users and vendors have to look carefully at what ISDN is used for. The key to acceptance has to be standards." And for ISDN to work in the IBM world, that standard is IBM's SNA. ◆

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TECH TALK

Network communications with a von Neumann twist

BY MICHAEL TUCKER

There is probably no single area of commercial computing today that's as active as communications. Whether you're talking micro-to-mainframe links, local-area networks (LAN), wide-area networks, RS-232C-based systems, integrated voice/data, Integrated Services Digital Network or network management — communications appears to be hot.

Care for some examples?

A press kit from Cambridge, Mass.-based BBN Communications Corp. announces that the company has just introduced the C/3R Packet Switching Node (PSN), "the first member of BBN Communications' tactical packet-switching product family."

In case you're interested, "tactical" means that the C/3R PSN is a packet-switching node designed to survive in the midst of bullets, artillery fire, radiological weaponry, nerve gas and all the other tools of modern combat. So, if you're MIS installation is under fire from management, give BBN a call.

Firms roll out communications tools for the Apple Mac SE, page 52.

Just to prove that the private sector is not to be outdone in communications innovations and press heraldry, a commercial consortium made up of British Airways, KLM Royal Dutch Airlines, Swissair and Covia (a subsidiary of United Airlines) sent a polite note saying that it has launched a joint computerised information and reservation system. The system reportedly will handle an estimated 75 million travel arrangements annually by the year 2000.

And there's more

And, mind you, these examples do not even mention the other materials that have made their way into my hands. There was also a loose-leaf folder from the Corporation for Open Systems, a bound notebook from IBM regarding its networking strategy and documents from Sun Microsystems, Inc. about its Network File System.

However, amidst the activity in the communications market, one analyst does not see any reason to become excited.

In a recent interview, Will Zachmann, vice-president of research at International Data Corp. in Framingham, Mass., made a surprising comment: "Traditional telecommunications aren't where it's at anyway. The network of the future, the one that matters, is a network where you use the LAN as a sort of extended system bus, . . . where things work off it almost as plug-in cards work off the PC bus in a personal computer."

A revision at hand

That kind of talk assumes a fundamental revision of the way the industry perceives data communications. In fact, this viewpoint rewrites the term "data communications" so that it becomes "data-and-instruction communications."

Call it the von Neumann revolution; just as von Neumann recognised that data and commands could be considered one and the same on a digital computer, so, too, could modern networkers combine communications with processing.

It's a pretty image and one that has been proposed before by a number of different analysts. The combined communications/processing net image is also immensely flattering to communications officers because it would greatly increase their power within corporate computing. Is there, though, any hard evidence to support this image?

Perhaps. In recent months, a number of curious incidents have occurred. Consider IBM. IBM has introduced three seperate LAN products: PC Network, Token-Net and Token-Ring network.

As little as two years ago, it was widely believed that those three products would define IBM's communications hardware offerings and that IBM would dominate LANs as completely as it currently rules the mainframe world. Independent LAN makers, like Novell, Inc., would fade from the scene.

More recently, IBM began publishing specifications for

Continued on page 54

PRODUCT CLOSE-UP

IBM extends Netview

IBM recently has been deluging the market with extensions of its Netview network management software.

The latest Netview product announcements included Netview Release 2, a facility that enables users to set up single control centers and manage both IBM Systems Network Architecture (SNA) and non-SNA networks. IBM added that Release 2 also allows users to control the operation of local and remote IBM 370s.

At the same time, IBM announced Netview/PC Version 1.1, an enhancement of the Netview Communications Network Management services that supports IBM local-area networks and non-SNA, non-IBM communications devices.

Netview Release 2 offers such capabilities as automated operation, operating system operation from Netview consoles that are local or remote and the ability to start and restart IBM's VTAM and VTAM applications. Customers reportedly can run Netview Release 2 unattended in distributed IBM VM or VSE environments.

Netview Release 2 reportedly can manage both SNA and non-SNA nets.

"Release 2 is an extension of the quest for more mainframe network management control that Netview represents," said Jack Musgrove, associate director of telecommunications at Dataquest, Inc., a research firm in San Jose, Calif.

Features of Netview/PC Version 1.1 include forwarding of SPCS Netview commands to applications, support of V.24 and V.25 bisynchronous line-switching protocols for international customers, an option to run host

Continued on page 52

BLUE
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A bundle of woes

Deidre Depke

IBM's strategy to tie its small-, medium- and large-scale machines together through the Communications Manager in OS/2 Extended Edition is causing some controversy among a few communications and data base software companies.

IBM is guilty of bundling in its OS/2 Extended Edition, charges Martin A. Goetz, senior vice-president of Applied Data Research, Inc. (ADR).

Goetz is serious enough to raise a major fuss. He says he plans this month to present a formal position paper on his charges to ADAPSO's board of directors.

Third-party difficulties

Goetz claims that by incorporating data base and communications software functions into the OS/2 Extended Edition, IBM is making it difficult for third-party data base and communications software firms to compete.

"There is no technical reason why IBM couldn't have built the two pieces separately," Goetz says. "It doesn't make the source code available to other companies, which is going to make it very difficult for third parties."

Goetz has experience in this issue. He was the originator of bundling charges against IBM in the 1960s, when IBM sold computers with an operating system and other software included. Goetz charged then that IBM was excluding third-party suppliers, and in 1969, ADR sued IBM for monopolizing the software marketplace. IBM settled with ADR for $2 million and announced soon afterward that it

Continued on page 53

Neural net coprocessor bows

In a display quite different from the run-of-the-mill networking technology, San Diego-based Hecht-Nielsen Neurocomputer Corp. unveiled in July its Anza 386 neural network computer.

Neural networking is a relatively new and little-known technology that attempts to make computers as similar to the human brain as possible. Neural network advocates — called "connectionists" — say they believe that computers will only act like brains when they are built like brains. Connectionists hope to build machines that would be composed of thousands, or even millions, of tiny processing elements that could be massively interconnected in much the same way that neurons are massively interconnected in the brain.

In a neural network system, software would be composed of unique sets of relationships between individual neurons, while an application would be a network of these neural connections.

Experimental neural network machines have already shown the power to recognise some patterns, learn from experience and recognise speech and even faces. Connectionists claim that neural network machines could be the best possible interface between human beings and conventional computers.

However, neural network hardware is still confined to the laboratories. In the meantime, connectionists work with software simulations of neural networks running on conventional computers, which range from personal computers to supercomputers. In the last year, a new industry has appeared to supply neurocomputers with coprocessors that perform the mathematically intensive job of network emulation.

A neurocomputing pioneer

Hecht-Nielsen was one of the first companies to offer a neurocomputer product based on a personal computer. Its flagship product, the Anza Coprocessor AZ500, is based on the Motorola, Inc. 68020 and costs $9500.

Hecht-Nielsen's Anza 386 is a complete neural network development workstation composed of the Anza coprocessor and a Zenith Electronics Corp. IBM Personal Computer AT-compatible using the Intel Corp. 80386 microprocessor. Total cost for the workstation, with a library of neural network software is $19,500.

Hecht-Nielsen is said to have considerable stature among connectionists. The firm was founded by Robert Hecht-Nielsen, who formerly led the neural network program at TRW Electronic Systems Group in Redondo Beach, Calif. TRW was one of the first large U.S. companies to enter the field of neural networking and still may be the largest player. TRW's applications of the technology have been primarily in pattern recognition for military systems.

In fact, Hecht-Nielsen's primary product is its expertise as much as its hardware. The firm's seminars are in as much demand as its products. At the same time the company introduced the Anza 386, it also announced a new week-long course on neural networking priced at $965.

With or without the week-long seminar, the Anza 386 entered a market that is becoming crowded. At the first International Neural Network Conference in San Diego last June, several firms displayed network emulator boards. These exhibitors included such market leaders as Dallas-based Texas Instruments, Inc., which was touting its Odyssey digital signal processing board as a network emulator, and San Diego-based Science Applications International Corp., which had a similar signal processing board. — Michael Tucker

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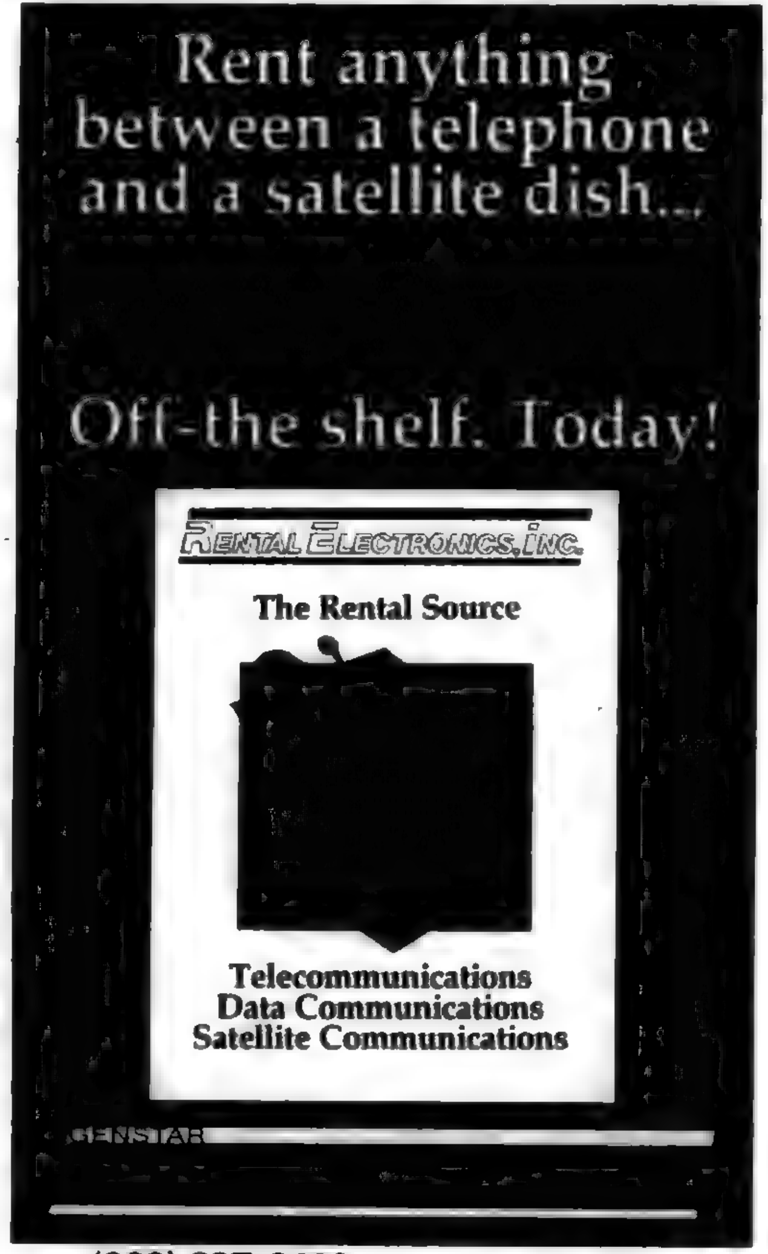

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Avatar, DCA offerings back Mac SE

Software packages provide IBM terminal emulation

The Apple Computer, Inc. Macintosh SE shows signs of contributing to the popularity of Macintosh products in the corporate environment. In response, two vendors — Avatar Technologies, Inc. and Digital Communications Associates, Inc. (DCA) — have introduced communications devices for the Mac SE.

Hopkinton, Mass.-based Avatar was an early developer of IBM 3270 emulation devices for the Macintosh. Working with Apple, Avatar has rolled out a board-level version of its Macmainframe external emulation device for the SE. Macmainframe SE is an internal card software package that allows the Macintosh SE to connect directly into a 3270 network.

A coaxial connector that extends from the Mac SE's access panel can attach to an IBM 3174, 3274 or 3276 control unit or an IBM 4300 series display printer adapter. The software provides full IBM 3278 Model 2 terminal emulation.

The primary advantage of Macmainframe SE over the external Macmainframe device is speed, according to Doug Rivkin, an information center analyst at Fidelity Systems Co., a Boston subsidiary of Fidelity Investments. "Macmainframe SE is at least twice as fast as Macmainframe," said Rivkin, who has tested both products.

Alpharetta, Ga.-based DCA, best known for its Irma 3270 emulation products for IBM Personal Computers and compatibles, has unveiled Macirma. Macirma's 3270 functions and feature set are based on the E78 Plus emulation software DCA developed for its Irma 2 products.

Like Macmainframe SE, Macirma includes an add-on board and emulation software. Macirma emulates both IBM 3278 and 3279 terminals

Avatar's Macmainframe SE is currently available for $795. DCA's Macirma, in versions for the Macintosh II and SE, is priced at $1,195 and expected to be available in early fall 1987.

Because the Macintosh SE is basically a closed-architecture box, users must have either the Avatar or Macirma boards installed by authorized Macintosh dealers. — Rebecca Hurst

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Netview

Continued from page 51

data transfer under the Netview/PC Region Manager and the inclusion of Netview/PC as part of IBM's Systems Application Architecture (SAA).

Musgrove claimed that the SAA facet of Netview is important because SAA will eventually provide a common set of applications interfaces across IBM computers and communications products.

"This will give users the ability to handle network management from a centralised point in mainframe, minicomputer and micro installations," he said.

The question is when this integration will happen.

Musgrove said Release 2 and Netview/PC Version 1.1 are important building blocks in IBM's overall network management strategy, but it could be awhile before enough pieces are in place to make it worthwhile for users.

Monthly license charges for Netview Release 2 are priced as follows: $1,255 for MVS/XA; $1,060 for MVS/370; $940 for VM; and $655 for VSE.

Netview/PC Version 1.1 has a one-time charge of $2,200. — Stan Kolodziej

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PRODUCT CHECKLIST

Ideassociates, Inc. has announced the **Ideacomm 5251/MC** emulation board, which connects IBM Personal System/2 Models 50 and 60 with IBM System/34, 36 and 38 minicomputers.

Ideacomm 5251/MC reportedly enables the PS/2s to emulate IBM 3180, 5251 Model 11, 5291 and 5292 Model 2 terminals and can be used with either a color or monochrome monitor.

The firm added that 5292 Model 2 emulation enables users to run IBM minicomputer graphics programs, including IBM's Business Graphics Utility.

Ideacomm 5251/MC, at $895, includes hardware and software.

Ideassociates, 29 Dunham Road, Billerica, Mass. 01821.

Circle Reader Service Number 148

Data General Corp. rolled out **CEO Profs Exchange Architecture** (CEO PXA), which enables electronic mail and document exchange between DG's Comprehensive Electronic Office (CEO) and IBM's Professional Office System (Profs) integrated office systems.

DG claimed that CEO PXA converts addresses, messages and documents at the company's MV line operating level, relieving the IBM host of these tasks by off-loading them and reducing customer data processing costs. A CEO PXA mail server reportedly can establish a link to Profs users operating on one or multiple hosts in a bisynchronous or IBM Systems Network Architecture network.

CEO PXA licenses are priced from $5,250 for the DG MV/2000 DC to $10,500 for the DG MV/20000.

Data General, 4400 Computer Drive, Westboro, Mass. 01580.

Circle Reader Service Number 149

Hayes Microcomputer Products, Inc. announced its **V-Series Smartmodem** line, composed of four modems.

The V-Series Smartmodems provide an implementation of the bit-oriented link access procedure link-level portion of X.25 and the asynchronous framing technique to allow point-to-point error control and a migration path to X.25.

The modems also reportedly include adaptive data compression, which can double data transfer and lower transmission costs and connect time.

All four modems are AT&T 103, AT&T 212 and CCITT V.2 and V.22 bisynchronous compatible to communicate with existing modems, according to the vendor.

The V-Series Smartmodem 9600 external modem and 9600B internal modem run at 9.6K bit/sec. and are priced at $1,299 and $1,199, respectively. The V-Series Smartmodem 2400 external model, which costs $899, and 2400B internal model, which costs $849, operate at 2,400 bit/sec.

Hayes, 705 Westech Drive, Norcross, Ga. 30092.

Circle Reader Service Number 150

Digital Communications Associates, Inc. (DCA) has introduced **Windowlink for Irma.**

The Windowlink for Irma software allows the terminal emulation and micro-to-mainframe file transfer capabilities of the vendor's Irma communications product to run as a true Microsoft Corp. Windows application. Running under Windows, Windowlink for Irma reportedly enables the user of a personal computer equipped with DCA's Irma 2 or Forte Communications, Inc.'s Forte PJ to initiate an IBM 3270 host session and emulate an IBM 3278 or 3279 terminal.

The product costs $195.

DCA, 1000 Alderman Drive, Alpharetta, Ga., 30201.

Circle Reader Service Number 151

The **VF-3000 facsimile**, a color video facsimile machine, has debuted from **Color Video Fax.** The VF-3000 is said to support the transmission of color video signals, including television pictures, over conventional dial-up telephone lines.

The Color Video Fax system includes the fax machine, a digital floppy disk drive and color printer. The VF-3000 facsimile retails for $5,600.

Color Video Fax, P.O. 5610, Playa del Rey, Calif. 90296.

Circle Reader Service Number 152

Ungermann-Bass's *Net/One NICPS/2 adapter card*

Ungermann-Bass, Inc. has introduced the **Net/One NICPS/2** Ethernet adapter card, an Ethernet card for connecting IBM Personal System/2 Models 50, 60 and 80 to a local-area network.

Ungermann-Bass said the product's network interface controller (NIC) uses an application-specific integrated circuit (ASIC) semiconductor chip that takes advantage of the speed and performance of the PS/2's proprietary Micro Channel bus architecture.

The firm added that the ASIC chip uses a shared memory architecture to maximize the speed at which transfers between the PS/2 memory and the NICPS/2 on-board random-access memory can take place.

The NICPS/2 costs $495.

Ungermann-Bass, 3900 Freedom Circle, Santa Clara, Calif. 95052.

Circle Reader Service Number 153

Systems Strategies, Inc. has announced **CSNADS** networking software, a Unix-based implementation of IBM's Systems Network Architecture Distribution Services (SNADS).

CSNADS reportedly allows non-IBM computers to asynchronously exchange electronic mail and documents with IBM office systems including mainframes running the Distributed Office Support System/370 under CICS and System/36 and 38 computers running Personal Services/36 and 38.

The single-quantity cost for CSNADS is $400. Volume discounts are available.

Systems Strategies, 225 W. 34th St., New York, N.Y. 10001.

Circle Reader Service Number 154

The **Net-127** local-area network has been announced from **Trans-M Corp.**

Net-127 was designed to connect IBM Personal Computers, PC XTs, ATs and compatibles with IBM's Personal System/2 Model 30 machines.

The product is said to allow all computers on the network to share each other's resources, including software stored on either 5¼-in. or 3½-in. floppy-disk media.

Net-127, including the board, network operating system and a 25-ft telephone cable with RJ-11 jacks, retails for $249.95 per node.

Trans-M, 28 Blacksmith Drive, Medfield, Mass. 02052.

Circle Reader Service Number 155

The Orion Group, Inc. has rolled out the **Orion SNA0123 Facility**, a product that supports terminal-to-host communications over networks based on IBM's System Network Architecture (SNA).

The Orion SNA0123 Facility is said to emulate SNA LU0, LU1, LU2 and LU3. It supports devices that emulate IBM's 3270 and 3770 families of terminals and peripherals as well as IBM's 4700 and 3650 systems used in financial applications.

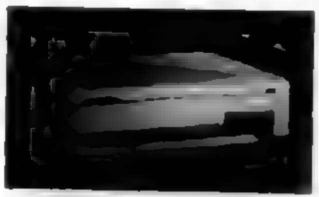
In addition, Orion said that SNA0123 can co-reside on a processor with Orion's SNA62 Peer Communications facility so that users may conduct LU0, LU1, LU2, LU3 and LU6.2 sessions simultaneously over a single communications link.

Orion's SNA0123 Facility is available to OEMs on a royalty basis.

The Orion Group, 1912 Bonita Way, Berkeley, Calif. 94704.

Circle Reader Service Number 156

BBN Communications Corp. has announced the **Advanced C/10 SNA PAD**, a packet assembler/disassembler (PAD). The product reportedly enables IBM 3270 terminal users to switch between IBM Systems Network Architecture (SNA)-supported mainframes and departmental systems.



BBN Communications' *Advanced C/10 SNA PAD*

BBN said that the product supports controller-to-host, peer-to-peer and host-to-host connections.

Prices for the Advanced C/10 SNA PAD start at $9,350.

BBN Communications, 70 Fawcett St., Cambridge, Mass. 02238.

Circle Reader Service Number 157

Soft-Switch, Inc. has unveiled **SNADS Gateway/3 + Mail**, a software gateway that enables electronic mail to be sent between 3Com Corp.'s 3System local-area network and IBM mainframes, using IBM's Systems Network Architecture Distributed Services (SNADS).

SNADS Gateway/3 + Mail connects directly to IBM's Distributed Office Support System and to the Soft-Switch SNADS Gateway/MVS. Through these mail servers, 3 + Mail users can exchange mail with other SNADS-based systems.

SNADS Gateway/3 + Mail is licensed between $3,000 and $5,000 per unit, depending on volume.

Soft-Switch, 955 Chesterbrook Blvd., Wayne, Pa. 19087.

Circle Reader Service Number 158

Blue Beat

Continued from page 51

was unbundling software from hardware.

Furthermore, Goetz says because IBM's OS/2 Extended and Standard Editions are not due until at least 1988, the market will be frozen until then.

IBM may have a defensible position on the communications portion of the operating system, Goetz admits, because of certain proprietary ties between the communications software element and IBM machines.

But the issue is far more clear-cut on the data base side, he says, because this market has historically been separate. This allegation is particularly true because IBM does not offer buyers the option of purchasing the data base components separately.

By bundling the three components within OS/2 Extended Edition, IBM is also pushing the idea to buyers that it is in a better position than independent software vendors to provide networking and distributed processing across the personal computer, minicomputer and mainframe tiers, Goetz says.

Not all software vendors agree with Goetz. Ashton-Tate's Chairman Ed Esber says IBM is entitled to market the products together because the Standard Edition is also offered. Esber's view may be skewed by recent market events, however. Ashton-Tate is eager to convince the industry that it can compete effectively against IBM and its strategic partner Lotus Development Corp. no matter what either firm does. But it is likely that there are other companies that share Esber's point of view.

ADAPSO is concerned about the long-term impact of such actions, says ADAPSO Chairman Jay Goldberg, who is also president of Money Management Systems, Inc. "The next thing that could happen is that it'll bundle in an application," Goldberg says. "We're concerned with the competitive threat."

But it is unlikely that ADAPSO will take legal action, claims member Dave Eskra, chairman of Pansophic Systems, Inc. "Our desire is to negotiate our way through this kind of thing," he says. "IBM has more lawyers than the Justice Department."

IBM, which is an ADAPSO member, disputes the charges. "We don't think it's bundling because OS/2 comes out in two editions, Standard Edition and Extended Edition," an IBM spokeswoman says. "You don't have to buy Extended Edition. It's up to the customer whether he wants to use IBM's Extended Edition, someone else's extended edition or build his own. To us, bundling says you're not giving people a choice."

Should the controversy reach the courts, it is likely that IBM will prevail. Granted, the company could have made available to the market on a separate basis the data base and communications components. But as IBM would successfully argue, the technology is proprietary, and IBM needs products to compete effectively against major foes like Digital Equipment Corp.

On the other hand, Goetz has raised several good points that should be taken seriously by independent software vendors. If IBM increasingly begins to market products together, those firms will find themselves threatened. And it is never too early to start thinking about that.

Depke is editor of "IBM Watch," a biweekly newsletter published by IDG Communications, Inc.

Tech Talk

Continued from page 51

SNA and a host of other communications protocols. Again, it was widely believed that these announcements formed the beginning of an era and that within a few years communications outside the IBM universe would be impossible. Alternative protocols would vanish.

Finally, this year, IBM rolled out the Personal System/2. For months before the debut, the industry speculated that the machine would contain secret technology that would allow the PS/2 to link directly to IBM mainframes. This ability would spell the doom of clone makers.

However, none of those predictions have come to pass. Clone makers, LAN vendors and non-SNA communications protocols are doing well. IBM has not forced its everlasting imprint on communications and shows no signs of wanting to do so.

The word is Netview

Instead, this summer IBM began a series of seminars for the press and consultants around the U.S. in which it stressed not networking but network management. The word at those meetings was Netview, an IBM system that allows an individual to control and monitor a network of almost any size that contains both IBM and non-IBM hardware. In particular, the Big Blue boys were showing Netview/PC, the personal computer version of the product.

Networking, even networking with machines from IBM's competitors, was taken as a given. Communications was not exciting to IBM but control of it was.

Could it be that IBM is saying networking itself is not particularly important? It appears as though the company is treating communications in the same way it treated the PC bus — as a means by which third-party suppliers can add value to an IBM product.

Now consider Chelmsford, Mass.-based Apollo Computer, Inc.

For a long time, Apollo's claim to fame was its machines' ability to network. Today, Apollo is not alone in offering a high degree of connectivity. However, Apollo is not merely resting on its networking laurels. According to a press release, David Nelson, the company's vice-president and chief technical officer, "is leading an industrywide coalition to support the computing of the 1990s — network computing and work group computing." (See interview on page 6.)

Note the wording — Apollo is not "computer networking" but rather "network computing." The emphasis is on the network as a device in its own right, rather than merely as the transport mechanism linking different devices.

Finally, let's consider the Software Productivity Consortium, located in Reston, Va. This association is made up of high-tech companies, mostly government contractors in aerospace and related fields, that came together in 1984 to address their common software development problems. The consortium is intended to produce new tools and techniques by which software can be developed more quickly, more efficiently and with fewer bugs.

The common environment in which the consortium says it intends to develop its software is a network called the Intelligent Distributed Resource Processing System (IDRPS). In consortium literature, IDRPS is described as "the network that is a computer" and as "a living system which will evolve to stay at the leading edge of the technology."

Strong language, indeed.

None of these incidents provides proof that Zachmann and other analysts are right when they say we will see the distinction between networking and processing immediately vanish.

But these industry examples do suggest that there is order in chaos. It may be that the representative, common thread to all those press kits is a slow interweaving of systems. This confluence will ultimately produce distributed processing that will seem, in hindsight, to be a logical, orderly and inevitable move.

HOT SEAT

Is there a security system that encrypts information for an IBM-type cluster controller to an IBM mainframe?

Jaime Zartman
Mcdata Corp.
Broomfield, Colo.

Jim Bidzos, RSA Data Security, Inc., Redwood City, Calif., and Thomas Mitchell, ACS Communications Systems, Inc., Reston, Va.: Link encryptors are the most common solution for this type of security. They work between the cluster controller and modem and between the modem and host. These encryptors typically are priced at approximately $2,000 each, depending on the product chosen. ACS and Sherlock Information Systems offer such security wares.

Focus's Hot Seat column consists of product- and service-related questions that you, our readers, would like us to ask a particular vendor.

Call us, toll free, at 1-800-343-6474 if you have a question. Or, forward your inquiries to Lory Zottola, Managing Editor, *Computerworld Focus*, 375 Cochituate Road, Box 9171, Framingham, Mass. 01701-9171.

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CALENDAR

Sept. 13-19

The Sixth Annual Gartner Group Information Industry Scenario Conference. Atlanta, Sept. 14-16 — Contact: Ashley Pearce, Gartner Group, Inc., P.O. Box 10212, Stamford, Conn. 06904.

Atre Annual Forum on Data Base. New York, Sept. 14-16 — Contact: Atre International Consultants, Inc., P.O. Box 727, 16 Elm Place, Rye, N.Y. 10580.

Local-Area Networks. San Francisco, Sept. 15-16 — Contact: Business Communications Review, 950 York Road, Hinsdale, Ill. 60521.

Sept. 20-26

T1 Networking. Washington D.C., Sept. 21-22 — Contact: Business Communications Review, 950 York Road, Hinsdale, Ill. 60521.

Dataquest, Inc.'s Business and Office Systems Conference. Littleton, Mass., Sept. 21-22 — Contact: Marina Pettijohn, Dataquest, Inc., 1290 Ridder Park Drive, San Jose, Calif. 95131.

Corporate Microcomputer Exposition & Technical Conference (Corpcon West). Los Angeles, Sept. 21-23 — Contact: Corpcon, P.O. Box 3727, Santa Monica, Calif. 90403.

CD-ROM Expo. New York, Sept. 21-23 — Contact: IDG Conference Management Group, P.O. Box 9171, Framingham, Mass. 01701.

Conference on Software Maintenance — 1987. Austin, Texas, Sept. 21-24 — Contact: The Computer Society of the Institute of Electrical and Electronic Engineers, Inc., 1730 Massachusetts Ave. NW, Washington, D.C. 20036.

Fifth Annual 1100 Data Center Management Conference. San Diego, Sept. 22-25 — Contact: DCM Conference, Datametrics Systems Corp., 5270 Lyngate Court, Burke, Va. 22015.

The Fifth Annual NCR Users Eastern America Conference. Fort Washington, Pa., Sept. 24-25 — Contact: Frank Whalon, Tinius Olsen Testing Machine Co., P.O. Box 429, Willow Grove, Pa. 19090.

Sept. 27-Oct. 3

Using Dbase III Plus Advanced Techniques and Networking. Philadelphia, Sept. 28-29 — Contact: Data-Tech Institute, P.O. Box 2429, Lakeview Plaza, Clifton, N.J. 07015.

Introduction to Telecommunications Systems: Technologies and Applications. Chicago, Sept. 28-29 — Contact: Business Communications Review, 950 York Road, Hinsdale, Ill. 60521.

Federal Computer Conference. Washington, D.C., Sept. 29-Oct. 1 — Contact: Ben Hughes, The Federal Computer Conference, P.O. Box N, Wayland, Mass. 01778.

Information Management Exposition and Conference. New York, Sept. 29-Oct. 2 — Contact: Info '87, 999 Summer St., Stamford, Conn. 06905.

Oct. 4-10

Eighth Annual CADRE (Complete ADR Environment) User Group Meeting. Las Vegas, Oct. 4-8 — Contact: Applied Data Research, Inc., Route 206 and Orchard Road, Princeton, N.J. 08543.

Third-Party Maintenance of Computers, Data Communications and Office Automation Equipment. San Francisco, Oct. 5-6 — Contact: Customer Service, Frost & Sullivan, Inc., 106 Fulton St., New York, N.Y. 10038.

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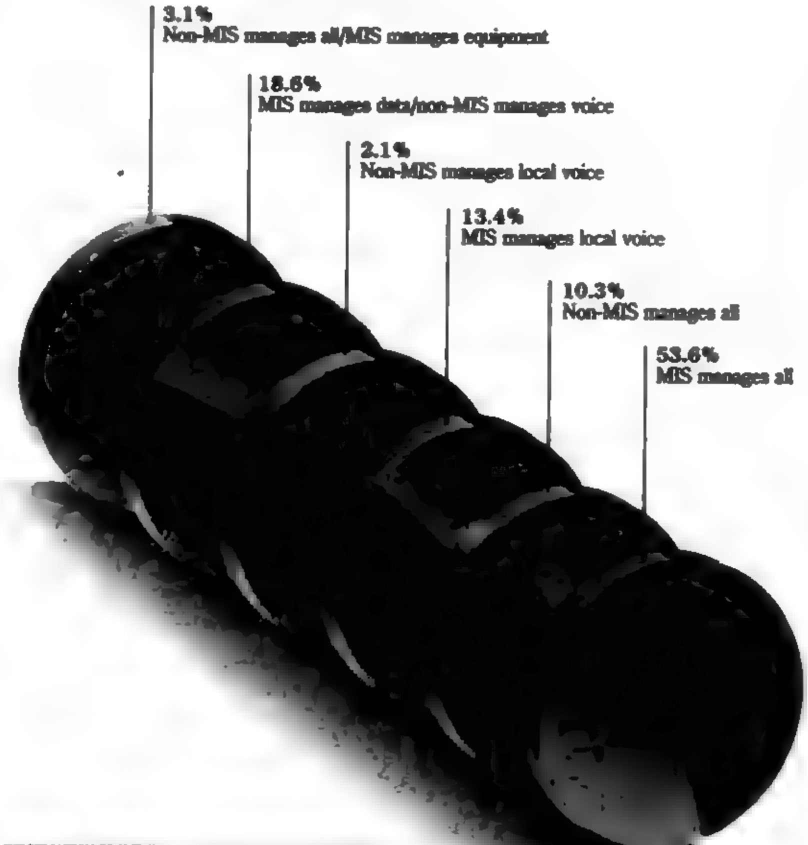
A survey of who oversees a firm's telecommunications functions



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next issue

Learn the latest on information centers in October's *CW Focus*. The issue will examine career paths and corporate politics and will bring you the results of a nationwide info center survey. We will cover languages, data base management systems, executive information systems and desktop publishing. And, with school back in session, *Focus* will feature a special section on training and education.

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Short-lived advantage

Thomas Roberts

It has been six months now since IBM unveiled its Personal System/2 line. Despite reported strong sales of the systems, the question that burns on many MIS lips is, What exactly will these personal computers bring me that other PCs will not?

Among the multitude of PS/2 promises IBM has made is the pledge that it will play a central role in solving corporate America's desktop connectivity needs. Oddly enough, IBM rarely mentions the tangible communications benefits PS/2s offer compared with standard Personal Computer ATs or compatibles. Much of the talk consists of the power that will be unleashed once users combine the PS/2's Micro Channel bus with peripherals and the Extended Edition of the OS/2 operating system.

This futuristic gobbledygook will provide three things. First, OS/2's multitasking features will allow communications tasks to be handled in the background so users will no longer completely tie up their machines while uploading or downloading data. Second, IBM's OS/2 Extended Edition will offer communications management facilities and the ability to manipulate IBM SQL data, such as that stored on an IBM mainframe under DB2 or Oracle Corp.'s Oracle, at the PC level. Third, the Micro Channel is an intelligent bus that can handle several communications requests at once.

While most of these capabilities are yet little more than concepts, the overall package is impressive. It's important to realize, though, that most of these features will run on standard AT-class systems and will be available from a host of vendors other than IBM.

OS/2 and OS/2 applications will run on Intel Corp. 80286 and 80386-based PC ATs and compatibles as well as on PS/2s. End users will be able to buy OS/2 from Microsoft Corp. and any hardware vendor that cares to license the product.

The features promised in IBM's OS/2 Extended Edition will also be available from independent vendors. A host of software firms, including Ashton-Tate, Oracle, Ansa Software Co. and Lotus Development Corp., have already announced their intent to offer SQL-based data management products under OS/2. Communications companies, such as Digital Communications Associates, Inc., reportedly will offer software products similar to the communications management facility found in OS/2 Extended Edition.

That leaves only the Micro Channel bus as the connectivity advantage offered by the PS/2. And if you believe, as I do, that IBM's competitors will be able to sell PS/2-compatible systems legally, then IBM's advantage in desktop connectivity does not seem substantial in the long run.

The PS/2 and OS/2 will bring a great many improvements to the desktop connectivity game. Be aware, however, that there will be attractive (and equally effective) alternatives to the solutions IBM will offer.

Roberts is manager of PC research at International Data Corp., a Framingham, Mass.-based industry research firm.

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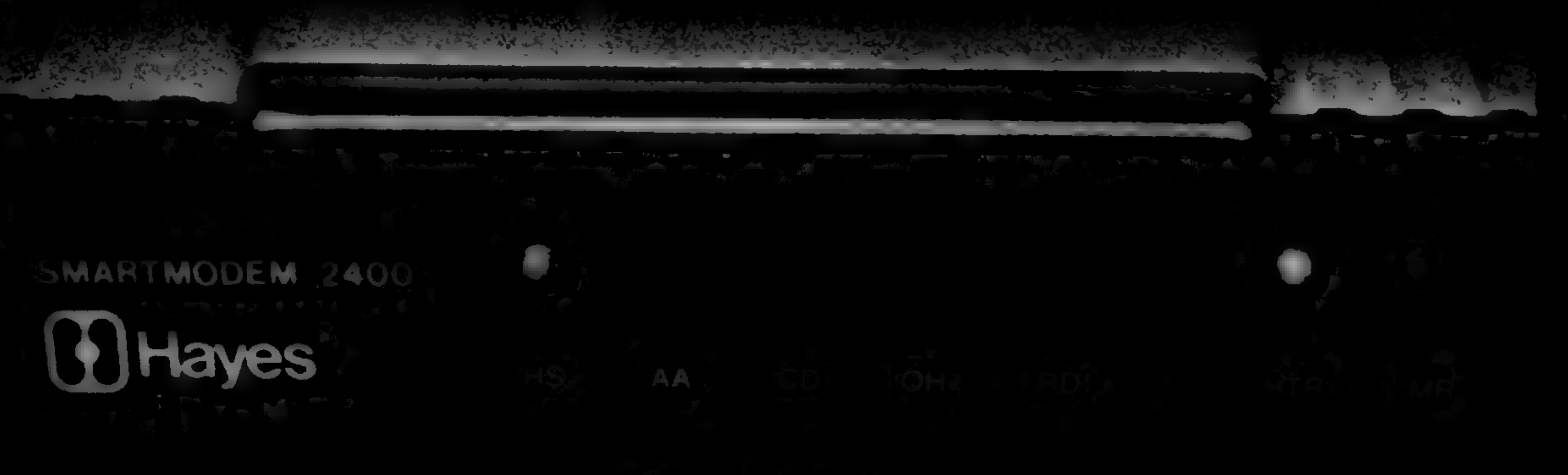

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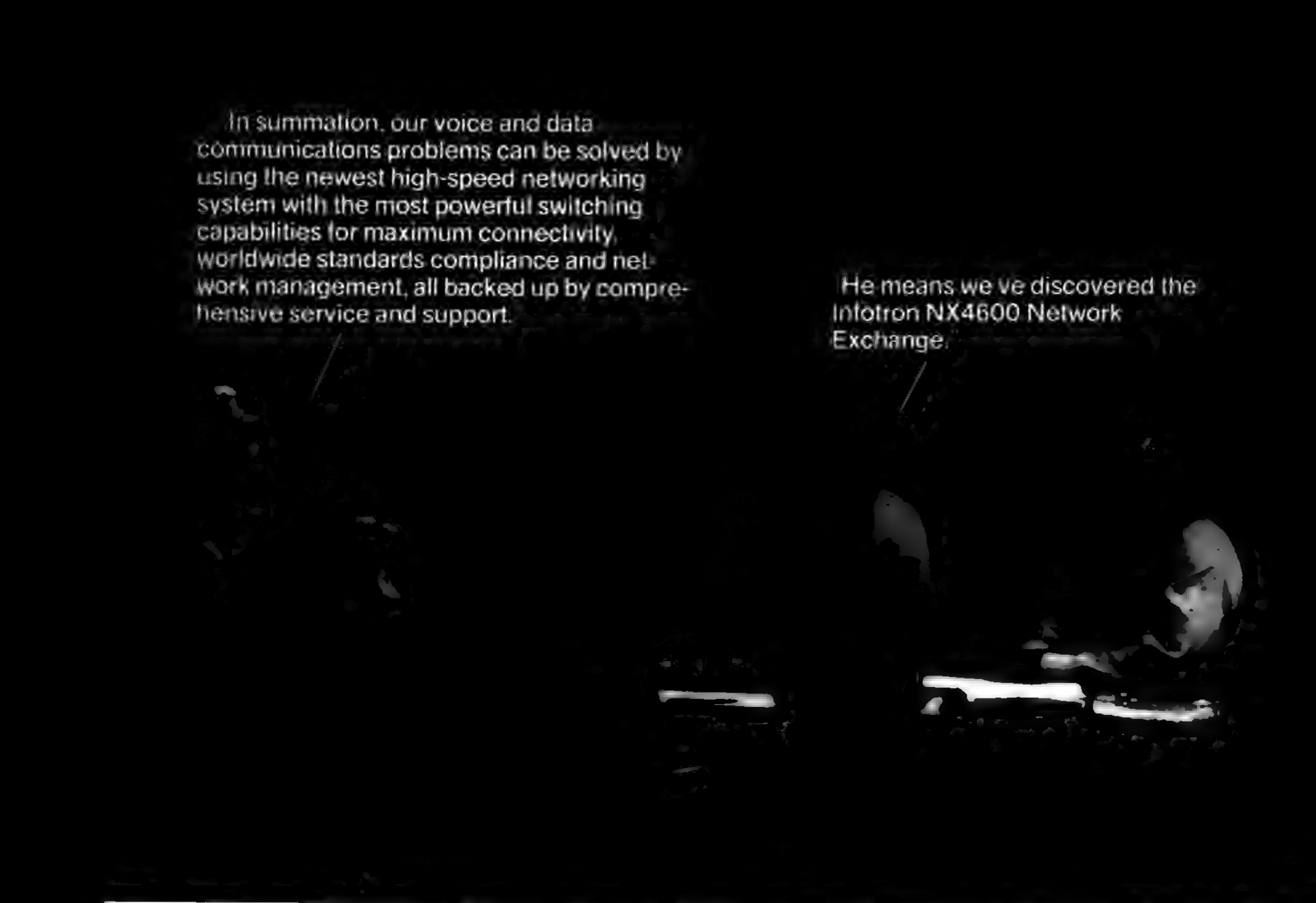
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Judge jilts Bells on key goals

BY ELISABETH HORWITT
CW STAFF

The first major review of the AT&T divestiture agreement loosened the regional Bell holding companies' restrictions in certain markets but denied them the ability to become long-distance carriers or develop information services.

As a result of U.S. District Judge Harold H. Greene's decision last week, users will still be unable to obtain interregional communications services from their local carriers, except in rare instances in which a waiver has been granted. And while the Bell companies may become major distributors of information services or telecommunications

Continued on page 9

High-octane Microvaxes roll

DEC taunts IBM, claims price/performance superiority over 9370

BY JAMES CONNOLLY
CW STAFF

BOSTON — Digital Equipment Corp. tossed fuel on the already raging flames of its rivalry with IBM last week by introducing two Microvax minicomputers pitted directly against IBM's 9370 line.

DEC used its highly visible Decworld '87 show as a stage to announce the Microvax 3500 and Microvax 3600 departmental systems as well as Vaxstation engineering workstations and work group servers based on the new processors. DEC claimed this third generation of Microvaxes provides three times the power of second-generation systems and supports almost three times as many DEC All-In-1 office automation system users.

Two software houses that tested the system said last week they basically support DEC's performance claims.

DEC officials, speaking to almost 350 reporters and analysts, repeatedly compared the new Microvax systems with the 11-month-old 9370. "With the 3500 and 3600, the Microvax family now spans the performance range of IBM's 9370 Models 20, 40 and 60 at significantly lower prices. The new Microvax systems outperform IBM's 9370 Model 60 at prices below [those of] the Model 20," claimed Domenic Lacava, low-end systems group manager for DEC.

DEC also claimed that the Vaxstation 3200 and Vaxstation 3500 offer better price/performance ratios than competing systems, such as the Sun Microsystems, Inc. Sun-3/260 and Apollo Computer, Inc. DN4000.

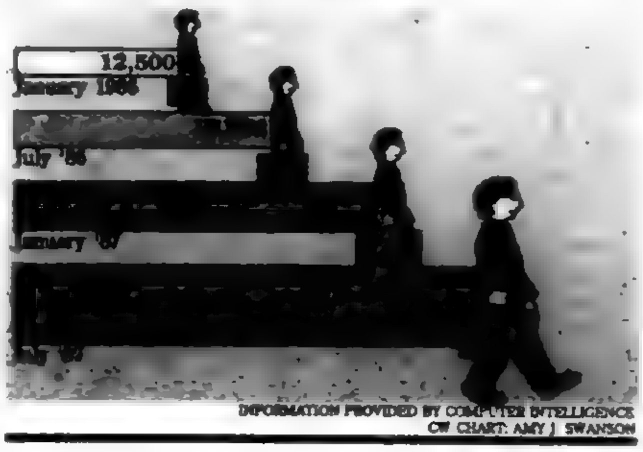
In an unexpected move, DEC positioned the new Microvaxes above the 2-year-old Microvax II, in a slot some observers said competes with DEC's VAX 8250 and 8350 lines.

DEC assigned the same performance range to both of the new Microvaxes, rating them at 2.6 to 4.2 times the power of the Microvax II.

DEC declined to provide ratings based on millions of instructions per second, but analysts rated the Microvax 3500 and 3600 at 3 MIPS, compared with

Continued on page 124

Microvax marches on
U.S. installations of DEC's Microvax line have grown rapidly, with the Microvax II representing 96% of the total



INFORMATION PROVIDED BY COMPUTER INTELLIGENCE
CW CHART: AMY J. SWANSON

1-2-3 to go unprotected

BY DOUGLAS BARNEY
CW STAFF

CAMBRIDGE, Mass. — Relenting to years of continuous pressure from corporate software buyers and users groups, Lotus Development Corp. is preparing to remove all copy protection from its next releases of 1-2-3 and Symphony.

Existing Lotus products, including the current versions of 1-2-3 and Symphony, will remain copy protected, according to users briefed by Lotus.

Copy protection will be fully removed from 1-2-3 Release 3, which is scheduled for release early next year, according to sources close to Lotus. In addition, a Lotus official said last week that 1-2-3 Release 3 may be available before MS OS/2 — if that Microsoft Corp. operating system lags behind its scheduled first-quarter 1988 release.

"There's a possibility we would release it before OS/2 if [the operating system's] availability gets blown out of the water," said Michael Kolowich, vice-president of corporate marketing and information services

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COMPUTERWORLD JOB SURVEY

Satisfaction (mostly) guaranteed

BY MICHAEL SULLIVAN-TRAINOR
CW STAFF

Diana Ericson is frustrated, both with veteran technical managers who set unrealistic project deadlines and with a lack of recognition by upper management for her efforts.

"I worked on the business side before I came over to DP," says the associate systems analyst for Northwestern National Life Insurance Co. in Minnetonka, Minn. "Suddenly, I became a very back-room part of the company."

However, like almost 80% of the more than 600 MIS/DP professionals who responded to *Computerworld*'s in-depth job satisfaction survey, Ericson says, "Overall, I like what I do."

Despite a general attitude of job satisfaction, four out of five respondents say they are frustrated with major aspects of their current positions. Chief among their complaints is ineffective or poor management, a concern one-third of the participants mention.

Improve communication

One of the top recommendations the respondents have for management is to improve communication.

"We have many layers of management, and the people who make the decisions don't come back to us to find out if we can do the job," Ericson says.

Dan Miotti, telecommunications manager at Andrew Corp. in Orland, Ill., says, "I'm generally satisfied with my position, but I'm frustrated with the amount of time it takes for the decision-making process."

Regardless of their concerns about their current positions, MIS professionals generally say they are satisfied with their chosen field. Almost 87% say they are very unlikely to change careers. Those surveyed come from a range of positions, from mid- to upper-level MIS/DP managers to systems analysts and programmers.

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Write on. Highlighting last week's Seybold Desktop Publishing Conference were Adobe and Next's joint announcement of the development of an interactive software version of Postscript for use on Next's yet-to-be-announced workstation displays and printers and Aldus's Pagemaker add-in for business templates. Page 12.

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>
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Toshiba changes policy in bid to block sanctions

BY CLINTON WILDER
CW STAFF

WASHINGTON, D.C. — Moving to head off potentially damaging economic sanctions by the U.S. Congress, Toshiba Corp. last week announced several internal policy changes on exporting sensitive technology.

Toshiba said it would create a division to screen potential defense-related exports and their customers in an attempt to prevent further violations of Japanese and international export control guidelines like Toshiba Machine Co.'s sale of confidential submarine propeller milling technology to the Soviet Union.

Congressional and government spokesmen were noncommittal on whether Toshiba's announcements would mollify Congressional calls for harsh sanctions against the Japanese firm. But some observers said they believe Toshiba's action will not pacify the company's U.S. critics.

"I don't think Congress will view this as any reason not to go ahead with sanctions," said Kenneth Bosomworth, president of market research firm International Resource Development, Inc. "Apologies and explanations are not going to be enough. Congress is trying to send a message to other companies and countries as well."

Toshiba's proposed screening division will report directly to Toshiba President Joichi Aoi. It will conduct compliance audits and educate employees on export controls.

In a related action, Toshiba repeated its earlier assertions that its high-level executives had no prior knowledge of the submarine technology sale to the Soviets. Two top Toshiba executives have resigned because of the affair, but their moves were seen as a symbolic gesture.

The company released a report from Big Eight auditor Price Waterhouse and two U.S. law firms that reiterated Toshiba's claim that it had been deceived by Toshiba Machine.

The report said that Toshiba Machine decided to pursue sales of its milling equipment to the Soviets after a French firm sold similar products to the Soviet Union in 1974.

CW expands West Coast staff, moves bureau near Bay Area

Computerworld has expanded its West Coast bureau staff and moved that bureau's offices to a new location about two miles away from San Francisco International Airport.

The changes are part of a broad increase in the newspaper's West Coast coverage.

Leong

Pitta

Kathy Chin Leong has been named West Coast bureau manager. She replaces Jeffry Beeler, who is leaving *Computerworld* to join Dataquest, Inc.

Jones

Martin

Leong has five years of experience covering the computer industry, most recently as the West Coast bureau chief for *Communications Week*. She was previously a senior writer at *Infoworld*.

In addition to managing the bureau, Leong will cover high-end data communications and West Coast-based users organizations.

Julie Pitta has been appointed West Coast senior correspondent. At *Computerworld*, Pitta's area of specialization will be in microcomputer hardware and workstations. She was formerly a senior editor at *Computer Systems News*.

Stephen Jones has joined *Computerworld* as a West Coast correspondent specializing in microcomputer software and low-end data communications.

Previously, Jones held positions as a writer for the *San Jose Business Journal* and an intern at *Business Week*.

James A. Martin will continue as a West Coast correspondent covering microcomputer storage and expansion hardware, peripherals and semiconductors.

Mary Elliston will serve as the West Coast bureau's editorial assistant. *Computerworld* is in the process of hiring a sixth bureau staff member.

The bureau is now located at Suite 400, 500 Airport Blvd., Burlingame, Calif. 94010. The phone number is (415) 347-0555.

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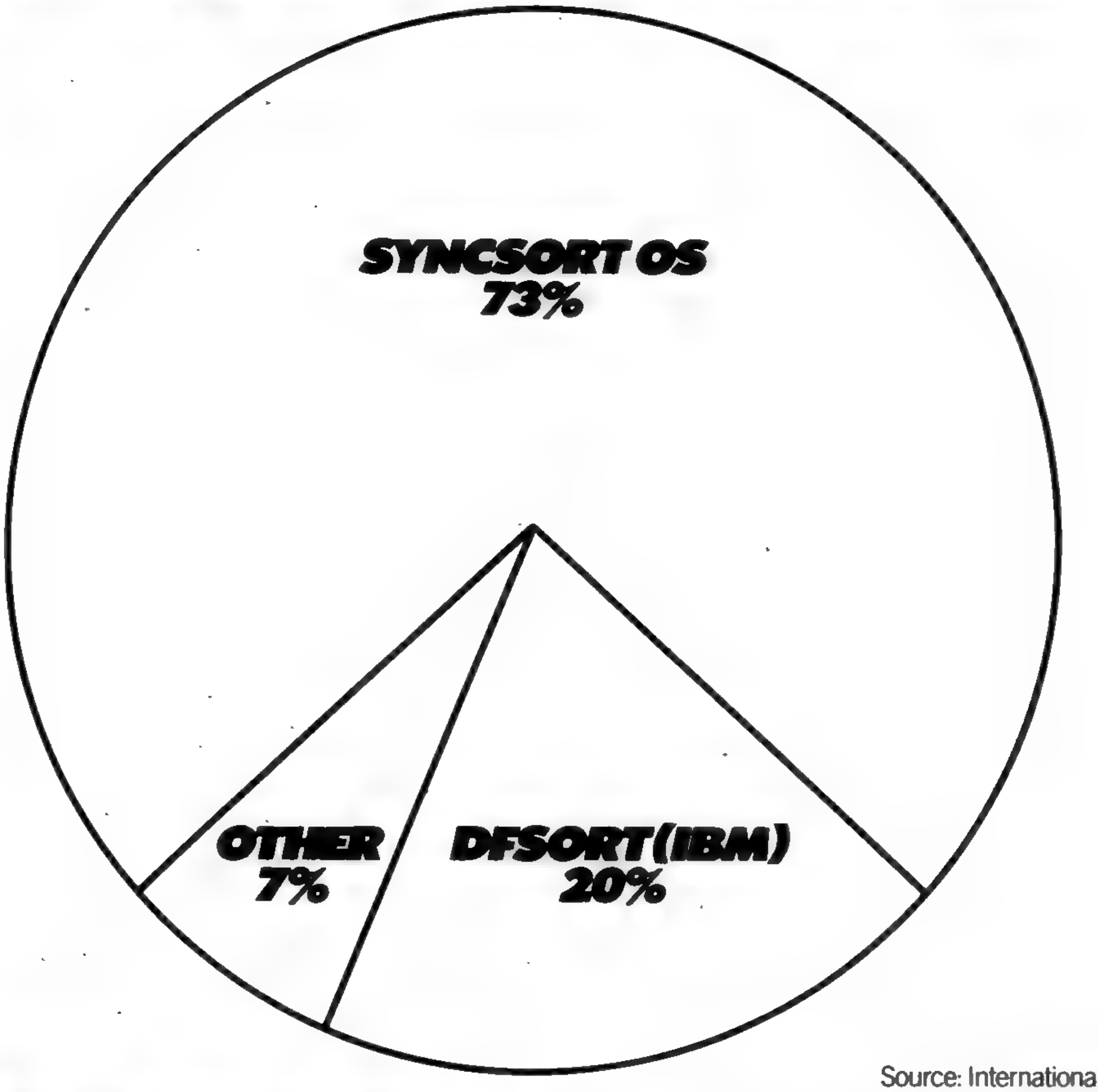

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Founders back off from NCC

BY DAVID A. LUDLUM
CW STAFF

The two organizations that started the National Computer Conference (NCC) have given up their direct ownership of NCC, effective next year, after failing to convince the other owners to do away with the annual event.

The Computer Society of the Institute of Electrical and Electronics Engineers (IEEE) and the Association for Computing Machinery (ACM) recently notified the NCC Board that they will give up their shares in NCC.

Under the NCC bylaws, the actions take effect at the end of the next fiscal year, Sept. 30, 1988. The organizations' shares — 15% each — will be distributed to the other owners in proportion to their current holdings.

The American Federation of Information Processing Societies (AFIPS) owns half of NCC and oversees its management. The Data Processing Management Association (DPMA) also owns 15%, and the Society for Computer Simulation holds the remaining 5%.

The IEEE and the ACM moved to give up their shares after the AFIPS board of directors defeated, by a 9-8 vote, a proposal aimed at dissolving the conference, which a few years ago was one of the world's largest trade shows.

The IEEE and the ACM, whose representatives on the AFIPS board backed the move to end NCC, still hold a stake in next year's show. After that show, they will continue to sponsor NCC indirectly, because they are among the 11 organizations that make up AFIPS.

Couldn't keep up

Roy Russo, president of The Computer Society of the IEEE and manager of the Advanced Design Automation Laboratory at IBM's Thomas J. Watson Research Center in Yorktown Heights, N.Y., said NCC failed to keep up with the times, as suggested by the show's declining turnout and exhibitor ranks.

"I think there was an inability to keep up with the changing environment in the industry — a difficulty in introducing new aspects, like keeping up with what was happening in personal computers and workstations," Russo said.

Russo said he believes the IEEE's 24-member board of governors unanimously backed dissolving NCC.

T. Michael Elliott, executive director of The Computer Society of the IEEE, said its officials are more disappointed than angry about the decline of NCC.

"Volunteers worked very hard over many years to make the conference what it was. Without casting any blame, there is disappointment that it was allowed to erode to the extent it did," Elliott said.

Concerned about contracts

ACM officials, who have now followed through on their February decision to withdraw from direct NCC ownership, are chiefly concerned with potential liabilities arising from NCC's commitments to hotels and convention centers for future conferences, according to the group's president, Paul Abrahams.

"Our main concern at this point is the possibility of liabilities if things don't go well. We do have our doubts about it," Abrahams said, adding that there are too many variables to calculate potential liabilities.

AFIPS President Jack Moshman, an independent consultant, said NCC officials hope to renegotiate contracts with hotels and convention halls for upcoming shows. The next three are scheduled for Los Angeles in 1988, Chicago in 1989 and New York in 1990.

The DPMA still backs NCC, which can survive as a smaller show under its newly installed outside management team, said DPMA President Robert Hoadley, DP manager for the City of Raleigh, N.C.

Hoadley said he thinks NCC made about $175,000 this year, which would be far lower than the millions of dollars it once made.

Fewer than 20,000 people attended the show in Chicago in June, down from a peak of more than 90,000 in 1983.

Carroll Lewis, chairman of the NCC Board and president of Commercial Data Corp. in Memphis, said he expects the actions of the IEEE and NCC to have little impact on the board. He added, however, that he hopes members of the groups will continue to promote NCC and participate in it.

Iomega seeks sales boost, revamps Bernoulli Box

BY ED SCANNELL
CW STAFF

ROY, Utah — Hoping to give its sluggish sales a bost, Iomega Corp. announced last week the long-awaited 5¼-in., 20M-byte versions of its Bernoulli Box.

The Bernoulli Box II series, which the company had hoped to deliver late last year, includes both internal and external products.

The internal products include a single-drive system that supplies 20M bytes of on-line storage as well as a slave drive that allows users to add an additional 20M bytes of internal storage.

The external products consist of a single-drive 20M-byte system and a dual-drive 40M-byte on-line system. The company is also offering an upgrade kit that it said lets users expand their single-drive external system to a dual-drive subsystem.

While the new products are compatible only with IBM's Personal Computer XT and AT and compatibles, the company said it plans to release additional kits in October that will be compatible with IBM's Personal System/2 Models 60 and 80.

Despite its smaller form factor, the Bernoulli Box II has the same capacity as the 8-in. model. Iomega said the 5¼-in. version will not replace its predecessor and that the company will continue to deliver enhancements for the original product. Iomega has shipped approximately 250,000 8-in. drives.

Like the 8-in. version, the Bernoulli Box II is removable, which enables it to play one of several data storage roles including that of primary storage, a complement to a fixed disk or a backup for primary storage.

> "WE thought we had sold users on the idea of removability in 1985 and '86, but apparently not enough."
>
> KEVIN DAHILL
> IOMEGA CORP.

The vendor said it will target those markets in which the benefits of removability, such as increased data security and transportability, are important. Some of those markets include financial institutions, manufacturing companies and various government agencies.

While the company has had some success with the original Bernoulli product, its message about the advantages of removability has not reached as many users as it would like.

Iomega had sales of $116 million in 1985 and $126 million in 1986, but it has sales of only $35 million for the first half of this year.

"We thought we had sold users on the idea of removability in 1985 and '86, but apparently not enough," said Kevin Dahill, Iomega's senior vice-president of finance and planning.

Part of the problem was that Iomega was depending on dealers to educate users about the advantages of the product and should have been more aggressive in educating users itself, Dahill said.

He added that the company plans to be much more aggressive about educating its users in the future.

Iomega is also providing backup software for its single-drive systems. This permits single-drive users to make image backups to another cartridge or to copy specific files from cartridge to cartridge. The company developed the software jointly with Gazelle Systems in Provo, Utah.

All models of the Bernoulli Box II line are available immediately.

The external dual-drive system is priced at $2,499, and the single-drive system sells for $1,599. The internal single-drive system costs $1,200 with the internal-drive upgrade kit priced at $900.

CORRECTIONS

In the Aug. 24 Spotlight, the Technology Transfer Institute, Inc. (TTI) should have been listed in the chart of training suppliers. TTI, which is based in Santa Monica, Calif., offers technical seminars for data processing and MIS professionals.

The chart of service providers in the Aug. 17 Spotlight on field service should have included mention of Harris Corp.'s Customer Support Division. That division, based in Dallas, provides all hardware maintenance and support for the corporation's Information Systems sector as well as third-party maintenance, support and consulting services for a broad range of products.

The chart of medium- and large-system data base management system products that appeared in the Aug. 10 edition of Spotlight should have included the dictionary-driven relational data base operating system Reality, a product from McDonnell Douglas Computer Systems Co.

The chart of personal computer-based communications software that ran in the Aug. 3 edition of Spotlight should have included Carbon Copy Plus from Meridian Technology, Inc. in Newport Beach, Calif. The product combines PC-to-PC remote control, PC-to-host terminal emulation and Xmodem and Kermit file-transfer protocols in one integrated software package.

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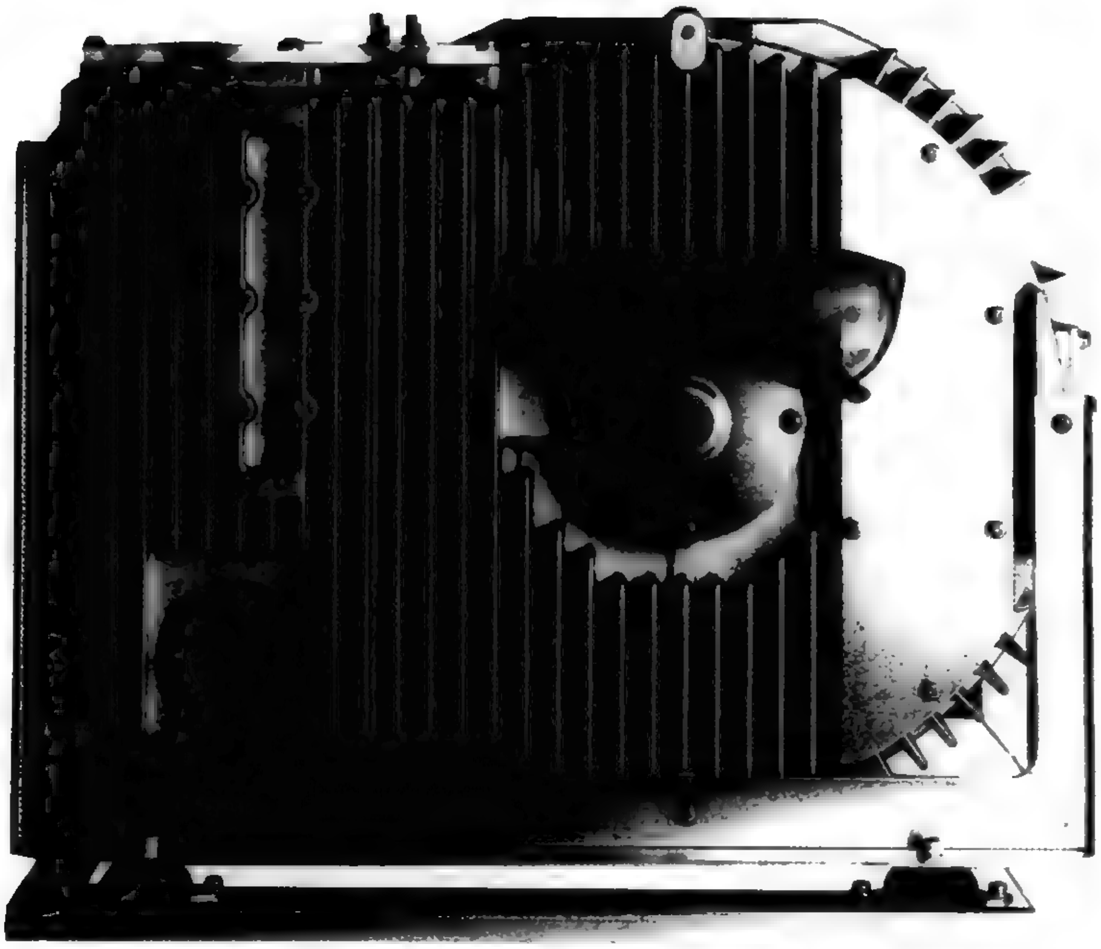

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DB2 advantages require hard sell

Development benefits over IMS seen outweighing CPU appetite

BY CHARLES BABCOCK
CW STAFF

TORONTO — IBM's DB2 consumes more machine cycles than IMS, but it more than makes up for those performance penalties in its advantages as a development environment, two early users of DB2 said last week.

However, the users said it is not easy to sell management on DB2's benefits, and they cited instances in which the relational data base had seriously slowed hardware performance.

Security Pacific Automation Co., a Los Angeles-based bank, built its first relational application in March 1985 and has since put seven banking applications into production use, according to Richard Wilson, vice-president and manager of data base administration at Security Pacific Automation, soon to be a subsidiary of Security Pacific Corp. and a spin-off business of Security Pacific National Bank.

Wilson, speaking at a Codd and Date Consulting Group conference in Toronto last week, along with a second user, Bruce Larson of Deere & Co. in Moline, Ill., emphasized productivity gains in developing applications with DB2 over similar applications with IBM's IMS.

Wilson said his firm has not documented the productivity gains related to DB2 applications but that it took a development group two years to rewrite the bank's Ready Teller system for IMS Fast Path, while an equally complex DB2 application that combined customer account information on one screen took only seven months.

In addition to allowing compressed development schedules, a DB2 application requires half as many people to develop as an IMS application, Wilson estimated in an interview.

Time lapses

Wilson said he has seen complex IMS applications cancelled after being under development for many months because the time lapse has caused them to become obsolete. "A DB2 project moves so quickly that requirements don't change before it's finished," he said.

His firm used a team approach in developing DB2 applications, tapping an end user, an application programmer and analyst and a data base administrator to form the group's nucleus, pulling in additional staff as needed. "We found having the end-user community heavily involved in the development cycle greatly speeded up delivery," he said.

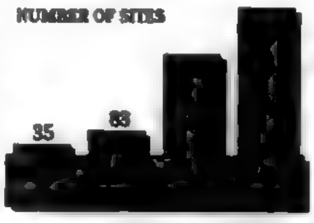
The end user was involved in the data-modeling and prototype-building front end of the development cycle. In building IMS applications, "we weren't able to prototype," Wilson said.

Security Pacific Automation developed relational applications for a flexible benefit program, personal trust querying, automatic credit tracking and, its largest application, the customer information program that combines information from different accounts for one customer.

"During the modeling phase, we developed a prototype of the Customer Information Facility and presented it to a branch office. They wanted to put it into production the next day," Wilson recounted.

DB2 spreads out

IBM's relational data base is finding its way into an increasing number of sites; an estimated 1,200 total licenses are in use at these sites



INFORMATION PROVIDED BY FOCUS RESEARCH SYSTEMS, INC.
CW CHART

"The real key is to nail down the requirements," Wilson commented. In the past, IMS programmers came up with the requirements and started coding instead of establishing the relationships between the data and how it would be processed.

Not only is development time compressed, but program modifications and maintenance are also made simpler. "DB2 has afforded us a lot of time to be spent in areas other than application development," he noted.

Part of Security Pacific Automation's success in using DB2 stems from the control the firm has asserted over its use. Few end users are allowed to lodge ad hoc queries against the data base. In a case where one did, with data base administration's approval, the systems administrators left for the weekend with the query having already run a day in background processing. When they returned Monday, it was still running, Wilson said.

Stories like that frighten top management away from relational data base management systems, he acknowledged. Top management should be confronted with the trade-offs rather than allowed to reject relational technology on such a basis. "What management has to wrestle with is the tremendous productivity gains vs. the higher machine-cycle cost," he said.

At Deere, Larson's programming staff developed an application for tracking hazardous materials from scratch in a few months, but struggled for 21 months trying to convert an existing IMS application that tracks vendor claims.

Larson said the firm's IMS programmers working on the latter application spent five months making mistakes as they attempted to learn the rules of relational applications, while the group working on the first application was not experienced in IMS and learned the rules of relational systems quickly.

Software AG 4GL given DB2 support

BY ROSEMARY HAMILTON
CW STAFF

RESTON, Va. — Software AG of North America, Inc. last week announced plans to release a version of its fourth-generation language and development environment that supports IBM's DB2 and SQL/DS data bases.

Currently at beta-test sites, the new releases, Natural 2 DB2 and Natural 2 SQL/DS, are scheduled for availability in January. A second release that will reportedly offer a performance boost has been slated for late 1988, according to Chuck Riegel, Natural 2 product manager.

The initial release reportedly is a basic interface to DB2 that compiles Natural 2 programs into SQL statements.

The second release will provide improved performance by defining the SQL statements to the DB2 environment, according to Software AG. By defining the program to DB2, it becomes part of the DB2 environment and can, therefore, take fuller advantage of DB2 functionality.

With the first release, also known as a dynamic implementation, DB2 will accept streams of SQL statements and interpret them as they are presented to it.

With the second release, a Natural 2 application developer defines the application using a utility within DB2. Because the application is part of the DB2 environment, it can use the DB2 SQL optimizer. This provides quicker response time and an overall performance boost, the company said.

'The dynamic version'

With the initial implementation of Natural 2 DB2 and Natural 2 SQL/DS, "there won't be any steps to take before accessing the data base," Riegel said. "We're providing the dynamic version so users won't have to worry about all this stuff."

According to Riegel, the release will be offered as an enhancement to Natural 2. "It isn't a requirement, but if you're seriously looking at the DB2 environment, you'll want this," he said.

The first release of Natural 2 DB2 and Natural SQL/DS will be for CICS and IBM TSO environments. A subsequent version for the IMS environment is scheduled for availability in July 1988.

Licenses for the DB2 version range from $100,800 to $126,000, depending on the IBM processor size. The SQL/DS version can be licensed for between $22,000 and $85,000, the vendor said.

Timeplex preps to purchase packet-switch firm Cygnus

WOODCLIFF LAKE, N.J. — Timeplex, Inc. announced last week that it intends to acquire a small Texas manufacturer of packet switches, Cygnus Computer Corp. For the past year, Timeplex has been selling Cygnus's CCITT X.25 packet-switch network nodes as the Timepac product line in Europe.

The acquisition by merger depends on the approval of both companies' boards of directors. Under the agreement, Cygnus, a 4-year-old Dallas start-up with 20 employees, will remain in Dallas but will be merged into Timeplex, which will sell and support the Timepac units. Cygnus will enhance the line, develop new designs and assist in marketing the products. The move came as sales began in Canada last week. Timplex reportedly plans to begin U.S. sales in the [illegible]

"Packet switching is a global standard," said Ed Botwinick, president of Timeplex, "and the packet-switching technology and products offered by Cygnus bring a new level of connectivity and the broadest array of packet-switching products to our customers."

The Timepac units are X.25 packet-switched network processors. Each is based on one National Semiconductor Corp. 32-bit 32000 chip and is said to independently manage an X.25 network of computers, terminals and communications devices. "There is no central control point in the network," said Cygnus President James D. Schindler. "This is a totally distributed processor architecture, so that the loss of any one unit does not disable the network."

Timeplex expects to gain significant revenue from the sales of the Timepac products, which Cygnus had called the NP/100 and NP/200 processors. "Timeplex will realize $150 million to $170 million of incremental revenue over the next five years," a statement from Timeplex projected last week.

Oracle revamps DBMS

BY ROSEMARY HAMILTON
CW STAFF

BELMONT, Calif. — Oracle Corp. last week made what it calls the opening move in its challenge to IBM's DB2 by introducing additional mainframe features for its relational data base management system.

"Oracle has a pretty good chance of competing with DB2 because of its microcomputer and [Digital Equipment Corp.] installations," said Shaku Atre, president of Atre International Consultants, Inc. in Rye, N.Y.

The announcement is the first in a series of mainframe-related introductions, said Peter Tierney, vice-president of marketing. Oracle now offers its data base management system, also called Oracle, on IBM Personal Computers, a host of minicomputers, including DEC VAXs, and IBM mainframes.

Atre said she expects Oracle to have difficulty penetrating IBM mainframe shops that traditionally "think IBM." However, Oracle "has its foot in the door" at those sites running Oracle on DEC hardware and on personal computers. "If they already have DEC, they're prone to look at vendors other than IBM," Atre said. "If they have Oracle running on a PC, they won't want to make a change."

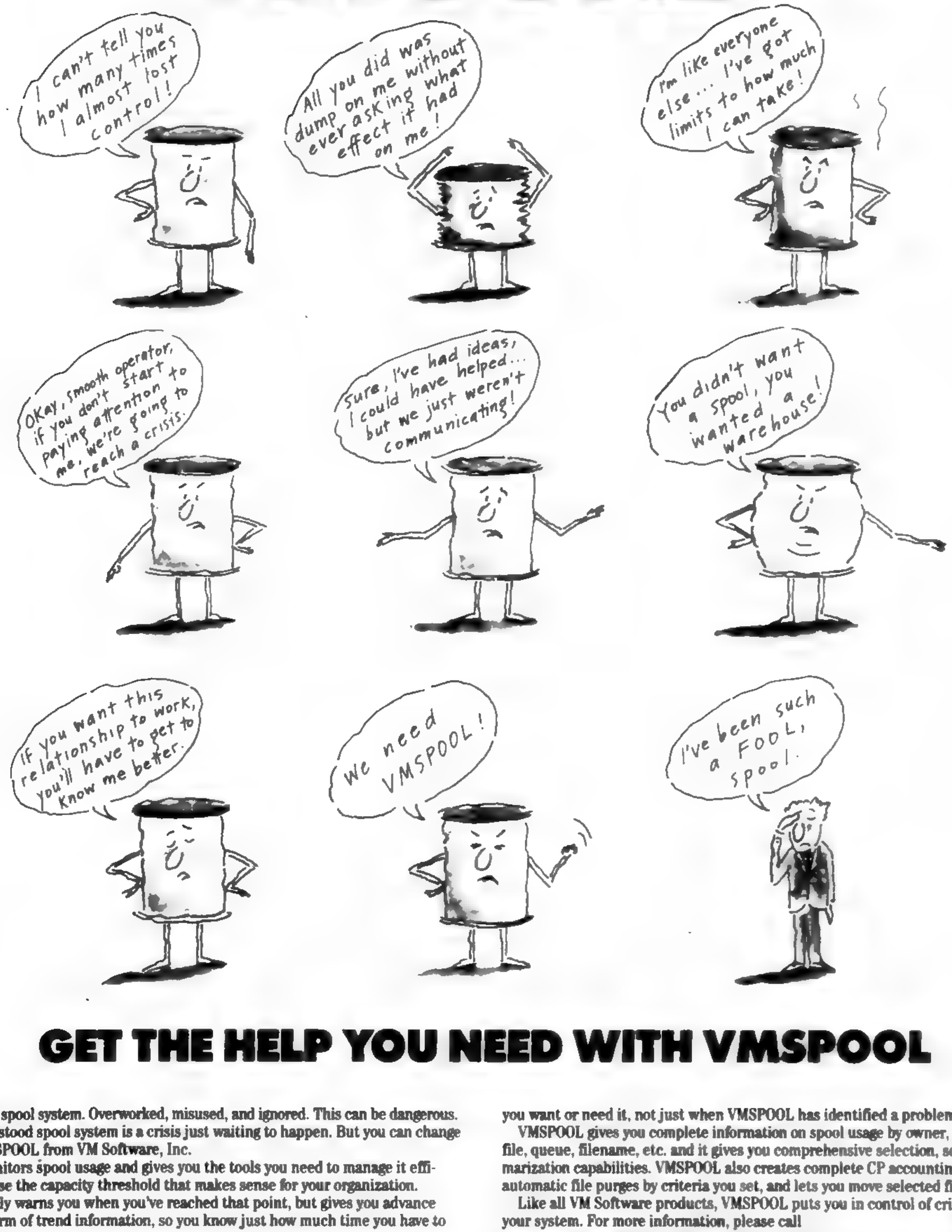
New features

Last week's introduction focused on two new features: an interface to CICS and support of the IBM MVS/XA environment. It also included enhancements, such as improved installation procedures, that will be part of a maintenance upgrade.

Both new features can be licensed for 25% of the base Oracle price, which varies depending on the hardware platform. For example, Oracle can be licensed for $100,000 for an IBM 4381 running MVS or VM. A version of Oracle with both new features would cost $150,000.

Tierney said there will be "two or three more" mainframe-related announcements before January. "Our mainframe customers are looking for more functionality, and as it becomes available we'll give it to them."

"I'M TIRED OF SPOOLING AROUND"


I can't tell you how many times I almost lost control!
All you did was dump on me without ever asking what effect it had on me!
I'm like everyone else... I've got limits to how much I can take!
OKay, smooth operator, if you don't start paying attention to me, we're going to reach a crisis.
Sure, I've had ideas; I could have helped... but we just weren't communicating!
You didn't want a spool, you wanted a warehouse!
If you want this relationship to work, you'll have to get to know me better.
We need VMSPOOL!
I've been such a FOOL, spool.

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Reaction to 3380 price cuts lags

Impact of reductions, low lease rates, rollouts on used market sluggish

BY STANLEY GIBSON
CW STAFF

The market for used IBM 3380 disk drives and 3880 controllers has been slow to react to IBM's recent announcement of new models, price reductions and a low leasing rate on the controllers, according to a major used equipment dealer.

"The market doesn't always behave the way you expect it to. The impact, particularly on the controller, has been less than I would have expected," said Svend Harttman, president of Computer Merchants, Inc., a dealer and lessor of used IBM equipment.

Harttman said he expected the prices of used drives and controllers to drop as a result of IBM's announcement of purchase price reductions of 8% on the 3380 disk drives and 15% on the 3880 controllers and a 61% to 67% reduction in the leasing rate for the 3880 controllers. A typical used 3880 Model 3 sells for $39,500, which is 66% of IBM's list price, Harttman said.

The triple-density 3380 Models J and K will be available in October, and the 3990 controller, which replaces the 3880, will not be available until the third quarter of 1988, according to the IBM announcement.

"Some market reactions are immediate. I thought this would be also, but we've been proven wrong. It's almost as if nothing has happened in the market for older equipment," Harttman said. He added that that could change if users wake up soon to the new prices.

Storage control

IBM 3990 controllers and enhanced 3880 offer a range of channel speeds and cache options

[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Data paths	1	4	4	2
Channel speed	3M byte/sec.	3M byte/sec.	4.5M byte/sec.	4.5M byte/sec.
Cache (in bytes)	NA[1]	NA	[illegible]	8M to 64M
Maximum subsystem capacity (in bytes)	60G	120G	120G	60G

[1] Not available

INFORMATION PROVIDED BY IBM
CW CHART

An operations manager for a major data center in Los Angeles said his company will probably, on the advice of IBM, sell the 3880 controllers it now owns and lease 3880s from IBM at the new low rate until the 3990s are available. The user said monthly payments for drives being purchased are greater than the reduced leasing rates.

"That would be your best move," Harttman concurred.

Regarding disk drives, Harttman said he expects the value of used 3380s to hold up. "Old drives are still the best buy for price and performance for many customers," he said.

Used AA4s and B4s, with which the new products compete, have been rising in value during the last year. In January, an AA4 was priced at $20,000, but recently, it has been selling for $28,000. The B4 had been selling for $20,500 in January but is now priced at $26,000.

Plateau ahead

Harttman said he expects prices to level out, rather than continue to increase. He said single-density D and double-density E models are not traded actively enough to be considered a mature market.

Overall, the announcement of direct-access storage devices was received well by several users.

George DiNardo, executive vice-president of Mellon Bank NA, said he welcomes the faster channel speeds. He said wherever he has bottlenecks created by the old slower speeds, he will install new J and K drives.

"Wherever we're channel bound, we will get a new disk as soon as possible," DiNardo said. "The channel and cache improvements should run like hell. It's a winner all the way around."

"If we buy something, it will probably be a J or a K," the Los Angeles user said. "The only negative is that you can't upgrade the D or E models." He added that he had doubts whether an upgrade was feasible.

Our intrepid scribe undertakes to install VM/IS

BY JEAN S. BOZMAN
CW STAFF

CHICAGO — If you can read a recipe, you can install VM/IS.

That's what IBM says about its new series of primers on simplified VM/Integrated System installation. In keeping with VM/IS's departmental orientation, the manuals are directed at the nontechnical end user rather than the systems programmer who usually installs VM systems.

Last week I took on the four-hour task of installing VM/IS on an IBM 9370 Model 90 and found that a nontechnical person can indeed do the job — but not effortlessly. IBM has not formally made VM/IS available on the Model 90 but plans to offer that support.

"With the 9370, we're moving many of the glass-house applications out to the departments," said Michael Zick, manager of VM packaging, who is based at IBM's Endicott, N.Y., computer facility. "Now we feel we've come up with a new way for these departmental end users to install, operate and maintain their 9370 systems."

The "new way" consists of a series of books, titled *Planning for Your System*, *Installing Your System*, *Managing Your System* and *Reporting System Problems*. Deliberately written to about a 12th-grade reading level, the books lead the departmental systems operator — or even the casual user — step by step through each process.

The books, which have been shipped with 9370 orders since July, have been tested on university students, IBM secretaries and other nonprogrammers, according to Bernard Newcomb, VM/IS project manager in Endicott.

Normally, installation of VM/SP, from which VM/IS is derived, takes more than 100 hours of work. VM/IS installation takes four to seven hours, depending on the number of applications used, and installers need to define only 32 variables instead of 150.

The 16M-byte 9370 I worked on last week was IPLed several times, while key VM components were read into an attached IBM 9335 disk drive from an IBM 3420 tape drive.

All this was done with three system tapes, a system console, an additional attached terminal and one 251-page book, *Installing Your System*. There was also a 15-minute introductory video and an hour-long video walk-through of the system, but these were not available before the demonstration at downtown Chicago's One IBM Plaza.

Such an inexperienced programmer as I would normally not be allowed to install a mainframe software package, but IBM executives suggested the exercise as a test of the system's friendliness.

"Normally, there would be IBM systems support somewhere available," an IBM spokeswoman said last week. "Usually, those who would be chosen to install VM/IS would have some working knowledge of programming and machine operations."

In a little less than three hours, I had reached Step 13 in the 16-step installation. To carry out these steps, I read or glanced at 104 of the 252 pages of documentation.

It was going to take me longer than IBM had promised to get the job done.

In general, the instructions were clear, but the language of the VM/IS Release 5.0 commands remained a bit foreign — close to its roots in VM/SP Release 4.0. Phrases like "ipl 190 parm autocr" and "spgen map cp" kept cropping up.

Though somewhat tiring, the task was clearly achievable. The statements the user needs to type are printed in red. The text in black is intended to explain the process and lead the installer along.

After several hours of work, it seemed easier to call the computer room staff for assistance. However, IBM managers asserted that that would not work for the hundreds of 9370 machines the company would like to see installed in large corporations.

The task of describing the VM/IS installation process, accordingly, has been cut down to size. "We've used the 80/20 rule," Zick said of the VM/IS documentation. "We feel that 80% of what needs to be done can be described in 20% of the pages."

If end users do get a little confused about the 650 pages of VM/IS documentation in the four spiral-bound primers, experienced technical help is a phone call away. IBM's support staff and software engineers have access to the full VM/IS documentation — all 8,000 pages of it.

Apple seeks to tap market for presentations

BY JULIE PITTA
CW STAFF

SANTA CLARA, Calif. — Apple Computer, Inc. last week said it has formed a new business unit to target the market for desktop presentations, which the company hopes will prove as lucrative as desktop publishing has been.

Apple Chairman and Chief Executive Officer John Sculley, at a press conference during the Seybold Desktop Publishing Conference here, said Apple's role in the desktop presentation market will mirror its position in desktop publishing. Sharing the podium with Apple were third-party developers. Microsoft Corp., Interleaf, Inc. and Cricket Software, Inc.; all of the firms' products aimed at the Macintosh's desktop presentations use.

"The way to begin is to pick a few companies to ally with and pick a few products to focus on," Sculley explained during the widely anticipated announcement. "Apple's role has been to bring together third parties to offer solutions."

Industry observers said the announcement was in keeping with Apple's current strategic direction. "It's not anything earth-shattering," said Tom Bertram, a Dataquest, Inc. industry analyst. "They're taking a step forward toward their stated direction — penetrating the business market."

Strong commitment

Jeff Raikes, Microsoft's director of applications marketing, said Microsoft has a strong commitment to the desktop presentations market.

"How seriously does Microsoft take this market?" Raikes asked. "We paid $14 million for Forethought because we believe in this market."

Microsoft is expected to offer a Macintosh II version of Forethought, Inc.-developed Powerpoint, which is a presentation-organization software package. However, a Microsoft spokeswoman said no introduction date has been set for a Powerpoint enhancement.

Additionally, Interleaf introduced Interleaf Publisher, a document processing software package for the Macintosh II, representing Interleaf's first Apple-based product. The product is set to be available in November at a price of $2,495.

Cricket unveiled Cricket Presents, a desktop presentation software package for the Macintosh. Priced at $495, the product is scheduled to be available Oct. 31.

Judge jilts Bells

CONTINUED FROM PAGE 1

equipment, the actual offerings will have to be supplied by another company.

After considering comments and petitions from a variety of industry players, Greene dashed the regional holding companies' hopes of significant new freedom in key communications arenas.

Greene eliminated the need for the companies to obtain a waiver before entering nontelecommunications markets but maintained the ban on the companies' manufacturing telecommunications equipment. He promised to lift all restrictions that prevent the regional holding companies from constructing "a sophisticated network infrastructure" that can transmit information services provided by others, but he prohibited them from developing and supplying their own information services.

Long-distance still taboo

Greene also kept in place the ban on the local carriers' right to offer long-distance services without first going through a waiver process.

Greene's recommendations relating to information services still leave in question whether the regional holding companies will be able to provide electronic storage of information.

"Clearly he's said yes to transporting information and no to data processing and actual provision of data bases" by the Bell operating companies, said Brian Moir, attorney for the International Communications Association (ICA). "We are still not sure about whether the operating companies can store information and what types of transport services they can now offer that they weren't offering before."

"We think he's made a big mistake," said Peter Bernstein, a senior research analyst at Morristown, N.J.-based Probe Research, Inc. "He says OK for the Bell operating companies to spread their resources into nontelecommunications-related activities, when he should have made sure these guys concentrated on providing the best networking they could."

Seeking freedom

With the industry moving toward Integrated Services Digital Network and other enhanced offerings, "you need to allow the people with the networking expertise" full freedom to develop such offerings, "including interexchange services and the transport, access and storage of electronic information," Bernstein said.

The entry of the regional companies "could expand information services from primarily local businesses to a mass market," he added.

Several regional holding companies released statements expressing disappointment in Greene's refusal to lift the interexchange and equipment manufacturing bans. Pacific Telesis Group (Pactel) had hoped to avoid going through a protracted waiver process each time it wants to offer cellular networking across local access and transport areas (LATA); noted company spokeswoman Ginny Juhnke. "At first look, the order doesn't allow interexchange traffic on a cellular network," she said. Pactel currently is petitioning for a waiver to offer cellular services across four LATAs in the Detroit area.

In contrast, Nynex Corp. was encouraged by certain portions of Greene's document to "go forward with our waiver request," which, if granted, would allow the regional holding company to offer trans-Atlantic services, according to Nynex spokesman Richard Adler.

"The language in the interexchange part of the document indicates that [the ban will be lifted if there are] certain economic and technical changes that spur competition," he explained, noting that "there is a high degree of competition in Manhattan and Boston," the cities from which Nynex would offer the service.

In general, the ICA considers the decree to be "very reasonable, consistent with industry thinking and of benefit to users," since it allows the divested Bell operating companies to leverage their expertise in the information service area, Moir said.

"Basically, we favor everything we've heard [about Judge Greene's decision]," said Kenneth Phillips, chairman of the Committee of Corporate Telecommunications Users and a vice-president at Citicorp. "We favor anything that promotes competition."

The group also approves of Greene's decision to ban the Bell operating companies from supplying information — in particular, Phillips indicated, selling selected customer information to local businesses. "That is a privacy issue and constitutes tacit cross-subsidization," Phillips said.

The judge's decisions resulted from his formal review of the current AT&T divestiture ruling, including comments and recommendations made by the U.S. Department of Justice and various user and vendor organizations. The Justice Department had recommended that the regional carriers be allowed to manufacture and sell telephone equipment and enter the information services and interexchange carrier markets.

In a formal statement, MCI Communications Corp. President Bert Roberts praised Greene's decision to bar the Bell operating companies from the long-distance arena — in which MCI is a major player. Greene, according to Roberts, "recognized the already competitive nature" of the long-distance and telephone equipment industries and has preserved their stability until the next review of the divestiture agreement, scheduled for 1990.

"In the IMS shop I'm working in [illegible]
I'm amazed at the lack of knowledge
from people who say they can do this stuff."
[illegible] DP consultant, Springfield, [illegible]

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Finally, this section introduces you to Message Format Service (MFS), a facility that lets you take advantage of the full-screen capabilities of 3270 terminals. By using MFS *format sets* to format screens, you can make data entry and retrieval much easier for the terminal operator (and cut down on operator errors that lead to later problems).

But format sets are complicated to create and maintain. So section 3 covers MFS in detail. Here, you'll learn how to create MFS format sets, including how to control cursor position and field attributes on a screen, switch from one screen format to another, and use physical and logical paging.

Now I know you may not have to write your own format sets in your shop. Even so, your DC programs will have to allow for the processing that MFS does. So you need to have the thorough understanding of MFS that section 3 gives you if you're going to be an effective DC programmer. (The fact that many DC programmers never master MFS will put you way ahead of the game, too.)

Section 4 covers advanced DC programming topics, like how to send output to a terminal other than the input terminal, and how to write a batch message processing (BMP) program.

Finally, section 5 teaches you to use Batch Terminal Simulator (BTS) to test your programs and format sets using IMS resources, but without disrupting the production IMS environment.

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Lotus strategy hamstrung by OS/2, delays

Lotus Development Corp.'s copy-protection phaseout will coincide with the firm's attempt to maintain market share by evolving its current product line and to move into new product areas.

Both of these efforts have been hampered by product delays and the continuing wait for OS/2, a next-generation operating system due out next year from Microsoft Corp.

The most important product on the way, at least in the near term, is Lotus's 1-2-3 Release 3. This entirely rewritten version of 1-2-3 will run under Microsoft's MS OS/2 and existing versions of MS-DOS. While the timing of 1-2-3 Release 3 may depend on the availability of OS/2 early next year, Lotus may not wait, according to Michael Kolowich, vice-president of corporate marketing and information services at Lotus.

Another key product is Symphony Release 3, which will be made to resemble 1-2-3 more closely. "We are converging the spreadsheet engine [of 1-2-3] so that Symphony Release 3 will start with the 1-2-3 spreadsheet engine," Kolowich said. Symphony Release 3 is expected to be available sometime next year and will run under both OS/2 and MS-DOS.

The firm will also release other versions of 1-2-3, including 1-2-3/G, which relies on the graphics user interface component of OS/2 and is set to be available late next year. Lotus is also on plan with 1-2-3/M, set for release early next year.

While spreadsheets may still provide the bulk of the firm's revenue in the coming years, Lotus will branch into the data base market late next year and will reenter the Apple Computer, Inc. Macintosh market with Galaxy, an integrated spreadsheet product.

In addition, Lotus is proceeding with Speed-Up and Learn, utilities for 1-2-3 that have fallen behind schedule but are intended to ship this year. The firm also hopes to release the Networker, which allows the use of 1-2-3 and Symphony on local-area networks, by the end of this year. In addition, the firm is expected to release a long-awaited but still unannounced product being developed by Lotus founder Mitch Kapor.

Lotus's push away from its mainstream spreadsheet segment has been held up by product delays, many of which are due to the incorporation of feedback from beta-test users, one user said.

The company is, however, on schedule with a new version of Graphwriter, dubbed Graphwriter II, set for announcement later this month. The package will contain a facility through which a permanent or semi-permanent link can be created to import data from 1-2-3.

A 1-2-3 user working for a New York brokerage firm said the improved link will help resolve one of the spreadsheet's weaknesses — less than satisfactory graphics. "This link between 1-2-3 and a graphics package is something we would expect to use," the user said.

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1-2-3

CONTINUED FROM PAGE 1

at Lotus. "We would then provide a retrofit module to make it compatible with OS/2 once it is available."

As the last holdout among the major software vendors, Lotus has long come under fire from users for refusing to relinquish its copy-protection scheme.

But with additional spreadsheet competition, Lotus has bowed to user pressure and market realities, observers said. "When you combine competitive pressures with things like Copy II PC [a popular copy protection-busting program], you are really forced to abandon protection," said Bruce R. Watts, managing director of investment firm Needham & Co.

"If they hadn't captured the spreadsheet market, the protection would have hurt them," said Fred M. Zickert, manager of personal computers for Eaton Corp. in Cleveland, which continues to be a large user of 1-2-3. "We had too many copies installed."

Users last week welcomed reports of Lotus's decision. "It is significant and interesting and desirable," said Jim McDonnell, a vice-president for The Equitable Life Assurance Society of the United States in New York. McDonnell said he would prefer to unprotect installed software but that he accepts Lotus's decision to not provide this ability. "We knew what we were purchasing," he added.

Copy protection has become a more burdensome issue with the release of IBM's Personal System/2 family, which uses nonstandard 3½-in. floppy disk drives. Users can move unprotected software to the new media by themselves but must upgrade through Lotus to move applications such as 1-2-3. "We went to Lotus for an upgrade, and that took a long time," Zickert said.

Anti-copy protection activist Jerry Schneider said the PS/2 introduction presented an ideal opportunity for Lotus to announce the removal of copy protection. That move would have also helped thwart the potential threat from Microsoft's Excel, argued Schneider, who is president of the Capitol PC User Group, Inc. While praising the Lotus decision, Schneider added, "Coming this late, it looks more defensive than it should have been."

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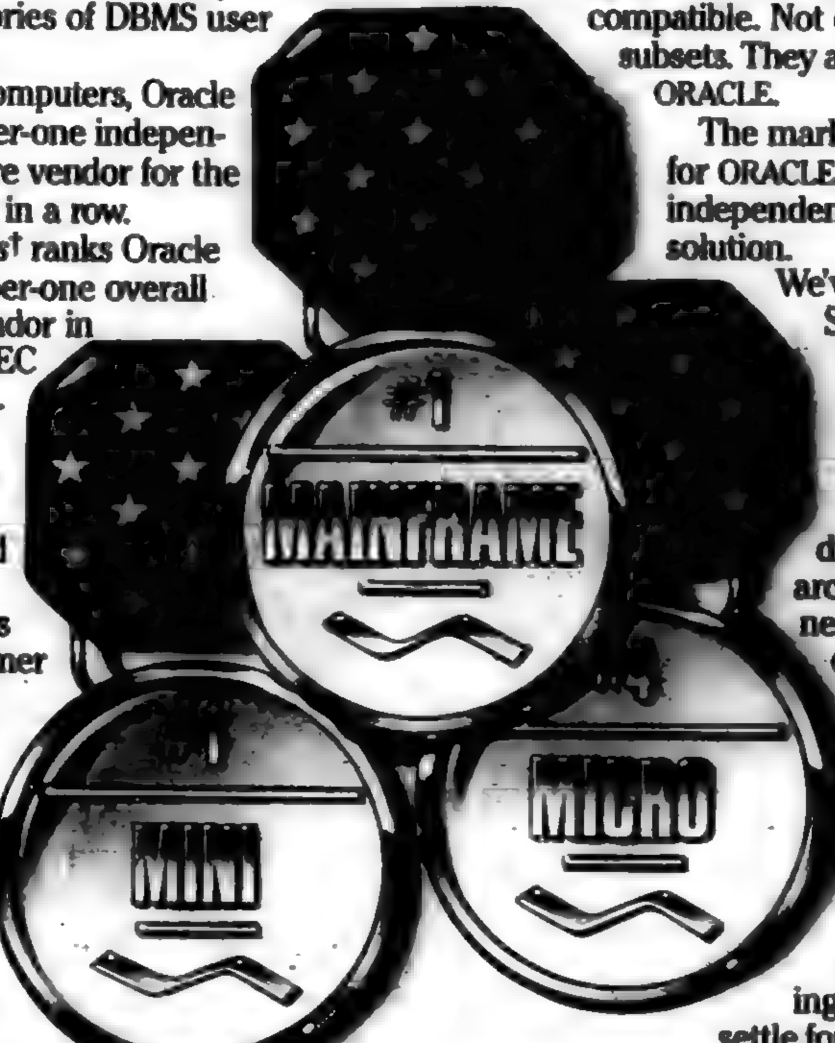

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† *Digital News*, December 1, 1986. ‡ Gartner Group currently available research.
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U.S. SEMINARS

AK	Anchorage	Sep 9
AL	Huntsville	Sep 17, Nov 12
	Montgomery	Oct 15
AR	Little Rock	Sep 16, Nov 10
AZ	Phoenix	Sep 22, Oct 22, Nov 19
	Tucson	Oct 21
CA	Lafayette	Sep 24, Nov 12
	Los Angeles	Sep 8, Sep 30, Oct 15, Oct 29, Nov 12
	Newport Beach	Sep 17, Oct 6
	Sacramento	Oct 15
	San Diego	Sep 10, Oct 8
	San Francisco	Sep 15, Oct 20, Nov 17
	San Jose	Sep 2, Oct 7, Nov 5
CO	Colorado Springs	Sep 17
	Denver	Sep 15, Oct 15, Nov 12
CT	Hartford (Farm.)	Oct 28
	New Haven	Oct 14, Nov 12
DE	Wilmington	Sep 1, Oct 1, Nov 5
FL	Ft. Lauderdale	Nov 5
	Jacksonville	Sep 9
	Orlando	Nov 4
	Tampa	Sep 10
GA	Atlanta	Sep 16, Nov 11
HI	Honolulu	Sep 17
IA	Des Moines	Sep 17, Nov 17
ID	Boise	Nov 19
IL	Chicago	Sep 15, Oct 15, Nov 18
	Springfield	Nov 19
IN	Indianapolis	Sep 24, Oct 20, Nov 24
KS	Wichita	Oct 6
KY	Louisville	Sep 10
LA	Baton Rouge	Oct 22
	New Orleans	Oct 23
MA	Boston	Sep 10, Oct 28, Nov 10
	Burlington	Sep 30
	Springfield	Sep 16, Nov 17
	Worchester	Nov 5
MD	Baltimore	Sep 3, Oct 8
	Bethesda	Sep 8, Oct 6, Oct 27, Nov 21
ME	Portland	Oct 8
MI	Detroit	Sep 15, Oct 13, Nov 10
	Grand Rapids	Nov 4
	Traverse City	Oct 28
MN	Minneapolis	Sep 29, Oct 29, Nov 18
MO	Kansas City	Sep 22, Nov 10
	St. Louis	Sep 16, Oct 13, Nov 10
NC	Charlotte	Sep 23
	Raleigh	Sep 16
	Winston-Salem	Oct 7
NH	Manchester	Oct 21
NJ	Cherry Hill	Sep 9, Oct 29
	Iselin	Sep 16, Sep 29, Oct 8, Oct 22, Nov 5, Nov 17
	Princeton	Sep 22, Oct 14, Nov 12
NM	Albuquerque	Sep 22, Nov 5
NV	Las Vegas	Sep 9, Oct 27
NY	Albany	Oct 6, Nov 4
	Buffalo	Sep 29
	Long Island	Sep 15, Oct 15, Nov 12
	New York City	Sep 9, Sep 17, Sep 23, Oct 7, Oct 21, Oct 28, Nov 4, Nov 18
	Rochester	Sep 22, Oct 22, Nov 18
	Syracuse	Oct 15
OH	Cincinnati	Oct 1
	Cleveland	Sep 17, Oct 15, Nov 12
	Columbus	Sep 30
	Dayton	Sep 22, Oct 20, Nov 17
OK	Oklahoma City	Sep 15, Nov 17
	Tulsa	Oct 20
OR	Portland	Oct 6
PA	Harrisburg	Sep 15, Oct 22, Nov 12
	King of Prussia	Sep 17, Oct 29
	Philadel.	Sep 10, Oct 8, Nov 5
	Pittsburgh	Sep 8, Nov 4
SC	Greenville	Oct 14
TN	Knoxville	Nov 4
	Memphis	Oct 14
	Nashville	Oct 21
TX	Amarillo	Oct 13
	Austin	Oct 9
	Dallas	Sep 9, Oct 6, Nov 4
	Houston	Sep 18, Oct 16, Nov 18
	San Antonio	Oct 8
UT	Salt Lake City	Sep 29, Oct 29
VA	Norfolk	Oct 20
	Richmond	Sep 8, Nov 17
	Virginia Beach	Oct 15
VT	Burlington	Sep 2
WA	Seattle	Sep 3, Oct 15, Nov 10
WI	Madison	Nov 12
	Milwaukee	Sep 3, Oct 14

CANADIAN SEMINARS

Calgary	Sep 9, Nov 18
Hamilton	Oct 20
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Ottawa	Sep 3, Oct 1, Nov 5
Regina	Oct 27
Saskatoon	Nov 3
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Rollouts sparse at Seybold conference

BY JAMES A. MARTIN
and STEPHEN JONES
CW STAFF

SANTA CLARA, Calif. — Although several vendors, including Steven Jobs' Next, Inc., expressed intentions and announced license agreements, the annual Seybold Desktop Publishing Conference held here last week yielded little in the way of actual product introductions.

Adobe Systems, Inc. and Next jointly announced the development of an interactive software version of Adobe's Postscript page-description language for use on Next's yet-to-be announced workstation displays and printers.

According to Jobs, the screen version of Postscript will simplify and enhance the end user's relationship with the language. Currently, Postscript commands are embedded in printer firmware, and users are not able to alter commands and fonts from a CPU terminal.

Display Postscript reportedly will be independent of any windowing software and will not be demonstrated until next summer. Neither Jobs nor Adobe officials would expand on the announcement.

Adobe also revealed that QMS, Inc. in Mobile, Ala., would become the first vendor to manufacture and market a color Postscript printer.

The QMS printer will reportedly be based on the 300 dot/in. Mitsubishi Corp. color thermal marking engine. QMS said it will introduce the printer during the first quarter of next year. The printer promises 35 resident Postscript typefaces as well as serial, parallel and Apple Computer, Inc. Appletalk network interfaces. Pricing was not disclosed.

Although some analysts had anticipated a new version of Aldus Corp.'s Pagemaker, the Seattle-based vendor announced only an add-in package of business productivity templates. The $99 product, called Pagemaker Portfolio: Designs for Business Communications, is aimed at corporate users who have no design expertise but desire slick-looking business documents.

The templates run with Pagemaker and include predesigned grids for proposals, memos, overhead transparencies, handbooks and business plans. The package is available for Apple's Macintosh and the IBM Personal Computer series.

Mike Fontana, a conference attendee who serves as information center director at The Hartford Insurance Co., said he plans to put the templates on his company's list of standardized products. Fontana said the package will help Hartford employees put out the company's 250 different newsletters.

"People want a tool that they can use to get their message across in a professional-looking way, but they don't want to spend a lot of time learning about graphics design," said Fontana, who has been using beta-test versions of the Aldus product for the last two months.

Several companies sought to get a foothold in the desktop publishing market by porting current turnkey systems for high-end applications down to the personal computer level. The offerings included a new version of Omnipage Corp.'s engineering workstation system, which features software that runs on all PCs based on Intel Corp.'s 80386 chip, and a similar package from Publishing Empire.

Harris to add CMOS 286

MELBOURNE, Fla. — Harris Corp. is scheduled to introduce this week what it claimed will be the first CMOS 80286 microprocessor to provide manufacturers of desktop and laptop systems full compatibility with IBM's Personal Computer AT.

The chip, called the CG80C286-12, will have a maximum clock speed of 12.5 MHz and will be fully compatible with the NMOS version of Intel Corp.'s 80286, including support for multitasking. Harris said it will have samples of a 16-MHz version of the product available in the fourth quarter.

With its static design, the product is well suited to battery-operated laptop systems, according to the company.

The chip provides systems-level power savings of up to 90%, according to Harris.

'Obvious interest'

Asked if leading laptop makers, such as Tandy Corp. and Zenith Data Systems, have an interest in incorporating the chip in future systems, Michael Graff, vice-president of marketing at Harris's Semiconductor Products Division, declined comment, but he did say "there is an obvious and great interest from all the manufacturers of laptops."

Other markets in which Graff said he expects the chip to do well include battery-operated instrumentation, robotics, military and "harsh environments where sealed boxes are required."

Cost of the CG80C286 ranges from $125 to $170 each in quantities of 100 to 999, according to the company.

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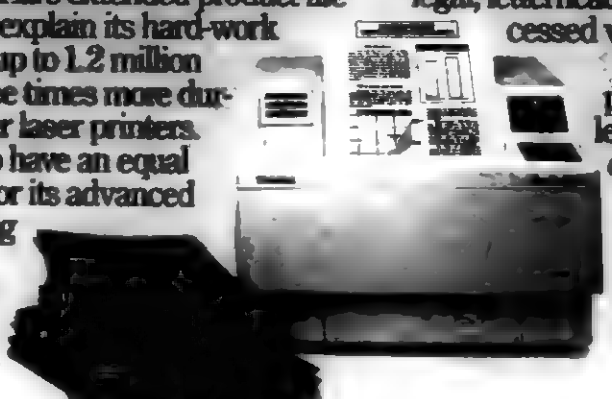


NAS claims AI system sniffs out potential mainframe disk crashes

BY STANLEY GIBSON
CW STAFF

SANTA CLARA, Calif. — National Advanced Systems Corp. (NAS) last week announced what it called the first expert system designed to predict failures in mainframe-type disk drives.

The Nastrack system, which consists of a single hardware board and software that is installed in the head of a string of drives, monitors seven performance parameters of NAS drives and sends performance data via a modem to an NAS support center in San Diego. The information is sent in batch mode on a daily basis.

"The system in San Diego sifts through the data and identifies what is out of the norm," said Charles Molloy, an NAS spokesman. Information that might indicate an imminent failure will alert a specialist who, in turn, can dispatch a customer support representative to the site in order to prevent a failure, according to Molloy.

"I think this is one of the critical components that people in the disk market will need," said Gerald Atterbury, a vice-president at Dataquest, Inc., a San Jose, Calif., research firm.

Not the first

Although Nastrack may be the first system of its kind for mainframe-type drives, it is not the first such system altogether. Atterbury pointed out that Digital Equipment Corp. currently offers a software product called the VAX System Integrity Monitor, which similarly flags errors that might indicate potential failures and then sends the information via a dedicated phone line to a DEC service facility.

"NAS and DEC may not charge their customers for this, but it can really help sales," Atterbury said. "One of the worst things is not being able to get to a portion of your data. This is a very cost-effective way to keep data on-line."

Nastrack is available to all U.S. customers at no charge. However, customers must install a dedicated phone line at their own expense in order to send information to NAS's customer support center.

Nastrack has been installed in two customer locations and at three NAS sites.

Molloy said testing performed has demonstrated that the system works, but not enough data has been gathered yet to show an improvement in performance reliability. NAS said it plans to use information gleaned from the program to design future enhancements to its disk subsystems.

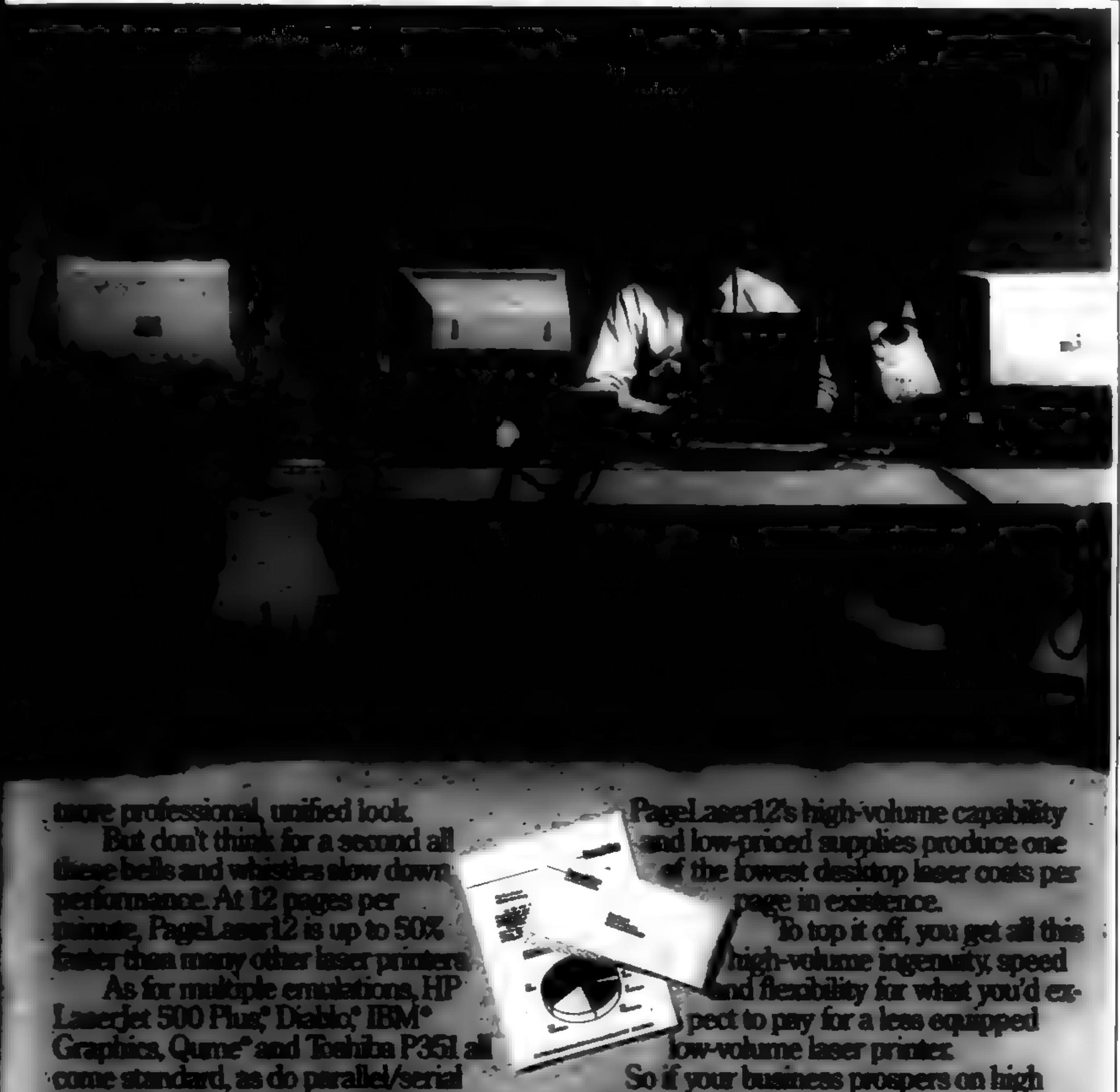
HP will extend printer language

SANTA CLARA, Calif. — Hewlett-Packard Co. last week disclosed its intention to extend its proprietary Printer Command Language (PCL) to non-HP output devices.

In a statement of direction at the Seybold Desktop Publishing Conference here, HP announced agreements that license five vendors to implement PCL on their printers or typographic systems. The licensees are Compugraphic Corp., Olivetti USA, Tandem Computers, Inc., Tegra, Inc. and Wang Laboratories, Inc.

Last week's announcement marks the first time that HP has made PCL available on other vendors' equipment, according to Roger Archibald, a product marketing manager with the firm's Boise, Idaho, division. Previously, the company had restricted the language to its own Laserjet family of printers.

The licensing arrangement also brings Laserjet compatibility to output devices that are better suited to niche applications than the HP printers themselves.



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COS ships first OSI test package

BY KATHY CHIN LEONG
CW STAFF

MCLEAN, Va. — After more than a year in existence, the Corporation for Open Systems (COS) reached its first milestone last week when it shipped its initial software product designed to test Open Systems Interconnect (OSI) protocols.

COS, a nonprofit standards organization, fulfilled its promise to members by offering the first release of the Transport Protocol Conformance Test System.

The $20,000 package, which runs on a Sun Microcomputers, Inc. Sun-3/160 workstation, is said to enable vendors to test their products for conformance with the transport layer of the OSI model, known as Level 4.

COS officials stressed that the software will support products that address the lower layers, specifically the CCITT X.25 packet-switching protocol and IEEE 802.3 and 802.4 specifications for wide- and local-area networks.

Developed jointly with the National Computer Centre in Manchester, England, the software will be offered to members first and then to nonmembers at a higher price, which is yet to be determined.

While COS officials would not disclose who is using the product, they did say several of the largest computer manufacturers have ordered the software. COS is not a direct sales organization but is taking orders via telephone for interested parties.

Touch Communications, Inc. in Scotts Valley, Calif., an OSI software developer, seems to be anxious to get its hands on the COS software. As a member of COS, Todd Corenson, Touch product marketing manager, said the test software will accelerate acceptance of OSI in the industry and help vendors, including Touch, speed up OSI product development.

"We are all for this product and absolutely intend to use it," Corenson said. "To date, no one has set up formal testing tools such as this, and COS is leading the way."

The package is just one step on a long and costly road to product interoperability, a major COS goal. Before vendors can use the software, they must attend a five-day training course that costs $1,200 for members and $1,800 for nonmembers.

Putting on a show

The software testing program is also a prerequisite for COS members wishing to participate in the Enterprise Networking Event '88 International next June. At the Baltimore meeting, vendors from the MAP/TOP Users Group and COS will link their devices together on one network for an interoperability demonstration.

According to Ted Manakas, COS product manager, the transport software represents the first in a line of COS conformance products.

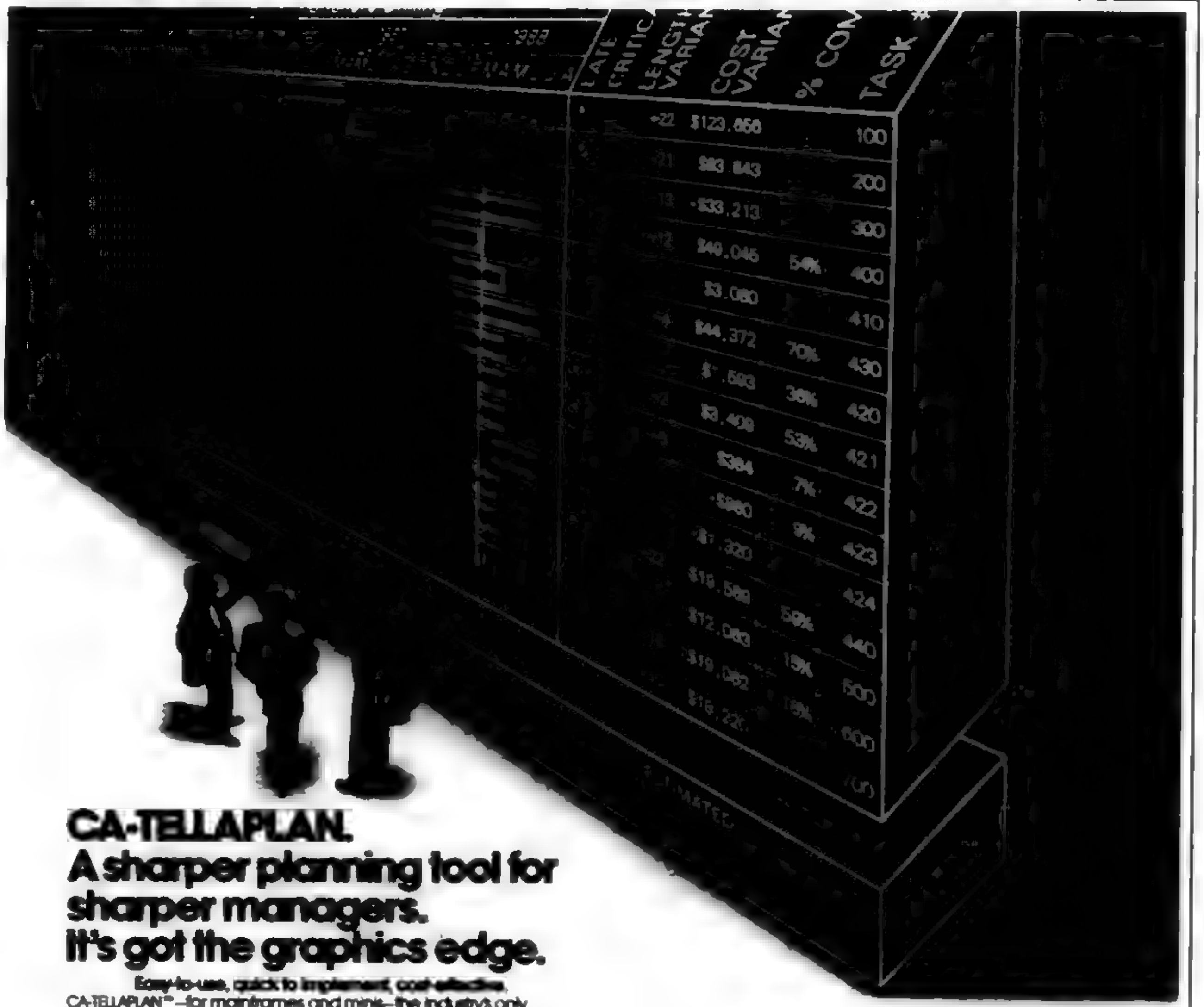
An FTAM conformance program will be delivered in November, and similar Message Handling System software will be shipped in December, noted Karl Litzenburg, vice-president of information systems.

Signing up

After vendors use the COS software products to ensure that their products conform with all seven levels of the OSI model, they can sign up for a COS conformance service to be offered in mid-1988.

Under the conformance service, vendors return to COS headquarters for an official test to obtain COS certification, "similar to the Underwriters Laboratory seal of approval," Manakas said. There, engineers will take the vendors' products to verify conformance with COS test software.

Corenson acknowledged that the COS certification will be beneficial to vendors supporting OSI but had reservations about how COS will price the service. "If we test a product and later modify it, I would find it stiff to have to pay for testing all over again," he said.



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Data base set to list used DP equipment

Start-up claims network will let MIS skirt dealer mark-ups; focus on IBM mainframes

BY CLINTON WILDER
CW STAFF

ATLANTA — A networked data base to help MIS executives sell used computer gear directly to other users is scheduled to be unveiled today by a start-up based here.

Named Usernet and marketed by Usernet, Inc., the network is intended to allow users to bypass the markup costs of buying and selling used equipment through traditional computer dealers and brokers, according to Usernet executives. The network is aimed at large DP operations running primarily IBM systems and peripherals. The criterion for listing in the data base is that the equipment must be relevant to the mainframe user.

"Because of the drastically high markups that some of us have seen from third-party dealers, we want to bring users together so they can buy and sell their own equipment and negotiate their own pricing," Usernet President Tom Cobb said.

"We will also make sure the transactions are properly managed — that the contract is good and the equipment is maintenance-certified by the manufacturer."

CDLA jeers

The Usernet concept drew a cynical response from Robert Gulko, chairman of the Computer Dealers and Lessors Association (CDLA).

"It makes sense conceptually until you look at the reality of how these transactions are done," Gulko said. "If a user has disk drives for sale now and the buyer doesn't want to install them until December, would the seller get paid now? The leasing companies and brokerage firms are geared to handle those situations because we keep inventory."

Gulko also asserted that there is a threat of a myriad of contract squabbles. "There are a lot of things that can happen outside the contract — maintenance issues, equipment being damaged in delivery, late deliveries, specifications out of line," he said. "I don't think the end user handling two or three transactions a year is equipped to handle all of that."

All this and consulting too

But Usernet officials said they will provide the expertise in managing transactions, advising both parties on contract structuring and other relevant details.

"We will also look for other markets for the users' equipment, such as value-added resellers and third-party maintenance firms looking for parts," said Bob Graham, Usernet's vice-president of sales and marketing. "We can provide a market for out-of-service equipment."

The Usernet data base can be accessed by any ASCII device with an asynchronous communications link. The cost of the service is $160 for installation and $60 per month or $600 per year.

For transactions, both the buyer and the seller pay Usernet a commission of between 2% and 5% of the purchase price. If a user performs a transaction through Usernet in the first year, the subscription fee will be refunded.

Graham said the data base may also include computer industry news, wholesale pricing information, news from the Data Processing Management Association and possibly third-party advertising.

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European airline reservations to run on 3090s

BETHESDA, Md. — IBM's Federal Systems Division last week disclosed details of its $100 million agreement to provide the fledgling European airline reservation system, Amadeus, with hardware and systems software.

The system will reportedly run on IBM 3090 mainframes with Transaction Processing Facility control software and a data base residing in IBM 3380 storage devices.

The mainframes will be linked with the Amadeus partners' individual reservation systems and four travel agency networks by a network that is based on CCITT standard X.25 in addition to International Airline Telecommunications Association protocols covering layers four to seven using an Open Systems Interconnect mod[illegible]

IBM, which helped develop American Airlines' Sabre reservation system in the 1960s, will adapt application software that will be supplied by Texas Air Corp., which operates Continental Airlines and Eastern Airlines.

Amadeus was formed in July with a $300 million agreement between Air France, Iberia, Lufthansa and SAS. These companies will own and operate the system.

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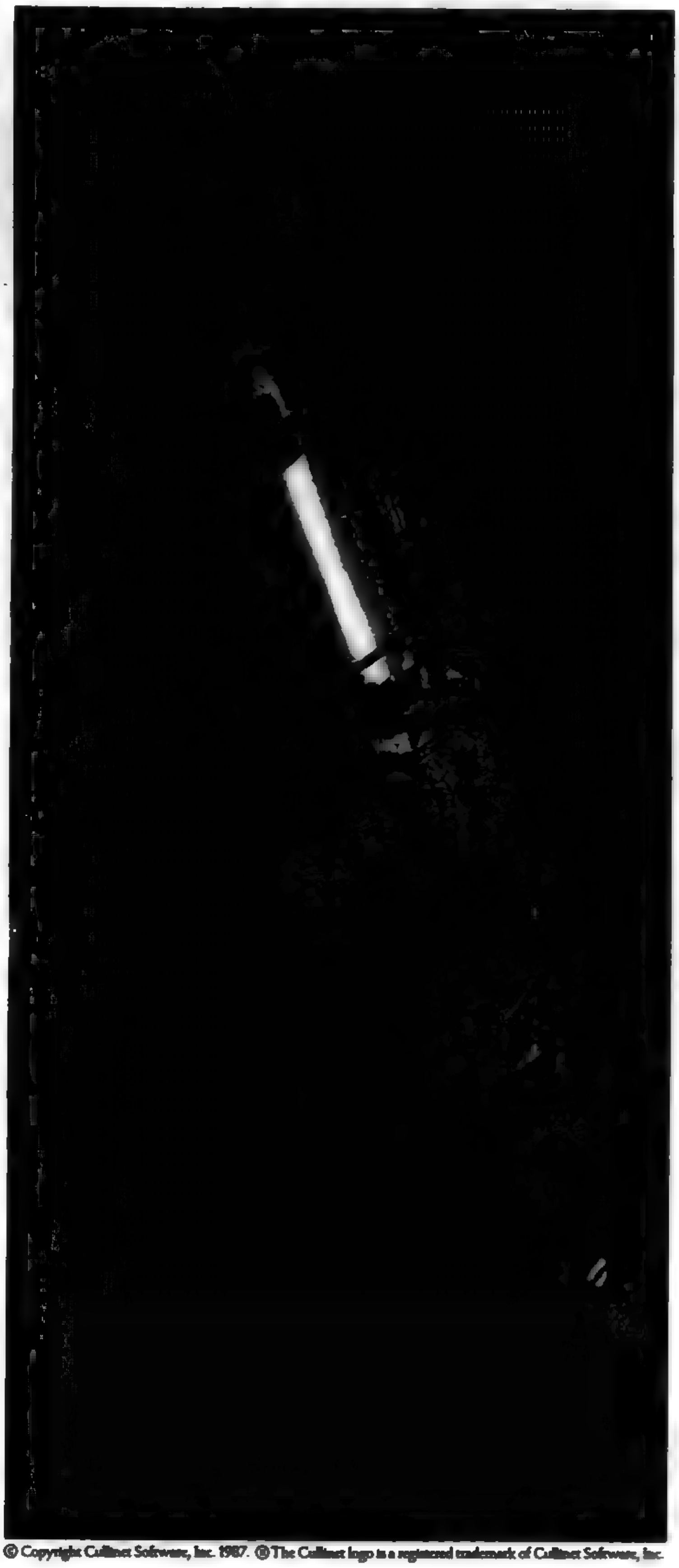
James A. Erd

James A. Erd
Information Center Manager
Mining Machinery Group
Joy Technologies Inc.



"Energy the right way" is the mission of the new Joy Technologies. And business solutions the right way are the result of their Mining Machinery Group's selection of Cullinet's Information Center Management System (C/ICMS) software. This $300 million Joy division is the world's largest manufacturer of underground mining equipment. They needed to expand capabilities and streamline operations. C/ICMS was the answer.

Reduced MIS dependency has led to increased efficiency. Joy's PC-based system has integrated the activities of 12 locations coast-to-coast and cut MIS overhead by $125,000. Every day Joy's Mining and Machinery people unearth greater profit potential. C/ICMS has helped in Joy's financial area by cutting the quarterly budgeting process by 30%. And end-users at all sites can now access corporate systems for better control of financial statements.

Joy's C/ICMS system is fully integrated with Cullinet's database product to deliver tremendous adaptability – for word processing, engineering analysis, machine performance tracking and financial updates. The concerns of MIS and end-users are readily addressed and productivity is efficiently fueled.

For more information on how your company can access Cullinet through C/ICMS, call toll-free 1-800-551-4555. Or write to Cullinet Software, Inc., 400 Blue Hill Drive, Westwood, MA 02090-2198.

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Reserve your place at Cullinet's User Week in Anaheim, California, September 27-October 1, 1987, by calling 1-800-551-4555.

Microsoft gives IBM PC the Works

BY KATHY CHIN LEONG
CW STAFF

REDMOND, Wash. — In a calculated move to attract first-time users and price-sensitive buyers, Microsoft Corp. last week announced its first integrated software application for the IBM Personal Computer.

Originally developed for the Apple Computer, Inc. Macintosh as Macworks, Microsoft Works for the IBM PC includes the same word processing, communications, data base and spreadsheet applications as the Macintosh version but features an added spelling checker program, macros and a computer-based training diskette.

According to product manager Bruce Jacobsen, the company experienced great success with Macworks when it hit the market a year ago. Compared with all its other programs, the $295 software represented the company's biggest seller the first month it was on the shelves. Now Micosoft is looking to bank on that winner by pricing the IBM PC version, informally referred to as PC-Works, lower than the Mac product at $195. Jacobsen said Microsoft is readying an updated version of Macworks to include PC-Works' additional features.

PC-Works, slated for shipment in October, will initially run on Intel Corp. 8086- and 8088-based machines operating Microsoft's MS-DOS. Users will need a minimum of 512K bytes of random-access memory, two 360K-byte drives and a color graphics adapter or Hercules Computer Technology, Inc. graphics card. Unlike the Mac version, PC-Works provides file compatibility with Microsoft Word and Lotus Development Corp.'s 1-2-3.

Sold via retail channels in 3½- and 5¼-in. disk formats, the program will be carried by Zenith Data Systems and Tandy Corp. computer stores. Zenith will resell PC-Works as an application to run on the Zenith laptop computer, according to Jacobsen.

Don't rule out OS/2 version

Whether a version will be created for IBM's OS/2 has yet to be determined. "We are positioning this product as an entry-level package for new users in small businesses and schools and to executives who have yet to learn how to use a computer," Jacobsen said. "OS/2 is still a while off, and we will have to see how this product does on the market."

PC-Works will be the only integrated program from Microsoft, Jacobsen noted. "Offering another integrated product would only be counterproductive for us," he said.

While the four applications are not as sophisticated as single products, Jacobsen stressed that PC-Works has more than enough capabilities for the user who must attend to a variety of tasks during an average workday.

CAD/CAM tool gets revamp

BEDFORD, Mass. — Computervision Corp. is scheduled to introduce tomorrow a revamped release of its computer-aided design and manufacturing (CAD/CAM) software.

Cadds 4X Release 3.0 includes a number of new modules for mechanical and electronic CAD as well as enhancements to Computervision's data base offering, Product Data Manager (PDM). Release 3.0 also has new features for CAM applications.

Computervision said Release 3.0 is available immediately. Current users will be charged for new modules, while upgrades to existing modules will be provided at no extra charge, the vendor said.

The software, with the exception of PDM, runs on the Sun Microsystems, Inc. 68020-based workstation platform. PDM runs on IBM mainframes or Digital Equipment Corp.'s VAXs.

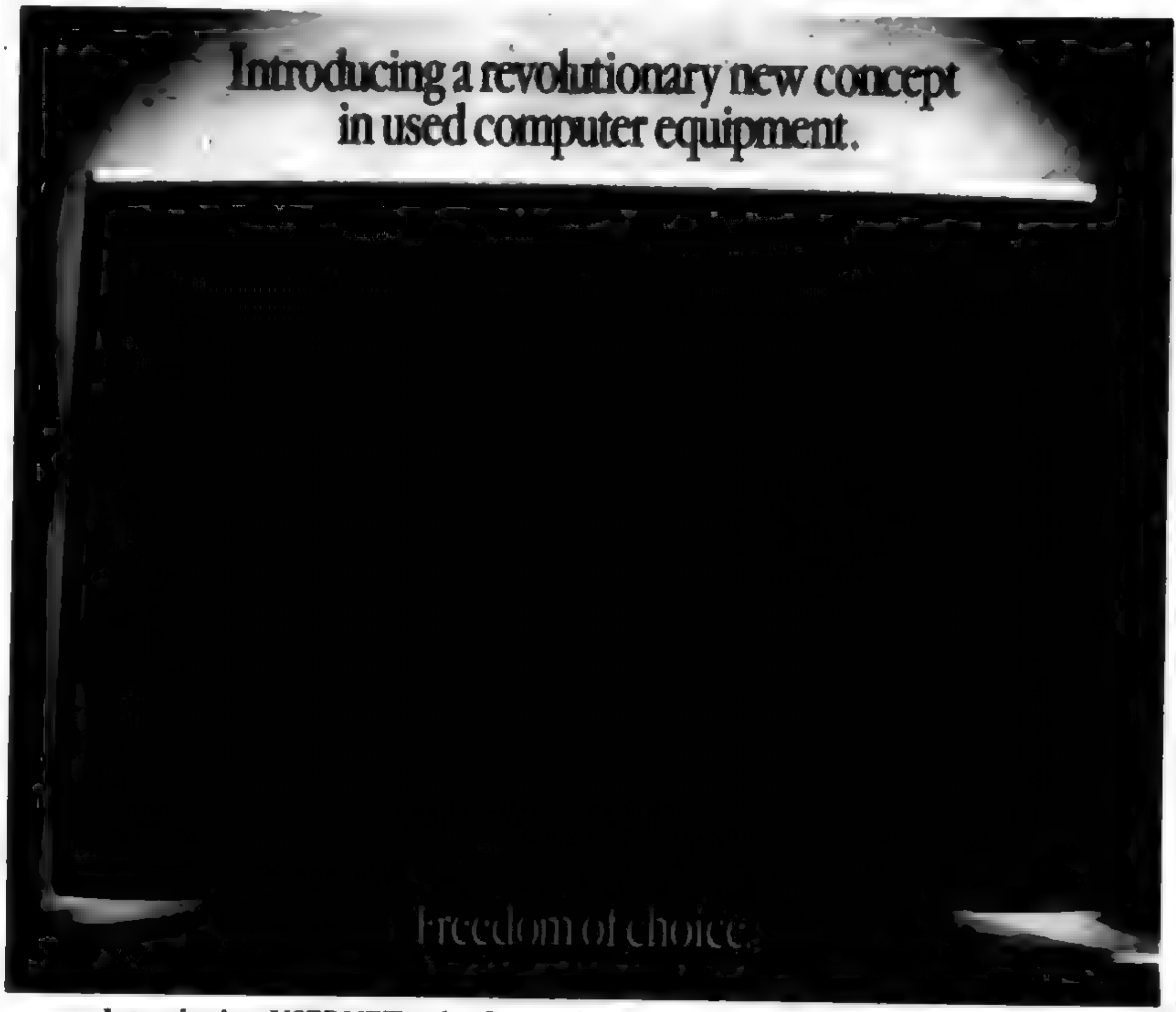
A Computervision spokesman said the company will announce within a month whether it will port its CAD/CAM software to the reduced instruction set computing-(RISC) based workstation Sun introduced in July.

Increases control over CAD data

The enhanced PDM is said to increase the control a department has over CAD data. For example, Command Lists can be created that allow a manager to specify which PDM commands a user may execute. A manager can also set up Authority Groups, which assign different levels of authorization to engineers.

Current PDM users will receive the new release free of charge, the vendor said. For new users, licenses start at $70,000, depending on the hardware platform.

Among the new mechanical CAD offerings is the Nurbs Surface Design module, a tool that is said to allow users to model complex sculptured surfaces such as automobile bodies. Nurbs is a more advanced version of the current Advanced Surface Design module, the company said. New licenses cost $5,000 per copy.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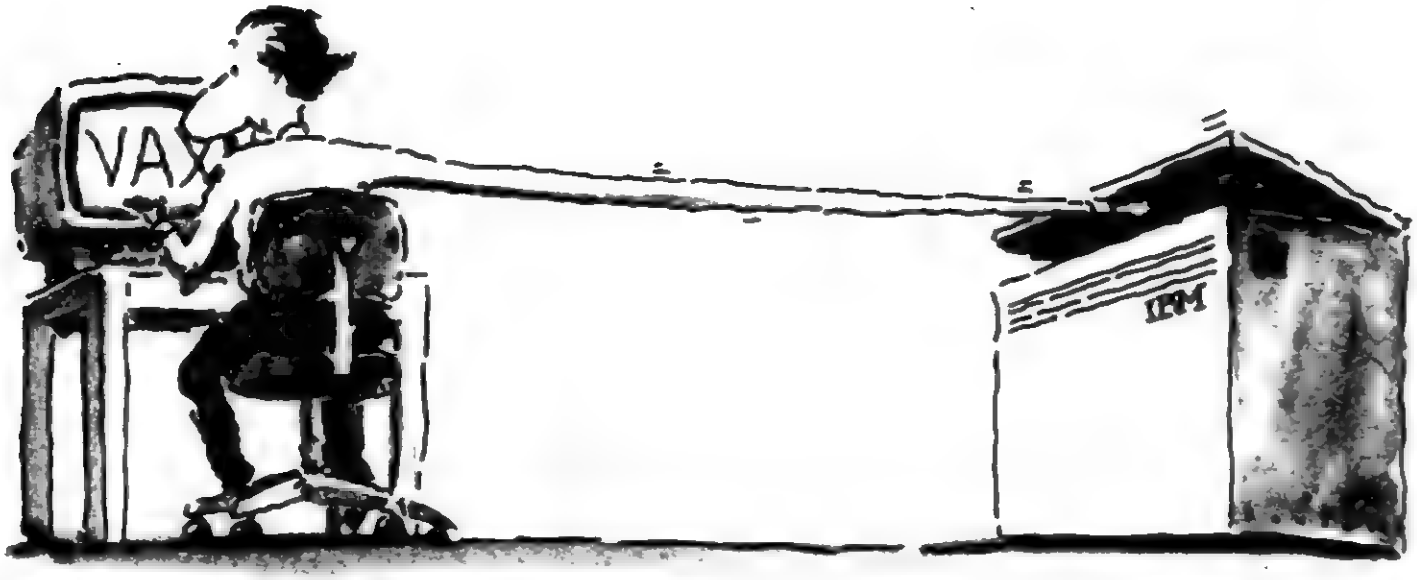

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EDITORIAL

DEC'd out

The software engineering manager at DEC puts it this way: Until recently, DEC managers were cautioned against doing anything that might "rile" IBM. "You know, let's just do our thing and not bother them," he says.

Now there's a different tune being played internally at DEC. "They're telling us to confront IBM — to practically go out of our way to, not to step out of the way," the DEC manager says. "We're feeling pretty good about this."

An awful lot of people are feeling good about DEC at its Decworld extravaganza in Boston. Featuring the Queen Elizabeth II as a floating hotel, Decworld is a single-vendor, invitation-only show for 30,000 guests that has the company's competitors green with envy.

What can you say about a $9 billion company whose double-digit growth in fiercely competitive markets has surpassed the wildest expectations? You say the company's been doing something right. That something is serving the needs of its customers at least as well as any of its competitors.

What DEC did best was neatly summarized by Gordon Bell, ex-DEC vice-president and father of the VAX strategy. While many vendors, most notably IBM, were featuring a melange of product lines that segmented the user base or filled application gaps, the VAX concept provided a reasonably compatible, single-interconnection environment. And DEC's third-party cooperative marketing programs are reaping great rewards in the applications development area.

But no one stays high forever, and DEC is facing formidible challenges, most of which emanate from within the company itself:

- DEC's own arrogance caused it to miss a ride on the PC bandwagon. What will it do about OS/2 support?
- Its sales force just doesn't measure up to the efficiency of IBM's.
- Peripheral offerings have many users shopping at third-party stores.

Still, it's hard to knock success. Even harder, though, to make it last.

Staffing up

As you will see from our article on page 2, *Computerworld* has greatly beefed up its editorial staff on the West Coast, with five full-time reporters to be working out of our new Burlingame, Calif., offices.

With the expansion of this office, we now have an editorial staff of 57 in the main office as well as four bureaus. This is a staff considerably larger than that of any other journal written for computer professionals. It is with this kind of investment that we will endeavor to maintain the high editorial standards developed over our 20-year history.

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LETTERS TO THE EDITOR

Still on the board

The article about the Federal Bureau of Investigation's National Crime Information Center (NCIC) [CW, July 6] was a good one, although slightly misleading. There was an implication that the NCIC Advisory Policy Board had approved certain proposals.

The board asked for ideas from justice professionals in every state on how NCIC could do a better job and more wisely use our tax dollars. We recently referred some of those ideas for detailed study. The board needs a great deal more information before a recommendation can be made to the FBI as to any NCIC improvements.

There has been no FBI proposal to expand NCIC, and the Advisory Policy Board has not recommended any change. We will not hesitate to make recommendations when and if we determine there is a reasonable, lawful and economical way to improve the program with the support of Congress and the vast majority of responsible Americans.

W. Gray Buckley
Chairman of the NCIC
Advisory Policy Board
Denver

Lost standard

James Bradley's data base management system article in the Spotlight section [CW, Aug. 10] contained the mistaken idea that Structured Query Language (SQL) is a language. Many recent opinions would categorize it as a common specification for data base access or a data base sublanguage, and we can safely conclude that it is not a language in the normal sense.

We could apply the old Codasyl term data manipulation language or maybe the Codasyl term data definition language, but we should probably apply both. C. J. Date is of the opinion that keeping the two functions separate is archaic.

In view of this, Bradley's elevation of SQL to the status of a nonprocedural language must be qualified as a nonprocedural sublanguage. In defense of Cullinet Software, Inc.'s IDMS/R, the syntax and ability of SQL to be nonprocedural is no more nor less than that of IDMS/R.

In this age of name games, we must all work to clarify the misunderstanding that vendors, the ill-informed and consultants use to sound better than they are.

Bradley should also be aware that IDMS/R is just one of a variety of other relational systems that is implementing the SQL syntax.

It remains to be seen just how good Cullinet's implementation will be, but the notion of a standard SQL seems to be lost.

Harold Kleven
Manager of Data Administration
Super Valu Stores, Inc.
Eden Prairie, Minn.

This week in history

Sept. 12, 1977
Chicago Stadium managers install an automated ticket printing system that enables stadium officials to order a limited number of tickets from outside vendors and print additional tickets in-house as needed. The minicomputer cuts production and printing costs and, when fully operational, allows officials to maintain mailing lists and offer expanded customer services.

Sept. 13, 1982
A federal judge rejects a government request to seal files detailing IBM's role in a Federal Bureau of Investigation trade secrets sting operation against Hitachi Ltd. and Mitsubishi Electric Corp. The decision allows defendants in the espionage case access to an assortment of IBM documents and requires the government to disclose the identity of the sting operation's informants.

Joint effort

We appreciate your reference to the Paine Webber, Inc./Computer Decisions survey of MIS attitudes that we conducted in June among 1,200 data processing managers [CW, July 13]. However, we would like to point out that this is a joint effort between Paine Webber and Computer Decisions, and the data is processed by SPSS, Inc. A lot of work goes into this survey, and we feel that all parties involved should be referenced.

Stephen K. Smith
First Vice-President
Paine Webber, Inc.
New York

Computerworld *welcomes comments from its readers. Letters may be edited for brevity and clarity and should be addressed to Bill Laberis, Editor,* Computerworld, *P.O. Box 9171, 375 Cochituate Road, Framingham, Mass. 01701.*

Relating to relational DBMSs

Knowledge of what 'relational' means will lead to improved productivity

EFREM MALLACH

New users often think that if a package can connect (or relate) files, it's a relational data base manager. If it can't, it's a file manager. They also think these two categories cover all the bases. They've never heard of any other kind of data base management system.

New users think "relational" has to do with relating one piece of data to another. Does a data base manager use links to connect a record with its parent? Fine — that's its way of establishing a relationship. See the link, the connection, the relationship? The data base manager is relational.

Veteran users know better. "Relational" comes from "relation," meaning a data table. The "how relational should relational be?" debate has raged in these pages for years.

However, that question is not the issue to new users. A woman who coauthored one of the industry's best microcomputer guides put it in a nutshell when she said to me, "So it isn't technically relational. What difference does it make to me?"

What matters to users

Good question. We should question the emperor's clothes. If something matters to users, let's focus on what matters and why. Then people will see the need for the distinction and use the terms correctly.

If it doesn't matter, pedantic nitpickers should get off their soapboxes and let real people get on with their jobs.

The fact is that relational does matter. Relational data base managers do things that other types of data base managers cannot do or can only do with great difficulty, such as the following:

- They provide a simple, uniform interface for users. Everything is a flat file. Data files are flat files. Users can create new views of the data, which will then act like still more flat files.

Query responses are flat files and can be reused in turn. Reports are flat files and are suitably formatted. There are no special-purpose "lookup files" to convert part numbers into descriptions or state codes into fully spelled-out names.

- They eliminate major programming hassles. There are no road maps of the links to learn, making the user navigate one record at a time. Fields are compared, tested and matched.

Entire tables are manipulated as single units, so there is no record processing to program and no end-of-set exceptions to deal with. It is easy for a novice to understand, yet behind-the-scenes mechanisms can make the process efficient.

- They deal with previously unplanned relationships. Suppose supplier, customer and employee files reside in a relational data base. We can locate the suppliers that are also customers. We can see which cities have suppliers and customers, and how many, to set up regional warehouses. We can find which employees live in the same cities as customers.

PAUL [illegible]

We can do this even if, in defining the data base, we did not put in these connections. And we can do them without navigating the links or writing programs that will read several files and compare fields for a match.

- They deal with complex relationships. In a political data base, a candidate's record may belong to the state's record as "favorite son" while the state's record also belongs to the candidate's as "place of birth."

These circular paths are impossible to implement in a hierarchical data base and tax most network-style data bases. In a relational data base, they are trivial.

- They rearrange connections. Since the connections aren't there, as far as the user is concerned, they never have to be changed. Did the patient switch doctors? Just change the doctor code in the patient record. The patient record does not have to be unlinked from the physician record and relinked to the new one.
- They provide extremely high performance. This point goes against the conventional wisdom, much of which is out of date but persists nonetheless. Modern relational technology, which a few vendors now have and the rest are developing, handles transaction processing with ease.

A good relational DBMS can outoptimize almost any programmer in accessing a complex data base and reoptimize automatically when storage structures change. Relational data bases, because of the inherent parallelism in their operation, can also exploit modern parallel architectures more easily than other types.

- As long as they are properly defined, relational data bases have a solid mathematical foundation that ensures certain desirable characteristics.

None of these points is meant at all as a put-down of the hierarchical or network data base managers. They have done a fine job for decades. However, the relational approach obviously has real pluses.

That's why people adopted early relational DBMSs despite performance penalties.

That's why IBM overcame its long-standing IMS preference and brought DB2 to practical use: Users had voted with their checkbooks for other vendors' relational products.

That's why relational DBMSs dominate data base management on minicomputers. Some relational DBMSs are available for some microcomputers today.

More DBMSs are coming that have evolved from nonrelational packages, been brought down from minis and developed from scratch. People who use them will, all things being equal, develop better and more flexible applications, more quickly and more easily.

That's the difference. That's why being relational matters and why we should keep our terms straight.

Mallach teaches at Boston College School of Management and is a consultant to top user and vendor executives. Much of his consulting work involves systems selection and competitive analysis.

The looming disaster of software standards

READER'S PLATFORM

CARL CARGILL

In a small committee in West Germany, rules are being prepared that may make much of the world's software obsolete.

These rules are not being prepared by archetypal mad scientists but by a group of well-intentioned, motivated (albeit prematurely) software ergonomists. They may be able to create rules for ergonomic software that will delay, confuse and generally disrupt the entire information technology industry.

Ergonomics — the scientific study of work — is a discipline that is becoming a major influence in the business world. Its concepts are not new; the phrases "fit the tool to the task" and "fit the tool to the worker, not the worker to the tool," are now standard in the workplace.

The newness of ergonomics is that it is now a discipline in and of itself, divorced from the areas that initially gave rise to its founding, such as manufacturing or military weaponry design.

Ergonomics is important to the information technology industry. Everything from keyboards to office chairs has been studied, measured, quantified, improved and even standardised to some extent.

Sensory and perceptual studies have improved the design of computers, making them easier to build, use and maintain. In nearly every instance, the quantification of information has provided a basis to help people better perform a physical task.

Computer perceptions

Of late, however, a new field of ergonomics has developed — software ergonomics. While the field can make definite contributions to the way people perceive and use computers, the attempts to create ergonomic standards are extremely worrisome.

The effort has already been formally initiated in Europe, with the Deutsches Institut fur Normung e. V. , the West German standards society, driving the effort. The West German union influence — participation in management — is one of the major forces in this activity.

Unlike its hardware counterpart, software ergonomics is largely a cognitive discipline — it anticipates the way people think. A software standard could, in the name of making software easier to use, mandate field placement, the arrangement of menus or the definitions of word processing terms such as "edit" or "format." And all these items would have to be adapted for specific industries, applications and languages.

While it sounds wonderful, this concept is still in the early developmental stage, dealing with a thus far difficult-to-measure cognitive discipline. Software ergonomics should be looked at as an extension of behavioral and organizational psychology rather than an extension of human factors.

It is extremely difficult to measure and quantify thinking that is based upon cultural, business and personal differences. It is axiomatic to state that no two people are exactly alike; this observation is especially true of the way people think.

Standards, however, are based on measured performance, capable of being repeated under differing conditions. Standards creation and implementation requires that there be no ambiguity in concepts or text.

At this time, software ergonomics can claim neither. Software ergonomics will come of age in the next 10 years and will make the computer a more beneficial tool.

SOFTWARE ergonomics is largely a cognitive discipline — it anticipates the way people think.

But before software ergonomics can accomplish this goal, it must define the task for the tool and define all aspects of the person who will do the task with that tool. If it does not have the discipline necessary to do these tasks first, software ergonomics will ultimately fail.

Currently, the Computer and Business Equipment Manufacturers Association is the only major U.S. group working to counter premature standardization in software. More voices are urgently needed.

Unless the entire industry becomes involved in the software ergonomics effort, companies will be rewriting their software under the most confusing of circumstances.

We cannot merely object down the road when an international standard is formally proposed. We must participate now. Failure to do so will mean following the standards makers into software disaster.

Cargill is a standards consultant at Digital Equipment Corp.

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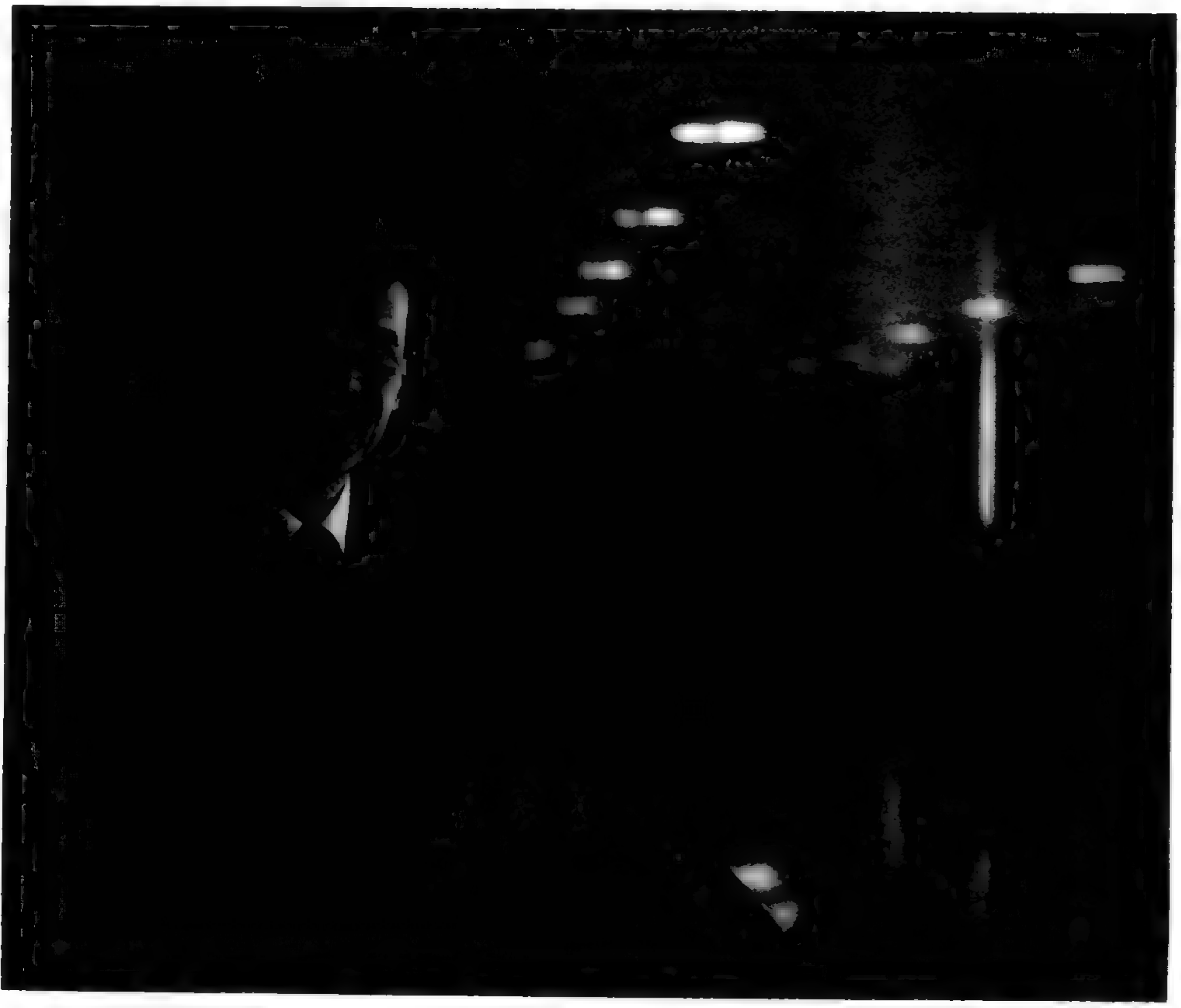

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William Inmon

Data bases come of age

It is interesting to compare the computer industry with other industries. The computer industry is, after all, new compared with most other major industries. That it is immature is not a disparaging remark — the immaturity of the industry is merely a statement of its age, which is a mere quarter of a century or so.

Contrast the age of the computer industry with those of other industries, such as construction (remember roads that could get you to Rome from wherever?) or accounting (remember the hieroglyphics on the walls of the tombs of the Egyptian pharaohs?). The worlds of software and data base management systems in particular are still in their formative stages.

Compare the data base industry with the automotive industry. In 1910, the automobile marketplace was dominated by a very few models — Model T Fords, for example. The Model T, in 1910, was a general-purpose vehicle. It served to carry chickens to market, the family

Continued on page 30

IBM burrows into CICS niche

Competitors see monitor software as potentially serious threat

BY ROSEMARY HAMILTON
CW STAFF

Nearly two years after its introduction, IBM's much-improved CICS performance monitor software has yet to pose a serious threat to the independent suppliers of CICS performance monitor tools.

But observers as well as these independent vendors agree that the IBM offering is just the beginning of what could be very tough competition in the future.

"We still don't come up against them as a major competitor," said Patrick McGettigan, president of Landmark Systems Corp. in Springfield, Va. "But they've made major upgrades to their product. This may be a small niche, but they are coming after it."

IBM's CICS Performance Analysis Reporting System (PARS) for MVS was first introduced in late 1985 and became available in March 1986. Since then, it has received additional enhancements from IBM, the latest of which came in May. CICS PARS/MVS is for CICS Release 1.7 and carries a monthly license fee of $900.

The product represents a big boost in performance, as well as price, over the older performance monitor offerings, a fact observers said indicates that IBM has big plans for this product.

"Transaction processing is a hot-button area now, and CICS is the main gun here. I would expect [IBM] to become more aggressive," said Herb Gepner, a senior associate editor at Datapro Research Corp. in Delran, N.J. "CICS PARS may be inferior [to the independent vendors' products] now, but that's just like many other IBM products.

Continued on page 30

Data View

Unix shipments by size class

Unix is still predominantly used on mid-range processors or smaller machines

INFORMATION PROVIDED BY INTERNATIONAL DATA CORP.
CW CHART

SOFTWARE NOTES

CPA group goes on-line

The **New York State Society of Certified Public Accountants**, the **Texas Society of CPAs** and **Price Waterhouse** have jointly developed an information management system to run a statewide CPA association, including managing data on membership, mailings, continuing education and event management. The system uses the relational data base in the IBM System/38 operating system. Although the developers were 2,000 miles apart, Margaret Gray, director of administration for the N.Y. group, said such a joint effort was possible when

Continued on page 27

Firm offers parallel software

BY CHARLES BABCOCK
CW STAFF

BEAVERTON, Ore. — Producers of parallel processor computers have complained there is no software designed for their machines, but now a small Bedford, Mass., firm is offering one of the first commercial applications for large-scale parallel processors.

Two-year-old Nektonics, Inc. has developed a $20,000 to $90,000 fluid dynamics and heat-transfer simulation package for Intel Scientific Computers' IPSC-VX, a parallel processor employing Intel's hypercube architecture, in which each node is a processor, according to Nektonics spokesman Brian McCay. Intel Scientific Computers is a Beaverton business unit of Intel Corp., based in Santa Clara, Calif.

In addition, the simulation

Continued on page 27

Inside

- Theos Software offers mainframe-style operating system for 386-based machines. Page 26.
- Carnegie Group prepares to sell individual components of Knowledge Craft. Page [illegible]
- Sigma Design enhances Unix-based CAD tool. Page 31.

THE BOSS IS COM [illegible]

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Carlsbad, CA [illegible]

Software, Inc.

Theos system brings power to 386 machines

BY STEPHEN JONES
CW STAFF

WALNUT CREEK, Calif. — Theos Software Corp. recently announced a mainframe-style 32-bit operating system that is said to allow up to 128 users to tap into the power of one microcomputer running on Intel Corp.'s 80386 microprocessor.

The $799 multiuser multitasking program can physically address up to 4G bytes of memory with a virtual memory space of up to 64 terabytes in the protected mode. I/O redirection and command pipes make Theos 386 compatible with DOS and Unix operating systems.

Theos 386 is scheduled for commercial release in January 1988. OEM porting will be available in September, while application porting will be ready in November, company officials said.

The vendor also announced Theos C, a $599 companion C compiler that meets the forthcoming ANSI C standard and features Unix and DOS source code compatibility.

A full development kit — consisting of Theos C, Theos Basic and a Script text processor — will be available for $1,599, the vendor said.

Theos has an installed base of about 70,000 licensed copies of its operating systems, including software that runs on 8- and 16-bit computers, company officials said.

For migrating downward

Theos 386 is aimed at users who want to move from mainframes and minicomputers to less costly microcomputers. Theos Chairman Timothy Williams said he believes users may start migrating downward as powerful 386-based micros blur the line between large- and small-system performance.

Like earlier Theos operating systems for the Intel 80286 chip, Theos 386 uses much of the programming and many of the same command names found in mainframe and minicomputer environments.

Mainframe-like features include a user interface similar to the one on the IBM VM/CMS, the Exec job-control language, a full-screen editor and sophisticated index files.

Paul Cubbage, a senior industry analyst with Dataquest, Inc., agreed that the product would appeal to minicomputer users looking for improved price/performance, but he said conservative mainframe users would be unlikely to downgrade to a micro.

Because Theos 386 was designed to act primarily as a user-friendly operating system for multiuser business systems, Cubbage said the package could be an alternative to Unix.

Knowledge Craft components to be sold separately

PITTSBURGH — The Carnegie Group, Inc. recently announced its plans to sell the components of its artificial intelligence environment, Knowledge Craft, individually.

The seven modules have prices starting at $7,800. A complete system starts at $23,200.

Knowledge Craft is based on the Carnegie Representation Language. The product includes an inference engine, the Prolog language and a Carnegie-developed language called Ops as well as other supporting modules.

Meets customers' needs

"We've received a lot of pressure from customers to provide this," said James Ferguson, the Carnegie Group's product manager for knowledge-based tools.

According to Ferguson, individuals generally use the entire Knowledge Craft environment the initial development work. "Then, as they go on, they usually determine one or two areas they want to concentrate on," he said. "They want just those pieces."

Knowledge Craft is available on Digital Equipment Corp. and Sun Microsystems, Inc. hardware.

It is also available on two dedicated artificial intelligence systems — Symbolics, Inc. systems and the Explorer from Texas Instruments, Inc.

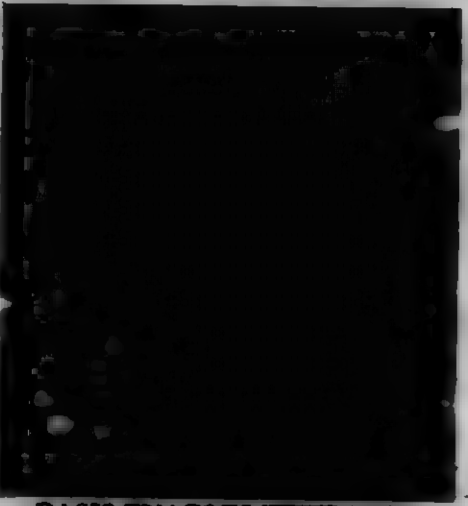
Individualized pricing

The complete Knowledge Craft for Sun workstations and Microvax IIs is $23,200, while the starting price of components is $7,800. The DEC VAX 8000 series is priced at $39,000 for the full system and begins at $19,500 for individual modules.

The cost on both the Symbolics and the TI systems starts at $12,500 for separate modules. A complete system costs $37,100.

The price of the complete Knowledge Craft package is about 15% less than the cost of all modules if purchased separately, according to Ferguson.

On the Sun workstation, for instance, Ferguson said the seven modules purchased separately would cost a total of $27,300.



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Notes

CONTINUED FROM PAGE 25

minor differences between the two organizations are ignored. "Tightly control the design, and once 95% agreement is obtained, go with it," she said.

Sterling Software, Inc. and **Tangram Systems Corp.** are working together on a storage management system for personal computers that would use mainframe storage devices.

In the first phase of the joint effort, Tangram will reportedly integrate a modified version of Sterling's Intelligent-Backup, which is a PC storage management system, with Arbiter, its micro-to-mainframe package.

Southwest Software in Arlington, Texas, has changed its name to that of its parent company, **Altai Software, Inc.** Altai is best known for Zeke, an automated job scheduler for IBM mainframes. Altai's business has become more national, making the Southwest name "not as appropriate as it once was," said James P. Williams, president of the software firm.

The **American Association of Computer Consultants** has been formed to provide a directory of members' areas of specialty, sponsor conferences and take complaints from the public, said managing director Jonathan Wallick. Officers and board members are to be elected by the membership. Students may join for a $35 annual fee; the annual fee for other members is $100.

Wang Laboratories, Inc. has signed an agreement with **Panasophic Systems, Inc.** to market the Panvalet source code control system on Wang VS minicomputers. The Wang version reportedly will be called Panvalet VS.

Westinghouse Electric Corp. in Pittsburgh recently purchased a minority interest in **C&K Software Ltd.**, a maker of systems software for IBM mainframes. Westinghouse has remarketed a number of C&K products, which were designed for IBM's MVS and VSE operating systems, for the past three years. VM versions of a network control interface and a multiple sessions manager are now under development, a Westinghouse spokesman added.

IBM struck a deal with **Molecular Design Ltd.** in San Leandro, Calif., to jointly develop a system to manage chemical information. The software is intended for users of IBM 370 hardware in the chemical process and pharmaceutical industries.

A DB2 and SQL/DS newsletter is now available from the **DB2 and SQL/DS Users Bulletin** in New York. Interested users can send a self-addressed, stamped envelope to the organization at P.O. Box 560, Wall St., New York, N.Y. 10005.

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Parallel

CONTINUED FROM PAGE 25

package will run on a supercomputer from Cray Research, Inc. in Minneapolis; an FPS-164 or FPS-264 parallel processor from Floating Point Systems, Inc. in Beaverton; and an X1-CP from Convex Computer Corp. in Richardson, Texas, McCay said.

Problem solver

The simulation package can be used to solve a variety of complex two- and three-dimensional fluid dynamics and heat-transfer problems.

It was designed for use in the aerospace, automotive, electronics, energy and materials and process industries, the Nektonics spokesman said.

Nekton 2.0 has been released by Nektonics for the Intel IPSC-VX/2 parallel processor, available in configurations that range from 16 to 128 processing nodes. Each node consists of an Intel 80386 microprocessor.

Simulations that require four hours to run on the Digital Equipment Corp. VAX 8600 can be run in three minutes on IPSC-VX consisting of 32 nodes, Intel spokesmen claimed.

Several other commercial parallel processing software packages are slated for delivery, including extruded materials modeling and molecular modeling, Intel spokesmen said.

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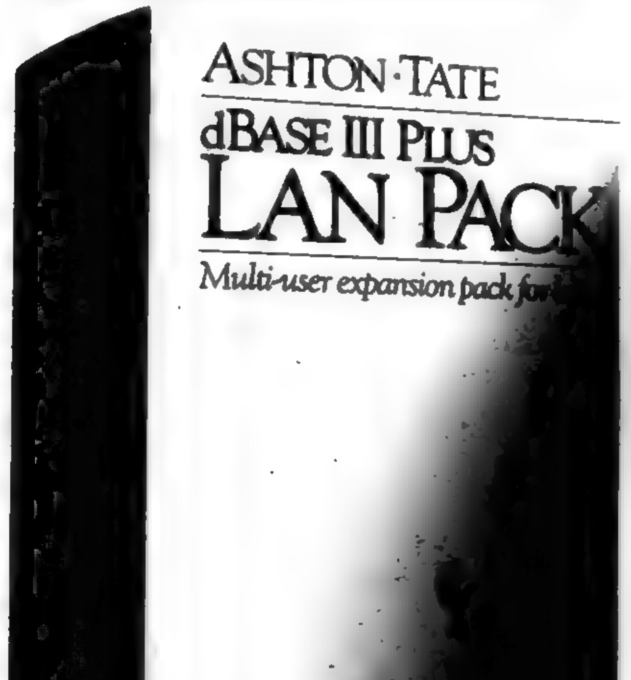

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the data management standard

Data bases

CONTINUED FROM PAGE 25

to church on Sundays, the saleaman from one town to the next and so forth.

Look at the automotive industry today. There is a wide variety of forms of personal transportation — motorcycles, trucks, sedans and Ferraris are but a few. The industry has branched out and created a product for the many niches in the marketplace. A general-purpose Model T in today's marketplace would simply be an anachronism.

Contrast the automotive marketplace with the data base marketplace. In the early dawn of the data base market — around 1960 or so — what did you have? The pioneers that attracted attention in the marketplace were Cincom's Total, IBM's IMS and SAS Institute's System 2000. If you were doing anything on data bases at all, you were using one of these products because that was all there was. At the same time, these were general-purpose products that served whatever data base needs arose. These data base products may be considered the Model Ts of the industry.

Age of specialization

But look at the data base marketplace today. What you find is a wide variety of specialized products — Ashton-Tate's Dbase II for microprocessors, Information Builders' Focus for end users, ACP for transaction processing and so forth. Predictably, the data base market has reacted just as the automotive marketplace has, by rewarding the specialists. Clearly, the world is staunchly turning toward the specialized data base package.

The result is the storage of data in many forms in many data bases. A byproduct of the specialization that has occurred is the prolific redundancy of data. In short order, the specialization of the data base marketplace has mandated that the dual data base approach is the wave of the future.

But there is some curious thinking that can be found in both the marketplace and academia. Many of the mainstream vendors in the market doggedly cling to the notion that a single DBMS will serve all needs. These companies are trying to extend the Model T to serve the needs of hauling hay to market, impressing your date on Saturday night and taking the family on a vacation. The result is a monstrous polyglot that is neither glamorous, efficient nor capable of hauling large loads.

Dual data bases, redundancy of data and specialization rather that generalization are reality, and there doesn't appear to be any turning back. The vendors that firmly entrench their products in concepts rooted in the 1960s are doomed to creating and proliferating museum pieces.

Inmon is a senior principal with American Management Systems in Lakewood, Colo., and an author on the subject of data base design.

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IBM burrows

CONTINUED FROM PAGE 25

They start out that way, and then IBM ends up making it better."

The CICS PARS offering is considered by observers to be the first serious CICS performance monitor from IBM.

Prior to CICS PARS, IBM offered a series of tools with a batch orientation. Some of those tools were rolled into CICS at no extra charge. Others, like Performance Analyzer II, were offered as separate products.

Others filling the gap

Before IBM offered a true performance monitor, a number of vendors stepped in to provide systems with real-time capabilities and more advanced analysis tools. Candle Corp. rolled out Omegamon/CICS in 1981 and now claims to have 3,000 users.

Other software vendors, such as Applied Data Research, Inc.; added a CICS option to their performance monitor product line.

Landmark Systems introduced The Monitor for CICS in 1984 and now boasts a user base of 2,200. Newer entrants include Boole & Babbage, Inc., which acquired a CICS monitor product from Quantum International Corp. in Birmingham, Ala., in 1985 and began shipping a modified version of that product called CICS/Manager in late 1986. It claims to have sold 400 licenses.

Goal Systems International, Inc. in Columbus, Ohio, got off to a rocky start in the mid-1980s that "took the wrong approach to monitoring CICS," according to Jeffrey Barnard, a product manager at Goal. The vendor revamped the product and rolled out Explore/CICS Release 3 last year. It has since built up a user base of 175, Barnard said.

Observers said these vendors continue to enjoy a performance advantage over IBM. But they also said they expect IBM to continue boosting CICS PARS/MVS's functionality. In addition, the fact that it comes from IBM, the creator of CICS, carries considerable weight, according to users.

One CICS installation, which is a long-time user of IBM's CMF, is in the process of reviewing a new performance monitor, and it has already ruled out IBM's offering.

"I don't believe CICS PARS is as good as the others," said Ted Keller, manager of systems programming at Yellow Freight System, Inc. in Overland Park, Kan. "It just isn't in the same ballpark."

NEW PRODUCTS

Systems software

Syncsort, Inc. has enhanced its **Syback** backup/restore product and its **Syncsort CMS** sort/merge product.

Release 2.1 of Syback provides support for IBM's VM/XA in an IBM 370-mode machine. Other features include a scheduler service machine that enables the automation of all backup operations, automatic job checkpoint restart in the event of a system crash and improved task- and job-tracking capabilities.

Syncsort CMS Release 6.1 incorporates new sort algorithms and a faster copy function, the vendor said. It supports interactive prompting for copy-and-compare applications and for sort-and-merge applications.

A three-year license for Release 2.1 of Syback costs $4,125 per year. A three-year license for Release 6.1 of Syncsort CMS costs $3,500 per year.

Syncsort, 50 Tyce Blvd., Woodcliff Lake, N.J. 07675.

An upgrade to the cross-referencing facilities in Version 1.4.B of its **Magec** application development system has been announced by **Magec Software.**

Users can now obtain hard-copy reports of all references and usage of data elements by batch or on-line applications developed or maintained through Magec. The reports are formatted to accommodate on-line viewing directly from the print queue.

According to the vendor, the usage report can show reference from the nonprocedural specifications and from Cobol customization coding done by the developers.

Magec operates on IBM mainframes under DOS and MVS. It costs $32,000 for DOS and $72,000 for MVS.

Magec Software, 2324 Seedling Lane, Dallas, Texas 75252.

Applications packages

Sigma Design, Inc. has released an updated version of its Unix-based computer-aided design (CAD) software for building design, at the same time changing the system's name from CAD Solutions to **Arris.**

Arris Release 5.5 includes an object-oriented user interface and a space planning application called Space Design. Other enhancements include the ability to produce production drawings and create models and renderings, metric support and support for IBM's Enhanced Graphics Adapter-compatible graphics cards.

Arris is priced from $3,000.

Sigma Design, 61 Inverness Drive E., Englewood, Colo. 80112.

Utilities

A series of software products designed to connect non-IBM graphics peripheral devices to IBM mainframes has been announced by **Maersk Data, Inc.**

MD-Connection includes MD-Plot, which makes it possible to output Graphical Data Display Manager (GDDM)-produced charts on non-IBM plotters; MD-Laser for graphics on laser printers; MD-Slide, which links film recorders to IBM mainframes; and MD-Graftext, which mixes graphics and text on laser printed output.

MD-Connection supports all GDDM versions under IBM's MVS/TSO. Prices range from $7,500 to $13,500.

Maersk Data, 25 Vreeland Road, Florham Park, N.J. 07932.

Services

A review service, which the vendor said helps determine the true cost of information systems projects before resources are committed, has been introduced by **Duncan Associates.**

The **On Target Estimate** (OTE) basic review includes a written report that rates the project on more than 40 reliability factors. The Expert review includes customized recommendations for improvements. Comprehensive reviews include a fully documented, independently prepared project plan and an estimate.

Basic reviews start at $695, Expert reviews start at $1,895, and Comprehensive reviews are custom priced.

Duncan Associates, 5 Kitson Park Drive, Lexington, Mass. 02173.

Development tools

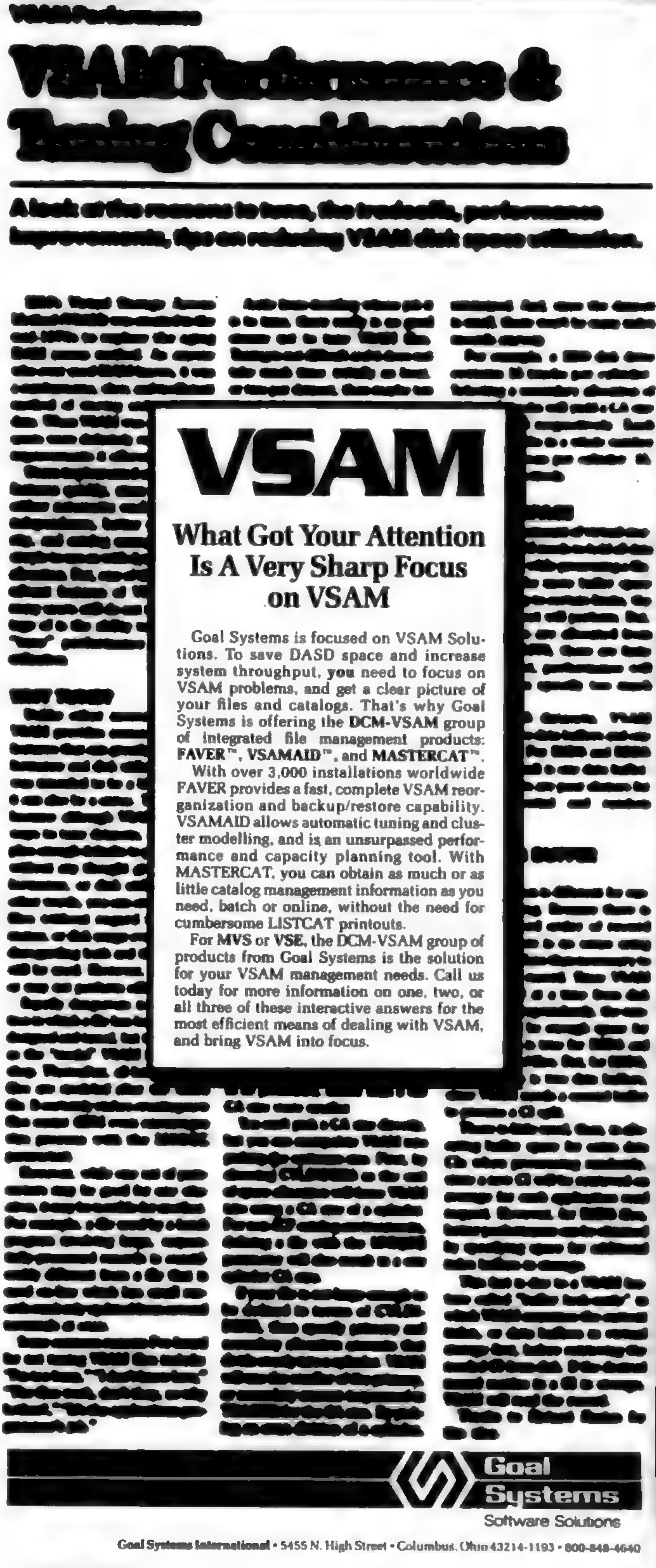
A kit said to allow application programmers to develop multitasking applications based on Digital Equipment Corp.'s VAX/VMS system services has been announced by **Wendin, Inc.**

The **Wendin-DOS Application Developer's Kit**, released in conjunction with Wendin-DOS, is said to allow system services to be called from high-level languages. Suppport for assembly language programmers is also provided.

New programs can access disks in physical, logical or virtual coordinates. Programs can open up to 128 files at once, access up to 4G-byte disk partitions, use files up to 4G bytes and use 16M bytes of extended memory. File locking is built-in.

The Wenin-DOS Application Developer's Kit costs $99.

Wendin, Box 3888, Spokane, Wash., 99220.



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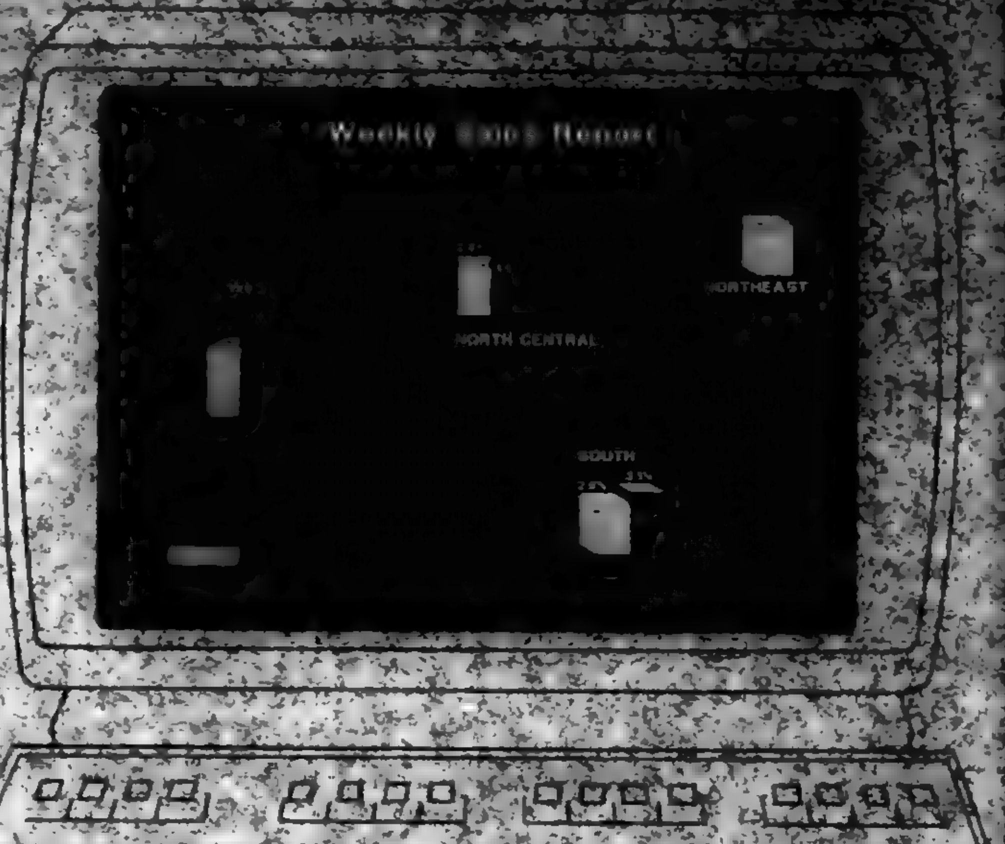

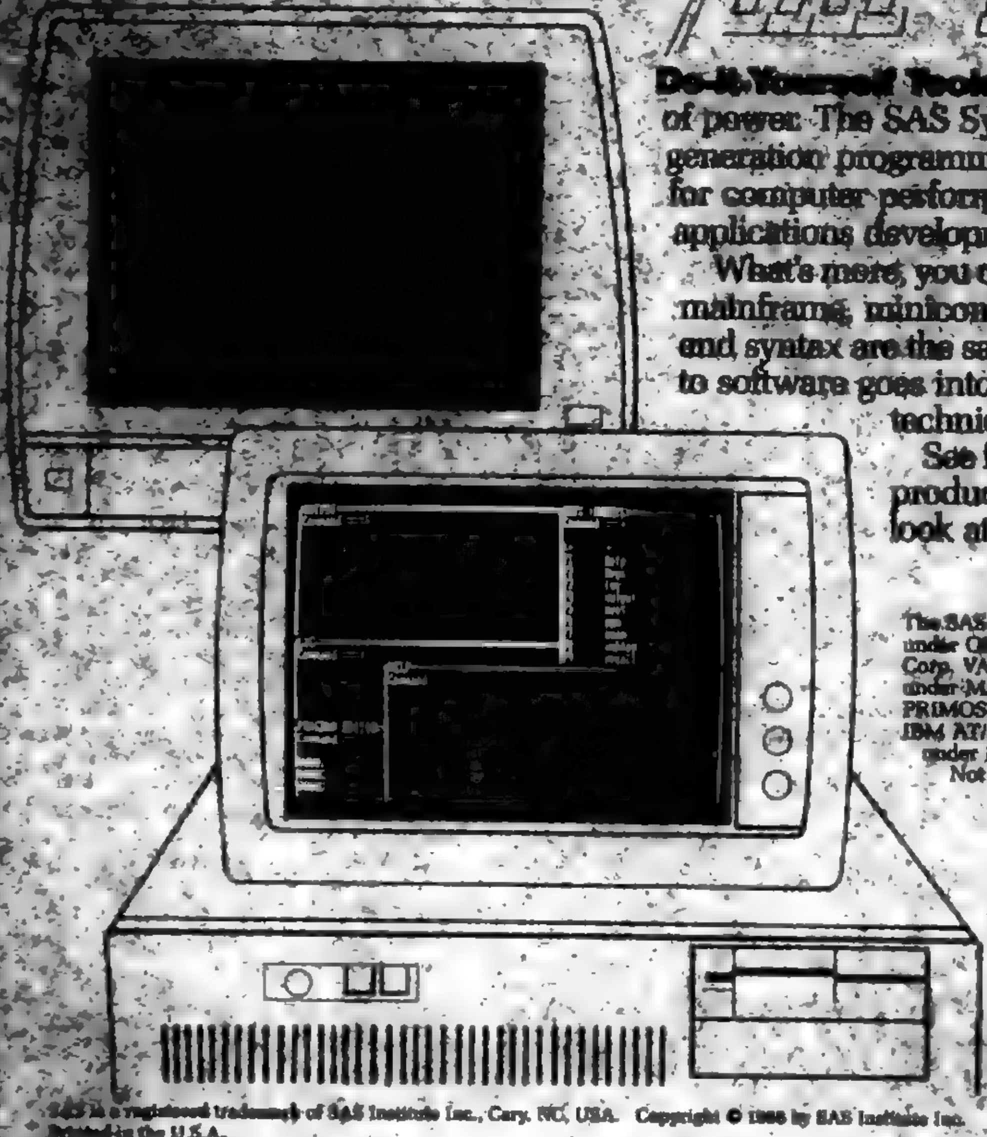

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SMALL TALK

William Zachmann

Programming by the book

In an era of exciting new computer software, it is interesting to note that some of the best software-oriented products aren't computer software at all. I'm referring to a batch of books that have recently been published as a result of an agreement between Borland International and Osborne/McGraw-Hill, Inc.

Judging by the four books in the Borland-Osborne/McGraw-Hill Programming Series, authored by Herbert Schildt, this joint publishing venture will prove to be a great resource for corporate developers interested in learning how to build serious applications on microprocessor-based systems.

Directed primarily toward Borland's Pascal, Prolog and C language products, Schildt's books offer first-rate material of more general applicability as well.

The titles are *Using Turbo C, Advanced Turbo C, Advanced Turbo Prolog Version 1.1* and *Advanced Turbo Pascal.* The first is a beginner's introduction to the C language, priced

Continued on page 36

Claris set to leave Apple nest

Apple subsidiary concentrates on software as it strives for independence

BY JULIE PITTA
CW STAFF

CUPERTINO, Calif. — Claris Corp., Apple Computer, Inc.'s software subsidiary, will take its first step toward severing ties to its parent when it moves into its own building in Mountain View, Calif., this fall.

While the move from Apple headquarters could be viewed as merely a symbolic gesture, Claris and Apple executives maintain that it is part of a three-part plan to eventually spin off the subsidiary.

John Zeisler, Claris marketing vice-president, said Claris, which be jokingly refers to as [Claris President Bill] Campbell Land's Apple-Rejected, Inspired Software — is in phase one. "We're a start-up in reverse," Zeisler explained. "We started with revenue, and now we're building an organization."

Claris' management team is now in place and includes former Metaphor Computer Systems, Inc. cofounder Yogan Dalal, recently named Claris vice-president of product development. Dalal was a member of the Xerox Corp. Palo Alto Research Center team that included Apple fellow Alan Kay and Apple Vice-President Larry Tesler.

Zeisler said Apple software — Macdraw, Macpaint, Macwrite, Macproject, Appleworks and Access II — is currently being repackaged with the Claris label and is scheduled to be on dealers' shelves by year's end. Those five products account for about $40 million in annual revenue.

A priority at Claris will be to improve support services for those six packages, something Apple has "notoriously avoided," according to Zeisler.

A large part of Zeisler's time is spent on the phone, talking to software developers eager to pitch their packages to Claris.

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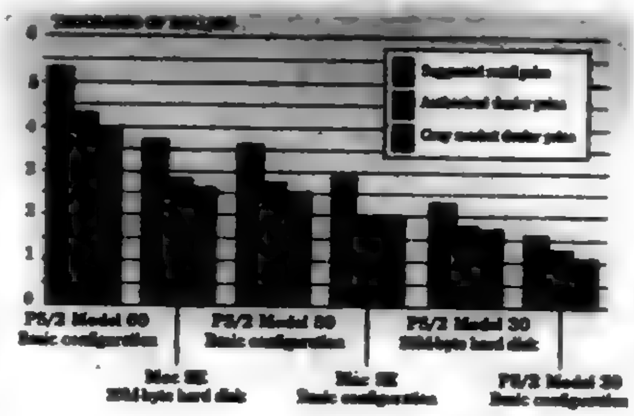
Inside

- Facsimile boards open up a new market. Page 38.
- Delta rolls out IBM-compatible PCs. Page 41.

Data View

Dealer discounts

Current retail IBM PS/2 and Apple Mac SE prices



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CW CHART

New president eyes cure for Micropro market ills

Leon Williams

Micropro International Corp. was in a tailspin when Leon Williams took over as president a year ago. The San Rafael, Calif.-based vendor's technology had grown dusty after years of neglect, and its once-intimidating share of the word processor marketplace had been lost to a number of younger, more innovative companies.

Although the company is far from regaining the glory of its heyday, Micropro is showing signs of recovery. Armed with $23 million in cash, Micropro is chasing acquisition targets that might bolster current products or spark the company's entry into Apple Computer, Inc.'s Macintosh marketplace.

To cozy up to its large installed base, Micropro is set to release a spate of products by year's end. The first will be a $495 enhanced version of Wordstar 2000 Plus, scheduled for release in October.

The firm is also reaping profits from a recent Wordstar Professional upgrade, the first in years, based on the acquisition of a product from Newstar, Inc. late last year. Williams recently spoke with *Computerworld* West Coast correspondent Stephen Jones about Micropro's strategy.

Why did Micropro become so disconnected from its huge installed base?

Two reasons. Number one, early on in the company, good records on customers either were not

Continued on page 42

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FROM PAGE 33

at $19.95. The other three offer more advanced treatment of C, Prolog and Pascal, at $22.95 each.

Schildt is an author who clearly knows what he is talking about.

Using Turbo C is a beginner's introduction to the C language — obviously Schildt's favorite. Providing numerous practical examples, the book is as much an introduction to basic programming concepts as it is to the C language generally and to Borland's Turbo C in particular.

The book is written in three parts. The first is an introduction to C as implemented in Borland's Turbo C.

Starting with some background on the C language, Schildt goes on to describe the Turbo C environment and editor.

Part one concludes with an introduction to the fundamentals of Turbo C.

The second part is a straightforward cumulative presentation of the Turbo C language starting with variables, constants, operators, expressions through program control statements, arrays and strings, pointers, functions and I/O.

The book's final section covers more advanced topics like user-defined data types, preprocessor and compiler options and library functions.

The presentations are accompanied by example code illustrating the point being discussed.

The reader can try out these examples, with variations, to his own satisfaction.

Shows his stuff

It is with *Advanced Turbo C*, however, that Schildt hits his stride. More than just a follow up to the more introductory material in the basic book, *Advanced Turbo C* provides what amounts to a comprehensive computer science course as well as an advanced C programming guide.

The first two chapters, for example, thoroughly develop the basics of searching and sorting algorithms and queues, linked lists and binary trees.

Dynamic memory allocation, graphics programming, statistics, codes and data compression, random-number generators and simulation and expression parsing and evaluation are among the topics covered in other chapters.

Advanced Turbo Pascal is organized around an outline similar to that found in *Advanced Turbo C*. It differs primarily in that the examples given are for Turbo Pascal rather than for Turbo C.

In addition, it contains chapters specific to the Turbo Pascal Data Base Toolbox and Turbo Pascal Graphics Toolbox. These are libraries of subroutines sold by Borland as accessory products to Turbo Pascal.

Advanced Turbo Prolog, however, is quite a different book, reflecting the unique capabilities and applications potential of the Prolog language.

A key language for artificial intelligence applications, Prolog is treated by Schildt under topic headings for which it is well suited, including expert systems, natural language processing, vision and pattern recognition, robotics and machine learning.

'Real' applications

One of the best opportunities for corporate users of personal computers during the next few years will be their employment for serious "real" applications.

Programming languages like C, Pascal and Prolog are much better tools for capitalizing on these opportunities than traditional languages like Fortran and Cobol.

Books like these, combined with language tools like Borland's, make it easy for information systems professionals to learn how to use the newer tools more effectively and take advantage of the opportunities PCs offer.

They can also help more experienced PC users who lack a professional systems background grow into more capable and sophisticated users.

Zachmann is vice-president of research at International Data Corp.

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Economics spur facsimile board sales

BY JAMES A. MARTIN
CW STAFF

With the shrinking of facsimile transmission technology onto a microcomputer add-in card, a hot new micro communications market has emerged.

In 1986, the facsimile board's first full year on the market, fewer than 1,000 units were sold, according to International Data Corp. (IDC). So far this year, about 10,000 units have been sold, a figure that is expected to double by the end of the year and triple in 1988.

The facsimile board enables an IBM Personal Computer or compatible to directly transmit or receive images of text and graphics with the immediacy of a facsimile machine, while at the same time cutting communications costs and offering ease of use.

Currently, a dozen or so smaller office automation and image processing companies are fighting it out for market share, including Datacopy Corp., Dest Corp. and Gammalink. Meanwhile, more broad-based vendors, including Intel Corp., Apple Computer, Inc. and IBM, are rumored to be preparing products to compete in this market, while Next, Inc. will reportedly feature a built-in facsimile board in its upcoming workstation products.

The various facsimile boards now on the market have only a few things in common, other than the obvious ability to turn a microcomputer into a facsimile machine. Many currently available machines combine Rockwell International Corp.'s R96 facsimile chip set with a modem compatible with the CCITT Group III facsimile standard on one board.

Some boards, such as Gammalink's Gammafax Plus, also offer a Hayes Microcomputer Products, Inc.-compatible 1,200 bit/sec. modem, usually on a daughterboard, to ease the need for another expansion slot. Hayes-compatible modems are not capable of directly interfacing with facsimile machines or other facsimile boards, so a facsimile modem is required, according to H. S. Magnuski, president of Palo Alto, Calif.-based Gammalink.

Several boards, including Datacopy's Microfax, have an Intel 8088-2 or another on-board microprocessor to relieve the CPU of Send-Receive tasks. Others rely instead on scaled-down boards and the accompanying software to largely off-load the CPU tasks.

Making a difference

The software driver for these boards is "where a vendor can make a difference," according to Shelly Bakst, a senior analyst with IDC. "It's up to these vendors to make the necessary software links between the facsimile application and the standard micro software packages, such as Lotus's 1-2-3 or Wordperfect."

The differences in the products, however, are merely vendor trademarks and will not pose compatibility problems between the various vendor facsimile boards and machines, analysts say.

Economics is the chief factor behind the growth of this new technology. Priced between $900 and $1,500, facsimile boards are less expensive than the majority of $2,500 to $4,000 facsimile machines and offer the same capabilities.

Also, facsimile boards can enable a large corporation to cut down on the use of overnight mail services. With lower costs, a department in a corporation can have five or six facsimile machines, in essence, instead of the usual one per department as is common today.

If it takes off as expected, the facsimile board should hurt sales in the traditional facsimile market while boosting revenues in microcomputer peripheral industries. Modem and data storage vendors stand to gain, as the technology requires modems for sending and receiving and hard disks for storing the memory-hungry facsimile image files. Analysts say they expect users to print facsimile transmissions on laser printers for such applications as desktop publishing or computer-aided design and manufacturing (CAD/CAM).

Despite the technology's promise, the facsimile board technology has its limitations and drawbacks. Some analysts say it will not gain wide acceptance beyond certain niche markets like desktop publishing and CAD/CAM.

"In applications such as those, there is a need for merging text and graphics together in a time-vital situation," says Julie Weiss, an analyst at Dataquest, Inc. in San Jose, Calif. But when text or graphics requires large amounts of memory, or if any further significant processing is needed by the receiver, modems and other traditional data communications methods will continue to be preferred, she added.

"I don't think the current crop of products out there totally meets the end user's needs," Gammalink's Magnuski says.

Still, facsimile boards have come a long way since Gammalink introduced what is considered the first entry, for some $2,000, in November 1985.

In the future, facsimile modems will be emerging for IBM's Personal System/2 series with the Micro Channel architecture. Several other vendors, including Apple, are expected to unveil models for the Macintosh line and costs are expected to drop to $500.

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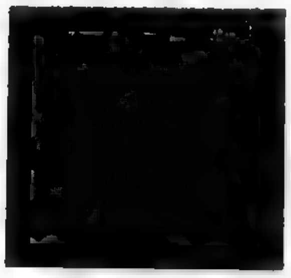

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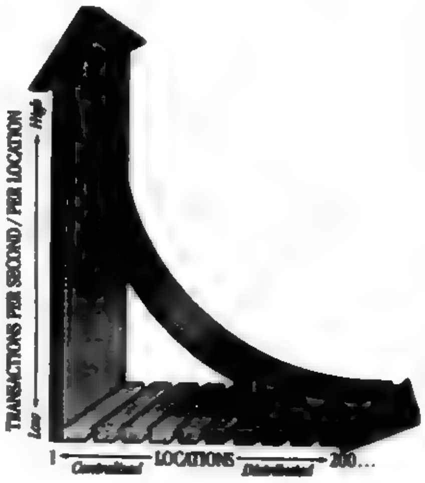

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Delta Computer enters IBM-compatible area

MANSFIELD, Mass. — Clone maker Delta Computer Corp. recently announced a line of IBM-compatible personal computers consisting of the Intel Corp. 8088-1-based Elite, the 80286-based Prestige and the 80386-based Premier.

Shipments will begin this month, according to James Patterson, vice-president of sales and marketing.

All three computers use 5¼-in. floppy disk drives. "The 5¼-in. drive is still a standard," Patterson said.

"Not all software is available in 3½-in. yet," he said, adding that Delta will continue to follow industry standards. The units are manufactured to Delta's designs in Taiwan.

The Elite comes with two 360K-byte 5¼-in. drives, 256K bytes of random-access memory (RAM) expandable to 768K bytes on the motherboard.

The Elite will sell for $1,195; a 20M-byte hard disk and color configurations will also be available.

The Prestige comes with 512K bytes of RAM expandable to 1M byte on the motherboard and one 5¼-in. 1.2M-byte drive. The unit has six expansion slots, four 16-bit and two eight-bit.

The Prestige, being marketed as a file server in network applications or as a high-speed workstation, will sell for $1,995 and is also available with a 20M- or 40M-byte hard disk and color monitor.

The 80386-based Premier includes 1M byte of memory on the motherboard, expandable to 16M bytes, the company said. It includes eight expansion slots, one 32-bit, five 16-bit and two eight-bit. It comes with a high-resolution enhanced graphics adapter color monitor. It lists for $4,995, including a 40M-byte hard disk.

Claris

CONTINUED FROM PAGE 33

He said these discussions with developers have ranged from sharing marketing resources and file formats to various development activities.

However, Zeisler said it is unlikely that Claris will enter into any sort of joint agreement soon. He is reticent to offer any specifics regarding Claris's plans for either company or product acquisitions.

"That's really phase two," he said. "Acquisitions are important in terms of the time-to-market issues, but I don't have any timetable to make it happen."

The final phase will be the marketing of Claris-developed products, something that Zeisler does not expect will occur for at least 18 months, coinciding with the tentative goal for Claris' spin-off.

Claris has received an undisclosed amount of funding from Apple, but its 30 employees also own a stake in the subsidiary. Apple officials would not disclose their percentage of ownership vs. that of the Claris staff. To spin off, Claris officials will consider a number of options, including an initial public offering and venture capital funding.

Independence is key to Claris's future success, both Apple and Claris officials have stressed. It will allow Apple to participate in the applications software market without alienating its third-party developers, they maintain.

"Apple was previously competing with its third-party developers but with the advantage of the Apple label," Zeisler said. "With Claris, we'll remove the Apple label, and we'll operate independently.

"Third parties recognize that the Apple logo was a marketing advantage and that removing that logo is a step in the right direction," Zeisler added.

Apple missing from logo

As proof of its intentions, Claris recently unveiled its own logo, which is strikingly different from the multicolored Apple. The Claris label sports elegant white characters on a background of royal blue. An apple is significantly absent.

However, that may not be enough to quell the fears of third-party software developers. In an August issue of Esther Dyson's "Release 1.0," Microsoft Corp. President Bill Gates expressed strong reservations. "Through Claris, they have a group of executives whose compensation depends on screwing us," Gates reportedly told Dyson.

Zeisler dismissed Gates' alleged remarks. "Third-party relationships should be reciprocal," he said, noting Microsoft's MS OS/2 efforts. "Apple should be aware that some of their developers have established dual loyalties. Should Microsoft be annoyed? That's up to Microsoft."

Valerie Houtchens, group product manager for Microsoft's Macintosh applications division, said Microsoft's ambivalence toward Claris is "close to being gone away.

"From the beginning, we've always been interested in having them remain a hardware vendor and leave software to the third-party community," Houtchens conceded. "At least their stated intention is that Claris will operate independently."

Ironically, it was Rob Campbell, former president of Forethought, Inc. — a recent Microsoft acquisition — and now a senior consultant to Microsoft, who first proposed the idea that Apple establish a separate software subsidiary. Campbell made his first pitch in 1980, one year after he joined Apple as applications software marketing manager. At that time, Apple had combined its software and hardware business units, a move that Campbell opposed.

"The problem when you combine software with hardware is you carry all the overhead of hardware, but you compete with a salesperson's attention — obviously hardware is the bigger sale for them and will get most of their energy," Campbell explained.

Despite Campbell's entreaties, the proposal was nixed. "They didn't understand the business," Campbell said. "They had too much on their plate at that time."

About a year ago, the project was revived.

Although as a Microsoft staffer Campbell may find himself in an adversarial position with his former employer, he is nonetheless a Claris advocate.

"It clarifies the roles of Apple," he maintained. "Now, if you're talking to Apple, you're talking to hardware people. When you're talking to Claris, you're talking to a potential competitor and a potential publisher for your software.

"Anyone worth their salt isn't afraid of competition," he added.

Campbell said he is confident that Apple and Claris will move quickly toward separation.

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Micropro

CONTINUED FROM PAGE 33

available or were not kept as the business was growing.

The second reason is that the company had not updated the main product, Wordstar Professional, for four years, and that had caused a lack of contact with the installed base.

Why did Micropro hit such hard times during the last few years?
Micropro's early success laid the seeds for some of its problems.

As other companies begin to target single products on single machines and Micropro had a plethora of products on a plethora of machines, it was very difficult for the company to make the transition from that very old installed base into the modern era.

Micropro had competitiors come in that were only working on second-generation customers.

What kind of changes have you made in the last year?
The first thing that we did was to start a vigorous product acquisition and licensing program. We kicked that program off with the acquisition of the Newstar product line.

We've also worked very diligently to rebuild our basic products, and we will be launching those products in the next several months.

Can you be more specific about some of the new products?
We are starting to ship our CP/M Release 4.0 now. We have a major upgrade to Wordstar 2000 Plus, which will be out in October.

That is a significant offering for us . . . we have dramatically improved the performance of the product in addition to its internal capabilities.

For instance, we've added in-line graphics, full-page preview, significantly enhanced laser printer support and several expansion modules that will provide the capability for creating desktop presentations and will enable the user to easily communicate back and forth with all the other word processors in the marketplace.

Is Micropro going to continue to be a one-product company, or are we going to see more diversification?
You're going to see more diversification, but we're not going to go off into wild areas for us, such as things like [Borland International's] Sidekick or language compilers or data base management packages.

We're going to focus on the area that we define as personal communications processing, which means anything that allows individuals in their private and business lives to communicate their thoughts to each other. We're no longer just a word processing company.

How do you plan to get into the Macintosh market?
We are actively pursuing an entry into that market.

We have looked at several acquisition opportunities; we don't have anything to report yet, but we're definitely working on it.

> "YOU'RE GOING to see more diversification, but we're not going to go off into wild areas for us. . . . We're no longer just a word processing company."
>
> LEON WILLIAMS
> MICROPRO INTERNATIONAL CORP.

With Wordstar and Wordstar 2000 becoming so similar, do you plan to follow many users' requests and merge the products?
Yes. Our long-term plan is to have one product that you can take home and install it with the classic Wordstar command set or install it with the mnemonic Wordstar 2000 command set. We are not discontinuing either product.

How does Micropro plan to win back some of the market share that it has lost?
The company has a strong image, but it has not had a strong image in the area of service, and that's something we're going to correct in a major way.

So if you say that the brand is perceived very positively, and you correct the service and come out with new products, I think we have a guaranteed winner.

And once we are able to reconnect to our installed base in large numbers and get them upgraded and on our modern product — and it will take us a couple of years to do that — I think Micropro will become extremely powerful in the marketplace. And my competition knows that, too.

How can Micropro leverage its installed base to boost sales and move the company toward recovery?
The installed base automatically generates a pull for the product.

Our challenge is to reconnect to that installed base; to let them know that we're here and that we've got new products for them. The installed base is our biggest asset.

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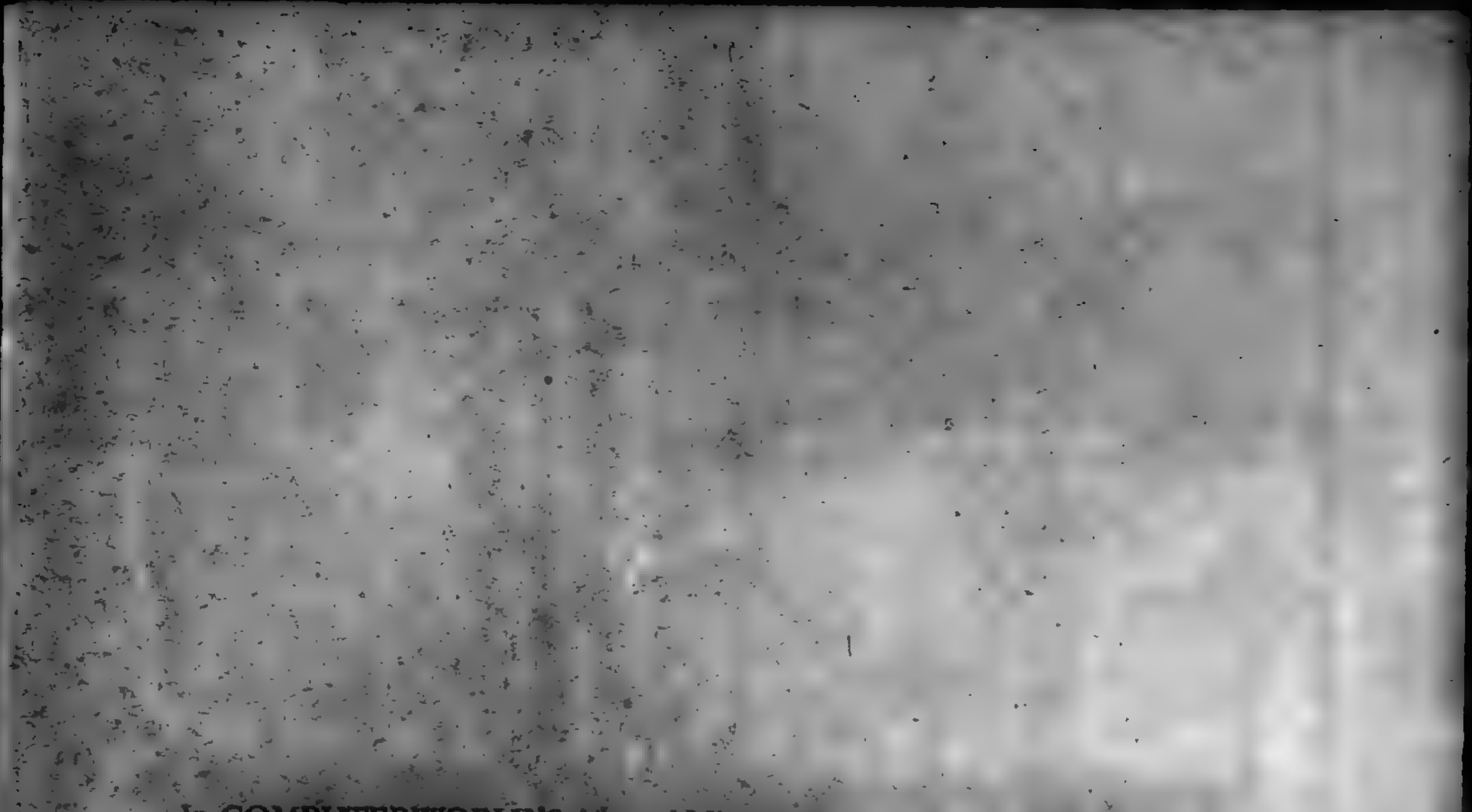

People who really know computers have just ranked Digital #1 in linking desktops to mainframes.

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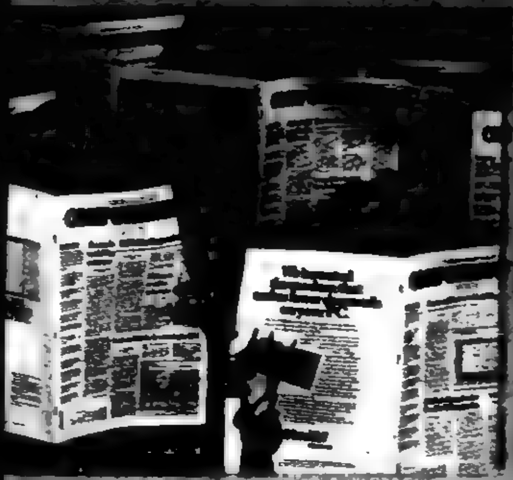

Further confirmation of Digital's leadership in terminals and systems networking comes from the latest IDC report, "With 55% of shipments in 1987 and 45% of the installed base, Digital is and will continue to be the dominant factor."

For a more competitive approach to your local area networking, write: Digital Equipment Corporation, 200 Baker Ave., West Concord, MA 01742. Or call your local sales office.

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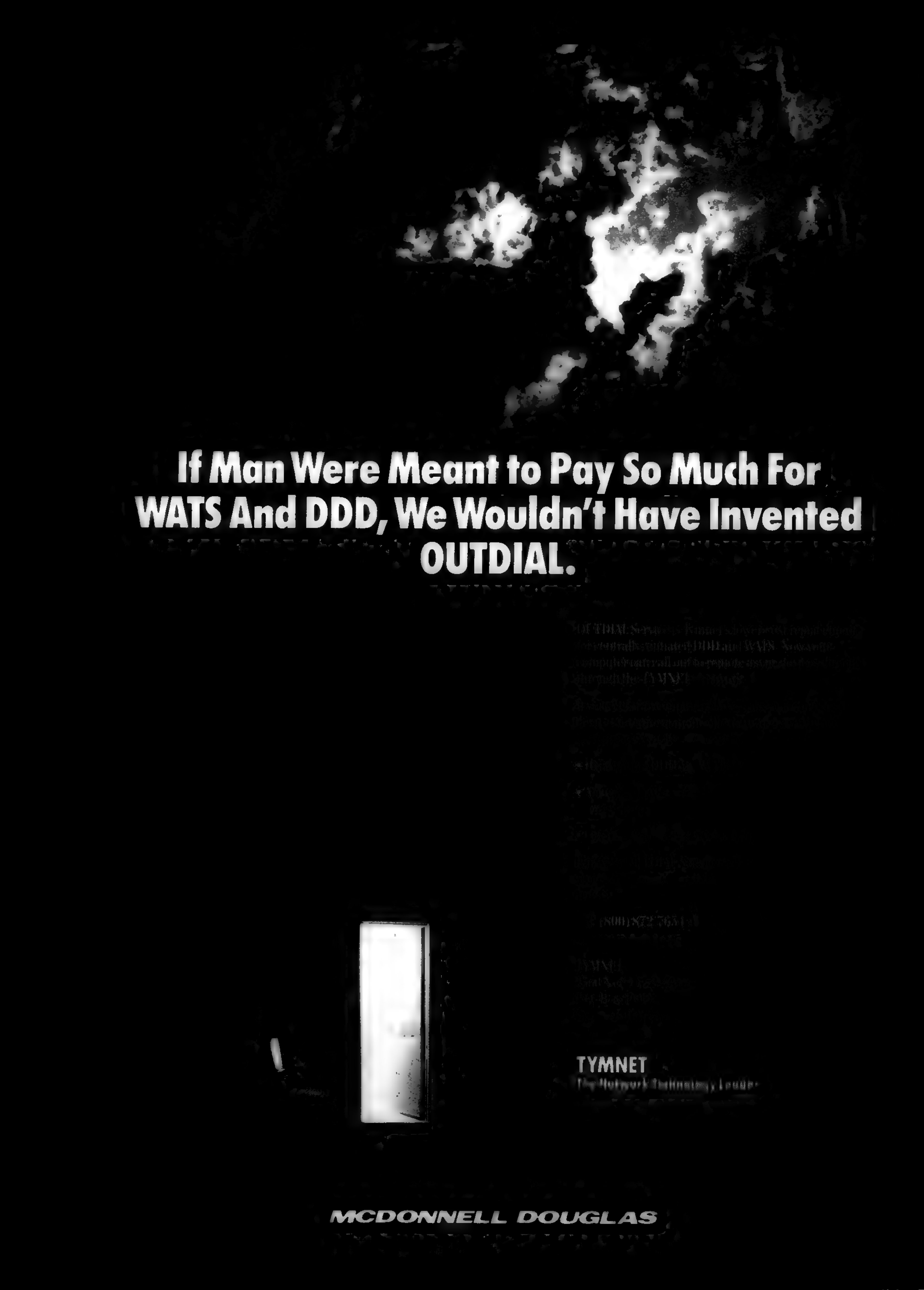

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NEW PRODUCTS

Software applications packages

The Accounts Payable System, a software application for use on Microsoft Corp. MS-DOS- or IBM PC-DOS-based computers, has been introduced by **Software Technology, Inc.**

The Accounts Payable System tracks invoices to be paid, monitors a firm's cash requirements and available discounts, ages invoices and generates a vendor analysis showing month-to-date, year-to-date and total-to-date information. The system provides for computer-generated checks from up to nine separate checking accounts.

The software integrates with the vendor's TABS III Time Accounting and Billing System.

The Accounts Payable System costs $500. A multiuser version for up to nine terminals costs $700.

Software Technology, Suite 120, 620 N. 48th St., Lincoln, Neb. 68504.

A full-function circuit board design package designed to run on IBM Personal Computers equipped with an IBM Enhanced Graphics Adapter (EGA) board has been announced by **Aptos Systems.**

Criterion II provides printed-circuit board design. It incorporates libraries of components and edits large designs. Users can enter new devices or new modules of a design as library parts. Library parts can also be created for existing parts or from scratch without the need to exit a design.

Each data base can have nine libraries, and each library can contain 600 entities.

Criterion II costs $1,500.

Aptos Systems, Suite 200, 10 Victor Square, Scotts Valley, Calif. 95066.

A mail- and name-management system called **Mailbox**, which is said to allow users of Lotus Development Corp.'s Symphony to set up and maintain company and individual names, titles, addresses and phone numbers, has been announced by **Front Row Systems.**

Mailbox prints personalized letters, envelopes and mailing labels. It produces eight different reports including name and address lists, index cards and up to three different personalized letters.

The system has a capacity for about 1,000 names on a PC configured with 640K bytes of memory, the vendor said. Front Row Systems recommends a minimum of 512K bytes. The program runs on IBM PCs, PC XTs, ATs and compatibles, according to the vendor.

Version 1.1 or higher of Lotus's Symphony is required.

Mailbox costs $89. Additional copies on the same order cost $40.

Front Row, P.O. Box 550346, Suite 44, 3158 Maple Drive, Atlanta, Ga. 30355.

Development tools

An entry-level microcomputer program development tool preconfigured for use with IBM Personal Computer XTs, ATs and compatibles has been announced by **Step Engineering, Inc.**

The **Microstep Development Station** consists of one AT or XT plug-in card and Microstep Debug/Control software. The Microstep system supports writable-control-store (WCS) memory with a 128-bit by 4K-byte WCS memory array.

The interface to the user's system is accomplished through read-only memory, programmable read-only memory and random-access memory simulation techniques, the vendor said.

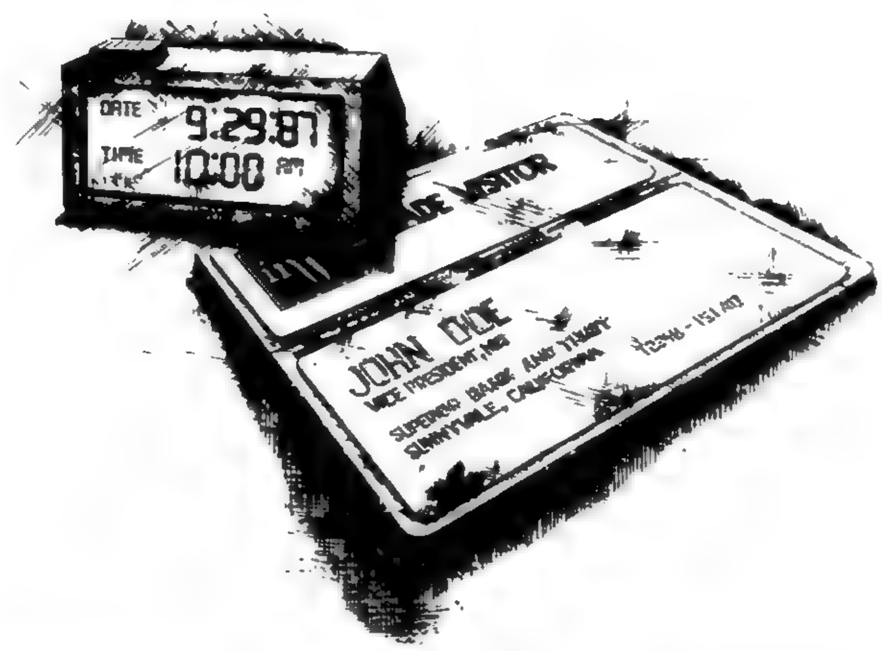
The Microstep Development Station costs $3,695.

Step Engineering, 661 E. Arques Ave., Sunnyvale, Calif. 94086.

Software enhancements

An enhanced version of the **OCR Plus** optical character recognition software package has been

Continued on page 48



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Continued from page 47

announced by **Datacopy Corp.**

OCR Plus Version 2.0 reads proportionally spaced text and titles ranging in size from 10 to 18 points. Pretrained proportional type styles include bold, Modern, Madeline, Cubic and Triad. A pretrained title type style has been included so that Courier text from 10 to 18 points in size may be read.

Eight word processing programs are supported by Version 2.0. Text can be formatted automatically as it is read or can be done in batch mode after a document file has been created.

OCR Plus Version 2.0 costs $695. It runs on IBM Personal Computers and compatibles.

Datacopy, 1215 Terra Bella Ave., Mountain View, Calif. 94043.

Data storage

The **Macdisk** family of external mass-storage systems for the Apple Computer, Inc. Macintosh Plus, Macintosh SE and Macintosh II has been announced by **Priam Corp.'s Systems Division.**

The Macdisk family consists of a Winchester disk drive with preformatted capacities of 40M, 65M, 100M or 230M bytes, interface cable, driver, utility software and manuals. The drive plugs directly into the Macintosh small computer systems interface (SCSI) port. A second SCSI port allows other printers to daisy chain from the Macdisk. Average seek times are said to be up to 20 msec.

The Macdisk costs $1,895 for the 40M-byte EM40; $2,295 for the EM65; $2,695 for the EM100; and $3,995 for the EM230.

Priam, 20 W. Montague Expwy., San Jose, Calif. 95134.

Tape backup systems said to store 64M bytes of data on a DC 2000 ¼-in. tape minicartridge have been introduced by **Irwin Magnetic Systems, Inc.**

The systems are available in both internal models and external subsystems. The internal **Model 265** is a half-height 3½-in. product designed for the IBM Personal System/2 line. The vendor said it slides into one of the floppy-disk slots in the microcomputer's cabinet. It is also available in a 5¼-in. version.

The external **Model 465** subsystem offers plug-in portability for use with multiple microcomputers in the same office. Both versions offer data-transfer rates of 500K or 750K bit/sec.

The Model 265 is priced at $995. The Model 465 is priced at $1,095.

Irwin Magnetic, 2101 Commonwealth Blvd., Ann Arbor, Mich. 48105.

Printers/Plotters/ Peripherals

An enhanced model of the **Twinriter 6** said to perform typeset letter-quality, high-density graphics and high-speed data processing printing has been announced by **Brother International Corp.**

Brother's *Twinriter 6*

The Twinriter 6 can mix text and graphics in one document and produce text douments at a rate of one to five pages per minute and high-speed data processing at 200 char./sec. It combines a 36 char./sec. daisywheel printhead with 200 char./sec. dot matrix printhead in the same printer. It automatically selects the correct printhead based on the user's need.

Available with optional RS-232C serial interfaces, the Twinriter 6 is priced from $1,395.

Brother International, 8 Corporate Place, Piscataway, N.J. 08854.

Board-level devices

Data Translation, Inc. has announced the **DT2853 Frame Grabber** and the **DT-Iris** subroutine library.

The DT2853 Frame Grabber is said to incorporate built-in real-time processing with standard Grab, Store and Display Image functions on the IBM Personal Computer AT.

The DT-Iris subroutine library provides software support for the real-time capabilities of the DT2853 Frame Grabber.

The DT2853 Frame Grabber costs $1,595. The DT-Iris software costs $695.

Data Translation, 100 Locke Drive, Marlboro, Mass. 01752.

The **PM3011**, a caching disk controller for the IBM Personal Computer AT, XT-286 and compatibles said to support ST506/412 drives or enhanced small device interface drives, has been announced by **Distributed Processing Technology.**

The controller utilizes a Motorola, Inc. 68000 microprocessor and transfers data simultaneously between the disk drive, cache memory and the host computer.

The PM3011 is priced from $600.

Distributed Processing Technology, P.O. Box 1864, 132 Candace Drive, Maitland, Fla. 32751.

A color graphics adapter capable of providing 2,048- by 2,048-pixel virtual-screen resolution and 1,280- by 1,024-pixel display resolution has been announced by **QDP Computer Systems, Inc.**

The adapter, called the **Viva 2000**, allows users to pan around an entire drawing in the 2K- by 2K-byte frame buffer in real time. The board is also said to feature hardware windowing. The window can be dynamically resized, relocated, hidden or retrieved.

The Viva 2000 costs from $2,200.

QDP Computer Systems, 23632 Mercantile Road, Beachwood, Ohio 44122.

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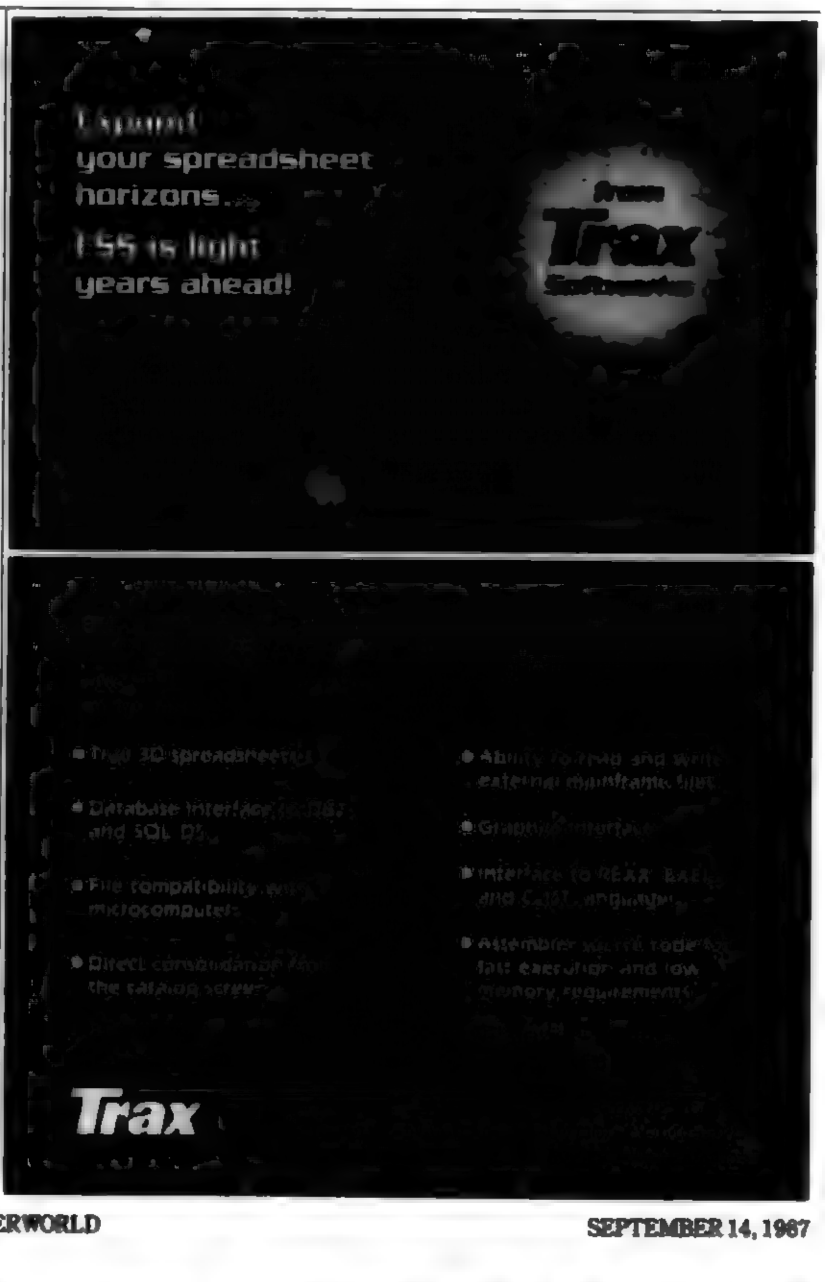

NETWORKING

DATA STREAM

Elisabeth Horwitt

Telecom also means data

"Telecommunications" is an overused word that has been assigned too many meanings to mean much anymore. Is telecommunications just voice, or does it include data? Does it refer to just those telephone-related communications products, like T1 lines and private branch exchanges, that may also carry data? How about local-area networks?

This same confusion extends to the telecommunications manager's job. At some companies, the title still refers to the nitty-gritty of wiring, telephone sets and trying to keep-up with the latest carrier tariffs. At an increasing number of Fortune 500 companies, telecom managers are equal partners with MIS, and regular information exchanges take place. The two organizations' territories overlap, with telecom managers' jurisdiction extending all the way up to the mainframe channel in some cases.

This kind of setup seems not only desirable but necessary for the growing number of companies that use telecommunications equipment and services to distribute data and applications to remote sites and workstations. In too many companies, MIS and telecom are adversaries locked in a perpetual power

Continued on page 51

Rivals burying the hatchet?

Microsoft, Novell downplay feud over LAN Manager; joint project eyed

BY PATRICIA KEEFE
CW STAFF

ANALYSIS

The winds seem to be shifting over Provo, Utah, and Redmond, Wash., the respective homes of network software vendor Novell, Inc. and micro software giant Microsoft Corp. Could a reconciliation be in the offing between the two?

Earlier this year, Microsoft and 3Com Corp. announced plans to co-develop the LAN Manager, which is being promoted as the standard for distributed processing in the work group environment. As a result, Microsoft is thought by many to be on a collision course with Novell and its distributed processing platform, Netware.

Novell has provoked Microsoft's ire by refusing to license Microsoft's LAN Manager protocol suite, just as it earlier declined to license any part of the LAN Manager's predecessor, Microsoft Networks. In turn, Novell has accused 3Com and Microsoft of fabricating the myth that Novell cannot or will not support the LAN Manager. But such bickering may soon be a thing of the past.

The once-strained relationship appears to be improving, as both Novell and Microsoft have softened their rhetoric about each other in recent interviews. One possibility, according to sources close to both companies, is that the two will shortly reach a formal agreement to work cooperatively, although probably not on the LAN Manager.

Referring to Craig Burton, Novell's vice-president of corporate marketing and development, one Novell source said, "I know Craig feels there is a way to work this out so that they can collaborate. If Craig says he's going to do something, he almost

Continued on page 54

Airlines lead telecom budget hikes

Telecom budget expenditures: 1987 budget vs. 1986 expenses

Airlines' communications spending will take a big leap this year; steel and utilities will dip

Industry	Percentage of increase or decrease[1]
Airlines (3)[2]	26.15
Trucking (4)	14.46
Financial (nonbanking) (20)	10.89
Beverages (2)	8.88
Automotive (2)	8.70
Banks and banking holding companies (21)	7.84
Manufacturing (4)	5.28
Oil service and supply (3)	2.89
Steel (2)	(9.05)
Utilities (3)	(9.41)

[1] Decreases are in parenthesis
[2] Number of companies responding to survey

INFORMATION PROVIDED BY INTERNATIONAL COMMUNICATIONS ASSOCIATION
CW CHART

BY ELISABETH HORWITT
CW STAFF

Telecommunications department budgets increased an average of 5.96% from 1986 to this year, with airlines' increases far outpacing those of other industries, according to the annual International Communications Association's (ICA) Expense Survey, published recently. Airline telecommunications departments plan to spend an average of 26.15% more this year than last, the survey found.

The next highest increase, 14.46%, was budgeted by the trucking industry, while steel and utilities' networking expenditures are scheduled to drop by more than 9% this year (see chart at left), the national user organization reported.

The 131 ICA members who responded to the survey provided information about "past and planned outlays in data commu-

Continued on page 54

Vendor aids Netview hookups

BY ELISABETH HORWITT
CW STAFF

SAN JOSE, Calif. — Determined to hasten the industry's faltering progress toward a multivendor network management system, Communications Solutions, Inc. recently formed a business group intended to help telecommunications vendors and users hook up to host-based diagnostic and control applications under IBM's Netview umbrella.

"We see Netview as a great beginning, just as SNA was in 1976," said Thomas Polizzi, a Communications Solutions vice-president who will head the 14-member group. Currently, he said, telecom vendors can write interfaces to IBM's Netview/PC product that allow them to send alerts to Netview — but do not allow for Netview applications to perform diagnostics and testing across various vendors' equipment. "We don't want to preannounce products," Polizzi said, "but we will help non-IBM vendors interface with Netview/PC and, in conjunction with IBM, help users and vendors develop software that will consolidate what commands should be present" in Netview-based network management applications.

Continued on page 55

Inside

- Tangram [illegible] VTAM subsystem lets host-attached PCs, APPC environments communicate. Page 50.
- Corvus adds Netbios, MS-DOS 3.1 support to PC/NOS. Page 55.

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PC-host link uses LU6.2, VTAM

BY PATRICIA KEEFE
CW STAFF

CAREY, N.C. — Tangram Systems Corp. recently introduced Arbiter Peer Services, a VTAM subsystem said to allow interprogram communications between host-attached personal computers and environments that support IBM's Advanced Program-to-Program Communications or LU6.2.

Users can develop and use LU6.2 applications and run the subsystem with any number of IBM 3270-compatible cards.

The subsystem can even be used asynchronously, regardless of the IBM Systems Network Architecture (SNA) networks in use, said Art Ingram, vice-president of marketing and sales at Tangram.

Uses VTAM subsystem

Arbiter Peer Services takes advantage of the core communications part of Arbiter, a VTAM subsystem for file transfer and remote virtual-disk applications between PCs and mainframes that was unveiled last September, adding additional capabilities.

Using Peer Services/PC, a PC-based component application program written in Cobol, Pascal, C or assembler reportedly can communicate with programs implemented under CICS, IBM's System/34, 36 or 38, Digital Equipment Corp.'s VAX family, IBM's Token-Ring network and other LU6.2 environments.

Also supported are a variety of host connections, including asynchronous, coaxial and IBM Synchronous Data Link Control (SDLC) links. A variety of high-level languages and connection protocols are also supported.

Peer processes

PCs can communicate with peer processes using standard conversation verbs like ALLOCATE, CONFIRM, RECIEVE AND WAIT and SEND, whether linked to the host by LU2 emulation adapters — such as products from Digital Communications Associates, Inc., IBM, CXI, Inc. or Integrated Network Systems, Inc. — linked asynchronously or by modems using any protocol converter, Tangram said.

Arbiter Peer Services provides the protocol switch between the requester PC connection and its peer LU6.2 server. It enables tasks to be segregated between the server and the requester according to the strengths of each processing environment, as opposed to the limits of the host connections, the vendor added.

Binary data and messages flow between peer processes anywhere in an SNA network with Peer Services, Tangram claimed. This means that PC-to-host applications that use techniques such as the "hide the IBM 3270 screen, find and fill in the fields using keystroke simulation, then press Enter if the X clock is off," techniques are no longer necessary, the vendor added.

Arbiter Peer Services uses an interprogram system communication (ISC) link to CICS where parallel, reusable sessions reduce the host system overhead allowing hundreds of PCs to be connected by a single CICS ISC link.

With Peer Services, Tangram said it is now possible for a PC application to allocate a CICS transaction, write or read a user-selected temporary storage file and optionally define it.

Options available

Arbiter Peer Services is available immediately, with first-year license fees ranging from $18,750 to $39,000. It requires Arbiter Release 1.4.0, which also includes two new options: The Arbiter Script Language (TASL) and a Third Party Program Interface with QMF.

TASL reportedly enables readers to automate repetitive PC and host tasks. TASL is like a "superbat" processor through which tasks such as asynchronous dial-up to Arbiter or its Interactive Session Relay-based host session sign-ons can be

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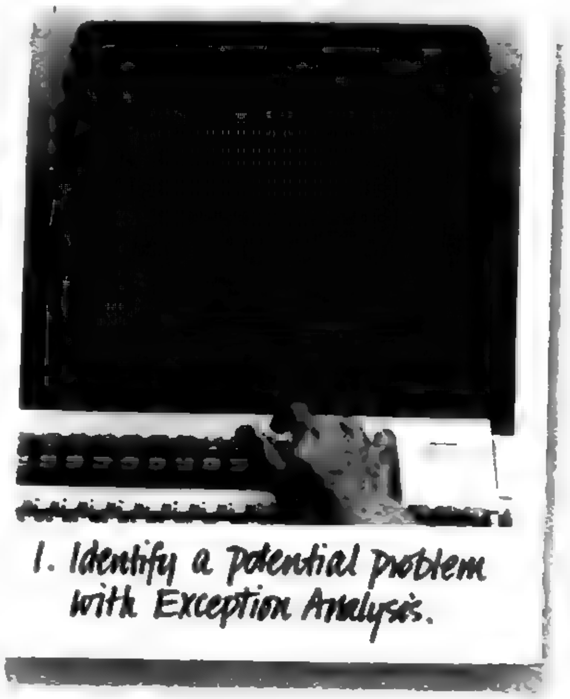

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automated, the vendor said. It ranges in price from $1,700 to $3,500 for a first-year license.

The Third Party Interface is said to transfer data extracted from IBM's DB2 from a QMF export file to a remote-dial file and converts it to CSV , BSV, IBM's DIF or WKS. This utility can execute under IBM's TSO or batch and ranges in price from $2,500 to $4,900 for a first-year license.

Telecom

FROM PAGE 49

struggle. MIS sees telecom as a narrow-minded profession stressing technical elegance above functionality and cost considerations above everything else — to the detriment of corporate strategic goals and user needs. Telecom managers, for their part, often complain that MIS comes up with high-flown applications that cannot be met by the existing cabling and leased-line facilities.

Often, when the smoke has cleared, a significant number of telecom techies have left the company, and MIS is indisputably on top. MIS oversees 69% of the telecom departments that responded to a recent International Communications Association survey.

This is not surprising: MIS departments begin with a lot of centralized power and are closer than telecom techies to the financial and administrative executives who make corporate strategy. As corporations merge data and voice networking facilities, traditional telecom people often end up as permanent subordinates who provide bandwidth at MIS's behest. Or they end up out of a job.

The savvy ones transcend their existing jobs' telephone maintenance orientation by acquiring the skills and knowledge to deal with LANs, IBM's SNA and other host-based communications products.

And they do their companies a lot of good, marrying to MIS concerns their hard-won telecom expertise — for instance, how to deal with a recalcitrant divested Bell operating company or cost trade-offs of installing new wiring for a high-speed network.

They can also provide a different perspective to MIS managers who tend to view their world through Big Blue eyeshades. This tendency had little effect on telecom realms while IBM stuck to computers, but now the vendor is making a major push into the networking field and using its leverage with MIS to influence corporate buying decisions on PBXs, modems and T1 switches.

According to one consultant, MIS managers, given a choice between IBM subsidiary Rolm Corp.'s central branch exchange and another vendor's PBX with more features, will choose the IBM label. An activist telecom manager can guard against this IBM myopia.

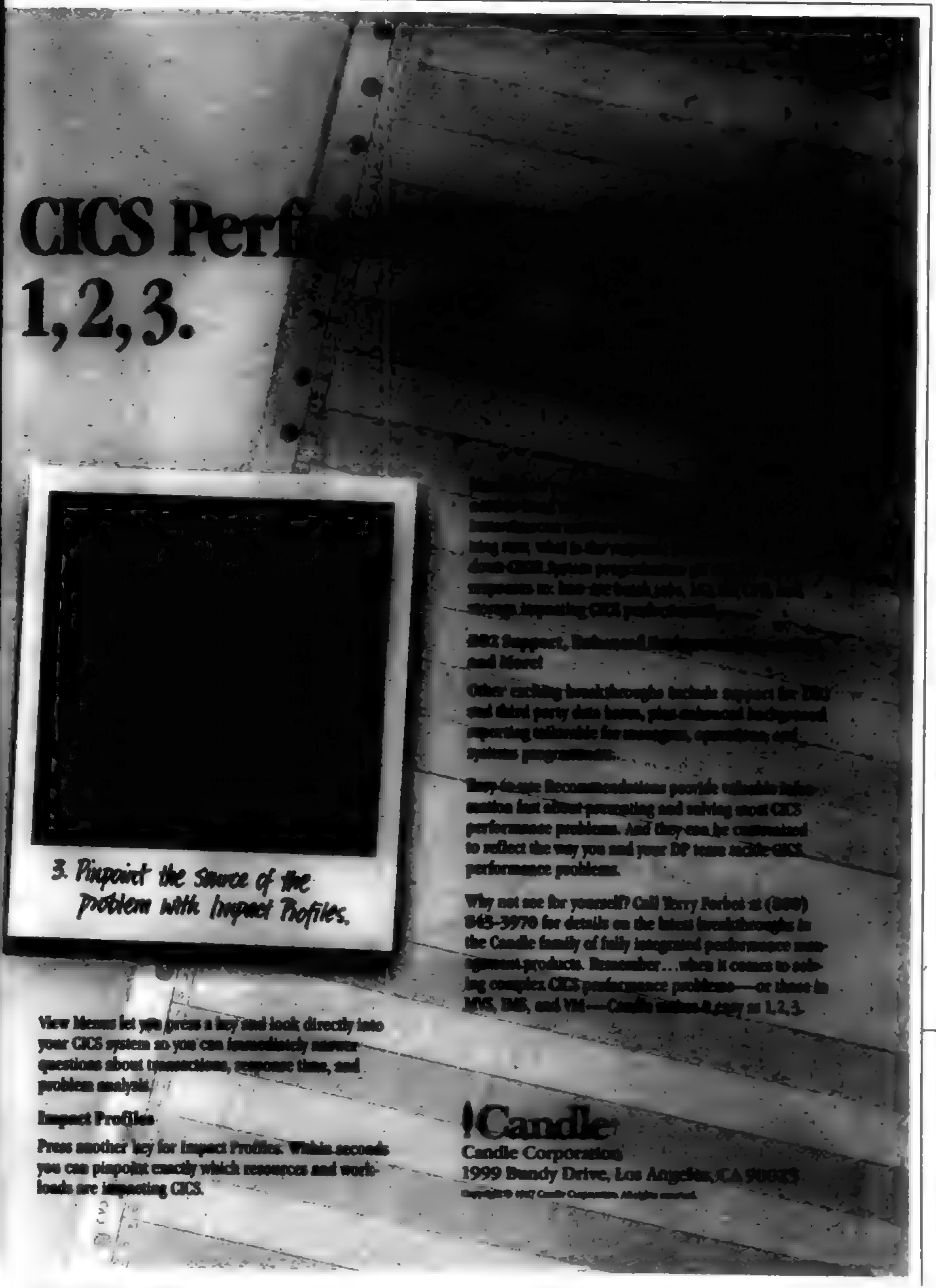
Lobbying

The other key role telecom managers can play in the corporate environment is that of industry activists. Several telecom users groups are vigorously conveying their members' needs and negative comments to vendors and regulatory bodies.

According to communications attorney Victor Toth, users groups are still too small and fragmented in terms of their goals to convey to the networking industry a coherent set of demands for cost-effective, flexible, diverse, universally available telecommunications services.

But there is hope for the future if telecom departments gain both the knowledge and the clout to become true advocates for their companies' communications goals.

Horwitt is a Computerworld senior editor, networking.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Rivals

FROM PAGE 49

always does."

In a July interview, Burton insisted, "I don't see why we have to license the LAN Manager." In a more recent interview at PC Expo, Burton reiterated his feelings toward the LAN Manager. "We can support OS/2 a lot better without the LAN Manager," he said, claiming that Novell's Netware network software provides more features today than are listed under the LAN Manager specifications, or "wish list," for delivery in 1988.

But Burton has also suggested that Microsoft salesmen, rather than company executives, are to blame for persistent reports suggesting that Novell will not be able to emulate the LAN Manager. And Microsoft says it has repeatedly offered to license the LAN Manager to Novell, all the while carefully emphasizing that its agreement with 3Com is not exclusive. Moreover, heavy traffic between the two companies during the last few weeks has not escaped the attention of industry observers.

The peacemaker

But it is not as if the two vendors are willing to kiss and make up on their own, according to sources close to both companies. They suggest the traditionally cool relationship between Novell and 3Com may be warming up, thanks to pressure from mutual [redacted] IBM.

IBM's alleged role as peacemaker would most likely be prompted by concern that Novell's Netware system remains compatible with IBM and Microsoft's OS/2, one source says. After all, a significant percentage of IBM's business networks are sold with Netware.

Also, Burton is reported to have met with William Lowe, the president of IBM's Entry Systems Division, to discuss concerns about the LAN Manager and other issues. Burton does not comment on Novell's relationship with IBM.

In its eagerness to market the LAN Manager to IBM for use in the latter's OS/2 Extended Edition, Microsoft may be only too happy to accommodate IBM by breaking bread with Novell.

IBM has not yet indicated its position on the LAN Manager.

As for Novell, analysts suggest that only pride could lead the ordinarily pragmatic company to spend considerable time and resources emulating the LAN Manager when it could more easily license and be done with it. Burton denies ego is the reason. He says the LAN Manager, pure and simple, is old, inferior technology.

Whatever the outcome, it appears that Novell and Microsoft will at least call a halt to the slings and arrows. "All Microsoft needs is for IBM to go its own way and have the LAN Manager be a dog, and Microsoft's glory days are over," ventures John McCarthy, research director at Forrester Research, Inc. in Cambridge, Mass.

That is unlikely to happen, but it will be interesting to see what kind of relationship Novell and Microsoft can come up with and how it will impact 3Com.

Budget

FROM PAGE 49

nications, carrier expenses, telephone equipment, staff salary, possibly networks — everything that comes under the control of telecommunications departments," explained ICA spokesman Robert Eilers.

The types of equipment and services that came under telecommunications departments' jurisdictions varied from firm to firm, he added. ICA also surveyed responding companies' telecommunications budgets in 1986 as a percentage of total revenue. Office equipment and computer companies led other industries in this area, allocating 1.7% of their total revenue to telecommunications. Airlines were next, allocating 1.6%; railroads were third, allocating almost 1.3%. Utilities, personal care products, steel, textiles/apparel, natural resources, food processing, paper and forest products and beverages industries were at the bottom of the list, allocating less than 0.5% of their total 1986 revenue to telecommunications expenditures, the survey found.

Corvus enhances PC/NOS

SAN JOSE, Calif. — Corvus Systems, Inc. recently enhanced its network operating system, PC/NOS, adding support for IBM's Netbios as well as Microsoft Corp.'s MS-DOS 3.1 and 3.2.

Through a new utility called Netpoll, the operating system is compatible with multitasking applications, such as Microsoft's Windows and IBM's Topview, that can be run concurrently with PC/NOS, Corvus said.

The upgraded PC/NOS, Version 1.1, reportedly provides an assortment of spooler utilities that provide print queue management and possess the ability to spool files from any other system on the network for printing.

Version 1.1 also features a "purge" utility said to deinstall the operating system and clean up all PC/NOS files, leaving the system ready to be deconfigured for a new activity. This feature might be used when the computer station is going to be changed to a new location or operation and previous files and structures are not wanted, Corvus said.

Also new is the Netview utility, which Corvus claimed is a display of plugs and sockets through which users can connect to any resource on the network that is not security-protected by the system manager.

PC/NOS Version 1.1 costs $695, as did the initial version. Upgrades are available to current users at no charge.

Netview

FROM PAGE 49

The group is already talking to vendors about its services and attempting to gain user input as to what kinds of commands should be part of the Netview diagnostic and control system, Polizzi said. "Major network operators know what commands are needed to manage modems, muxes, and non-IBM terminals from a centralized point," he explained.

'Caesar's wife'

"But," Polizzi added, "someone is needed to write them down and pass them to IBM, the vendors and perhaps standards committees. We don't have a vested interest in any gear, so we can be Caesar's wife. And many T1 vendors aren't cognizant of the SNA culture, so we can also bring that to the table."

The Systems Network Architecture software company will announce several products to facilitate the process of Netview applications and interfaces, Polizzi said.

"It is unreasonable to expect a bit [Netview] application effort from vendors with limited resources and expertise," he added.

"Developing Netview applications is a big commitment for most communications shops," agreed Hal Clark, a senior product manager at Digital Communications Associates, Inc. (DCA).

"Telecom vendors don't have expertise in C-lists and applications programming," Clark continued. "I've talked to Polizzi, and it looks like Communications Solutions will be doing a lot of the work themselves to provide multivendor network management applications under Netview."

Communications Solutions will develop software that runs under Netview as host application programs and work with vendors to develop software to run on the telecom systems, Clark reported.

Talks with Communications Solutions are at too early a stage for DCA to reach any conclusion about how useful the software vendor's offerings will be, Polizzi said.

Communications Solutions has been having "cordial conversations with IBM" about its project, according to Polizzi.

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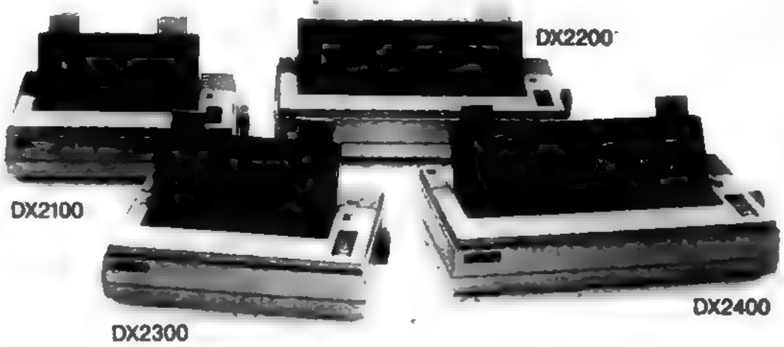

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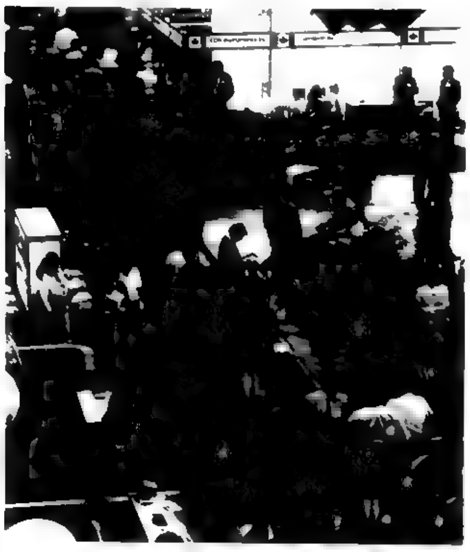

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Customer-premise equipment

Two products designed for sharing printers and plotters between computers or workstations or for intercomputer communications have been introduced by **Integrated Marketing Corp.** (IMC).

According to the vendor, the **Data Manager 4x4** and **Data-Net 1551** are buffered with 256K bytes of random-access memory, field-expandable to 1M byte. Each operates at user-selectable speeds from 300 to 38.4K bit/sec.

The Data Manager 4x4 is an eight-port system with four RS-232 serial ports on the motherboard. The four extra boards may consist of additional serial ports. The Data-Net 1551 is a six-port RS-232 serial system.

The Data Manager 4x4 costs $795. The Data-Net 1551 costs $695.

IMC, 1031-H E. Duane Ave., Sunnyvale, Calif. 94086.

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Links

A gateway said to allow up to 32 personal computers on a local-area network (LAN) to simultaneously conduct remote IBM 3270 sessions with an IBM mainframe has been announced by **Wall Data, Inc.**

The **Datagate/LAN** card fits into a PC slot. It features a microprocessor with 256K bytes of on-board memory and gateway software to emulate remote IBM 3174 and 3274 cluster controllers. It includes an individual remote diagnostics port and two concurrent direct-host links. The gateway PC is nondedicated and can be used as a standard LAN workstation.

Prices for the Datagate/LAN package start at $1,995 for 32 host sessions with one host link.

Wall Data, 17769 N.E. 78th Place, Redmond, Wash. 98052.

Electronic mail

A service that allows the exchange of electronic mail between users of most major U.S. systems and systems abroad has been introduced by **DA Systems, Inc.**

Dasnet currently links systems including AT&T's Mail, DA Systems' Dasnet E-Mail, MCI Communications Corp.'s MCI Mail and Telex. Dasnet can also link computers running the following software: Unix, Digital Equipment Corp.'s Vaxmail or On-Line Business Systems, Inc.'s Wylbur for the IBM 3080 series.

Cost to individual subscribers is $50 per month plus charges for intersystem mail. For system or site subscriptions, there is an implementation cost of between $459 and $6,000, plus usage and a monthly subscription fee.

DA Systems, 1503 E. Campbell Ave., Campbell, Calif. 95008.

Modems/Multiplexers

The Model 535 Modem Sharing Unit, designed for clustering multiple devices on a single line, has been announced by **Avanti Communications Corp.**

The Model 535 allows up to four terminals operating in a multipoint, polled network to share a single channel, the vendor said. It features CCITT V.35 interfaces.

Other features include a buffer option for tail-circuit applications, which compensates for timing differences between AT&T's Dataphone Digital Service or satellite networks and the individual Model 535 channel. The Model 535 Modem Sharing Unit is priced at $995.

Avanti, Aquidneck Industrial Park, Newport, R.I. 02840.

Cabling

A wall molding cover plate for through-the-wall computer cable installations has been introduced by **Midwest Innovations, Inc.**

The **Cable Outlet Plate** facilitates installation, use and removal of premanufactured cable as well as network wiring. The plate can be used with up to 10 cables at once. Installation is possible in about five minutes with a screwdriver and a utility knife, according to the vendor. Pre-existing installations can be accommodated by the removable gate plate.

The plate costs $9.95.

Midwest Innovations, Suite 1225, 2500 W. Higgins St., Hoffman Estates, Ill. 60195.

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HARD TALK

James Connolly

3380 defines disk standard

Not many companies or individuals in the computer industry can redefine a market. But why is it that the outfit that does it more than anyone is IBM?

On Sept. 2, IBM did it again, this time with the long-awaited third generation of 3380-class storage products — long-awaited as in the two years since IBM redefined the market with its second generation of 3380 disk drives and 3880 controllers.

Most of what IBM announced was expected. The 4.5M byte/sec. channel rate and triple-density disks were not surprises. The only question some people had about the features was whether IBM might go to 6M byte/sec. There also might have been some surprise in IBM's move to allow existing 3880s to be upgraded to handle faster CPU-to-cache channels and allow all 3090 mainframes, not just the E models announced earlier this year, to support those channels.

The basic features should be easy enough for IBM's competition, the plug-compatible man-

Continued on page 66

IBM maps mid-range strategy

Execs commit to two-tiered approach, outline plans to expand 9370 line

BY JAMES CONNOLLY
CW STAFF

The strategy has been falling into place for 20 months. Now, it is time to execute the plans.

IBM is positioned to carry out the two-pronged mid-range strategy it developed in 1985. The company refocused its efforts, eliminated confusion in the user community and designed a product plan, according to two key executives who are charged with mid-range responsibilities and who spoke to *Computerworld* recently.

IBM's product plans include the introduction and delivery of the System/36 and 38 follow-on product, commonly known as Silverlake, during the second half of 1988 while also expanding the 9370 departmental systems line downward and then upward, said Stephen B. Schwartz, president of the System Products Division.

Charting the course

Schwartz and Larry J. Ford, IBM vice-president and assistant group executive for mid-range marketing, outlined the company's plans to steer general-purpose mid-range customers toward the lower part of the IBM 370 family — the 4381 and 9370 or the "3X" line, which includes the System/36 and 38 follow-on product.

"Our whole focus of the 9370 was aimed at our very large accounts who wanted to distribute 370 processing throughout their departments," Schwartz said.

He added that the important features of the 9370, in comparison with the earlier 4361, include the former machine's smaller size, ability to run in an office environment and the packaging of easier to use software, such as VM/IS.

Meanwhile, Schwartz denied that the two-tiered strategy was designed to counter the success of rival Digital Equipment Corp.

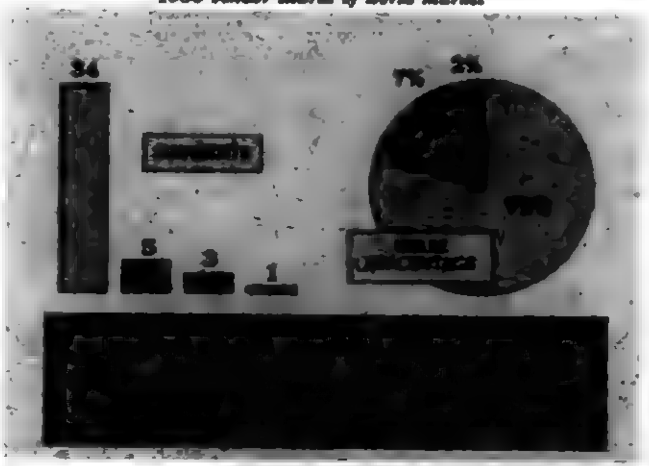
"They probably played some

Continued on page 63

Data View

Supercomputers

1986 vendor shares of world market



INFORMATION PROVIDED BY INTERNATIONAL DATA CORP.
CW CHART

Peripheral firms slide

LA JOLLA, Calif. — IBM plug-compatible manufacturers, or PCMs, are steadily losing market share in nearly all areas, according to a recent study by Computer Intelligence.

PCMs are gaining only in printer sales, losing ground in the direct-access storage device (DASD), tape drive, communications processor and terminal markets, the study showed.

Although the tape drive market has been its weakest, IBM has been showing steady progress there, thanks largely to its

Continued on page 66

Concurrent plans to add supers

HOLMDEL, N.J. — Concurrent Computer Corp., which now offers multiprocessor superminicomputers primarily for technical markets, recently set in motion a supercomputer development project.

Concurrent announced an agreement under which Princeton University will transfer to Concurrent the technology to build a commercial version of the Navier-Strokes fluid-dynamics computer. That system, developed under grants from the National Aeronautics and Space Administration, was demonstrated as a single-node computer in 1985 as part of research done at Princeton and the California Institute of Technology. Key researchers included Daniel N. Nosenchuck and Michael G. Littman of Princeton's department of mechanical and aerospace engineering.

Concurrent President James K. Sims said his company has begun an evaluation process to determine whether developing a supercomputer is feasible.

Inside

- Compugraphic offers a laser image setter that merges type with line art and halftones. Page 71.
- [illegible] electronic receipt and validation terminal. Page 71.

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Model 310

Model 410

Model 110

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IBM maps

FROM PAGE 61

role, but all competitors played a role. There are over 150 people making mid-range systems around the world. We take them all into consideration when we put a strategy and a plan in place," he said.

"I chuckle at times to read about how the 9370 was an answer to the VAX," Schwartz added. "The 9370 took four years from the time we started it until the time we shipped it, and at the time we started it, DEC wouldn't have been the one we would have been worried about. It was several of the Japanese computer manufacturers."

The System/36 and 38 lines are oriented more toward new accounts, Schwartz said. The System/36's strength is ease of use at the expense of 370 functionality. He added, "We will make 370 software easier and easier to use, but I do not believe we will make it as easy to use as the System/36."

Schwartz claimed the "System/3X" family, including the System/3, 32, 34, 36 and 38, will have an installed base of more than 300,000 processors by the end of the year. He also said the product line is key to attracting new customers, particularly those who are buying their first computers.

"There is a huge opportunity in the United States. Over the next five years, a million mid-range systems will be placed. Worldwide, there will be probably twice that number. The 3X product is awfully good where people use it as their data processing system," he said.

Answers questions

Schwartz, placed in charge of mid-range manufacturing and development in late 1985, said IBM "put a plan in place to make the strategy clear that we were supporting both the 3X and the 9370 as our general-purpose strategy. I think it is fairly well understood now. Whereas [at] this time last year there may have been some questions, I doubt if there are any questions today as to where we are going in the mid-range."

Ford said the strategy involves more than products. He said IBM wants all sales representatives focused on the mid-range, improved customer support and applications available through IBM and third parties. To keep the sales force focused on the mid-range, IBM added those products to sales representatives' quotas, Ford said.

In the applications area, IBM is strengthening relationships with applications providers such as value-added resellers and marketing assistance program participants, Ford noted.

Schwartz added that IBM's sales force and its customers understand there are two answers for general-purpose computing in the mid-range: that the long-term support and the areas in which IBM is spending money are the 370 and System/36 and 38 lines. According to Schwartz, the consolidation of IBM's product development efforts along two lines also means there are economies, particularly when systems such as Silverlake and the 9370 can use common peripherals and components.

"In the fall of 1985, we decided that we had to consolidate our development activities and put more focus on a couple of things that we could expend our resources on. We were spending a lot of money in development in too many different areas, and we needed to focus our development resources," Schwartz said.

Meanwhile, Ford and Schwartz said there should be no confusion about the roles of the two general-purpose product lines and IBM's special-purpose machines, which include the System/88 fault-tolerant computer, the Series/1 communications system and the RT Personal Computer Unix-based workstation.

Schwartz said, "The System/88 is for fault tolerance. That is a very narrow niche of computing. People who have a fault-tolerant requirement understand the role of the System/88. There is no confusion." IBM will offer special-purpose machines to respond to specific requirements, he added, claiming IBM will not "blindly" provide a single-product architecture.

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North Jersey (Woodbridge)	8/19, 11/5, 12/2
Philadelphia	10/6
Phoenix	11/4
Pittsburgh	10/8
Portland	10/6
Raleigh, NC	10/27
Salt Lake City	10/15
San Francisco	8/5, 9/16, 10/14, 11/18
Seattle	8/7, 9/9, 10/7, 11/5, 12/2
St. Louis	10/20
Tampa	10/7
Washington, D.C.	8/7, 9/9, 10/7, 11/5, 12/2
Canada	
Montreal	10/19
Ottawa	10/20
Toronto	8/19, 11/5, 12/2
Vancouver	10/8
International	
Bonn	10/16
Frankfurt	10/15
London	10/13, 11/13, 12/3
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Paris	10/8, 11/11, 12/2

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3380

FROM PAGE 61

ufacturers (PCM), to copy. But what might be tougher is the functionality that IBM is placing in the new 3990 controller.

The PCMs have a little more than a year to match that functionality, which includes writing to cache at electronic speeds and automatic copying of files to separate backup disk volumes.

The 3990 is not due for delivery until mid-1988, and PCM customers have come to expect at least a few months of delay after delivery before PCM versions of products arrive.

As with MVS/XA a few years ago and VM/XA SP this year, IBM is likely to again be hiding new functions in microcode, which is a move that makes the PCMs' cloning task that much tougher.

However, the PCMs are expected to survive, although a recent Computer Intelligence study showed that they are falling farther behind IBM in most peripherals markets, and IBM's pricing on its new products and the price cuts on the older 3380 family members might displease the PCMs' stockholders.

For users, there is good news. They might reap the benefits of a price war. They know for certain what IBM is going to do. They know what the triple-density drive looks like and what products support 4.5M byte/sec. channels. But of greater importance is that they know the answer to a question many have been asking, which is what role storage controllers will play in IBM's long-term plans. The answer, obviously, is that the 3990s will play a much greater role, probably freeing the host from many tasks.

But the answers raise new questions. One IBM customer wondered last week whether IBM's next step might be to use the 3990 as a controller for tapes as well as disks. And IBM leaves one to wonder whether the quadrupling of cache memory to 256M bytes is only a short-term step, with the company planning production of 4M-bit memory chips — four times as dense as the chips in the 3880 and 3990 — only months after the 3990 ships. One should remember that the 3880 was one of the first IBM products to be upgraded when 1M-bit chips arrived last year.

Connolly is *Computerworld's* senior editor, systems & peripherals.

Peripheral

FROM PAGE 61

popular 3480 tape cartridge device, with which PCM products have only recently begun to compete. Since 1985, IBM's market share has increased from 61% to 68%, the report said.

Currently, PCMs supply only 1% of IBM 3480 type drives, according to Computer Intelligence.

The study also showed a strong gain by IBM in the DASD market, from 75% to 83% from 1985 to this year, attributable to the success of the double-density 3380 drive. PCMs now have only 9% of this market, the report said, predicting that IBM should continue to add to its market share in both the DASD and tape drive markets. The survey was conducted before IBM's recent introduction of triple-density drives.

Storage Technology Corp. showed strength among tape drive manufacturers, with 23% of the installed base on IBM mainframes and a 50% share on PCM mainframes.

Storage Technology's success is a result of its strong performance in the IBM 3420 Model 8-compatible market, according to Computer Intelligence.

In the printer market, Storage Technology and Xerox Corp. have made inroads, according to Computer Intelligence.

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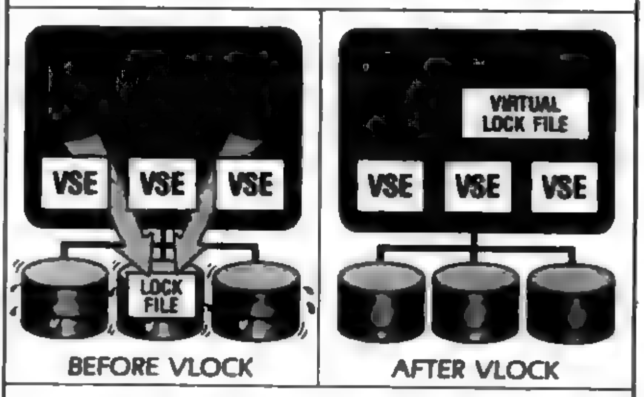

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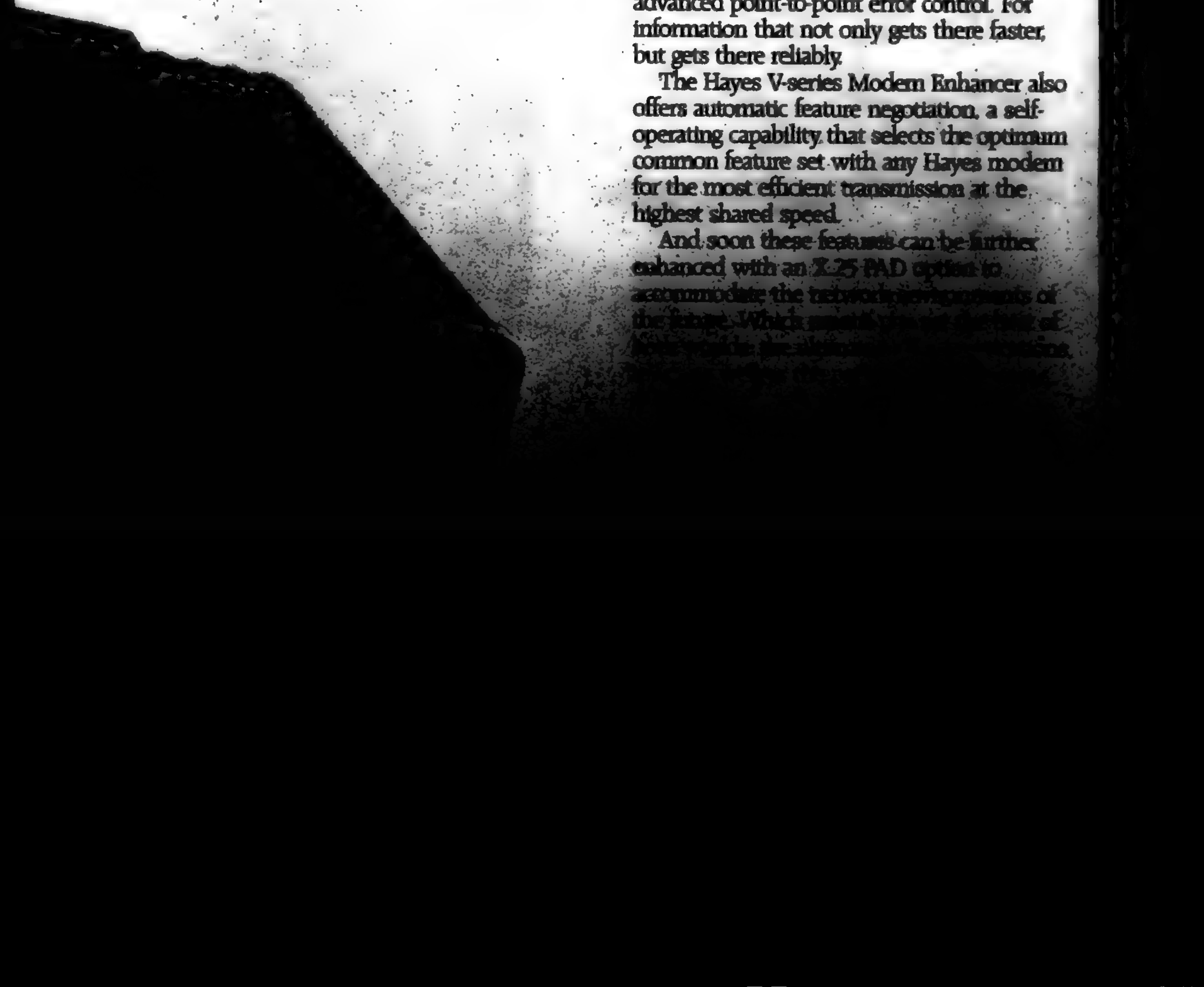

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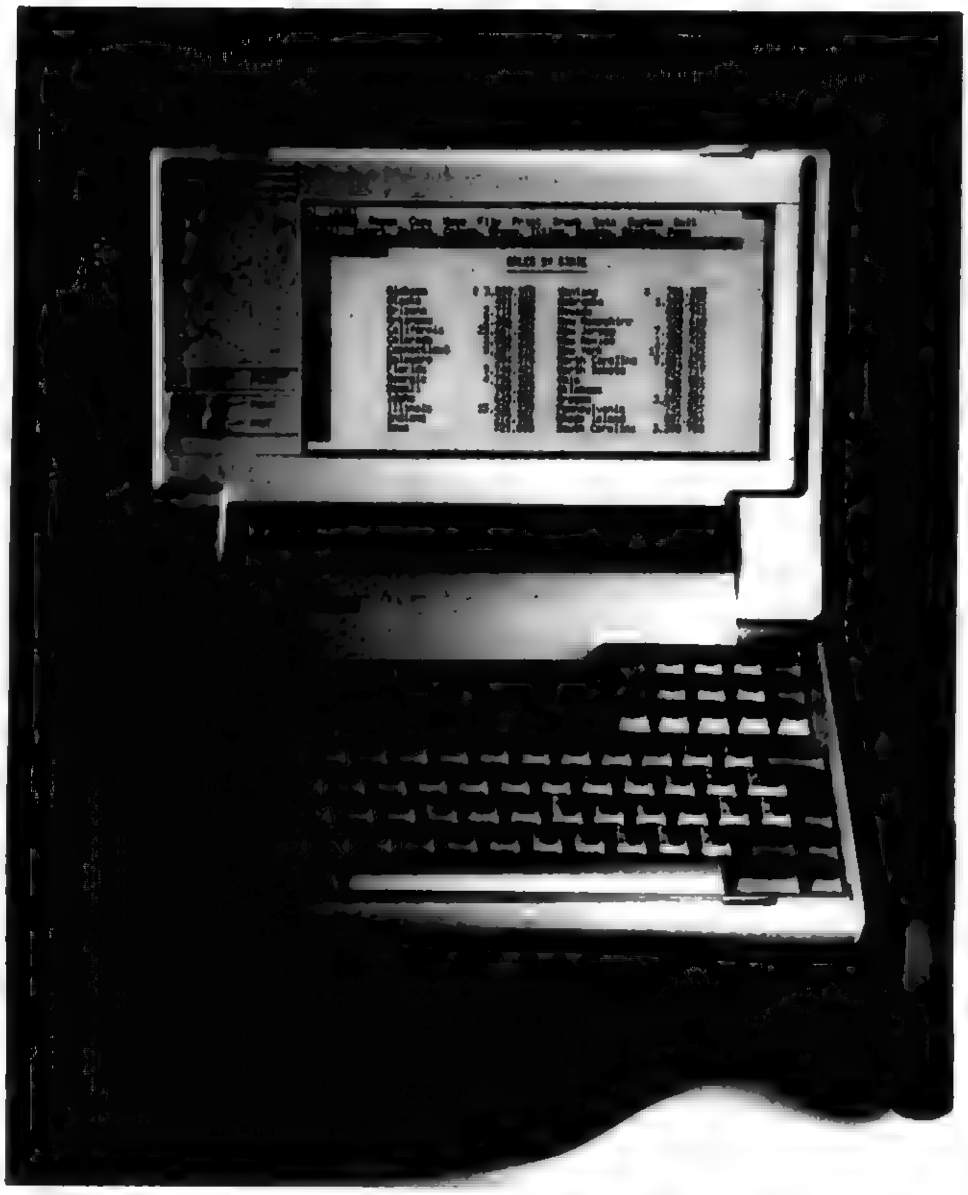

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Disk Drives	Dual 720K (3.5")	*Weight*	11.5 lbs.

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NEW PRODUCTS

Turnkey systems

A wide-measure laser image setter that merges type with line art and halftones has been introduced by **Compugraphic Corp.**

The image setter, called the **CG 9700**, can accommodate page widths of up to 108 picas. It outputs complete pages with text and graphics in position and sets type in sizes ranging from four to 999 points in half-point increments. It provides standard storage of up to 300 fonts on-line.

Resolutions are 1,200 or 2,400 dot/in. for text and 1,200 dot/in for graphics. Maximum speed is 10 in./min. Characters can be rotated in one-degree increments, and pages can be rotated in 90-degree increments.

The CG 9700 will be available in the first half of 1988 at a price of $95,000.

Compugraphic, 200 Ballardvale St., Wilmington, Mass. 01887.

Processors

A single-board computer for Multibus II systems, called the **MT68020A**, has been introduced by **Microbar Systems, Inc.**

The board was designed for use in multitasking applications using real-time or multiuser operating systems. It is based on the Motorola, Inc. MC68020 32-bit microprocessor and is available in 12.5- and 16.67-MHz versions.

Features include 1M to 4M bytes of on-board dual-ported random-access memory and an on-board small computer systems interface controller. On-board options include the Motorola 68851 Memory Management Unit and the Motorola 68881 Floating Point Coprocessor.

The 1M-byte MT68020A is priced from $2,373.

Microbar Systems, 785 Lucerne Drive, Sunnyvale, Calif. 94086.

A product said to provide the NEC Information Systems, Inc. Model 1500 workstation with full-motion video capability has been announced by **NEC Information Systems.**

The **Video Information Processor** accepts National Television Standard Code level and cable television video signals. Under program control, the processor allows window location and size and channel selection.

The 20-in. noninterlaced display features a landscape format and 1,280- by 1,024-pixel resolution. It is capable of displaying 256 colors from a palette of 16 million and provides up to 4M bytes of memory. Three RS-232C serial ports are standard, as are a 5¼-in. floppy disk drive and an 86M-byte hard disk drive.

The Video Information Processor costs $9,995.

NEC Information Systems, 1414 Massachusetts Ave., Boxboro, Mass. 01719.

Data storage

A mass-storage subsystem designed to provide Hewlett-Packard Co. HP 9000 Series 200, 300 and 500 computers with file- and disk-sharing capabilities for up to three users has been announced by **Bering Industries.**

The **Multiport** storage subsystem is available with a choice of 20M-, 40M-, 50M- or 70M-byte Winchester drives. The fixed drive can be configured for two or three users. Eash user has an equal amount of space on the fixed disk and also has access to the 20M-byte removable Winchester disk drive.

Features include built-in 20M-byte backup, a special traffic program that prevents more than one user from editing the same document simultaneously and increased users' security.

Prices for the Multiport are 20M bytes for $4,790; 40M bytes for $5,390; 50M bytes for $6,190; and 70M bytes for $6,990.

Bering Industries, 360 El Pueblo Road, Scotts Valley, Calif. 95066.

A disk storage system based on multiple-spindle Winchester technology, a proprietary disk controller and an open-architecture network has been introduced by **Recognition Concepts, Inc.**

Called **Visistore**, the storage system is said to transfer data at sustained rates greater than 18M byte/sec. Its storage capacity ranges from 600M to more than 20G bytes.

Random access of 8, 12 or 16 bit/word data records is accomplished within 60 msec, according to the vendor.

Four versions of the product are available: the Visistore 20, 40, 60 and 80, with respective bandwidths of 4.5, 9, 13.5 and 18M byte/sec.

Visistore prices start at $35,000.

Recognition Concepts, P.O. Box 8510, 341 Ski Way, Incline Village, Nev. 89450.

Terminals

An electronic receipt and validation terminal called the **Marchant Cashier Model VR-1000** has been introduced by **Marchant**, a division of Addmaster Corp.

According to the vendor, the Cashier Model VR-1000 has the ability to allow users to receive various forms of payments, validate invoices or other forms, endorse checks for deposit and apply payments to various accounts.

The Cashier Model VR-1000 also has the ability to stamp documents with the time and date in addition to a personalized endorsement message, according to the vendor.

Other features include a transaction journal and batch- and log-summary reports for each payment type and account. An optional RS-232 port is available for on-line communication to a host computer.

The Marchant Cashier Model VR-1000 is priced at $1,595.

Marchant, P.O. Box. 5016, 2000 S. Myrtle Ave., Monrovia, Calif. 91016.

Input devices

A **plug-in circuit board** said to provide enhanced capability, including alphanumerics, for bar code scanning devices used with its Datacaptor IV point-of-sale terminal has been announced by **Datacap Systems, Inc.**

It is available for Symbol Technology, Inc. laser scanners, Hewlett-Packard Co. pencil-type wands and Metrologic Instruments, Inc. tabletop scanners.

The board costs $325 for the laser scanner configuration, $575 for the hand-held configuration and $1,695 for the tabletop configuration.

Datacap, 212A Progress Drive, Montgomeryville, Pa. 18936.

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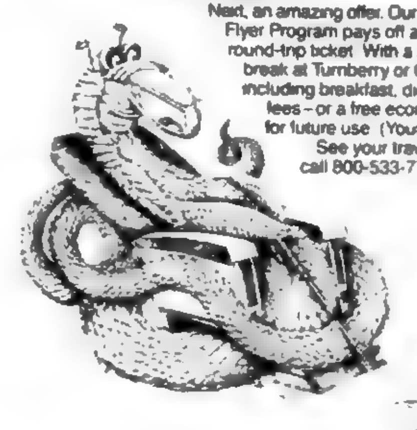

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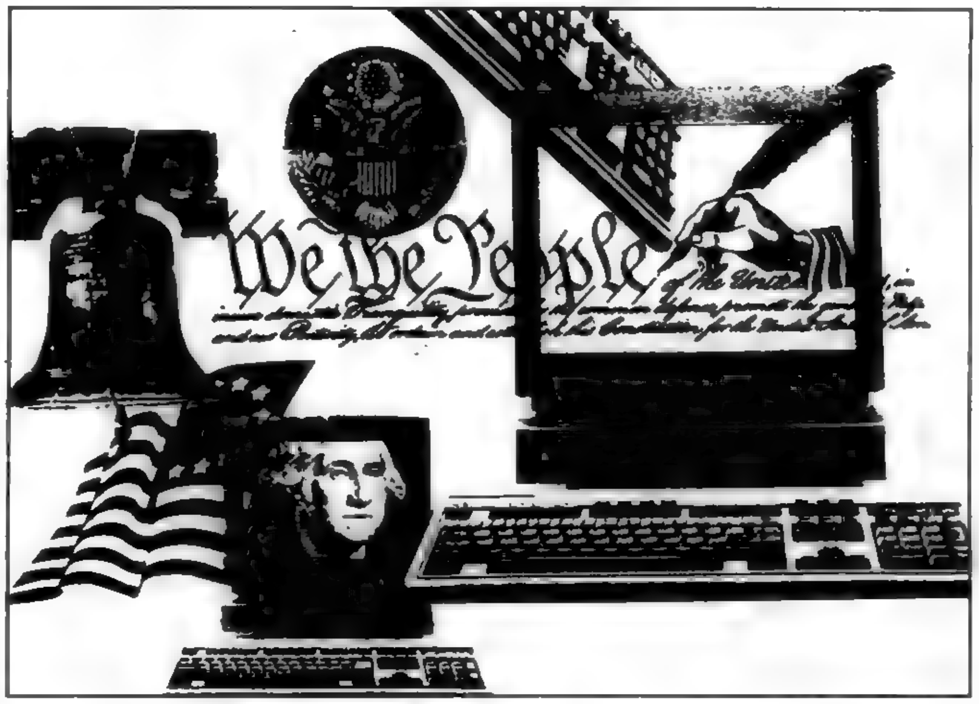
IN DEPTH

'We, the people' in the computer age

The U.S. Constitution's balance of power stands up 200 years and billions of bits later

BY ALAN F. WESTIN



Suppose we could use H. G. Wells' time machine to transport the 55 framers of the Constitution from Philadelphia in 1787 to 1987's bicentennial celebrations. The framers would look with wonder at the continental spread of the nation, the size and diversity of its population, the economic wealth this country has accumulated and the urban centers and suburban rings we have created. They would see the position the U.S. maintains as a leading world power as well as other features of modern American life.

But it would probably be the sweeping technological progress our society has accomplished that would most dazzle the men of Philadelphia. They would stare at the self-propelled modes of transportation, both on the ground and in the air. They would marvel at the ways in which raw power can be harnessed and how that power can be used to benefit — or harm — mankind. They would be amazed at the extent of automation and technological influences — from mechanized agribusiness and high-tech hospitals to microminiaturized listening devices to supercomputers.

After they had taken in the enormity of these technological changes, we can imagine the men of Philadelphia asking their contemporary hosts one basic question:

"Pray tell us, have these powerful technologies, and especially those that have come on so rapidly in the decades since your World War II, had direct impact on the structure and processes of constitutional government?

"More specifically, have they worked significant changes in the four central elements of the Constitution (and the Bill of Rights) that we left you as our legacy: separation of power, federalism, representative government and individual rights?"

How would we answer the framers?

Relativity in technology

Technologies involving energy, transportation, production, food and medicine exert enormous effects on our economic, social and personal lives. Weapons technology creates the perilous world of nuclear confrontation and portable terrorism we inhabit so nervously today.

Such technologies create substantive areas for government action — to promote, regulate and sometimes prohibit. They lead us to create new government agencies and, taken all together, help explain the rise of independent regulatory agencies as a so-called "fourth branch" of the government.

But, I submit, these kinds of technologies do not affect our constitutional structure and processes per se.

Two other technologies *could* create such an effect. These deal with that unique commodity on which government depends for its understanding and decisions, which governors use to administer programs and protect their institutional positions and on which the governed rely to protect themselves and inform their participation. That commodity is information.

The two relevant technologies dealing with information are television and computers. Television collects information from anywhere in the "global village" and, through the filter of

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Westin is professor of public law and government at Columbia University in New York. His 23 books include *Privacy and Freedom* (1967), *Databanks in a Free Society* (1972) and *The Changing Workplace* (1985). He has chaired and served on many panels of the U.S. Congress's Office of Technology Assessment. This article is an expanded version of an article to appear in Burke Marshall (ed.), "A Workable Government: The Constitution After 200 Years" (W.W. Norton, Fall 1987).

• What the framers would think of high tech

• Personal data in government data banks

• Don't underestimate inertia and tradition

those directing the coverage, presents the images of events, people and transactions directly to the people watching the screen.

Most analysts assessing the impact of television during the past 25 years would advise the framers that television has weakened political parties by giving candidates an independent route to constituents' minds and pocketbooks and that it has helped some presidents (the "Great Communicator" Ronald Reagan) while harming others (Richard Nixon with Watergate or Lyndon B. Johnson with Vietnam). They would mention that television has helped dramatize serious social injustices and thereby assisted in their correction by legislation or judicial decision.

Television's high costs have also reinforced the advantage of wealth in U.S. politics. Some even believe that the 30-second political commercial, with its tremendous potential to distort, is almost grounds for removing First Amendment bars to forbid such practices.

Despite this impact of television on our political processes and on the effectiveness or ineffectiveness of political leaders, I submit that television has still not directly affected the four central elements of the constitutional blueprint, that is, separation of power, federalism, representative government and individual rights.

Which brings us to computers. More precisely, it brings us to the blend of computer hardware and software, communications systems and management science techniques that is increasingly called information technology. We would quickly brief the framers to understand that we are becoming an information-based society, in which almost all government agencies, businesses and nonprofit organizations now own computers (large, medium or small) or utilize data processing services.

The framers would see that whereas computer systems were once the tools of the rich and powerful and consisted of huge mainframes and facilities to house them and whereas, once, platoons of highly paid systems experts and programmers were needed to write their instructions, we have progressed to an era of cheap, easy-to-use, distributed computing, available on the desktop or laptop.

Today, the American Civil Liberties Union, the Rev. Jesse Jackson, the Rev. Jerry Falwell, Ralph Nader, the National Association of Manufacturers, Cesar Chavez and the *National Review* all depend on computers to massage their membership, readership or contributor lists. The fearsome cry, "The computer is down," strikes terror in the hearts of black and white, government official and business executive, liberal, conservative and middle-of-the-roader alike.

Given the ubiquity of information technology and our dependence on it to carry out the business of contemporary life, there is a proper sense in which we should regard computers as a control technology. We should ask whether the computer's potential to change the nature, form and distribution of information for public affairs has or could affect basic balances of the constitutional system.

The negative case

When computer systems began their entering organizational affairs in the 1960s and as their use expanded in the '70s and '80s, social analysts began to warn that the power of this new tool could lead to power shifts in our constitutional balances:

- Computer power in the hands of federal and state executive branches could enhance the power of those agencies against legislative oversight and control or diminish the capacities of the judiciary to apply constitutional limitations, thereby upsetting the checks and balances system.
- Large-scale computerization might expand national power over social programs in ways that would curtail the independence and vitality of state and local government, undercutting healthy federalism.
- The growth of large data banks and computerized operations could shrink the openness and

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availability of government information to the public and to the interest groups and media that facilitate "the people's right to know" what government is doing.

In addition, advanced computer operations might lessen the incentive for citizen participation as policies became more technocratic and less democratic in execution.

- Critics warn that computerized data systems in government, collecting and integrating millions of personal records on citizens, could result in a massive loss of privacy, denial of due process and chilling effects on expression and dissent.

These fears make up the negative case, or the Orwellian scenario, when contemplating the spread of information technology in our era.

The positive case

There has also been a 180-degree different line of analysis about the potential and the tendencies of information technology for our constitutional system. Some technological enthusiasts say computers could be the best thing for constitutional government since the framers did their work in Philadelphia:

- By providing more information-based resources for policy decisions and developing improved feedback on program effects, the use of information technology could enhance cooperation between the executive and legislative branches and give the judicial branch sounder bases for reviewing the actual effects of government programs.
- By better connecting the contributions and activities of federal and state governments in national social and regulatory programs, information technology could reduce the fractionalizing of policy administration and support the "marble cake" reality of intergovernmental administration.
- Proper use of information technology could enhance the public's access to government information. Additionally, the development of electronic plebiscites and direct citizen input through telecommunications could easily expand citizen participation.
- Because computer systems improve government's ability to identify individual differences and respond to them, automated information systems can enhance the diversity of treatment of citizens while protecting those dimensions of rights that call for equality and due process.

In short, we would note to the framers, we have developed a line of optimistic forecasting that competes vigorously with the pessimistic analysis first reported.

> ALL OF THE computer systems in the federal establishment cannot break through the court's jurisdictional filter, nor do they change the concepts of rationality and constitutional presumptions that the justices apply.

Once the framers had learned about the proliferation of information technology and had been exposed to the pessimistic and optimistic scenarios just summarized, they could be expected to offer several general observations. Drawing on their knowledge about governance from the days of Athens and Rome down through the constitutional struggles of the 16th through the 18th centuries, they might remark as follows:

"Dear fellow Republicans, we could not tell a modem from a moped, but we believe we have learned some things about politics and government that would surely be applicable to your age of computers.

"First, it is prudent to assume that new and powerful tools will be taken up and used by those in power to advance both the programs they believe in and their capacity to carry those programs out more effectively against opponents inside or outside the government. Therefore, to the extent that new tools do confer greater power and cannot be easily matched or overcome, assume that what can be done effectively and what is not flagrantly in violation of public values will probably be sought to be done.

"Second, do not, as a consequence of assuming the worst case, underestimate the forces of custom and inertia or assign too little strength and vitality to those institutions and processes we gave you for controlling abuses of power. If our checks and balances have not been allowed to fall into disrepair and disuse, do not assume they will be easily thrust aside.

"Finally, when looking at opportunities to improve institutions and processes through new tools, take carefully into account existing interests and beliefs, and consider where the energy and power must come from for such innovations to prevail."

Having reminded ourselves of how the framers would have approached the tasks of technology assessment and forecasting, let us see what we think has taken place over the past several decades in terms of information technology's impacts on our constitutional system, examining both the pessimistic and the optimistic scenarios.

Separation of powers

First, despite the proliferation and accomplishments of computer systems, there have been and continue to be major system design problems and internally destabilizing effects of agency automation. This stems partly from the dynamic and constantly changing arrangements of hardware, software and telecommunications techniques that make up computer systems.

In addition, after mastering what can be seen as the "easy tasks" of computerization — automating the most objective and routine information processing functions in government work — most agencies are now attacking more complex problems.

These agencies seek to provide more customized services to clients, apply more fine-grain decision-making criteria to standards set by legislators, replace experienced employees with software-driven decision systems, improve real-time feedback on operations and trends and support powerful management information systems for planning and decision making.

Uneasy applications

Given these realities, accurate observers of agency automation are aware that failures, mishaps and sheer confusion accompany almost all the experiences of agencies in using information technology. The Social Security Administration, the Internal Revenue Service, the Veterans Administration, the Air Force and other federal computer users (to cite only federal examples) have troubled histories of computer use and remain caught up in difficult struggles with their present ambitious systems.

In short, applications of information technology to the complexities and contradictions of public policy implementation have not been easy, nor have they

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This is critical to understand because it helps explain why neither Congress nor the Supreme Court has lost significant power thus far as a result of executive branch computerization.

There was a short period in the mid-1960s when the so-called "McNamara Thrust" seemed to mark a pronounced shift of authority away from Congressional oversight and toward expert executive decisions. This stemmed from then-Defense Secretary Robert McNamara and his cadre of systems analysts' reliance on computerized support systems for cost-benefit analysis of defense policies and programs.

The language and techniques of program budgeting and systems analysis were touted as a new and scientific approach to policy-making for both foreign and domestic affairs.

Members of Congress and their staffs were sometimes portrayed as traditionalists who lacked not only the technical resources to match McNamara's team's computer printouts but also the disciplined mind-set to formulate and support alternate policy positions.

At least as early as 1966 and 1967, that situation had been corrected, at least from a separation-of-powers standpoint. Congressional staffs and their support agencies — the General Accounting Office, for example — challenged the manipulated computerized statistics of the Department of Defense (for the "Safe Village" program in Vietnam, for example). The mystique of "system analyzing" was exposed by the objective realities and deep policy dissents concerning the war.

Getting domestic

On the domestic side, Congress quickly learned how to use its powers of authorization for new agency computer systems, its appropriation controls over spending for machines and personnel, its rules for procurement of DP equipment and its oversight powers over program operations and fidelity of agencies to Congressional policy directives for keeping agency uses of information technology within the bounds that the legislative branch considered wise.

A good example was Congress's total rejection of the IRS's 1974 proposal to create a massive automated tax administration system. Operating through a panel of its Office of Technology Assessment, Congress examined the IRS proposal for its consideration of issues such as tax equity, privacy, security and control over large-system complexities and simply said no to the IRS.

The Supreme Court has found adapting to the computer age even less troublesome. As long as the justices define the questions for constitutional decision and interpretation and control what elements of the information provided to them by the executive or the legislature will be treated as relevant, the Supreme Court will retain its customary powers to hold executive actions within the boundaries of what the justices apply as constitutional interpretation.

In none of the major Supreme Court decisions in the past 25 years involving intergovernmental powers has the role or the authority of the judiciary been affected by information technology arrangements. All the computer systems in the federal establishment cannot break through the court's jurisdictional filter, nor do they change the concepts of rationality and constitutional presumptions that the justices apply.

In summary, separation of powers — and the checks-and-balances system that reinforces it — is alive and well in the computer age.

The executive has not blown the other two branches away, nor has information technology dissolved the interbranch conflicts intended by the framers. Because the framers' concept *requires* the president and Congress to compete for authority, policy differences and political considerations inevitably overcome any semblance of "increased rationality" or "empirical data proofs " that executive agency computer systems might offer.

> NEITHER Congress nor the Supreme Court has lost significant power thus far as a result of executive branch computerization.

Technology in federalism

By the time computers entered government administration in the 1960s, federalism had already developed into the post-New Deal cooperative system in which the nationalization of social and economic affairs, the power of federal funding and the sources of program initiatives had moved decisively to the national government.

The question posed by computer use was whether this would propel the federal government even further into control through data centralization and management or whether state and local governments might use computers to redress or even reverse the "power-to-Washington" trends of 1934 to 1960.

Again, early developments proved rather misleading. Because of the cost-effectiveness factors in third-generation computing — giant mainframes holding centralized data bases and accessed by thousands of near or remote terminals — it seemed that either central or at least regional data banks in fields such as welfare, health or law enforcement would be inevitable.

In such a technology-driven arrangement, central rules, data banks and oversight would be in Washington and in the federal government's regional offices, leaving a reduced "local administration" under uniform systems to state and local government.

Technological changes and

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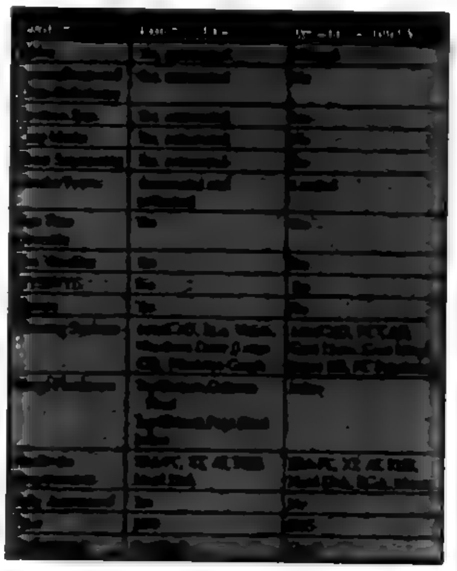

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political realities thwarted that scenario. First, the development of mid-size, micro and desktop computers and of cheap telecommunications made it technologically cost-effective to put both computing power and data bases wherever an organization or a group of cooperating governments chose to locate those resources. As a result, technology no longer dictated highly centralized information systems. Depending on what organizations sought to do and how they wanted authority and responsibility to be distributed, they could choose high, medium or low centralization or various combinations thereof.

Second, political debates over the proper role for Washington began in the 1970s and continue to be far more important in defining the relative power positions of the federal and state governments than the configuration of computer systems.

States beat back FBI

For example, invoking the tradition of state and local predominance in law enforcement and citizen fears about a national police force, the states, through their representatives in Congress, beat back efforts by the Federal Bureau of Investigation during the 1970s and early 1980s to obtain Congressional approval to build a centralized computer system for criminal history records.

This was attacked as a threat to state and local law-enforcement autonomy and a potential threat to civil liberties. It was also seen as an unwise increase in police power by having a police agency control the records needed by others involved in the criminal justice process.

The result was that the FBI was allowed to build and improve its National Crime Information Center, which handles wanted-person and stolen property records centrally and is used by local, state and national police agencies. However, the FBI was not allowed to build a central national criminal history record system.

Today, development efforts are proceeding to test a system of central national indexing while retaining storage and control of the actual records by the state agencies. Such a politically crafted system, now entirely supportable by technological capacities, illustrates the primacy of policy over technology in the federalism domain.

It also illustrates that many state and local governments have become adept, experienced and effective in applying information technology to their own tasks and offering quite powerful alternative models where there are shared or overlapping governmental functions involving federal and state or federal/state/local relations.

In short, federalism choices and arrangements remain issues of social and political policy; they have not been transformed or dictated by technology.

Technology and the citizen

Since campaigns, elections and the party system were not addressed in the Constitution, the two elements of representative government that need to be examined in terms of information technology's impacts are public access to government information and the general level and quality of citizen participation.

The negative view warns that shifting information from paper to machine-readable records might diminish the people's right to know. The assumption is that computerized data bases, accessed through software programs, might be less comprehensible to information seekers, allow the hiding or misdescription of relevant data, increase the cost of getting data or make less traceable the way in which government decisions would be made. These concerns, the framers would recognize, are not unfounded, given the long history of efforts at government secrecy and the tension between executive claims to temporary privacy for responsible decision making and the public desire to know what government is doing.

Because both freedom of information and privacy became central issues in the late 1960s and early '70s, Congress acted to insure that no techniques of data handling — automated or manual — would defeat basic rights of access. The Federal Privacy Act of 1974 required federal agencies to publish complete lists of the record systems they maintained, with personal information in them, and guaranteed inspection and challenge rights to subjects of the records.

The 1974 amendments to the 1966 Freedom of Information Act strengthened rights of public access to information held by the federal government. While neither statute addressed computers per se (unlike European data protection laws, which focused on the technology), the two laws, operating together, have effectively facilitated public access at the federal level. In addition, a parallel situation developed in state and local settings.

In a 1974 field study that examined how Congress, interest groups, the media and social critics felt that computerization had affected their existing ability to access government information, I found the following:

- Computerization was not as important as legal rules and administrative practices in determining the availability of what was sought.
- The information seekers reported that where well-designed systems were present, on the whole, automation was improving the precision, timeliness and responsiveness of federal agencies to their requests.

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1984, two conclusions emerged. The facilitating effect of computerization per se continued as before. But the policies of the Reagan administration were seen as reducing the timeliness and quality of information sought. Executive agency public affairs and freedom of information staffs had been drastically reduced; a policy was instituted requiring lawsuits under the Freedom of Information Act rather than compliance upon request; and a policy was adopted of selling government-produced information to the commercial sector for fee-based distribution, where such data had once been disseminated by federal agencies free or at a low cost.

Again, information technology was decisively shaped by political and legal debates and their outcomes. And, as the framers would be happy to observe, the tradition of extraordinary openness of American government was well preserved despite policy issues in the current administration's approach to public access.

On the other hand, efforts to use information technology to improve dramatically the public's right to know or its electoral participation have not materialized as yet. Despite passionate advocacy by consumer leaders like Ralph Nader, we do not put public computer terminals in shopping malls or ghetto storefronts and allow citizens to look up which stores or manufacturers violate safety, health or other regulatory rules. We could do this, but we choose not to spend the public's dollars that way.

Nor have we designed and funded the electronic democracy experiments that would frame key public policy issues and put them to citizen expression or formal vote through terminal, telephone or two-way television. There are two reasons for this. First, there are serious problems that the framers would quickly recognize in the agenda selection, issue framing, deliberation periods and binding aspects of such electronic plebiscites.

Second, such schemes address the participation of the 90 million "haves" who are already interest group members and active voters rather than the 80 million "have-lesses," who are the nonjoiners and nonvoters that exist in our society. Unless a serious political movement to bring nonparticipants into the system is the driving force of electronic democracy, the disadvantages of such proposals far outweigh their supposed advantages.

Individual rights

Perhaps the most publicized fear about computerization is that it will lead, inevitably, to the collection and consolidation of more personal information about people; the reliance on such systems to control people's benefits, rights and opportunities; and the uncontrolled sharing of such files with other government agencies or private organizations. This relates not only to privacy rights but also to due process, freedom of expression and equality.

These concerns were raised by social commentators, interest groups and political leaders when computer use spread in the 1960s. This led — in the U.S. and other industrial democracies — to a burst of empirical studies and commission investigations to learn just what computers could and could not do, how computers were actually being used and with what effect on existing individual rights and whether new laws or organizational rules were needed.

> AS THE FRAMERS would be happy to observe, the tradition of extraordinary openness of American government was well preserved despite policy issues in the current administration's approach to public access.

In the U.S., this produced the National Academy of Sciences report, "Data Banks in a Free Society" in 1972 and the influential report of the Health, Education and Welfare Secretary's Committee on Automated Personal Data Systems in 1973. These reports concluded that computer use had not yet produced the transformations of data collection, exchange and use that critics feared but that the technology was getting cheaper, more powerful and more reliable and that new laws and rules were needed if individual rights were not to suffer.

Legal safeguards

Whether we would have enacted national privacy laws had Watergate not occurred is an interesting question. But with that event as an unequivocal lesson in governmental information abuse, we decided that new legal safeguards designed to institutionalize fair information practices had to be installed.

As a result, a steady stream of federal and state privacy-protection legislation from 1970 to the present year has resulted. This legislation covers government files in general; credit, insurance, and employment reports; bank and financial records; tax information; medical and health records; educational records; and a variety of other fields.

Interestingly, it has not been the Supreme Court that has pioneered in this updating of the Bill of Rights for the computer age. While the Supreme Court acted in 1967 to reverse its narrow and inadequate 1928 reading that the Fourth Amendment was not applicable to government telephone tapping, the court's "reasonable expectation of privacy" standard has not been extended to cover citizen interests in government data banks. The court has left the definition of such rights to the legislative process.

Happily for the framers' blueprint, federal and state legislatures have responded. Enactment in the 1980s of federal privacy protections for subscriber data in cable systems and last year's Electronic Communications Privacy Act, covering communications on digital networks, cellular telephones and other new media, document that active protective legislation continues.

These new laws and organizational rules, it must be emphasized, were not natural by-products of technological innovation, nor were they bestowed as some kind of constitutional noblesse oblige by the government and private organizations adopting computer systems. Rather, these new rules were perceived as critical, publicized as necessary and fought for in the political trenches by ad hoc coalitions of interest groups that have been the "citizen's lobby" on privacy and due process protections in the computer age.

While consistently including civil liberties, union, minority, consumer and legal groups (the liberal component), the privacy coalitions have generally been able to mobilize representatives of specific record-subject populations whose lives would be affected by computerization: taxpayers, patients, insureds, bank account holders and so on. And, because the specter of a vastly more powerful government alarms conservatives as well as liberals, the privacy coalitions of the past two decades have often united a wide range of ideological positions behind laws and rules to safeguard individual rights in automated systems.

In short, every generation of Americans has to redefine and reassert constitutional rights as new socioeconomic conditions, governmental programs and

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technologies create pressures for traditional rights to be discarded or diluted. The framers could be expected to give a small smile of satisfaction and remark, "The system works."

Today, there is little doubt that our society has more privacy protection laws and organizational privacy rules relating to use of personal data than it had before computers arrived. In terms of due process, individuals are empowered to see and challenge their government records, and we have lively litigation over citizen rights in both public and private data bank uses. These new rights and procedures are being actively applied by the federal and state courts.

But, as government moves in the next decade into federal agency integrated record systems of unprecedented size and complexity, as computer-matching programs pass individual names through dozens of files from various agencies and governmental levels and as medical testing activities raise the possibilities of national screening-result record systems, a healthy and sustained concern is called for. Much new political mobilization and societal attention will be essential if the gains of the past two decades are to be preserved.

Technology's impacts

Our inquiry into the effects of information technology, it should be noted, has been framed at the macro or "regime" level, and we have found that neither the negative nor the positive projections have taken place as predicted. However, we hasten to note that information technology affects and will continue to significantly affect many vital areas of private and public life in the following ways:

- Information technology is reshaping work patterns and employee-employer relationships, greatly improving some work and impoverishing other jobs.
- Information technology is transforming industry definitions and arrangements, creating a global, rather than a national, production and marketing system and altering basic public expectations about consumer services.
- Information technology is transforming the way client services are organized and delivered by government agencies and may well reshape the structures of these agencies in the coming decade.
- Information technology continues to rearrange power and roles within large private and public organizations.

Calming the turmoil

Those changes are deep and important. And they come at a time of significant turmoil in American organizational life. At the federal government level, for example, there are serious problems with fiscal resources, labor-management relations, organizational processes and cultures and management of large-scale information system projects. There is also considerable uncertainty in Congress about how to perform the oversight role in this milieu.

In the private sector, the ferocity of domestic and international competition, the short-term-profit pressures and the "lean and mean" doctrines of enterprise operations threaten to take the enormous promise of office systems technology — for improved quality of work life and customer relations — and transform it into factory-like office automation.

Furthermore, while access to data base information and interorganizational networking has spread rapidly in the government, business and media sectors, this major enhancement in information-access capability has not yet been developed in and made available to the voluntary group sector.

If the 30,000 or more national voluntary groups in America are to play a critical role in promoting new ideas and serving as independent critics of government and private institutional policies, ways need to be found to readdress the growing imbalance between information "haves" and "have-leases" in the national policy process.

These are profoundly important problems, but they are not at the regime level. Even taken together, they do not constitute

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present impacts on the four major constitutional balances.

What information technology has and has not done to the four great mechanisms of our Constitution tells us some very important things about the nature of our constitutional system, the political culture and value system that spawned and sustains it and the ways that democratic societies have learned to look at and deal with powerful new technologies.

First, even as powerful a technology as computers flows along the deep, rock-like channels of a society's values, politics, laws and institutions. When we think about how to use computers (or how society will allow government and the private sector to use computers), we follow those channels and the pathways of action that they structure.

Second, the reception and shaping of information technology applications during the past 25 to 30 years attests to the strength of our interest-group advocacy system, the generally pro-civil-liberties orientation of our mass media, the widespread and nonpartisan distrust of authority and concern for its proper control and the general public readiness to defend constitutional norms, once alerted to threats to such values. It is these forces, not inherent limitations or benign properties of the technology, that have offered the best protection.

The past two decades attest also to the continued vitality of the separation-of-powers competition and federalism conflicts that the framers deliberately installed to help safeguard against potential abuse of power, whether by new tools or any other mechanisms.

Finally, the men of 1787 would probably react to this review of how technology has affected their handiwork by observing that they would have expected no other outcome. They might chide us gently: "We can understand how you might see such powerful technologies as these computers as a deus ex machina, something that would vault over the national political culture and the institutions it spawns and allow the deliberate creation of radically alternative systems. Some of your liberals want this to produce more egalitarian systems, with greater citizen participation and control over large institutions. And some of your conservatives wish to use computers to achieve more orderly social systems, to foster private decision making and to control antisocial groups more effectively.

"But even though new computer systems provide a wonderful handle with which to get media and public attention to such proposals for drastic change — in the name of controlling or using new technology — the ultimate test of such essentially political proposals is how well they fit with current political moods and system-support orientations of the national public. New technology applications will inevitably be accepted or rejected according to such fundamental balances of power, interest and ideology.

"In fact, we detect in much of your generation's thinking and writing about technology a tendency to seek relief from the struggles over wise policy and its administration through a focus on new machines. However, we are confident that the progress of the U.S. — if you and your adversaries do not blow up the world, of course — still depends more on the nurturing of a democratic civic culture, the attraction of the best people to government, the vitality of political participation, the pursuit of equality and justice, the continued productivity of the economy and the creative use of constitutional balances than on anything these information machines can accomplish."

Computer professionals

It seems appropriate to conclude by asking what roles computer professionals have played and should play in the accommodation of information technology to the American constitutional process.

When computer systems first appeared, a leading edge of computer scientists accepted the responsibility of alerting policymakers and the public to the problems and potentials of computer technology. Then, the major associations and publications in the computer field began to give sustained coverage to issues of privacy, security, due process, equity, citizen access to information, management of large public systems and so on.

Legal and social science experts working on these issues came to depend on such coverage and on debates among computer professionals to keep them informed about trends. Noncomputer experts were much more effective in alerting the public and lawmakers to problems because of the professional reportage and commentary available to them.

This vital service to guardian groups and public policymakers needs to be continued and even accelerated in the next decade. Even though there are natural divisions among computer professionals by ideology and interest, the airing of social-impact discussions about new information technology developments serves as a vital early warning signal for interest groups and political leaders. A high-technology society needs every bit of lead time it can get to consider such potential social impacts of computers and to decide on appropriate policy responses.

At least some of the framers would expect no less from leading computer professionals. Thomas Jefferson, a symbol in his day of commitment to science and liberty, might have called it a sacred duty of such professionals to country and Constitution. Surely, it is the appropriate bicentennial message to be heard and heeded by American computer professionals. ●

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Artificial Intelligence Corporation

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Unisys announces the birth of the Smallframe.

You're invited to celebrate the arrival of the newest member of the Unisys product family, as well as the birth of a new concept: The Unisys Smallframe.

It's three different tiny computers: A1, A4 & A6. Each built to fit in the same size cabinet, each with a small footprint and a low price. (That's what we meant when we said "Small.")

But each starts you running true mainframe applications economically and quickly. Plus, Smallframes use the same operating system as our biggest A Series mainframe—and every machine in between—without any software conversion. (That's what we meant by "frame." As in main*frame*.)

What potential!

With the newborn A1, the smallest of the Smallframes, Unisys now gives you a clear, continuous growth path of more than 100 times in computing power.

That means if you're running a small business or department with the A1, you can use proven mainframe software on a computer that costs about the same as a mini. And because the A1 is part of a broad line of compatible machines, your data and software investments are safe as you grow.

Meet the family.

The A1, A4 & A6 are the youngest and smallest members of the respected Unisys family of A Series mainframes. The series includes machines that run major banks, governments, schools, hospitals and businesses all over the world. An independent survey of mainframe owners found Unisys systems scored the highest five year average in overall satisfaction.*

While Smallframes are about the size and price of minis, the top of the A Series isn't a set of minicomputers playing together. It's the A15, one of the largest and most powerful true mainframes money can buy.

Between the A15 and the A1, there are 12 other models.

***Computerworld*, June 15, 1987, survey by Datapro Research Corporation.

All compatible over the line—and over time. Software written for any model or generation over the last 17 years is compatible with any current A Series model.

Since all three are built for the same size cabinet, the A1 itself is field upgradeable to A4 and A6 levels—a better than 3 times increase in computing power.

Doesn't cost much.

You already know the A1 gives you mainframe quality for about the price of a mini.

But what about the rest of the A Series? From the moment of conception, every computer in the family is designed to be easy to get along with and cost very little to run.

That means reasonable purchase price. Low operating costs. Low training costs. Even low software development costs, thanks to the powerful A Series operating system and LINC—the well-known fourth generation language from Unisys that can cut programming time by a factor of ten or more.

Grandpa's eyes.

All in all, the best thing about the Smallframe is that it sees the world the same way the powerful A15 and the whole A Series does. You might even call it a "chip off the ol' box." It's got the same operating system. Same interfaces. And it will even communicate with IBM machines.

So whether you want a small computer with a virtually unlimited conversion-free expansion path, or you've got a large Unisys computer and need a smaller yet fully compatible department level system, call the proud parents at Unisys.

We'd love to stop by with all the information you need. And show you pictures. After all, a new arrival like this is worth celebrating.

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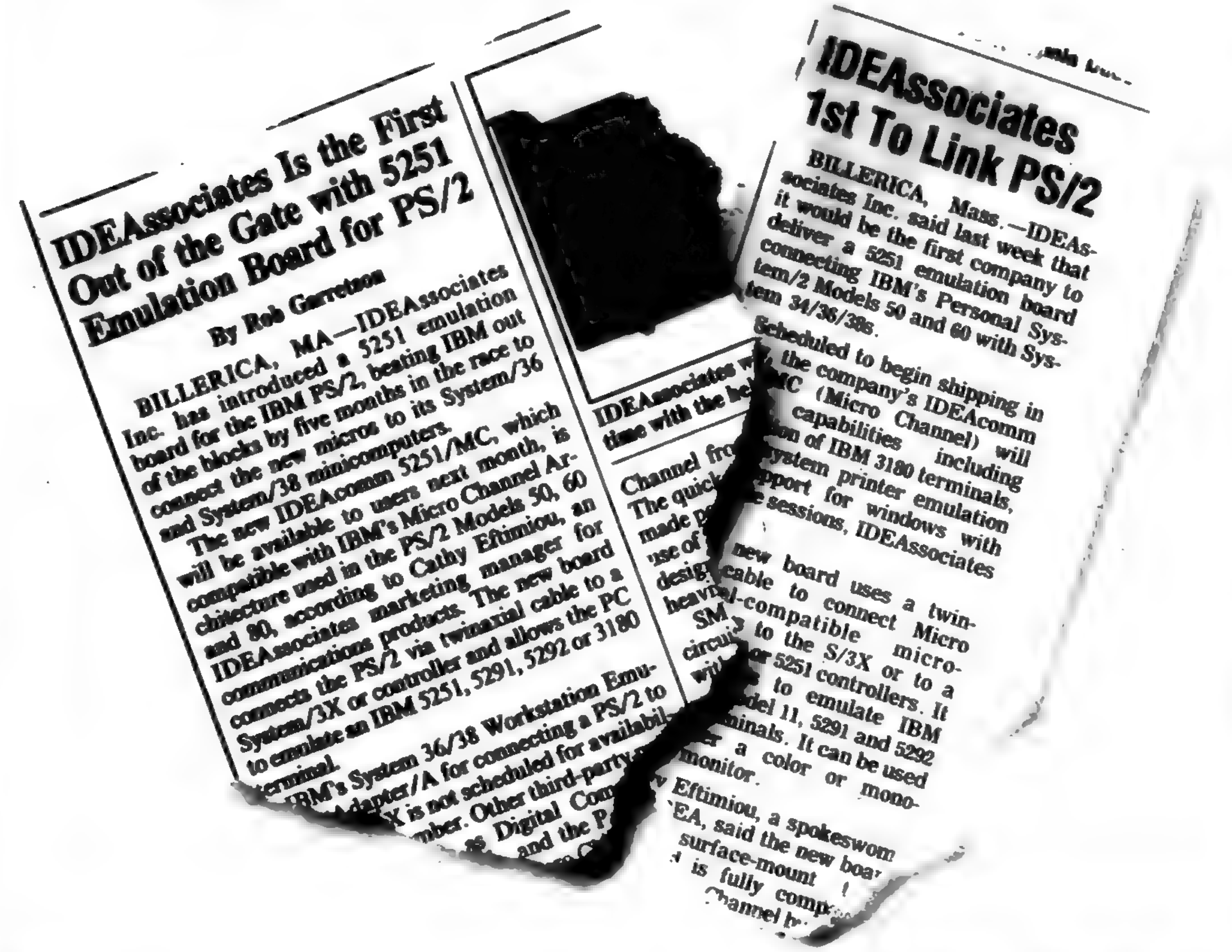
On April 2, IBM made PC history. Eight weeks later, we rewrote it.



IDEAssociates Is the First Out of the Gate with 5251 Emulation Board for PS/2

By Rob Garretson

BILLERICA, MA—IDEAssociates Inc. has introduced a 5251 emulation board for the IBM PS/2, beating IBM out of the blocks by five months in the race to connect the new micros to its System/36 and System/38 minicomputers.

The new IDEAcomm 5251/MC, which will be available to users next month, is compatible with IBM's Micro Channel Architecture used in the PS/2 Models 50, 60 and 80, according to Cathy Eftimiou, an IDEAssociates marketing manager for communications products. The new board connects the PS/2 via twinaxial cable to a System/3X or controller and allows the PC to emulate an IBM 5251, 5291, 5292 or 3180 terminal.

IBM's System 36/38 Workstation Emu-
dapter/A for connecting a PS/2 to
X is not scheduled for availabil-
mber. Other third-party
as Digital Com
and the P

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IDEAssociates 1st To Link PS/2

BILLERICA, Mass.—IDEAssociates Inc. said last week that it would be the first company to deliver a 5251 emulation board connecting IBM's Personal System/2 Models 50 and 60 with System 34/36/38.

Scheduled to begin shipping in
, the company's IDEAcomm
MC (Micro Channel) will
capabilities including
ion of IBM 3180 terminals,
ystem printer emulation
pport for windows with
e sessions, IDEAssociates

new board uses a twin-
cable to connect Micro
l-compatible micro-
to the S/3X or to a
or 5251 controllers. It
to emulate IBM
del 11, 5291 and 5292
minals. It can be used
r a color or mono-
monitor.

Eftimiou, a spokeswom
EA, said the new boa
surface-mount
is fully comp
Channel b

April 2, 1987.

To most computer add-on companies that was the date IBM dropped the bomb. With the introduction of PS/2 personal computers, the Micro Channel® revolution had begun.

The effect on our competitors? Many were prepared to do little more than count big inventories of emulation products for old PCs.

But we were ready.

Within eight weeks we began shipping the first Micro Channel communications product. IDEAcomm 5251/MC.™ The board that connects the new PCs to the System 3X.

How did we do it? The answer is simple. We don't rely on outside development sources. We have our own in-house R&D team. The same team that pioneered Surface Mount Technology (SMT) on computer cards. The very same manufacturing technique used heavily in the PS/2 design.

The result of these efforts is an add-on board that redefines the limits of PC communications. It provides 5292 Model 2 emulation. Support for 132 columns in 3180 emulation. And windows to monitor the real time status of multiple sessions on one PC screen. *Q38 Technical Journal* declared, "... while IDEA is delivering an emulation card that works completely, the other guys are just playing catch-up."

Which, historically speaking, is exactly the position we're inclined to take. For more information on the IDEAcomm 5251/MC, call 800-257-5027.

IDEAssociates™
The Leader in PC Technology.

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MANAGEMENT

TAKING CHARGE

Les Gilliam

Five keys to productivity

I assume all MIS directors would like to improve the productivity of their staffs. Yet, I wonder how much serious attention they give the subject. Where does "productivity improvement" appear on their prioritized list of objectives?

You may be thinking of productivity improvements as simply performing tasks in a shorter period of time; in other words, improving efficiency. But the greater gains will likely come in omitting tasks that contribute little toward organizational goals and redirecting employees' time and talent toward tasks that have a higher potential benefit for the organization.

Five primary factors serve as barriers or gateways to improved productivity: skills, knowledge, tools, opportunity and motivation.

Skills. Data processing is a technical field, and technical skills are necessary for success. Careful hiring procedures help ensure that each employee starts with at least the minimum

Continued on page 94

Hopper: The right stuff at AMR

BY DAVID A. LUDLUM
CW STAFF

With the success of American Airlines' Sabre reservation system celebrated far and wide, the name Max Hopper is as likely as any to be associated with the use of computers to forge a competitive advantage in business.

A look at Hopper's career beyond the Sabre success story reveals not only the foundation he laid for it, but also the limitations and frustrations he encountered trying to duplicate that success in a more challenging environment.

Hopper, a top executive with American Airlines' parent AMR Corp., achieved prominence in the 1970s by leading the airline's distribution of Sabre to travel agents. The move, challenged in lawsuits for creating too great a competitive edge, has racked up profit margins of more than 25% on the airlines' revenue.

Hopper found the going a lot tougher, however, in trying to help overhaul the calcifying international empire of Bank of America, which was the largest U.S. bank as recently as 1980 but is now half the size of Citibank N.A., the current leader. He joined Bank of America in 1982 and three years later abandoned his efforts there to return to AMR.

He did so, he says, to take advantage of a lucrative offer, even after Bankamerica Corp. countered it. He staunchly denies that difficulties with a huge, innovative conversion of the bank's transaction processing system affected his departure or left him out of favor with top management there.

PROFILE
Max Hopper

Position: *Senior vice-president, American Airlines.* **Mission:** *To support American, operate the Sabre reservation system and oversee a collection of niche-market information service businesses.*

Colleagues at other firms cite several keys to Hopper's rise. Among them are sheer imagination and insight. "You have breakfast with Max, and your blood is coursing all day," says David J. Barber, president of Interactive Training Systems, Inc. in Bedford, Mass., which has developed an interactive video kiosk promoting vacation travel for AMR.

Business foresight

Specifically, colleagues say Hopper long anticipated the use of computers to further business strategies. "He has been building that theme through most of his career," says Glen Belden, vice-president of planning at United Airlines, who worked with Hopper at that company.

Hopper has worked hard, broadened his activities and sought new opportunities. Belden calls him "an intense, hard-working person" who believes in what he is doing.

Right now, as senior vice-president of American Airlines and head of AMR Information Services, Inc., Hopper says he works 70 to 80 hours a week.

Trained as an engineer, Hopper responded early in his career to business needs as well as technological challenges, he says. "I climbed in those boxes nearly as much as any systems engineer," he says of his work at Shell Oil Co. during the early 1960s. But, he added, "even though I found the technology extremely fascinating, I was more interested in how it could be used."

Hopper, 53, is heavyset with dark hair and a dark complexion. He grew up in the eastern Texas oil country, a background suggested by the hint of a twang in his voice.

His family was of modest means, his father a labor leader and later a roofing contractor, his mother a hospital worker. He left the University of Texas at Austin because of lack of money after two years of studying chemical engineering.

Hopper became a technician at Shell's research lab in Houston and then did security work in the Army with an eye to GI tuition benefits. Supporting a wife and son, he went back to Shell

Continued on page 90

Hot future for DP pros

Employment of computer programmers and systems analysts will grow much faster than the hiring of any other occupational group between 1986 and the end of the century, according to the U.S. Bureau of Labor Statistics.

The bureau projects that overall employment will grow 19.2% by the year 2000 but foresees jumps of 75.6% for systems analysts and 69.9% for programmers, according to estimates to be discussed in the forthcoming issue of "Monthly Labor Review," a bureau publication.

The next-highest projected growth rate is for guards, at 48.3%. Following that are electrical and electronics engineers, at 47.8%, and computer operators, at 47.2%.

The bureau projects a labor force that is increasingly female, black and Hispanic, with women accounting for 63% of the growth between 1986 and 2000 and ethnic minorities accounting for 57%.

It also projects continued growth of employment in service industries, trade and construction, with a slight overall decline in manufacturing.

In manufacturing, the computer industry is expected to be the fastest growing segment, adding jobs at a rate of 20.3%, or 1.3% a year.

The 19.2% growth in employment through 2000 would be down sharply from 32% between 1972 and 1986 because of slower population growth.

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LOCAL HAPPENINGS

NORTHEAST

Boston, Sept. 16. Data Processing Management Association (DPMA) Boston Chapter. Computers and the Weather, with Bruce Schwoegler of WBZ-TV. Anthony's Pier 4 Restaurant. 5:30 p.m. Contact: DPMA, P.O. Box 1806, Boston, Mass. 02109.

Boston, Sept. 16. Society for Management of Professional Computing, Inc. New Trends in Work Group Software, with Esther Dyson of Edventure Holdings, Inc. The Great Hall at Quincy Market. 11:30 a.m. Contact: SMPC, 715 Boylston St., Boston, Mass. 02116.

New York, Sept. 17. Teltech CICS Users Group. Performance Analysis in CICS/VS, with Tom Harper of BMC Software, Inc. Citibank, 399 Park Ave. 1:30 p.m. Contact: Teltech, 30 Broadway, New York, N.Y. 10006.

New York, Oct. 14. DPMA Financial Industries Chapter. Principles of Project Management, with Thomas E. Conlon of Sherwood Securities Corp. Harry's of the American Exchange, 113 Greenwich St. 6:30 p.m. Contact: Dick Lofton, DPMA, P.O. Box 894, Wall Street Station, New York, N.Y. 10005.

New York, Oct. 14. Association for Women in Computing New York Chapter. Annual Fall Reception.Contact: AWC, P.O. Box 2293, Grand Central Station, New York, N.Y., 10163.

Harrisburg, Pa., Oct. 14. Central Pennsylvania Chapter, Association for Systems Management (ASM) International. Tour of DP center, City of Harrisburg. Harrisburg City Hall. 7 p.m. Contact: Mark Anderson, 809 Acri Road, Mechanicsburg, Pa. 17055.

Augusta, Maine, Oct. 21. Maine Pine Tree Chapter of the DPMA. People Skills, with Sally Harwood of University of Maine. The Senator Inn. 5 p.m. Contact: J. Pierwager, Delta Chemicals, Inc., Searsport, Maine 04974.

SOUTHEAST

Macon, Ga., Sept. 15. DPMA Middle Georgia Chapter. Ergometrics, with James Gaudet. Holiday Inn, Interstate 75. Contact: L. L. Purcell, P.O. Box 4, Macon, Ga. 31202.

Charlotte, N.C., Sept. 17. ASM Queen City Chapter. Fifteenth anniversary celebration and Building Your Own Company, with John W. Weil. Cosmos Steak House, 5100 E. Independence Blvd. 6 p.m. Contact: Robert Yearwood,Metro Information Services, Suite 140, 7 Parkway Plaza, Charlotte, N.C. 28217.

Richmond, Va., Sept. 22. Richmond Chapter of the ASM. Hallmarks of Well Being, with C.B. Gill of Luben Associates. Downtown Club of Richmond, 801 E. Main St. 5:30 p.m. Contact: Gary Morse, ASM, P.O. Box 32172, Richmond, Va. 23294.

Lafayette, La., Sept. 24. Acadiana Chapter of the DPMA. Monthly meeting. Evangeline Steak House, Highway 167 South. 6:30 p.m. Contact: Debra Billeaud, 4th Floor, Guaranty Bank and Trust Co., 200 W. Congress, Lafayette, La. 70502.

Columbia, S.C., Oct. 1. ASM Midlands Chapter. Student Night. Quality Inn, I-20 and Broad River Road. 5 p.m. Contact: George F. Haykoe, 118 Park Ave. S.E., Aiken, S.C. 29801.

Chamblee, Ga., Oct. 13. ASM Atlanta Chapter. Robotics: Today and Tomorrow, with Les Ottinger of Advanced Manufacturing Systems, Inc. Holiday Inn Chamblee-Dunwoody, 4386 Chamblee-Dunwoody Road. Contact: Jane Roberts, HBO & Co., 1 Ravinia Drive, Atlanta, Ga. 30346.

Charlotte, N.C., Oct. 15. ASM Queen City Chapter. Productivity in Systems Development, with Olin Broadway of Broadway & Seymour. Cosmos Steak House, 5100 E. Independence Blvd. 6 p.m. Contact: Robert Yearwood, Metro Information Services, Suite 140, 7 Parkway Plaza, Charlotte, N.C. 28217.

Macon, Ga., Oct. 20. DPMA Middle Georgia Chapter. Stress Management, with Nancy Ridley of Charter Northside. Holiday Inn, I-75. Contact: L. L. Purcell, P.O. Box 4, Macon, Ga. 31202.

MIDWEST

Des Moines, Iowa, Sept. 14. Des Moines Chapter of the ASM. Sales and Service — the Inseparable Duo, with Don Gold of Barrow, Barton, Hudson, and Swab. The Howard Johnson Inn, Merle Hay Road. 5 p.m. Contact: Joleen Montag, Integrated Resources Life Insurance Co., 3737 Westown Pkwy., West Des Moines, Iowa 50265.

Grand Rapids, Mich., Sept. 14. Grand Valley Chapter of the ASM. Function Point Analysis and CBT Training, with Allen Kalkstein of M & I Data Services, Inc. Contact: Michael J. McCann, Byker, Van Popering & Bergsma, 3083 Washington St., Grandville, Mich. 49418.

Dayton, Ohio, Sept. 15. Megacity Chapter of the ASM. Desktop Publishing, with Robert Dice. Dayton Marriott, 1414 S. Patterson Blvd. 5:30 p.m. Contact: S. Beebe-Owen, Western Ohio Pizza, Inc., 2324 Stanley Ave., Dayton, Ohio 45404.

Toledo, Ohio, Sept. 16. Toledo Chapter of the ASM. Strategic Planning, with Bob Garrity of Price Waterhouse. The Edison Club. 5:30 p.m. Contact: Dale R. Briggs, Computer Services, Marathon Oil Co., 539 S. Main St., Findlay, Ohio 45840.

Wausau, Wis., Sept. 21. Wisconsin River Valley Chapter of the DPMA. Seminar: Managing Change; monthly meeting: Another Perspective on Change. Contact: Patricia Grasse, City-County Data Center Commission, 407 Grant St., Wausau, Wis. 54401.

Fort Wayne, Ind., Sept. 22. ASM Fort Wayne Chapter. The Chief Information Officer, with Dave Allen of Lincoln Life. Goeglein's, 7311 Maysville Road. Contact: Beth Hakill, ASM Publicity/Newsletter, Suite 103, 10427 Leo Road, Fort Wayne, Ind. 46825.

Lafayette, Ind., Oct. 8. DPMA Sagamore Chapter. Career Planning for a Lifetime, with Terry Phillips. Judith Painter Catering, 101 Plaza Lane. 5:30 p.m. Contact: Joan Vaughan, MIS Department, Aluminum Co. of America, Box 7500, Lafayette, Ind. 47902.

Minneapolis, Oct. 8. The Minnesota Intellectual Property Law Association. Software Copyright Infringement: The Emerging Standard. Whitney Hotel, 150 Portland Ave. 1 p.m. Contact: Walter Linder, Suite 1500, 625 4th Ave. S., Minneapolis, Minn. 55415.

Toledo, Ohio, Oct. 14. ASM Toledo Chapter. Selling Ideas and Change to Management, with Ken J. Shoe of Executive Support Systems. Heatherdowns Country Club. 5:30 p.m. Contact: Dale R. Briggs, Computer Services, Marathon Oil Co., 539 S. Main St., Findlay, Ohio 45840.

Dayton, Ohio, Oct. 20. Megacity Chapter of the ASM. Computer Security and Business Concerns. Dayton Marriott, 1414 S. Patterson Blvd. 5:30 p.m. Contact: S. Beebe-Owen, Western Ohio Pizza, Inc., 2324 Stanley Ave., Dayton, Ohio 45404.

WEST

Walnut Creek, Calif., Sept. 16. ASM East Bay Chapter. Monthly meeting. Contact: ASM, 32 Robert Road, Orinda, Calif. 94563.

Portland, Ore., Oct. 19-20. Effective Software Practices: The Fifth Annual Pacific Northwest Software Quality Conference. Sheraton Inn, Airport. Contact: Lawrence & Craig, Inc., P.O. Box 40244, Portland, Ore. 97240.

Walnut Creek, Calif., Oct. 21. ASM East Bay Chapter. Monthly meeting. Contact: ASM, 32 Robert Road, Orinda, Calif. 94563.

El Paso, Texas, Oct. 22. DPMA El Paso Chapter. Disaster Recovery (Bosses Night). International Club, Mesa Tower. 5:30 p.m. Contact: Steve Tarro, Las Cruces, N.M.

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CALENDAR

SEPT. 20-26

The Eighth Annual Data Design Users Conference. San Francisco, Sept. 20-23 —Contact: Data Design Associates, 1279 Oakmead Pkwy., Sunnyvale, Calif. 94086.

Interex North American Conference of Hewlett-Packard Business Computer Users. Las Vegas, Sept. 20-25 — Contact: Interex Conference Department, 680 Almanor Ave., Sunnyvale, Calif. 94086.

Management Information Systems for Strategic Advantage. Philadelphia, Sept. 20-25 — Contact: Registrar, Office of Executive Education, 200 Vance Hall, The Wharton School, University of Pennsylvania, Philadelphia, Pa. 19104.

Systems Integration in Multivendor Environments: Dataquest, Inc.'s Business and Office Systems Conference. Littleton, Mass., Sept. 21-22 — Contact: Marina Pettijohn, Dataquest, 1290 Ridder Park Drive, San Jose, Calif. 95131.

Integrated Services Digital Networks. San Francisco, Sept. 21-22 — Contact: Customer Service, Frost & Sullivan, Inc. 106 Fulton St., New York, N.Y. 10038.

CD-ROM Expo. New York, Sept. 21-23 — Contact: IDG Conference Management Group, 375 Cochituate Road, Box 9171, Framingham, Mass. 01701.

Corpcon Corporate Microcomputer Exposition and Technical Conference. Los Angeles, Sept. 21-23 — Contact: Corporate Expositions, Inc., P.O. Box 3727, Santa Monica, Calif. 90403.

Office Technologies Conference. Los Angeles, Sept. 21-23 — Contact: Corporate Expositions, Inc., P.O. Box 3727, Santa Monica, Calif. 90403.

Engineering Workstations Conference. Los Angeles, Sept. 21-23 — Contact: Corporate Expositions, Inc., P.O. Box 3727, Santa Monica, Calif. 90403.

CSM '87: Conference on Software Maintenance. Austin, Texas, Sept. 21-24 — Contact: The Computer Society of the Institute of Electrical and Electronics Engineers, 1730 Massachusetts Ave. N.W., Washington, D.C. 20036.

10th National Computer Security Conference. Baltimore, Sept. 21-24 — Contact: Irene Isaac, B266 Technology Building, National Bureau of Standards, Gaithersburg, Md. 20899.

MAP/TOP Users Group Meeting. Dallas, Sept. 22-23 — Contact: The MAP/TOP Users Group, P.O. Box 930, One SME Drive, Dearborn, Mich. 48121.

1987 Lawson Associates User Exchange Conference. Minneapolis, Sept. 22-25 — Contact: Lawson Associates, Inc., 2021 E. Hennepin Ave., Minneapolis, Minn. 55413.

5th Annual 1100 Data Center Management Conference. San Diego, Sept. 22-25 — Contact: Datametrics Systems Corp., 5270 Lyngate Court, Burke, Va. 22015.

Network Management Systems Expo '87. San Diego, Sept. 24-25 — Contact: Telestrategies, Inc., Suite 100, 1355 Beverly Road, McLean, Va. 22101.

Fifth Annual NCR Users Eastern America Conference. Fort Washington, Pa., Sept. 24-25 — Contact: Frank Whalen, c/o Tinius Olsen Testing Machine Co., P.O. Box 429, Willow Grove, Pa. 19090.

SEPT. 27-OCT. 3

Information Systems Perspectives Symposium: Managing Information Systems in the 1990s. San Francisco, Sept. 27-30 — Contact: Guide International Corp., Suite 600, 111 E. Wacker Drive, Chicago, Ill. 60601.

67th ADAPSO Management Conference. Colorado Springs, Sept. 27-30 — Contact: ADAPSO, Suite 300, 1300 N. 17th St., Arlington, Va. 22209.

National Retail Merchants Association 29th Annual Retail Information Systems Conference. Chicago, Sept. 27-30 — Contact: NRMA Information Systems Division, 100 W. 31 St., New York, N.Y. 10001.

Ninth Annual Lasers in Graphics/Electronic Publishing in the '80s Conference. Orlando, Fla., Sept. 27-Oct. 1 — Contact: Lasers in Graphics, Suite 1, 1855 E. Vista Way, Vista, Calif. 92084.

Fall '87 SAS Users Conference. Toronto, Sept. 28-29 — Contact: Alexandra Miller, C130, West Office Building, York University, 4700 Keele St., North York, Ont., Canada M3J 1P3.

1987 National Communications Forum. Chicago, Sept. 28-30 — Contact: NCF87, Suite 4808, 505 N. Lake Shore Drive, Chicago, Ill. 60611.

Coping With Computer-Age Vulnerability. Amsterdam, Sept. 28-30 — Contact: Vulnerability Conference, P.O. Box 2030, Springfield, Va. 22152.

Tablebase User Group Meeting. San Francisco, Sept. 28-Oct. 2 — Contact: Donna Rouayne, Data Kinetics, 97 Norman St., Ottawa, Ont., Canada K1S 3K5.

Optical Disk and Engineering Drawings in the CIM Environment: User-to-User Forum II. Chicago, Sept. 29-Oct. 1 — Contact: Randy Martin, The Yankee Group, 200 Portland St., Boston, Mass. 02114.

Federal Computer Conference. Washington, D.C., Sept. 29-Oct. 1 — Contact: Ben Hughes or Jessica Kabsansky, The Federal Computer Conference, P.O. Box N, Wayland, Mass. 01778.

Fall National Design Engineering Show & Conference. New York, Sept. 29-Oct. 1 — Contact: Show Manager, Fall National Design Engineering Show, 999 Summer St., Stamford, Conn. 06905.

Imex 87: The Integrated Manufacturing Exposition and Conference. Chicago, Sept. 29-Oct. 1 — Contact: Carol Hurley, Penton Expositions Division, Suite 900, 122 E. 42nd St., New York, N.Y. 10168.

Laseractive '87. Boston, Sept. 29-Oct. 2 — Contact: Laseractive, P.O. Box 3415, Indialantic, Fla. 32903.

Optical Disk: Strategic Impact on Engineering Document Management. Oakbrook Hills, Ill., Sept. 30-Oct. 1 — Contact: The Yankee Group, 200 Portland St., Boston, Mass. 02114.

Fall Joint National Conference on Software Risk Management. Los Angeles, Sept. 30-Oct. 2 — Contact: Jerry Smith, QSoft, Suite 206, 2755 Hartland Road, Falls Church, Va. 22046.

Conference and Exhibition for Business and Professional Users of Apple Computers. Schaumburg, Ill., Oct. 2-4 — Contact: RJW Phase III, c/o Randall Jackson, 1511 N. Bell Ave., Chicago, Ill. 60622.

OCT. 4-10

Financial Networks Workshop. Chicago, Oct. 4-6 — Contact: Ed Atwood, American Bankers Association, 1120 Connecticut Ave. N.W., Washington, D.C. 20036.

CASE '87: Annual Complete ADR Environment User Group Meeting. Las Vegas, Oct. 4-8 — Contact: Allen Haggar, Applied Data Research, Inc., Rt. 206 and Orchard Road, Princeton, N.J. 08543.

Second Annual Conference on Object-Oriented Programming Systems, Languages and Applications. Kissimmee, Fla., Oct. 4-8 — Contact: OOPSLA '87, P.O. Box 3845, Portland, Ore. 97208.

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Issues of the Information Age:

PROMISES KEPT, PROMISES TO KEEP.

At the beginning of this century, Theodore N. Vail, president of AT&T, understood his competition not just as other telephone companies, but as distance, loneliness, separation. He foresaw that the success of his company could end the geographic isolation of man. And in ending that isolation, the company's success would be assured. The vision became reality: by the mid-'70s, America had universal telephone service.

Today, as the Information Age has begun, there is a new kind of isolation. People are awash in a mounting sea of information, yet unable to connect or work with information in an orderly, useful form; that is, with the world's knowledge. Often, information machines do little to help. They are difficult to use, rigid in their demands, generally unable to work with any but their own kind.

To overcome this new kind of isolation, we have a new vision: to make the Information Age universal, to help build a worldwide Telecommunity, not just open to all, but inviting.

At AT&T, we are now working toward the day when people around the world will be able to handle information in any form—conversation, data, images, text—as easily as they make a phone call today. And they will be able to get information in a form they can use, whenever they need it, from wherever it is.

We envision a vast global network of networks, the merging of communications and computers, linking devices so incredibly capable, they will bend to the will of human beings, rather than forcing humans to bend to theirs.

Obviously, no one company, no one nation, can universalize the Information Age. It will take the best minds of many companies and many nations. The needs of our customers are creating imperatives for our industry. We need common standards and compatibility. We need national and international policies that are open and encouraging. And we need to make information machines far easier to use.

We have the science to construct the systems now. The technology is rapidly taking shape.

We are dedicating our minds, our energy, our resources—our future—to making Telecommunity a reality. To bringing the best of the Information Age to the world.

Our vision has its roots in AT&T's heritage of service. Just as the telephone extended the reach of the human voice, Telecommunity will extend the reach and capability of minds and talents.

Telecommunity is our goal. Technology is our means.℠

We're committed to leading the way.

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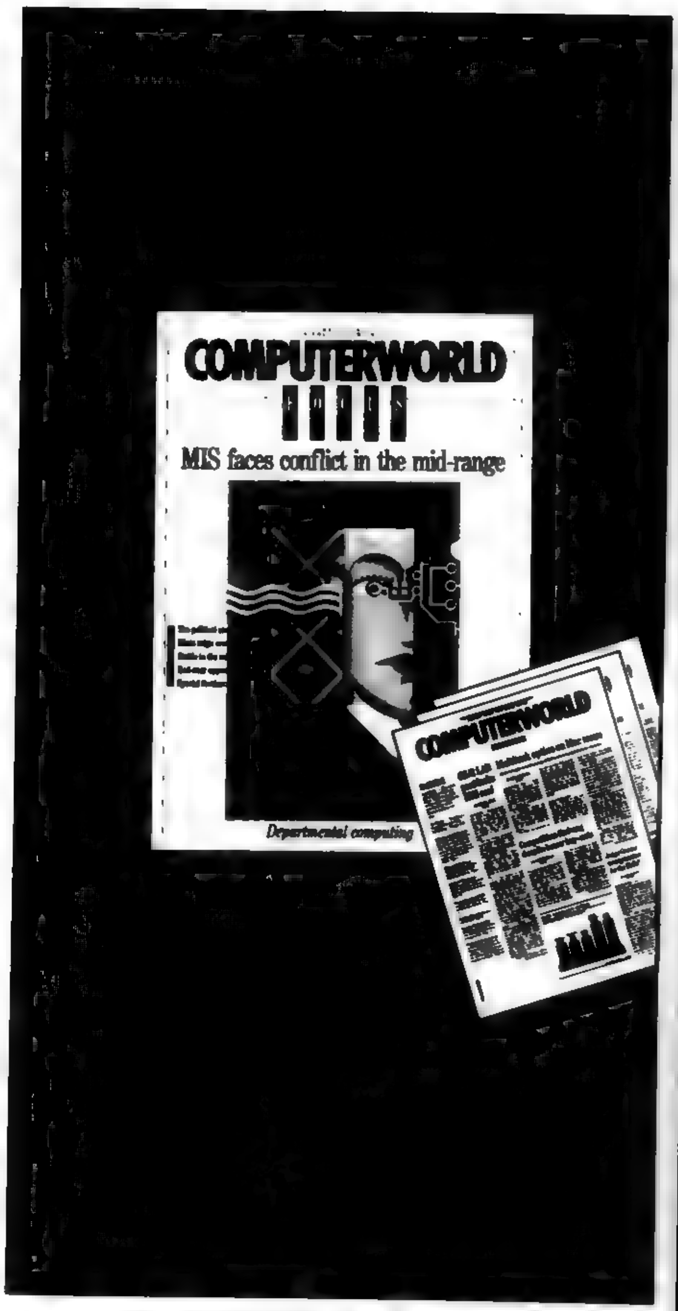
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Satisfaction

FROM PAGE 1

The respondents' overall satisfaction rating registered in the job satisfaction survey corresponds to the results of a separate salary survey conducted by *Computerworld* and the Data Processing Management Association, published last week, in which almost 70% of the nearly 1,500 respondents said they are pleased with their compensation and benefits packages, rating it as "good" or "excellent."

Among the specific aspects of MIS jobs that are most important to satisfaction are the following:

- The variety of responsibilities the job entails. Survey respondents say they are satisfied with this area.
- Salary and opportunity for advancement. Respondents give these factors relatively low satisfaction ratings.

MIS and the issues

A barometer of workplace attitudes

	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Micros have diminished the power of MIS/DP in my organization	23%	[illegible]	11%	14%	3%
Management views MIS/DP as important to the strategic position of the company	4%	23%	7%	47%	20%
Unrealistic upper management expectations and deadlines are never a problem for MIS/DP	[illegible]	13%	10%	10%	3%
We never have enough money to do the job right	1%	41%	13%	33%	9%
End users are very satisfied with MIS/DP	5%	40%	13%	40%	[illegible]
MIS/DP is a pretty unexciting vocation	38%	45%	9%	10%	9%
In comparison with other departments in my company, MIS/DP usually commands pretty high salaries	4%	17%	19%	61%	19%
I cannot keep up with new technologies and techniques	8%	[illegible]	7%	61%	[illegible]
Data communications complicates my job	6%	[illegible]	19%	30%	3%
I have a high-pressure job	2%	23%	9%	40%	19%

CW CHART

- Work load and nonmonetary recognition. Again, respondents rate themselves as less than satisfied in these areas.

MIS professionals also say there are many intangible aspects of their jobs that contribute to satisfaction.

"There's a kind of ambience here that I like," says Jay Dahl, DP manager at Hatch Grinding Co. in Denver. Dahl has worked at Hatch for 16 years and likes the diverse responsibilities his position entails.

"In a pinch, I'll go out and drive a forklift if they need me to," he says.

Harris Koehn, senior systems analyst at Northwestern Memorial Hospital in Clarendon Hills, Ill., says he likes his job because his work leads to more efficient medical services and because he knows his co-workers well.

"I have grown up in my career with a number of people here," he says. Like many of the other respondents, Koehn says he has struggled with management policies. A recent change in management, however, has made him more satisfied.

"I was having a hard time finding good reception for new ideas, like implementing productivity tools," he says. "Now, there's a new director of the department, and the attitude against new ideas is not as entrenched as it used to be."

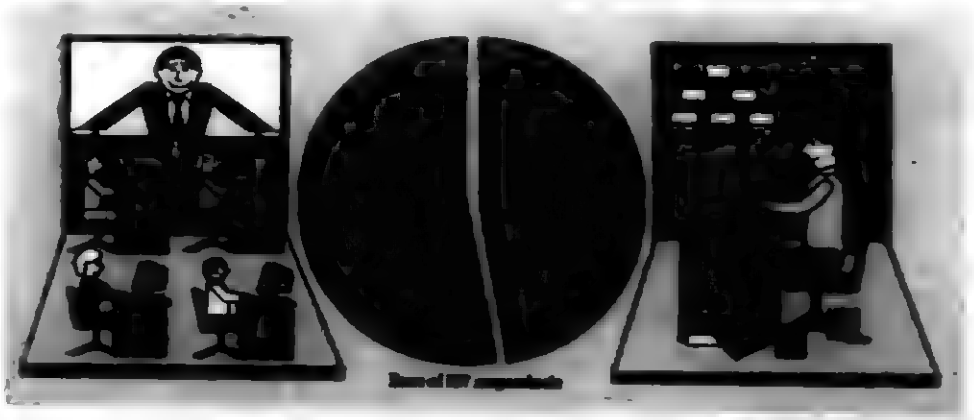
Short of changing their bosses, the majority of the respondents say their job satisfaction would improve if they could convince their companies to provide more recognition for MIS professionals and to implement better planning.

"A pat on the back is better than a raise for some people," says Bernie Scheidt, MIS director at Bruno Scheidt, Inc., a family-owned canned goods distributor in New York.

Other respondents report they would be more satisfied if they had more time to deal with their large work loads.

MIS and skills development

Most survey respondents focus on developing their management, rather than technical, skills

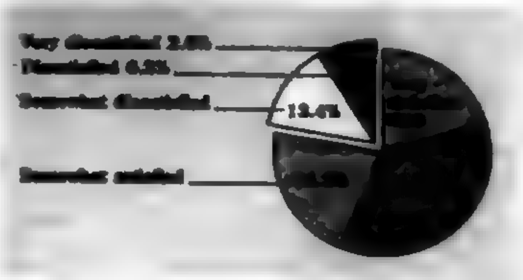


CW CHART: MITCHELL J. HAYES

Larry Bell, a senior manager for Quantas Airways, Ltd. in San Bruno, Calif., is frustrated with the demands of his position. As information systems manager for Quantas's North and South American business, he is caught between conflicting needs for his input into management decisions and keeping the corporation's information systems running efficiently.

How satisfied are you?

Out of 605 Computerworld survey respondents, 77.8% are satisfied with their jobs



CW CHART

"I'm a scarce commodity," Bell says. "The executives need me to give them information on how information systems can meet their needs, and I have to keep up with the rest of the world at the same time."

Another of his concerns is the amount of resources Bell says he can deploy to support user departments. "Finance is crying for service, but attention to that area would only save nickels and dimes. Our attention has to go to sales where we can get a high return," he says.

Frustrations aside, however, Bell joins the rest of the respondents in reporting satisfaction with his work.

MIS professionals surveyed also say they are satisfied with the location, reputation and industry of their companies. But sometimes the reputation of the company is cause for concern.

"We're in Chapter 11 bankruptcy reorganization," says Melvin Belt, manager of distributed systems technical support for Manville Corp. in Littleton, Colo., the world's largest manufacturer of asbestos.

Despite the turmoil, which includes a move to a new building, Belt says he likes the variety of responsibility his job offers.

Reorganization at Manville also meant a loss of recognition of the human side, Belt says. "The employees are treated more as numbers. They are not paying attention to them as people, except for the head count," he says.

Almost 60% of the respondents say they set definite career goals, and 12% report that they expect to be in their current positions for the next three years. Of those who plan to move on in the short term, 20% say they expect to attain positions as managers or MIS/DP directors. In 10 years, less than 5% of the professionals respond that they expect to be in their current position; 12% hope to be department, area or group managers.

Despite their desire to advance to management positions, the respondents are fairly evenly divided when it comes to focusing on technical vs. management training. More than 52% say they are currently targeting management skills, while 47% say they are primarily acquiring technical skills.

Donald Bears, senior systems programmer at BASF, Inc. in Pinehurst, Mass., is targeting technical training because, he says, he does not want the headaches of management responsibility. "I'm not interested in getting into management. I'm into doing my own thing and not worrying about other people," he says.

On the other hand, Andrew's Miotti sees benefits in being a manager. "In management, you get more information," he says. "You may hear about things at a nonmanagement level, but they are not explained in detail unless you're a manager."

The research division of IDG Communications, Inc.'s marketing and communications group conducted this *Computerworld* job satisfaction survey. Of the random sample of 2,000 subscribers, 616 questionnaires were returned — a 32.73% response rate.

Elements of a satisfying job

Variety in work load, salary and opportunity for advancement top survey respondents' list[*]

	Importance[1]	Satisfaction in current position[2]
Variety of responsibilities	3.38	[illegible]
Salary	[illegible]	2.85
Opportunity for advancement	3.21	2.61
Work load	3.06	2.75
Nonmonetary recognition	3.02	2.53
Performance review process	2.95	2.55
Retirement program	2.94	2.77
Reputation of company	2.82	3.08
Location	2.79	3.09
Physical environment/Office	2.78	2.70
Daily commute to work	2.77	3.08
Bonuses	2.42	2.36
Profit sharing	2.35	2.54
Industry of company	[illegible]	3.13
Child care	1.44	[illegible]

[*] Base of 616 respondents

[1] Very important = 4, Important = 3, Somewhat important = 2, Not important = 1

[2] Very satisfied = 4, Satisfied = 3, Dissatisfied = 2, Very dissatisfied = 1

CW CHART

Hopper

FROM PAGE 85

and studied at night for a mathematics degree from the University of Houston. Afterwards, he worked in data processing for Shell's oil exploration operation.

Leroy Drury, now Shell's vice-president of information and computer services, worked with Hopper then. He says Hopper was technically competent but also "well met," with a pleasing personality that made him popular with internal clients. Hopper showed an interest in the business, "striving to use the computer to the most significant advantage to the people he supported," Drury says.

Risking failure

Hopper next moved to Shell's DP operations and corporate DP planning outfit in New York, then returned to Texas in 1967 to join Electronic Data Systems Corp. (EDS) in Dallas. He says he welcomed the more entrepreneurial environment at EDS, feeling Shell would not let him risk failure.

"They weren't going to give you enough rope where you could hang yourself," he says. "At the same time, you couldn't necessarily stretch yourself as much as I felt I wanted to stretch myself at that age. I was willing to take more risk than they were willing to take with me."

> "A LOT of guys are like veneer. Max is solid walling. He looked better every day. Some people never looked better than the day you hired them."
>
> H. ROSS PEROT
> ELECTRONIC DATA SYSTEMS CORP.

In a telephone interview, EDS founder H. Ross Perot said he was impressed with Hopper's background and with his modesty. "He didn't wear it on his sleeve. His record spoke for itself," Perot said.

At EDS, Hopper worked with Blue Cross/Blue Shield of Texas but says he did not find insurance particularly stimulating. He joined a new account with United Airlines and soon took charge of it, helping track aircraft parts and supplies.

When EDS and United Airlines failed to renew their contract, Hopper decided to keep his family in Chicago and joined United Airlines to manage computers in operations.

Perot said that in an industry "where wearing well is everything" and a first impression means nothing, his respect for Hopper kept growing. "A lot of guys are like veneer. Max is solid walling. He looked better every day. Some people never looked better than the day you hired them," Perot said. He also called Hopper an effective leader, "a straight shooter" in dealing with people and a man who generates trust and respect.

Hopper missed a promotion at United Airlines, which he attributes to his failure to promote his accomplishments. He moved back to Texas to join Dallas-based American Airlines in 1972, taking charge of Sabre, which had been used internally since the early 1960s.

Developing the idea with Robert Crandall, now American's chairman and chief executive and at the time its vice-president of marketing, Hopper led the distribution of Sabre terminals to travel agents. The strategy has driven up sales of American tickets and brought the airline a wealth of data on the travel market. It has also generated immense profits from travel agents who use the system and from other airlines whose tickets are sold through it.

Described by some as the world's largest on-line data base, Sabre incorporates nearly 100,000 terminals and printers and can process 1,450 inquiries per second, according to American.

Left for Bankamerica

Hopper was named vice-president of DP and communications services in 1980, but two years later he accepted an offer from Samuel H. Armacost, chief executive of Bankamerica, to move to San Francisco and join the firm as director of retail information and processing services.

Hopper's offer came 11 months after Armacost had taken the top job at the banking company, which was starting to slip from its stature as operator of the largest U.S. commercial bank.

The fall stemmed in part from deregulation, which hit Bankamerica particularly hard because of its heavy reliance on consumer deposits. But the bank was plagued by organizational defects too, including a culture that was both highly bureaucratic and sprawlingly decentralized. The environment fostered loose management of loans, as officers filed overly optimistic reports.

The bank had also slipped from leader to laggard in technology. Despite its reliance on consumer deposits, it was last among the major banks to use automated teller machines and had dozens of incompatible systems.

Hopper helped Armacost revamp the bank's long-range strategy to deal with deregulation. He describes the concept as developing a low-cost means of distributing financial products that would be difficult for competitors to copy. A major thrust was addressing the lack of technology.

Working 70 to 80 hours a week, *Hopper maintains he enjoys his job, so most of the time, 'it doesn't become an overwhelming burden.'*

Under Hopper, the bank installed more than 1,000 ATMs, centralized check clearing (saving $15 million to $20 million a year, Hopper says) and, in his most ambitious undertaking, expanded the bank's California transaction processing capabilities by converting from IBM's IMS operating system to IBM's TPF, (formerly known as the ACP Transaction Processing System), the high-volume system that had allowed the airline reservation systems to function.

Plans also called for bringing DP and communications into one organization, consolidating the bank's 60 or 70 networks, improving management information and converting to TPF overseas.

But in the midst of such efforts, Hopper says, "we got hammered with the loan loss situation." With its heavy lending to basic industries and California agriculture and real estate concerns, and with the lack of loan controls, the bank was hit harder than most by the disinflation of the early 1980s. "It was almost totally unexpected," Hopper says.

He suggests the poor loan performance stemmed in part from lack of technology but more from the performance of loan officers. "It's their judgments you're trying to gather information on," he said, although "getting those in a consolidated way may not have been as good as we would have liked."

Return to AMR

In January 1985, the year the bank was to fall into the red, Hopper was named executive vice-president for systems engineering and launched a five-year, $5 billion program to expand and integrate. But 10 months later, he abruptly resigned to return to AMR as senior vice-president for information systems.

Hopper says Crandall made a generous offer for him to return to AMR, and the bank made a tempting counteroffer, including the prospect of a pure business role. He denies that disagreements within his organization over the TPF strategy [CW, Nov. 11, 1985] reflected a lack of confidence in him on the part of the bank's management.

The conversion was controversial on several counts. While accommodating high volumes, TPF is a relatively loose operating system, more subject to losing records than others — a much greater concern at a bank than at an airline. The operating system required modifications, which necessitated hiring scarce and expensive TPF programmers. The bank had to recruit programmers from airlines as far away as Australia and New Zealand.

The TPF system was also difficult to integrate with other bank applications. On top of this, the growth in transaction volumes that the operating system was intended to address did not materialize as quickly as projected.

'Max the Ax'

An MIS director who worked at Bank of America then says the firm's top management backed Hopper despite grumblings within the organization over the conversion. He adds that the complaints may have been aggravated by a shake-up of the bank's static culture that Hopper was expected to help carry out, including work force reductions that helped earn Hopper the nickname "Max the Ax."

"Some people were in the wrong place at the wrong time. He sure was," said the MIS director. "The problems were the most complex you can imagine in the business."

Hopper says disagreements over strategy were in good faith. "There was no acrimony. They were honest business discussions. Yet they got picked up by people at very low levels, as things are wont to do, as a cause celebre.

"It was far, far from that. In the world that I deal with, there are always multiple ways to solve a problem," Hopper says. "And there are always going to be, I hope, people who are recommending one side vs. another so that you get some contrasting views on how to solve a problem."

Hopper says he agonized over staying with the bank or going back to American. "Texas was home, relatives and friends, kids. On the other hand, I had initiated a lot of things [at Bank of America] that weren't totally through." Ultimately, he says, it seemed American offered a slightly better situation, in part because of the balance between technology and business roles.

Hopper describes his latest position as a three-legged stool. One leg is supporting the airline. A second is operating the Sabre system as an independent business, which Hopper says might generate $100 million in pretax profits this year. The third is trying to generate profits with information technology in various niche markets through AMR Information Services.

AMR is overhauling Sabre to provide users with on-site processing. Earlier this year, the firm significantly extended the system's reach by linking it with the Resana reservation system of All Nippon Airways, Japan's largest domestic airline.

On the other hand, the company watched its rivals get in on the two European reservation systems launched this summer. The European airlines that are running the systems may have been reluctant to work with American because of its strength as a competitor in Europe, according to industry analysts.

Policy-making role

Last year, AMR announced the formation of three Information Services business units, aimed at telemarketing, banking and travel services like hotels and rental cars. Hopper plays a policy-making role in such ventures, maintaining centralized overhead and support for largely autonomous units.

He says his role in these and other endeavors is demanding. Starting up AMR Information Services, which should take two or three more years, requires his 70- to 80-hour work week. The biggest challenge is finding the right people, he says. But he likes the work. "If I didn't enjoy it, it would be a burden, and sometimes it is. But most of the time it's fun doing what I'm doing, so it really doesn't become an overwhelming burden," he says.

Managing information services is not all he thinks about, however. He likes to ski and travel, particularly in the wine country outside San Francisco, where he might want to retire. "I guess my ultimate retirement dream, if I could, is to grow grapes," he says.

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Five keys

FROM PAGE 85

required skills. Periodic reviews of the staff's technical skills and areas for improvement can often help managers develop refresher courses or advanced training, thereby keeping each employee's technical skills current.

But often overlooked are employees' personal skills. Traits such as creative thinking and leadership will benefit the organization. Every employee could use help in time management, too.

Knowledge. Just as there are two types of skills to consider — technical and personal — there are two types of knowledge to think about: MIS knowledge and business knowledge.

Most MIS managers keep their people up to date regarding MIS knowledge. There are magazines and books to read, classes, seminars and conventions to attend and, of course, good old on-the-job training.

But where most managers fail is in not keeping their people informed about the company and its business. It really shouldn't take much time to hold periodic meetings with employees to talk about the company, its objectives and how it is doing in reaching them.

The more knowledge employees have about their company, the more they will feel a part of it and the more of a personal commitment they will make to its success. They want to feel they've contributed to the success of the company.

Tools. There are numerous tools to consider using in today's fast-paced, high-demand MIS organization, such as fourth-generation language products. When you consider the low cost of hardware compared with the value of employees' time, it makes sense to provide each worker with personal tools.

Are there other tools that should be provided? Some shops maintain a pool of terminals or personal computers in a room where employees can do online work. This practice not only boosts efficiency but can also enhance motivation.

Opportunity. If managers want employees to be more productive, they must provide the opportunities. The place to start is by asking employees where and how to do so. This might be done in brief meetings, perhaps over lunch.

Next, the manager must provide the needed resources. Once that's been done, most employees will go all out to make the gains they have indicated are possible.

Motivation. The one factor most likely to help improve productivity is motivation. How do managers motivate MIS employees to make greater gains? And, just as important, how do managers avoid demotivating workers?

The first step is to learn enough about employees to understand what might motivate them, perhaps through a good appraisal and counseling system. If you think money is the primary motivator, you are not as effective a manager as you could be, and you can expect morale and turnover problems.

An occasional walk through the employees' areas, a brief chat or periodic visits with small groups can provide extremely valuable insights into what is going on. This not only results in better informed managers but also shows employees that their managers are caring people. After all, employees are directly motivated by the opinions they hold about their superiors.

As is widely known, salary is not a motivator — at least not for long. But the lack of fair wages is certainly a demotivator.

Managers should spend time analyzing wage scales, comparing them with other groups' salaries both in the company and out of it. It helps when employees know of such studies and feel that managers want to pay them top wages: wages on par with the competition yet within limits that help keep the company in business.

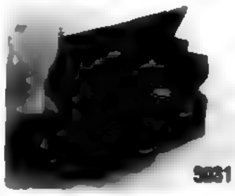
Another motivating factor is a clear growth path for each employee, technical as well as managerial. To many employees, moving up the ladder is obvious evidence to them and to others in the organization that their performance has been recognised as exceptional. The key is to develop rungs on the ladder that allow earned promotions over reasonable intervals.

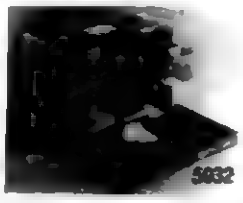
Finally, spending long hours at the office does not necessarily result in greater productivity. Working smarter and more efficiently will pay off in the long run. Too many hours on the job produce fatigue and reduce employees' effectiveness. It can also hurt family life and limit the time available for staying healthy and vital.

Employees should be encouraged to seek the right balance. They need to know that their managers do not want them at the office all the time. They need to know their managers care about their family lives and good health.

Improvement in staff productivity doesn't happen by accident or because of executive order. It requires planning, organizing, motivating and controlling — the four universally accepted managerial functions.

Gilliam is president of Gilliam Associates, a computer and management consulting firm in Ponca City, Okla.





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COMPUTER INDUSTRY

INDUSTRY INSIGHT

Alan Alper

AT&T tries, tries again

Every time you think AT&T is about to withdraw from the computer industry, it introduces some 40-odd new products or enhances existing products. Then the firm pleads with just about anyone who will listen that despite mounting losses, it's in the business for keeps.

That's just what the telecommunications firm did at a recent press conference in Parsippany, N.J. But this time, it was the way AT&T did it that had some observers shaking their heads.

It was only a couple of months ago that the rumor mill spun out of control with indications that AT&T was going to spin off its Data Systems Group into a separate business run by its computer partner, Ing. C. Olivetti & Co. in Italy.

The Parsippany press conference was intended to dispel rumors that AT&T had had it with the computer business.

Interestingly, the event occurred at the midpoint of PC Expo, a major trade show for large corporate purchasing types, which was being held some 40 miles east in a small town called New York.

AT&T contended it called the press to Parsippany, near its systems group's operations center, rather than to its New York headquarters, for a variety of reasons. The primary reason, AT&T spokesmen claimed, was that the Data Systems Group executives needed to be near their offices at that time.

The event points out AT&T's acute inability to cast itself in a favorable light at a time when its computer business is in vital need of a promotional boost.

Staying in the race

Yet despite the lack of coordination, the press conference did, for the moment, set the record straight on AT&T's intention to remain in the computer industry.

Continued on page 103

NET soars in T1 atmosphere

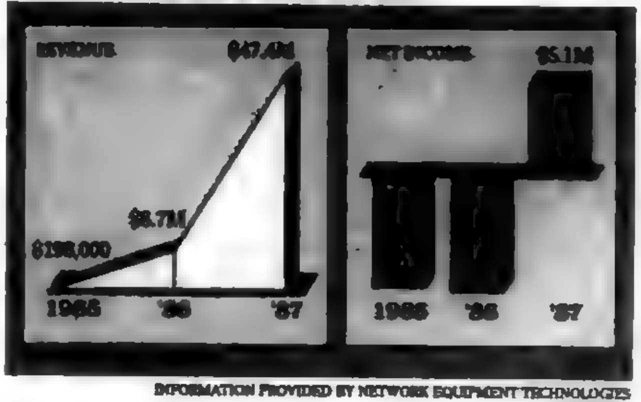
BY KATHY CHIN LEONG
CW STAFF

REDWOOD CITY, Calif. — Praised by the financial community as one of the hottest technology start-ups in years, Network Equipment Technologies Corp. (NET), a provider of high-end T1 multiplexers, is operating at breakneck speed.

In the fiscal year ended March 31, NET posted a 448% increase in annual sales over the previous year, reorganized across the board and clinched a worldwide marketing arrangement with IBM. And that, according to NET executives and industry analysts, is only a glimpse of what is to come.

Flying high

Network Equipment Technologies has grabbed 24% of the T1 multiplexer market, and its results have soared



INFORMATION PROVIDED BY NETWORK EQUIPMENT TECHNOLOGIES
CW CHART

"They're driving 130 miles an hour with the roof pulled down," says Michel Guite, an analyst at Salomon Brothers, Inc.

Sensitive to competitive pressures, NET President Bruce

Continued on page 102

Former CMI execs found new firm

BY CLINTON WILDER
CW STAFF

BLOOMFIELD HILLS, Mich. — Four former CMI Corp. executives have quickly formed a computer leasing company to compete with the rival lessor that bought out CMI in a bitterly contested acquisition earlier this year.

The four executives were among several who resigned from CMI after losing a court fight to block the $50 million acquisition of CMI by Continental Information Systems Corp. (CIS) in Syracuse, N.Y. That deal combined two of the U.S.'s largest independent computer lessors into the industry's second largest player. The new firm, named Encore International, Inc., is headed by Lloyd B. Marks, CMI's former senior vice-president of marketing.

Edward Cherney, CMI's former chairman who led the fight against the CIS buy-out, is not involved with Encore.

"I just didn't feel like joining the competition," Marks said. "We felt we could hold the CMI team together and start over."

Marks said Encore will target former CMI leasing accounts and new business.

He said the firm has $70 million in capitalization from employee stock ownership, bank credit lines and an undisclosed venture capitalist.

Orion expands IBM connectivity line

BY STEPHEN JONES
CW STAFF

BERKELEY, Calif. — Orion Network Systems, Inc., a leading third-party supplier of IBM connectivity software, last week announced that it has acquired Berkeley-based X.Dot Corp. through a stock swap of an undisclosed amount.

With X.Dot, Orion gains a line of software that uses the CCITT X.25 standard protocol to send packets of information over public data networks. The acquisition is intended to round out Orion's line of connectivity products, which allow non-IBM computers to talk with IBM machines by using IBM's Systems Network Architecture (SNA) standard.

Under the agreement, which was privately finalized Sept. 4, X.Dot has been completely merged into Orion.

With a gaggle of small companies specializing in SNA software today, the deal should help Orion broaden its base of opportunity, said David Terrie, president of Boston-based Newport Consulting, which specializes in the networking industry.

Orion currently sells its connectivity packages to companies such as Apple Computer, Inc., AT&T and Italy's Ing. C. Olivetti & Co.

"Having X.25 in their pocket gives them a lot more flexibility as a multiple-product vendor," Terrie said.

Merging technologies

In addition to gaining an immediate jump into the X.25 packet-switching market, Orion's vice-president of sales and marketing James Mullen said Orion will combine X.Dot's technology with its own SNA capabil-

Continued on page 103

Maxtor thins its ranks

Layoffs due to shipment delays from supplier

SAN JOSE, Calif. — Maxtor Corp. recently laid off 60 employees because of problems with manufacturing and 5¼-inch hard disk drive shipments.

Maxtor's woes stem from the decline in availability of thin-film read/write heads from its major supplier, Read-Rite Corp. in Milpitas, Calif.

Read-Rite has been experiencing significant manufacturing problems since May, creating severe shipment delays of its heads to Maxtor, Hewlett-Packard Co. and other disk drive makers using the new thin-film disk drive technology.

The staff cutbacks focused on Maxtor's San Jose manufacturing plant and represent approximately 5% of the company's domestic work force.

Approximately half of the layoffs involved temporary employees and did not affect overseas workers.

Although Maxtor could experience reduced revenue of $20 million this year as a result of component delays, the company said it is making headway in developing alternate sources for the read/write heads.

The component shortages are not expected to significantly affect those computer vendors currently using thin-film hard disk drives, analysts said.

HP, for example, which manufacturers its own disks, has previously reported that its systems using thin-film disks are not yet available commercially.

Prime to acquire micro CAD vendor in bid for low end

NATICK, Mass. — Staking a claim in the microcomputer end of computer-aided design (CAD) software, Prime Computer, Inc. last week announced an agreement to acquire Versacad Corp. in Huntington Beach, Calif.

Versacad is the No. 2 vendor of microcomputer CAD programs behind Sausalito, Calif.-based Autodesk, Inc. Privately held Versacad has annual sales of about $6 million.

Versacad's products run on IBM and Apple Computer, Inc. micros as well as on Unix-based systems.

The move into the low end of CAD makes sense for Prime, according to Mike Seely, a CAD software analyst for San Jose, Calif.-based Dataquest, Inc.

"A definite segment of the market is interested in PC-based CAD tools," Seely said. "It is an area that will benefit further from the 80386 and other chips to enhance floating-point capabilities and graphics."

Prime recently introduced its own Intel Corp. 80386-based unit, the EXC 360. Versacad can also run on the Sun Microsystems, Inc. low-end workstation that is marketed by Prime.

Although Prime said Versacad will continue to operate independently, Seely speculated that Prime may integrate some of the Versacad product line into Medusa, its flagship software for CAD applications.

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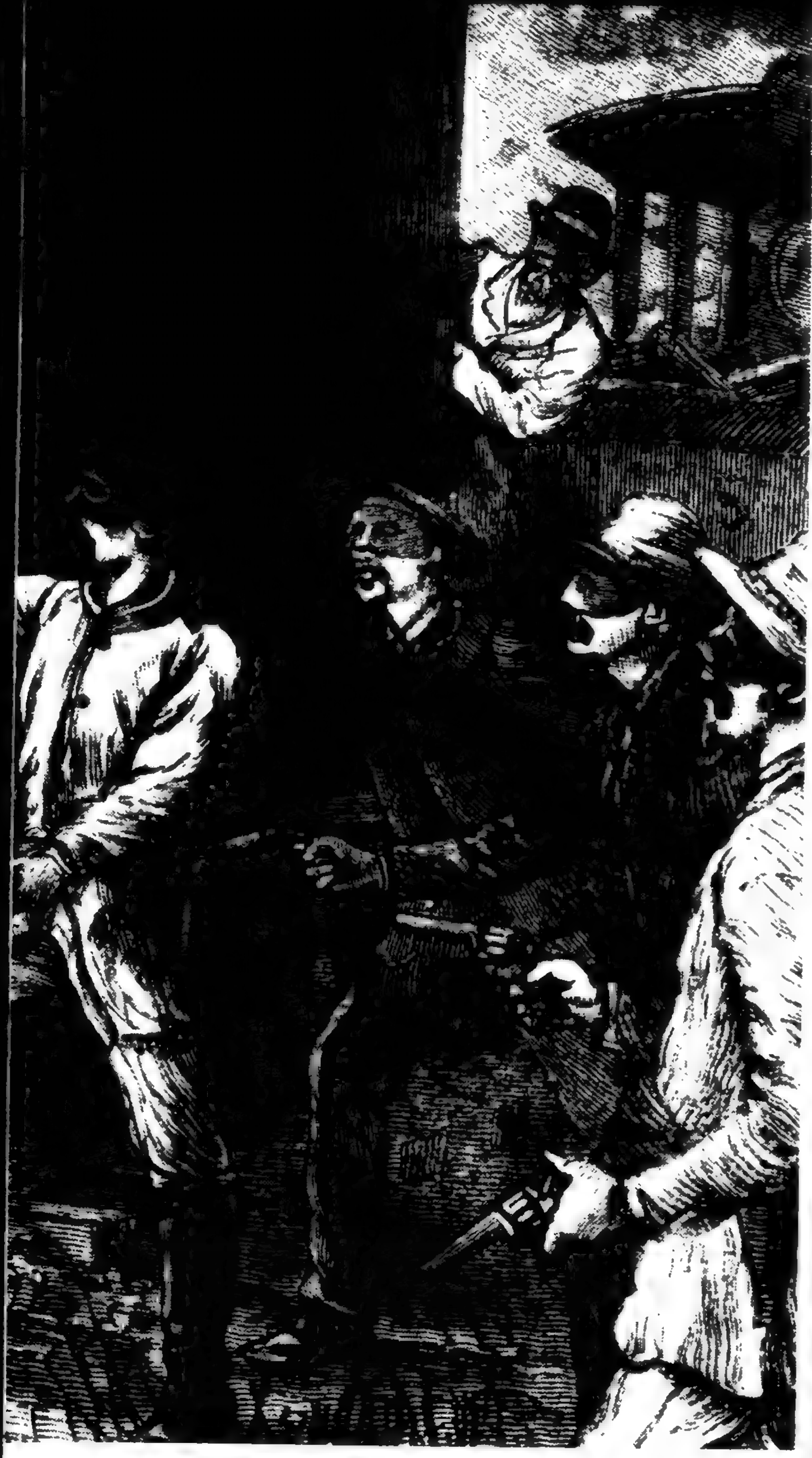

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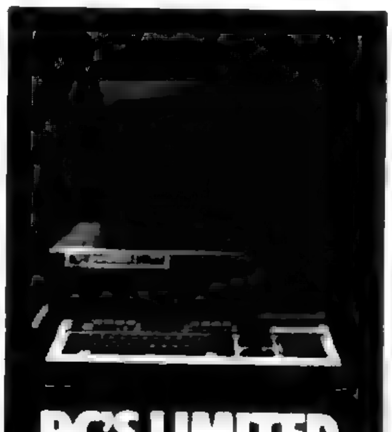

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COMPUTER INDUSTRY

MERGERS & ACQUISITIONS

SCI Systems, Inc. announced that it has reached an agreement in principle with **Magnetic Peripherals, Inc.** to acquire substantially all of the operating assets of the latter's Rapid City, S.D., operation. The transaction is projected to be completed by Sept. 30. After the purchase, the Rapid City operation is slated to become a fully integrated manufacturing plant of SCI.

California Micro Devices Corp. announced its $14.5 million cash acquisition of the **Microcircuits Division** of **GTE Communication Systems** based in Tempe, Ariz. The acquisition, which may triple California Micro Devices' current production level to approximately $30 million annually, includes all the Microcircuits Division assets, inventory, receivables, contracts and trade payables in addition to a silicon wafer foundry and test facilities.

Davox Corp. announced its intent to acquire **TBS International, Inc.** in Richardson, Texas, from TBS's sole shareholder in a transaction valued at approximately $12.3 million. Davox is a supplier of computer-aided communications systems. TBS manufactures a family of autodialing systems that complements Davox's existing product line.

Servcom, a division of **Alcatel Information Systems, Inc.**, has reached a definitive agreement with **Executive Computer Maintenance, Inc.** to acquire the latter's field service operation.

Under terms of this agreement, Servcom will acquire all field service-related assets of Executive Computer Maintenance's operation and assume responsibility for providing continuing maintenance, repair and related support services to all of that firm's current customers.

Telos Corp. has signed a letter of intent to acquire privately held **DMA, Inc.** in an exchange of stock valued at approximately $2.1 million. Based in Amery, Wis., DMA operates a depot repair facility for computer hardware and sells computer equipment and related engineering services for major customers nationwide.

DMA was founded in 1976 and had annual revenue in fiscal 1987 of approximately $3 million.

General Automation, Inc. has signed a letter of intent to acquire privately held **Aston Technology Ltd.**, an integrator, marketer and distributor of multiuser business computers and applications solutions and a provider of computer field service for the UK marketplace. Terms were not disclosed.

Aston, founded in 1983, serves vertical market niches, including the legal profession, health care, school and university administrative systems and vehicle fleet management.

Sorbus, Inc., a **Bell Atlantic Corp.** company, has acquired **Jolynne Service Corp.**, a privately held computer maintenance firm. Rockville, Md.-based Jolynne is one of the largest independent national companies specializing in the maintenance of microcomputer and terminal equipment for U.S. government agencies.

For those analyzing developments in the PC industry, Compaq offers an executive summary.

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In the midst of the clamor surrounding the new IBM® PS/2 series of personal computers, one thing is perfectly clear to people who really know PC's. COMPAQ® personal computers still work better. They're faster, more compatible, more expandable, and more flexible to accommodate the advancements so many users demand.

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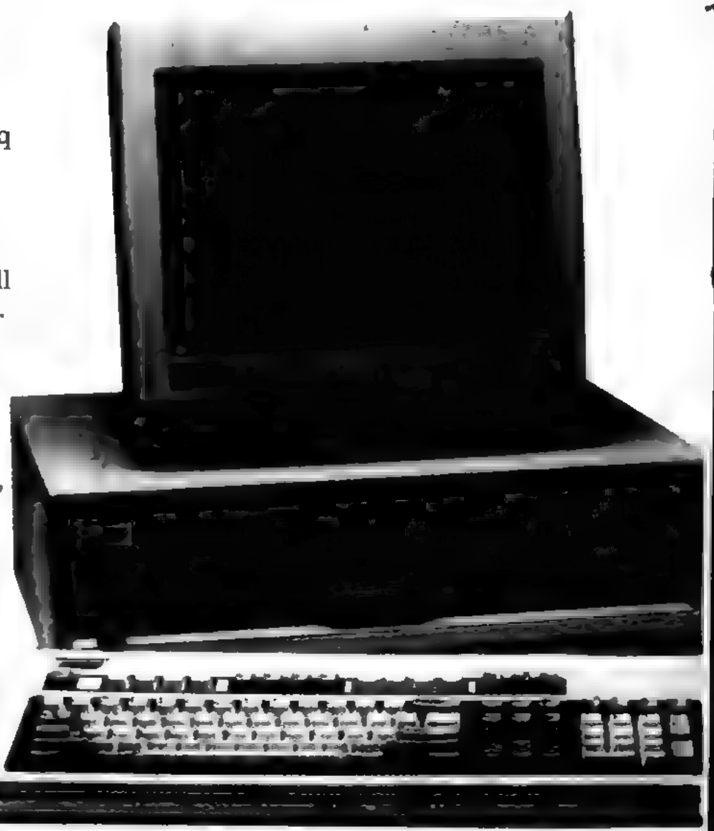

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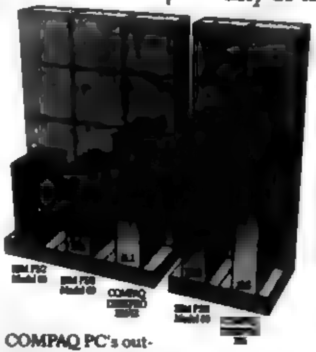

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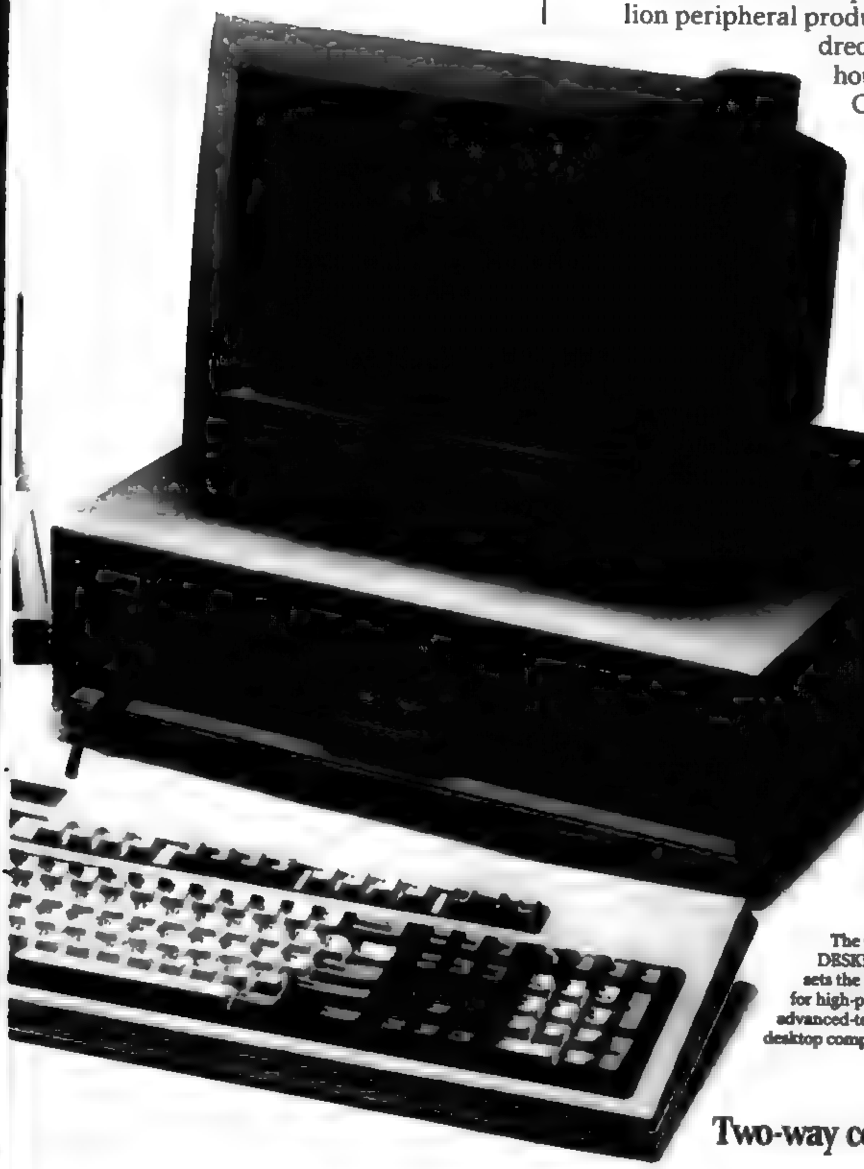

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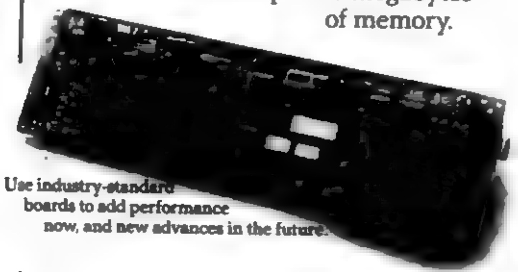

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NET

FROM PAGE 95

Smith refuses to let his company rest on its laurels. "Were you ever the passenger of a car that was going so fast around a mountainous trail that you just hoped that there was nothing to block your way on the other side? That's what being in this business is like," he says. "None of us in this market is exactly sure what is around the corner."

Today, all eyes in the T1 market are on NET, which posted $47.4 million in sales for fiscal 1987 ending in March. Although Timeplex, Inc. still holds more than 50% of the T1 market share, according to Framingham, Mass.-based market research firm International Data Corp. (IDC), NET has snapped up 24% of the market in a hurry.

"I've been very impressed with their products and marketing strategy," says Rick Villars, an IDC senior market analyst. "Others have failed to market correctly or have failed to deliver product. They have done both."

Even though IBM's Rolm Corp. subsidiary could potentially come up with a competing T1 product, NET has scored such a sweet multiyear marketing pact with IBM that NET doubts IBM would do anything to compete against itself. The deal specifies that IBM is allowed to use NET protocol technology in future products.

While many other small companies have suffered as a result of alliances with IBM, NET added several clauses to the contract to protect itself, according to Vice-President of Corporate Marketing Tony Russo. One of the clauses indicates that IBM cannot cancel shipments it has ordered.

Crystal ball

NET was formed in 1983 by Smith, Walter Gill and four others after they learned that T1 lines would be available to the general market after the AT&T divestiture. As they predicted, Fortune 500 companies and others were interested in building private T1 networks for long-term cost savings.

To date, NET has installed more than 500 T1 nodes for some 65 customers, including AMR Corp., Merrill Lynch & Co. and Shearson Lehman Brothers, Inc.

Bill Stout, strategic network manager at San Francisco-based Wells Fargo Bank NA, recalls Wells Fargo serving as one of NET's original beta-test sites. "Going with them was the biggest technical risk I ever took," he admits. After a six-month pilot test against a Timeplex multiplexer three years ago, Stout says, the NET IDNX won out due to its greater nodal capacity and flexibility.

While known mainly for the IDNX line, NET is not limited to the T1 market. Whatever devices or services move information is open game as far as Smith is concerned. Last year's buyout of Santa Barbara, Calif.-based Comdesign, Inc. proved just that, Comdesign makes a variety of low-end data communications products, including X.25 packet-switching gear.

IDNX product manager Lloyd Collins indicates that this year, NET's own product line ventured into the lower end of the market with smaller versions of the IDNX.

No longer considered a small-time start-up company, NET employs 550. The work force is expected to double next year.

The company reorganized in April to prepare for its expansion. Three new product groups were born- one to concentrate on network management, another on the IDNX hardware line, and the third on IDNX-related products and services.

Salomon Brothers' Guite predicts that the 30 or more T1 equipment companies will dwindle down to a handful over the next three to five years. An alliance of T1 companies and vendors could prove to be formidable competition for NET.

But Smith is confident NET will be one of those independent survivors in the T1 shakeout.

"We have a lot to do still, and my attitude is that we haven't done enough for the market yet," he says. "My challenge now is managing this orchestra of players to be so well-tuned that it is not equaled by anyone in Silicon Valley."

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AT&T

FROM PAGE 95

As the firm's new high-end 3B4000 multiprocessor and Intel Corp. 80386-based micros suggest, AT&T's woes are not technological.

The Data Systems Group's seemingly intractable problem is selling and marketing its computer products to the data processing and MIS communities.

The systems group's sales force sells everything from telephones to data communications and telecommunications devices. The formation of a dedicated sales force would help focus the division's efforts at a time when most DP/MIS executives, outside of government and educational institutions, lack the confidence required to buy computers from AT&T.

> AT&T'S Data Systems Group's seemingly intractable problem is selling and marketing its computer products to the DP and MIS communities.

The Data Systems Group is making some inroads. The unit recently won a contract to supply McDonald's Corp.'s company-owned stores with its new 386-based micro. The McDonald's contract is estimated by some analysts to be worth about $20 million.

The silver lining

At the press conference, Data Systems Group Senior Vice-President Vittorio Cassoni found a silver lining in the unit's continuing losses.

Although revenue was flat for the first seven months of the year, the division's losses were only 45% of year-earlier levels. That puts Cassoni well ahead of AT&T's corporate goal of cutting red ink for the year by 35% on the estimated $1 billion in losses that the unit had last year.

Many believe that if anyone can turn the Data Systems Group around, it is the charismatic Cassoni. The group's image problems, however, must be resolved if the ex-Olivetti and IBM executive is to have a chance.

Even so, a turnaround is at least three to five years away, most analysts say. If Cassoni is unsuccessful after that period of time, AT&T may then be willing to spin off the Data Systems Group. But, will Olivetti still be interested?

Alper is *Computerworld's* Mid-Atlantic bureau correspondent.

Orion

FROM PAGE 95

ity to make an integrated package that will feature both protocols.

The product, due out in 1988, would have a common user interface to help convert SNA data into the efficient information packets that are sent over wide-area telephone lines with the X.25 protocol. That would enable IBM machines to talk with other machines via the public data networks used by most of the world's common carriers, such as McDonnell Douglas Systems Co.'s Tymnet, Canada's Datapac and West Germany's Bundespost.

Other companies offer similar products, but none have completely integrated the two protocols, Mullen claimed.

In an unrelated acquisition of a packet-switching systems manufacturer announced last week, Timeplex, Inc. in Woodcliff Lake, N.J., said it plans to acquire Dallas-based Cygnus Computer Corp. The move would be accomplished by exchanging shares of Timeplex's common stock for all outstanding shares of Cygnus.

Timeplex has exclusively marketed Cygnus's packet switching software for the X.25 protocol for the last year. The product, which carries the Timeplex label, is currently sold in Europe.

Pending approval of the deal, Cygnus will become the marketing and engineering division of Timeplex and remain in Dallas.

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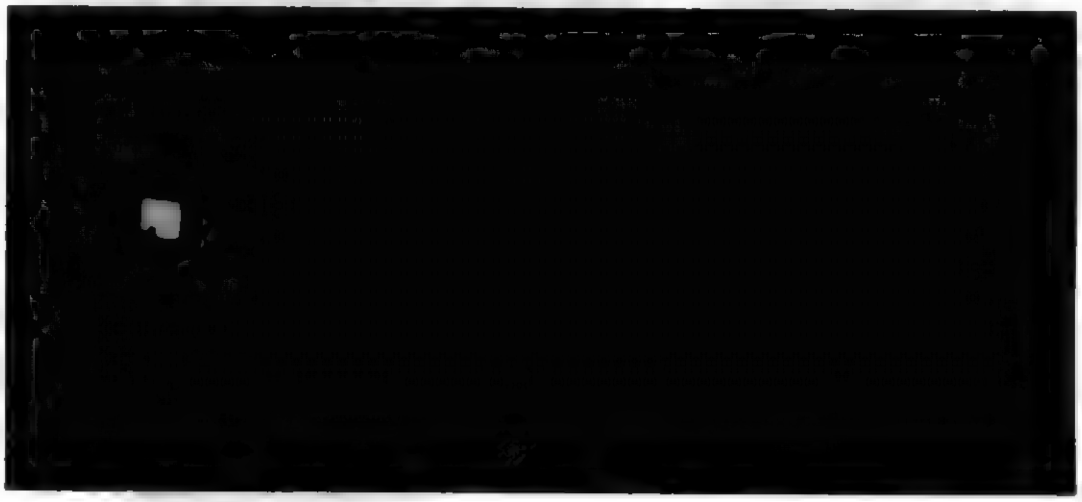

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COMPUTER CAREERS

Career fairs tighten standards

Experienced candidates benefit; newcomers, executives look elsewhere

BY MICHAEL BALL
SPECIAL TO CW

Computer career fairs are evolving from wide open company showcases that attract everyone, regardless of skill level, into highly focused events aimed at drawing only qualified candidates.

This trend is good news for MIS professionals still early on in their careers, but job candidates just trying to break into the industry or senior managers looking for high-level positions will probably not find what they are looking for at job fairs.

Companies that participate in the fairs cite two years of professional experience as the minimum qualification for job candidates, and they rarely expect to find executive applicants.

Two-way street

MIS professionals who possess enough experience but are not looking for the highest level jobs can save themselves a great deal of legwork by attending fairs. They facilitate a two-way screening process. Candidates can check out the company, and company representatives can inquire about applicants' experiences without the formality of sit-down interviews.

Employers are attracted to the fairs because of the qualified candidates they promise and because hiring costs are lower for positions filled through the fair than through other means.

"The fairs are very cost-effective programs," Digital Equipment Corp.'s Charles Lufkin says. DEC attends about 50 shows a year run by six different organizers; it has hired as many as 27 people at a single fair.

Some companies say they find they can save even more hiring costs by pooling their resources and holding their own career fairs. The Southwest High Technology Cooperative, a group of companies in the Dallas area, holds four career fairs annually.

"Typically, we look for programmer/analysts with three to six years experience," says Richard Bell, staffing manager for Arthur Young in Dallas and chairman of the cooperative. "Most of our companies have a similar profile. They may look for a project manager but not the senior management level. They definitely aren't looking for entry-level talent; they can get those hires easier in other ways."

Blue Cross and Blue Shield of Texas, Inc. in Dallas, a member of the cooperative, generally sends representatives to shows that prohibit entry-level attendants. "If we are looking for entry-level talent, we go to a different show that allows them in," says Ed Toogood, director of employment.

Firms that run career fairs are not oblivious to such attitudes and are leading the trend toward qualifying candidates.

For example, Software Career Link in Westford, Mass., runs 35 shows a year nationwide and makes a significant qualifying effort. The more rigid qualification process became necessary because of complaints from participating companies, says Software Career Link President Paul Vincent. He says they found long lines of marginally experienced people preventing others from being interviewed.

EMPLOYERS are attracted to the fairs because of the qualified candidates they promise and because hiring costs are lower for positions filled through the fair than through other means.

"Some [attendees] pass themselves off as experienced programmers because they can spell 'Cobol,' " Vincent says.

Vincent notes that the 2½-year experience requirement is a guideline only in the screening process. It is waived for someone with a solid year of Unix, C language or networking experience or with other high-demand skills.

Employers say the most important benefit of job fairs is the reduction in the cost per hire from that charged by recruiting agencies. "The average company hires a little more than two people per show," says Bell, whose cooperative is a nonprofit group and charges a fee for each participating company. "That works out to about $1,000 a person."

Software Career Link's Vincent says he does not view the fairs as replacements for agencies and advertising but rather as "an alternative tool in the recruiting tool kit of our clients."

Many candidates are reluctant to attend career fairs because they do not want their current employers to know they are seeking a job. "Obviously, if the candidate's employer is going to be there, they have to make a choice," Vincent says. Many candidates review the literature first or call to ask if a particular company will participate. "Those who don't want to come in can send in resumes, but some come in anyway."

Bell says he has noted the same attitude at his group's fairs. He would not name any but said that he knows of some companies that come largely to make sure their employees do not. "But as far as I know, nobody has been fired for coming," he says. "I think it works the other way — the manager finds out they're looking and sees what has to be done to keep them."

'We'll keep you on file'

Many companies say they keep resumes collected from the fairs and refer to them more than those that come in through advertising. Job seekers and employers alike say that hiring someone a year after a fair is not at all unusual.

However, many of the companies with medium-size or small DP and MIS operations go to fairs only when they are ready to hire. In Carrollton, Texas, for example, Computer Language Research/Fast-Tax goes to the local fairs and one regional show to meet immediate needs.

"We're a specialized DP shop and don't look for everyday Cobol talent," says Eddy Guy, staffing manager for Computer Language Research. He says his company wants professionals who have experience in specific IBM mainframe and C language programming.

Ball is a free-lance writer based in Boston.

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THE DB2 MARKET

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INSIDE

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Staying on top of DB2-inspired relational products will require careful planning. As choices pile up, the stakes get higher.

SURF'S UP AFTER DB2 BREAKER

BY PAUL HESSINGER

TIM LEWIS

DB2 is the whitecap — the most visible and easily tracked portion — of a major wave called relational DBMS, now washing over information systems territory. The strategic impact of IBM's DB2 can be summarized in four main areas: the fostering of broad acceptance for relational data base management systems, reinforcing the value of a data architecture, demonstrating the performance possibilities of relational technology and standardizing on SQL.

Relational DBMSs are now accepted as the primary data management technology for all types of applications. Cooperative processing and shared data applications require a platform with a low level of data granularity — a platform that only relational DBMS can provide, particularly in a heterogeneous, dispersed computing network. The degree to which an installation succeeds with DB2 is in direct correlation with its commitment to a data architecture program. The same holds true for any other relational DBMS.

DB2 is a high-quality DBMS capable of supporting high-volume processing applications. However, a critical caveat is that "high-volume" and "performance" are relative terms. Performance is defined by one computer expert as "a statement of speed at which a computer system works" — rather, the speed at which it might work under certain circumstances, or rather, the speed at which it was rumored to be working at some point in the recent past at an unknown location for which no further evidence is available. The point is that there are no inherent volume or performance constraints in relational technology.

DB2's ultimate legacy will be the standardization on SQL that it has enforced on software technology vendors. Essential to note, however, is that SQL as a standard is no longer an IBM issue. Both the American National Standards Institute (ANSI) and the International Standards Organization (ISO) have embraced it as one of the most meaningful standards they may ever address.

But DB2 is certainly not alone in the relational DBMS marketplace. Cincom Systems, Inc., with Supra, and Cullinet Software, Inc., with IDMS/R and IDMS/SQL, are legitimate contenders to DB2's position on the edge of that wave. Cullinet's direction with IDMS/SQL as a platform for departmental systems gives evidence of a powerful undercurrent to the main relational wave.

Applied Data Research, Inc.'s (ADR) SQL support will be among the most comprehensive and far-reaching announced to date. The firm's three-level SQL strategy includes support of SQL in the nucleus of the Datacom-DB DBMS; as a target protocol for its languages so that they generate SQL calls to the data base; and embedded in the languages themselves, allowing the complete utilization of the supported SQL-based DBMS.

Both Oracle Corp., with Oracle, and Relational Technology, Inc., with Ingres, are delivering the fundamental components of a distributed data base architecture.

These components, in the form of powerful SQL-based tools and networking facilities such as

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Hessinger is vice-president of research and technology for Computer Task Group, Inc., a professional service and consulting firm based in Buffalo, N.Y.

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Surf's up

FROM PAGE S1

Relational Technology's Ingres/Star, will enable the initial implementation of shared-data applications operating in a heterogeneous computing environment. Rather than consider these products as competitors with DB2, the pragmatic strategy would blend products that meet an installation's requirements for data integration and sharing.

The relational DBMS marketplace and DB2's sphere of influence are not limited to conventional implementations of relational technology, however. At times, performance is an overriding consideration, and combining high-volume transaction processing and data sharing with existing applications and data bases is not necessary. At these times, Teradata Corp.'s DBC 1012 data base processor and Tandem Computers, Inc.'s Nonstop SQL facility offer strong alternatives to a mainframe-only solution.

While not directly supported by DB2, workstations — such as IBM Personal Computers and the new generation of Personal System/2s and even Apple Computer, Inc.'s high-powered Macintosh family — are also catching the relational wave. IBM's OS/2 Extended Edition will be the basis for the company's distributed relational DBMS strategy. By mid- to late 1988, kernels of DB2/SQL will be present in OS/2 Extended Edition.

Closing the gap

Will IBM provide a complete architecture for data sharing between PS/2s and its 3090s? Eventually, yes. In the interim — realistically, three to five years — vendors are rushing to close the gap in IBM's product offerings.

IBM's relationships with Lotus Development Corp. and Microsoft Corp. are, in all likelihood, frameworks for broader initiatives between the partners. These relationships are also strategic opportunities for each vendor to shed a PC-only image and become a major player in the software industry.

Such an upscale move is not without risk. Microsoft, recognizing that OS/2 Extended Edition is a long-term threat to its expansion strategies, moved quickly to form an alliance with a premier workstation relational DBMS vendor, Sybase, Inc., with Dataserver. And it didn't stop there. An additional partnership with the leading vendor of natural language technology, Natural Language, Inc., with Datatalk, will permit Microsoft to market relatively complete solutions for the workstation environment. One has to believe that Lotus will respond aggressively, though not necessarily immediately, to these moves.

In workstations, Unix remains an important consideration. Unify Corp.'s Unify and Informix Software, Inc.'s Informix-SQL represent strong relational DBMS implementations with SQL capabilities and architectures that leverage the inherent strengths of Unix. If for no other reason, DB2 is important because it has spawned the rapid evolution of these products as well as a dramatic change in users' mentality for deploying them.

Harbor watch

Faced with a growing demand for strategic, mission-critical applications that contribute to competitive advantage for their enterprises, MIS managers are understandably torn between a desire to grab the tide and to wait and see what lies beyond the horizon.

A pause for assessment is a valid response at this point. Even though the rapid acceptance of relational DBMSs has positioned it as the most significant software technology issue for the balance of the 1980s, and even though relational DBMSs and related value-added tools are already proving themselves able to provide an effective software infrastructure for engineering strategic applications, caution is still warranted.

> "I'M NOT sure what a relational DBMS is or why I'd even want one. But then again, I felt the same way about IMS back in 1977."
>
> DP EXECUTIVE

Already, 1987 is being heralded as "the year of distributed data base." There is a danger, however, in overstating the significance of relational technology.

The technology has matured to the point at which it is a viable platform from which to begin implementing a distributed, shared-data strategy in a heterogeneous computing environment. The key point for the pragmatic information systems executive is that relational is first and foremost an information architecture issue. A careful balance between pure business requirements, information technology-based opportunities and an information asset/data resource management philosophy is the architectural implication of "going relational."

Too often, the real meaning of relational DBMS is obscured by the very factors that provide the motivation for implementing it.

"I'm not sure what a relational DBMS is or why I'd even want one," one DP executive observes, "but then again, I felt the same way about IMS back in 1977." Despite this paucity of knowledge, the executive was willing to try relational DBMS as a desperation measure.

"Why can't I implement an integrated set of tools to get full value out of any DBMS?" he laments. "Every new 'wonder tool' I try just seems to add to the automation anarchy I'm trying to overcome. A relational DBMS is my last chance to improve productivity around here."

Unfortunately, the prospects for that gamble succeeding are not very good, given the fact that when questioned about the impact of data-driven design on his methodology, the executive's answer was, "Oh, I'm not concerned about that. We haven't used a system development methodology for years."

Lost at sea

Relational DBMS in general and DB2 in particular have already created a wash of DBMS technology that has cast many MIS organizations afloat in a sea of data-driven systems integration products. A solid planning and implementation framework is important for two reasons: Many of the powerful tools that are currently available are relatively unproven and not particularly well understood, and the learning curve will get steeper as new waves of value-added products begin to pile up during the next two to three years.

The only way organizations can be successful in riding the incoming waves is to carefully create an integrated software infrastructure on top of a relational DBMS that will serve as a dependable flotation device.

Successful, insightful users of relational DBMS have used "going relational" as a catalyst for refining and, in some cases, redefining their entire approach for building and delivering information systems.

These installations are successfully defining migration strategies, but business issues dictate that a cost-effective, low-risk approach must be employed. It is interesting to note that several installations recognized the power of relational DBMSs long before it was a dominant software issue. The experience of one installation offers important insight concerning design implications of relational and, for that matter, other significant software technologies such as computer-aided software engineering (CASE) and expert systems.

In 1976, this installation began moving into IBM's IMS DB/DC from a VSAM environment. As new applications were designed, logical data views were adopted as a "standard." Data administrators (they were not called that then) examined

Continued on page S6

A data dictionary, from the ground up

BY WILLIAM PITTERMAN

At Bell Atlantic Corp., a homegrown data dictionary for DB2 has become a valuable information resource, not only for its creators, but for other areas of the network service companies as well.

A series of steps lay behind the decision to develop a dictionary internally. The company realized it needed to standardize on a single data base architecture and selected IBM's DB2 as the data base of choice.

In late 1985, the Financial Systems department of Bell Atlantic took on the task of standardizing the financial systems of each of its four operating companies — New Jersey Bell, Bell of Pennsylvania, Chesapeake and Potomac Telephone Co. and Network Services, Inc. — within a common data base architecture.

Restructuring begins

In January 1986, this project, the Standard Financial Systems (SFS) project, began modeling Bell Atlantic's network services companies to better design the planned data base architecture along functional lines. The business model identified the candidate-subject data bases for the architectural as well as the data needs for each business function performed.

The information collected during the business modeling phase was recorded in several personal computer software packages, one of which was a major PC computer-aided software engineering (CASE) tool with data dictionary functions.

The SFS project management team then conducted an inventory of the applications currently supporting the clients of Financial Systems. The information from the business model was then mapped against these applications to produce an applications directory.

The applications directory helped determine the extent to which the current systems duplicated data needs. This information assisted the planners in identifying the systems rewrite and consolidation requirements the new data base architecture would require.

The information yielded by the business model and applications directory assisted enormously in the strategic and tactical planning phase of the project. The candidate-subject data bases of the business model laid the groundwork for data base development, and the applications directory identified the systems that needed consolidation to achieve system standardization objectives.

The value of the business model and applications directory for the ongoing data base and application development efforts was quickly realized, but the need to include all of this information at one central location did not become apparent until later.

The next phase of the project was logical data base design. Armed with the information identified by the business model and the applications directory, a fully normalized logical data base design was completed. This information, which reflected the necessary data structures and relationships for subject data bases, was recorded in the CASE tool and several other automated and manual documents.

New hire

In December 1986, the decision was made to use DB2 as the data base management system for the SFS project. Previous systems had used IBM's IMS or sequential files; those involved in the decision felt that a modern technology was needed and that they wanted to take advantage of relational technology.

With the known lack of data dictionary functionality for DB2, a further decision was made to develop a customized data dictionary rather than to purchase a generic product. This decision was prompted by two factors.

First, with the anticipated arrival of IBM's repository for DB2 in the near future, the developers wanted to allow for the easiest possible transition. Second, no product offered Bell Atlantic the capabilities it could develop itself.

Because the dictionary would be built in-house, it was determined that no actual limits would be imposed on the scope in terms of the information it would contain. This lack of limits became an asset during the tool's evolution. The dictionary's initial purpose was to act as a basic reporting tool. However, as its developers learned more about the capabilities of DB2, they found it advantageous to incorporate everything they gathered about the project into one central location. The end product

Continued on page S10

Pitterman is staff manager of data administration for the Standard Financial Systems project at Bell Atlantic Corp. in Freehold, N.J.

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Surf's up

FROM PAGE S3

the views and attempted to synthesiae them into a composite one that might satisfy multiple applications.

The composite view was then studied with data base administrators. It was their reponsibility to write the data base access code (such as DL/1 calls). Development managers were concerned that the composite views — making extensive use of IMS data structuring facilities — would be too complex for the typical programmer to navigate. The data administrators and the data base administrators pooled their resources to write a common I/O module that handled access to IMS DB data bases and existing VSAM files.

FULLY 30% of current DB2 users are in full production mode, and 45% are applying DB2 as an integrated platform for production and end-user applications.

Borrowing from E. F. Codd's work on the relational model, basic verbs were defined for the programming interface (roughly, GET, REPLACE, INSERT and REMOVE). Simply put, until 1983, all applications built used that interface.

During that period, the data administrators continued doing their homework. They came across a paper by Peter Chen titled, "The Entity Relationship Model: Toward a Unified View of Data." This, along with the growing interest in relational, provided an impetus for extending the application-oriented data modeling effort. A prototype of an automated tool was created to define and store logical user views and to transform these views into the necessary code to utilize the common I/O module.

Preserving investments

As managers became interested in relational, generally, and DB2, specifically (circa early 1984), their gravest concern lay in preserving their investment in existing applications and data bases.

To make a long — but successful — story short, the installation's subsequent migration to DB2 has proceeded almost transparently to the development community. To be sure, design personnel have been aggressively trained in relational concepts and in DB2's overall capabilities.

As new applications are considered, the inherent power of a relational environment is being incorporated into the application's design. Functions that previously required significant programming, such as table management, are now being done directly by end users.

The size of the user community for DB2, announced in June 1983, has exceeded even IBM's expectations, amounting to more than 1,800 licenses worldwide as of last June. This estimate is disputed by some analysts because a significant percentage of existing DB2 licenses are said to be "experimental." In fact, fully 30% of current DB2 users are in full production mode, and 45% are applying DB2 as an integrated platform for production and end-user applications. Fifteen percent are employing DB2 for information retrieval and analysis applications.

Many of these last applications are, admittedly, quite basic in nature, but a significant number of end-user applications are, nonetheless, strategic. An interesting avenue being pursued in several installations, for example, is that of integrating two IBM products, Application System (AS) and Professional Office System, with DB2 via SQL/DS for strategic office automation applications.

All told, perhaps 180 DB2 licenses could be classified as truly experimental. Those in charge of these installations would observe, however, that there is no urgency in their use of DB2 as a technology.

Seldom does one IBM employee have lasting impact on both a product's design and its philosophy. The first DB2 product manager, Marlyn Bohl, who left IBM last spring, and other members of the DB2 team, including Norris Vanden Berg, Chris Loosely and George Zagelow, have created a unique product development philosophy based on DB2.

This philosophy hinges on close working relationships with other strategic IBM software units and an almost fanatical commitment to incorporating user requirements both for new functions and enhancements into new releases of DB2 on a timely basis. The philosophy also incorporates a conscious effort to work with other software vendors and consultants so that DB2's capabilities are leveraged and a broad base for defining new features is established.

Bohl's legacy will be perhaps the finest piece of software ever produced by IBM. Of even greater long-term significance, though, will be the pulling together of what had, for years, been competing and often contradictory IBM software tools. "Use-at-your-own-risk" interfaces, without warranties, are now giving way to gradual integration of a select set of strategic IBM products.

Systems Application Architecture (SAA), the logical extension of this gradual integration effort, cannot be dismissed as just another IBM plot. As DB2's influence permeated the IBM organization, the need for more software architectures emerged; hence, SAA was born.

But IBM learned a lesson from its experience with Systems Network Architecture (SNA). The problem with a standard is that everyone can have their own version. IBM's Communication Products Division has broad responsibility within IBM to ensure this does not happen with strategic IBM products.

Mirroring the success of this organizational push behind a strategic IBM initiative, IBM recently created the Application Systems Division. This unit will be the flag bearer for SAA as well as the leading edge of IBM's long-awaited foray into applications software. DB2 has proven within IBM that entire families of software tools can be created with the appropriate blend of technology and organizational strategy.

A number of elements in IBM's May 19 relational announcements provide continuing evidence of the "family" strategy. These should not be overlooked in the flurry of interest provoked by the presentation of DB2 Release 3 and the unveiling of the Data Base Relational Application Directory (DBRAD), which is the initial component of the long-awaited repository.

IBM LEARNED a lesson from its experience with SNA. The problem with a standard is that everyone can have their own version.

The elements that telegraph that message are tighter integration of the Cross System Product (CSP) set, IBM's primary development technology; a closer coordination of function between SQL/DS and DB2; and the layering of application functions with interfaces between the AS and Query Management Facility. IBM also continues to enhance Host Data Base View (HDBV) as an enabling agent for mainframe-to-PC data transfer.

The strategic significance of DBRAD should not be overstated, however. It is a small, perhaps disposable, piece of technology. It does have value, but, in all candor, any installation that has already embraced DB2 probably has built such a capability without IBM's assistance.

Missing link

The dictionary aspect of IBM's DB2 strategy remains perplexing. In an SAA context, the May announcement clearly establishes DB2 and SQL/DS as mainframe relational DBMS platforms for SAA-based development — which comes as no real surprise. At the workstation level, OS/2 Extended Edition's debut clearly indicates that IBM wants to control the upper and lower layers of a computing hierarchy.

Also, IBM announced a VSAM/Transparency feature, which was produced by a European software firm specializing in migration facilities. In all likelihood, this is the beginning of a migration effort by IBM to move the vast majority of corporate mainframe data under DB2's control. An IMS/Transparency feature cannot be far behind.

While making a statement of intent to provide a System/36 SAA relational DBMS, IBM's failure to announce what that product will be keeps its midrange strategy in disarray. It was probably the most disappointing aspect of the latest growth in IBM's relational family.

Missing from initial discussions of this distributed relational DBMS strategy was a definitive statement of the relational DBMS for System/36s and 38s and any hint of resolution to the System/36 and 38 dilemma that IBM and users of these machines face: What will the new departmental system be? The 9370? High-end PS/2 models? What will it be called? System/74? System/37.5?

Detractors are quick to point out that IBM has not really solved the dual-DBMS dilemma, as the venerable IMS continues to evolve (even if it is into a carefully constructed niche). Relational experts like Codd continue to belittle IBM's efforts in this regard. They suggest that IMS must once and for all be put to rest, showing their pronounced insensitivity to the challenge large IMS installations face in migrating away from IMS.

As installations analyze their "as-is" and "to-be" application portfolios, new opportunities arise because of relational technology's power. However, old opportunities that were satisfactorily addressed by IMS continue to define a role for that technology. Do the relational gurus believe IBM is unnecessarily propogating the IMS technology?

There is also continued emphasis by relational experts on IBM's failure to provide referential integrity in DB2. However, an industry survey of 80 of the largest active DB2 users revealed a 100% consistent, high-priority requirement for IBM's description of — implicitly, a commitment to — its distributed relational DBMS plan.

This requirement, which was expressed to IBM during the last six to nine months, indicates that the growing emphasis on distributed data base systems, distributed data base technology and referential integrity, domain support and foreign key support are not important if users do not know how to proceed with design for cooperative and distributed systems that will emanate from a DB2 mainframe platform in which the aforementioned features are obviously essential. It is a matter of sequencing technology development. Some, if not many, users do not apparently agree in total with the experts. It is this heavily IMS-oriented user base that is behind some of IBM's DB2 direction.

Missing the point

On a one-for-one basis, competing tool vendors such as Sage Software, Inc. (APS Development Center), CGI Systems, Inc. (Pacbase), Information Builders, Inc. (Focus), Artificial Intelligence Corp. (Intellect) and Micro Decisionware, Inc. (PC/SQL-Link) are correct in their assertion of superior function, compared with those IBM offerings.

But such a comparison misses the point, which is that there is room for an extended family of applications and tools built on a DB2 foundation. Users of products from vendors such as Management Science America, Inc. (MSA) and Pansophic Systems, Inc. can attest to that.

It is Pansophic, after all, that offers what is arguably the industry's best generator for DB2 with its product Telon, as well as the best strategy for tool integration and DB2 leverage with Pan/RD. Simply put, DB2's family can be an extremely hospitable application development and information processing environment.

An ideal configuration of value-added products for a DB2 environment would include the following:

- An application generator (be it APS Development Center, Pacbase, Telon or Transform Logic Corp.'s Transform/DB2).
- An "information generator" (Focus, On-Line Software International, Inc.'s Ramis, AS) or two (Intellect or MSA's Information Expert).
- A platform for departmental applications (like Ingres or Oracle) resting on an architecture for distributed data base with appropriate workstation support and networking facilities.
- An inference-based development tool for the construction of expert systems with direct relational DBMS interfaces. Aion Corp. is clearly the leading supplier of such technology. However, several other AI vendors — the most prominent of which are

AI Corp. with KBMS and Teknowledge, Inc. with Copernicus — are moving rapidly with development efforts for products aimed at the mainstream IBM mainframe environment.

CASE tools (depending on whose definition you abide by — some, if not all, of the above vendors might claim inclusion in this category) are an emerging component of relational-based software infrastructure.

Other prominent DBMS vendors like ADR and Software AG of North America, Inc. may find new, highly profitable directions in which to proceed, with the extremely powerful application development tools Ideal and Natural2, respectively. While not a trivial undertaking, each vendor can and should address the hunger for DB2 development tools with DB2 versions of these products. They represent two of the best application development system architectures available today.

In fact, ADR has recently announced its commitment to deliver Ideal for the DB2 environment. With this announcement, the company has indicated there will be a tight coupling between Ideal and the DB2 system, in general, and the DB2 catalog, specifically. Ideal accesses the DB2 catalog for all view and table descriptions and fully integrates this information with its own active application dictionary. In addition, the Ideal language allows use of either its own high-level data manipulation langugage or embedded SQL.

> ROME wasn't built in a day, and neither will your integrated relational data resource.

Data architecture

Another dimension of "going relational" is the adoption of architecture-oriented systems planning and design methods that facilitate integration and leverage the shared data potential of a relational DBMS.

The ultimate objective of a data architecture is a comprehensive inventory of the data that is important to a business, along with a consistent definition of the meanings of data and the business rules that govern their interrelationships. The data architecture must support an application architecture that provides the business process view of an application's data needs and a perspective for determining an application's interrelationships with other applications so that data sharing requirements can be identified.

A data-oriented application design methodology implemented in the broader context of architecture facilitates the incremental definition of a conceptual corporate data resource. As applications are implemented, an application project's data model provides the logical requirements for shared data. These may be satisfied via a physical component of the ultimate integrated data base.

Possibly a file interface and file migration tactic may be employed, the point being that even if storage redundancy is being propagated, an organization's data architects are aware of the situation and will incorporate the elimination of the duplication at an appropriate point in the application development sequence.

Rome wasn't built in a day, and neither will your integrated relational data resource. As technology for distributed access to that resource continues to emerge, the need for a comprehensive data architecture becomes more critical.

The conceptual dimension of the data architecture facilitates application planning in a distributed data environment. The logical dimension provides the basis for designing the data bases for individual applications within a shared data context. At some point, of course, we get to the physical issue of actually implementing applications and data bases.

The final component of an information architecture is a system architecture that provides a definition of the configuration of processor, storage and communications technologies for an enterprise. This, in turn, provides the technology perspective of where data is used and how it flows within an organization. This perspective is essential for an organization committed to integrated applications with distributed data base support.

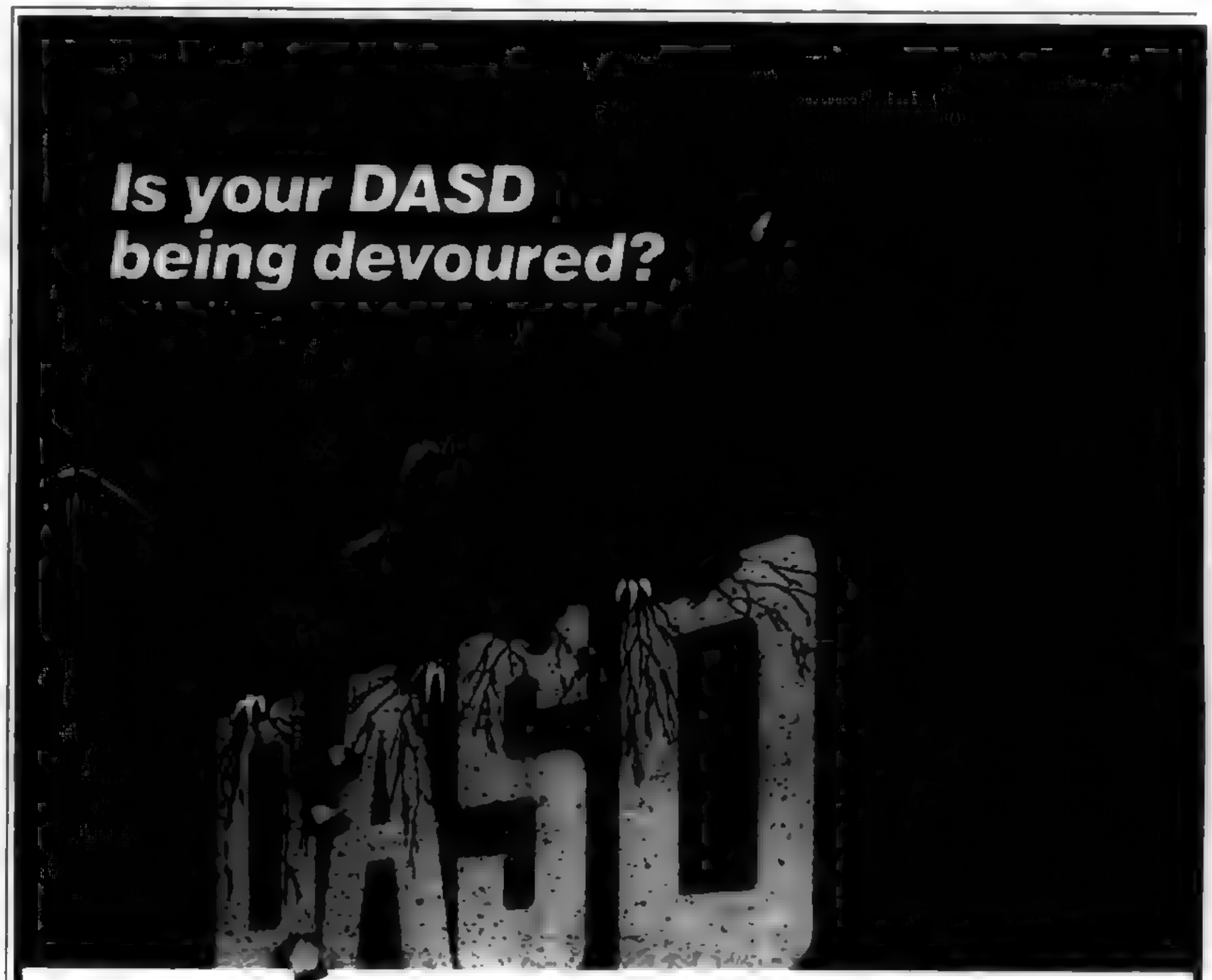
The overall information architecture enables better planning -of information needs and the resources (data and technology) required to address those needs. Within the system architecture, a software infrastructure can be established.

Going relational

There is growing evidence that this infrastructure must be based on relational technology so that both top-down and bottom-up approaches can be fully integrated. The reason the infrastructure is so important is because another enormous wave of technology is surely just beyond the horizon.

Codd's model explicitly defines 12 basic, three critical integrity and various structural and manipulative rules for defining, accessing and managing data consistent with the basic definition of the relational model. These rules provide an effective means of evaluating relational DBMS. They are also the source of some controversy.

The unfortunate aspect of Codd's fidelity rating is that he elected to retroactively apply the rules to products — such as ADR's Datacom/DB and Cullinet's IDMS/R — that may have taken marketing liberties with the relational concept. But the vendors that were poorly rated by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by Codd nonetheless offered effective infrastructure solutions. The controversy will not go away unless Codd consistently applies his rating scheme. His original rating of Cullinet's IDMS/R, for example, created unnecessary confusion on the context of the transition to relational systems.

There is no single, universally accepted definition of relational, but, strictly speaking, one is probably not really needed and might even get in the way as users venture into the software marketplace in search of a practical implementation.

The level of abstraction inherent in the relational model is both a blessing and a curse, especially in the pursuit of tools. Many users will say, "Forget the ton of abstraction. I need an ounce of application." This is quite appropriate, since this is a new technology that requires a significant investment and a transition to a different application design mentality.

Without that transition, the inherent power of the model's emphasis on data will prevent an installation from maximizing its return on an investment in a relational DBMS. Relational is the key software technology strategy issue for MIS organizations to deal with. But a single, universally accepted definition of relational is not a fundamental requirement.

Swatting myths

C. J. Date, an associate of Codd's, points out a significant number of relational myths. These, of course, extend to the tools that will be implemented on top of a relational DBMS.

One of the most important, and apparently contradictory, myths is the notion that, unless data is physically stored in tables or flat files, the system managing such storage cannot be relational. In fact, one of the most important attributes of relational is that we view data as if it were stored as tables, whether or not it is. This maintains consistency throughout the various stages of an application's design. Moreover, it facilitates a shared-data perspective when multiple applications are being considered and when data distribution is required.

> THE LEVEL of abstraction in the relational model is both a blessing and a curse. Many users will say, 'Forget the ton of abstraction. I need an ounce of application.'

As Date points out in refuting this particular myth, a system can be relational as long as it adheres to "the spirit, if not the letter, of the law." Value-added tools must provide the business user with the ability to view data "conceptually" as tables. If required data is not under the direct control of a relational DBMS, then the logical view of that data must incorporate a "transformation" of data from its native physical format to the relational (tabular) view of the user.

Structured Query Language (SQL) is a direct outgrowth of Codd's relational model. It is not in and of itself a "tool," and yet it presents tremendous productivity potential. It is a language for much more than structured queries.

One relational DBMS vendor recently commented that SQL has real problems in that it is "semantically impoverished" and "nonorthogonal." SQL is clearly not a panacea, but the latter arguments are irrelevant and will hurt the vendors that resist accepting SQL for what it is.

As it was first implemented in the Oracle technology, then in IBM's SQL/DS and later in DB2, SQL has a proven track record as a data definition language for creating views and tables; as a data manipulation language for selecting, updating, inserting and deleting data within tables and views; and as a data control language for controlling access to data.

DB2 is important both for its own sake as a high-quality DBMS that is capable of supporting volume-processing applications and for the influence it has exerted on software technology vendors in terms of standardization on SQL. Making SQL a standard is no longer "an IBM issue," since both ANSI and ISO have now embraced it as such.

SQL is perhaps the major bottom-up consideration when implementing a relational DBMS, because it provides a consistent interface layer between tools and relational DBMS. Simply put, if a software product does not offer an SQL capability today or if the vendor lacks a coherent, comprehensive definition of how SQL will be supported, then that product should not be considered an implementation tool. Far from indicating "submission to IBM," adopting SQL is one of the best ways for a vendor to ensure the long-term viability of its product and the tool's ability to adapt to various hardware and software environments.

SQL has the added value of giving an application access to multiple DBMSs as more DBMS vendors incorporate SQL into the data definition and manipulation facilities. SQL can be implemented in a transparent fashion so users and their tools do not interact directly with SQL but do so through a form of translation.

Take it from the top

In addition to bottom-up application and information generator tools, there is a need for tools that assist in the top-down definition of a data architecture, starting from the conceptual and logical levels.

At the conceptual level, the focus is on the basic data of an enterprise and the rules that govern the processing of that data and its interrelationships.

The logical layer of a data architecture presents that data using the tabular data structure. The simplicity of tables hides the technical details of navigation links and access paths so that the business meaning of the data is not obscured during analysis and design.

There is also a need for tools and methods that define a corresponding application architecture, that is, a process orientation.

The relational model, if it is being viewed as more than a specification for relational DBMS technology, is a powerful catalyst in this regard. Entity relationship modeling methods approach the definition of tabular data structures from a business information perspective. The relational model provides the rules for

Continued on next page

From rich soil, secondary crop springs eternal

BY WILLIAM INMON

Like the dandelions in springtime, it's a sure bet that when IBM creates a marketplace, secondary products will rise up to complement and enhance it. DB2 is no exception to this phenomenon — in fact, it has spawned quite a vigorous and varied secondary marketplace.

What follows is a sampling of some of the more innovative products that have sprung up in this area.

PC/SQL. Although DB2 is not known as a personal computer product, PC/SQL, from Micro Decisionware, Inc., is known as a DB2 PC product. PC/SQL will allow end users to access DB2 data with the comfort and security of their PCs.

PC/SQL allows the end user to format the DB2 request on a PC through a series of menus. Once the request has been formatted, the end user initiates activity that links the PC to DB2. The request, looking like any other DB2 request, is then submitted to DB2.

The end user may either remain linked to the mainframe while the request is executing or may choose to sever the link. If the link is still active, once the request finishes execution, the result of the request is sent to the end user. If not, the results of the query are held until the link is reactivated.

Upon receiving the results of the request, the PC/SQL user can format the output into the desired format, such as Lotus Development Corp.'s 1-2-3.

DB2 Toolkit. Everybody talks about DB2 performance, but nobody does anything about it — except for Innovative DP Designs, Inc., which has produced the DB2 Toolkit for managing DB2 at the system level. Other systems software — including IBM's — offer a few of the features found in the tool kit, but no company offers the complete, integrated, sophisticated tools found here.

The tool kit contains standard tools such as a catalog organizer, a performance analyzer and a table space analyzer. In addition to integrating the full set of tools, another interesting feature of the product is its ability to look at table space data and statistics on-line. Unlike other monitors that produce statistics in a batch mode, DB2 Toolkit can be used dynamically. Analytical as well as early warning data is provided.

Other tools include a table copier, a table extractor and a table space organizer. A powerful feature of the table space extractor is its ability to efficiently unload and reload data. Using the extractor, users can reconvert data between a relational and other formats.

Perhaps the most intriguing feature of the DB2 Toolkit is the table space surgeon. Using the surgeon, rows and columns in DB2 table spaces can be displayed and modified. Bad control information and other integrity errors

Continued on page S10

Inmon is a senior principal with American Management Systems in Lakewood, Colo., and an author on the subject of data base design.

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Surf's up

FROM PREVIOUS PAGE

transforming the conceptual view of an application into a logical design that can take full advantage of relational DBMS and bring about massive productivity gains at application development time.

CASE tools are rapidly evolving to support these top-down requirements. Of particular note would be the "methodware" approach embodied in D. Appleton & Co.'s Data Resource Leverage and in Texas Instruments, Inc.'s Information Engineering Facility (IEF). There are many other effective CASE tools that have varying degrees of top-down and bottom-up application life cyle support, such as Knowledgeware, Inc.'s Information Engineering Workbench (IEW), CGI's Pacbase and Intech's Excelerator.

D. Appleton's Leverage provides techniques for modeling activities, or processing, as well as data. With effective task management guidelines, Leverage provides an effective top-down method for establishing an architecture.

Further, using a variation of Chen's entity relationship modeling method, Leverage provides an Activity and Structural Modeling Language that is used to define entities and relationships to a mainframe glossary. From the glossary, user views can be composed, analyzed, synthesized and, finally, transformed into a relational DBMS's view. Leverage's underlying software technology, Janus, translates what are, effectively, entity relationship models into SQL Create statements, which can then be loaded directly into DB2's catalog.

TI's IEF also offers effective planning tools and provides a unique feature in today's CASE market in the form of a DB2-based "encyclopedia." This facilitates design and development efforts using other features of IEF.

The encyclopedia is important for the "horizontal" integration of existing and planned components of IEF that address all aspects of an application's life cycle. It is also key as software vendors or other organizations, such as Pansophic with Telon, consider "vertical" integration between existing components of IEF, screen and data base design facilities and other products that will generate application code and handle basic DBMS functions. The mainframe facility is also important for large projects in which sharing of application design data is a key productivity improvement mechanism.

> IBM's frequent discussion of a DB2-based system repository has resulted in several misconceptions. One is that the repository is just a fancy name for the missing data dictionary.

Other CASE products will move in similar directions. Vendors such as Intech are sure to succeed with the open-architecture strategy for Excelerator. That product, which has a consistent track record of impressive productivity gains for analysis and design tasks, also raises a key relational DBMS implementation issue.

Part of going relational involves a transition to a data-oriented design methodology. Embedded methodology can be seen in two lights with products like Knowledgeware's IEW and TI's IEF.

The good news is that the adoption of these tools mandates the parallel adoption of the information engineering methods that are literally embedded in the respective products' components. The bad news, which then becomes a boon for sales of a "methodology-neutral" product like Excelerator, is that an installation may already have implemented effective data-driven design methods that may not be compliant with the rigor of IEW's or IEF's techniques.

On the horizon

This brings us to the question of what the immediate future looks like in terms of user expectation and vendor response.

In addition to the basic prescribed tenets of the relational model and the explicit recognition of the need for tools to leverage a relational DBMS, there are three key issues that can be identified as user design implications and vendor requirements in the value-added relational DBMS software marketplace:

- Adherence to SQL as the de facto industry standard for data access.
- The need for a relational DBMS-supported repository to support application development and information retrieval tools as well as information planning and application design tools.
- Support for applications operating in distributed and intelligent workstation environments.

Date's recent tutorial on distributed data base is an excellent statement on conceptual rules for creating a distributed data base environment. The rules reinforce the above three issues. Vendors must respond to the rules, not for fidelity's sake but because they represent what users want.

The repository issue has, thus far, remained in the realm of vaporware. IBM's discussion of a DB2-based system repository has resulted in several misconceptions. The first is that the repository, and hence DB2, will be mandatory in an MVS environment. A second is that it will be the mechanism for merging IMS and DB2 data. Still another is that the repository is just a fancy name for the missing data dictionary.

The first and second points, as stated, are complete distortions. The third point holds some validity, but the repository issue is more than a data dictionary issue.

The current focus on a repository deals with the growing need for a user-oriented dictionary/directory of data, or metadata, about the information and applications that are available in a systems environment.

One major bank, for example, experienced tremendous benefits from going relational by taking the metadata gathered in comprehensive data modeling projects and storing it in DB2. Users were then taught the basics of SQL and allowed to access the metadata stored in DB2 in order to satisfy queries concerning what data was available and who owned it. As information retrieval tools such as Focus were introduced and as DB2 data bases of business data were constructed, tremendous productivity gains were realised by users' being able to help themselves to their data.

An application generator was also introduced, and programmers found that data structures required by an application could also be determined by referencing DB2's repository. The generator, once a view was defined, could automatically produce the required SQL statements. The generator houses a catalog in which application data views can be stored for reuse should developers encounter similar data requirements.

Both a global repository and a tool-specific, local repository are important. A relational DBMS provides the ideal mechanism for the former, while individual tools will increasingly reflect the need to support the applications and data within their sphere of influence via a localised directory/dictionary facility. The functionality and complexity of such a repository will vary in direct correlation with the functionality of the tool in question.

> ALL the trumpeting about 1987's being "the year of distributed data base" is premature. A better way of looking at it would be as the year of planning for distributed data bases.

In terms of a common layer between global and local repositories, SQL is the obvious product for the physical layer of data definition. The conceptual and logical layers of interface between multiple dictionaries are not, however, as clearly defined.

A very significant standards effort is under way concerning a repository. The ANSI group focusing on this issue published a draft standard for an Information Resource Dictionary System (IRDS). Not directly connected to relational DBMS or the SQL issues, this potential standard may be the furthest reaching of any such effort. If accepted, IRDS-based dictionaries such as Pansophic's Pan/RD, which is still under development, would enable users to share common applications and data definitions across heterogeneous computing environments.

The ability of a tool to operate in a distributed environment is also critical, although all the trumpeting about 1987's being "the year of distributed data base" is probably premature. A better way of looking at 1987 would be as the year of planning for distributed data bases and the implementation of relational DBMSs.

Practical implementation of relational begins with the realization that information management is, first and foremost, a data architecture and design issue. But if systems builders attempt to ride the relational wave as an implementation-only panacea, then relational DBMSs will be lost in the same turbulent waters that swallowed up the riders of the first wave of DBMS technology. ●

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Ground up

CONTINUED FROM PAGE S3

was a dictionary that served a variety of needs, from business modeling through application development.

The data dictionary began merely as a vehicle to aid in physical data base design and applications development by providing numerous cross-reference reports about the various DB2 objects and programs that used them. In four months, the data base structure for the dictionary was complete, and the initial cross-reference reports were produced.

Many of the people responsible for the logical data base design also took part in the physical design. As a matter of convenience, the information of the logical data base design was integrated into the customized data dictionary, extending its functionality. Once this was done, the data that had been recorded in several different places was consolidated. Comparison between logical data base design and physical implementation was now merely a report request away.

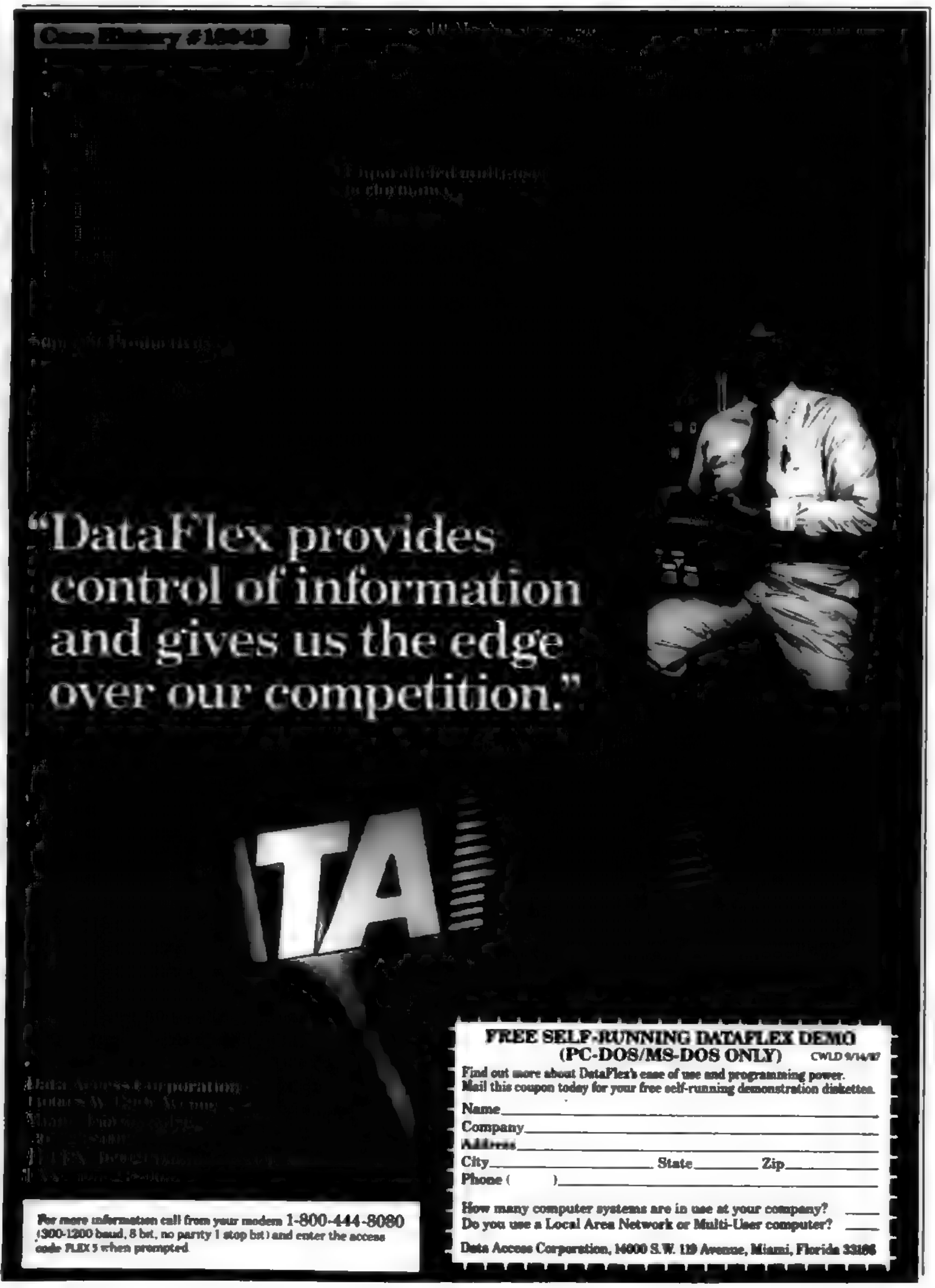
The idea of integrating more information into the data dictionary was then taken further. The locally developed PC application that stored the applications directory was replicated with DB2 and the information it contained integrated into the data dictionary. This gave the dictionary the ability to report information at the application level.

> COMPARISONS between logical design and physical implementation were now merely a report request away.

The integration of this information, as was true throughout the entire project, proved an invaluable resource in assisting system consolidation and the development planning efforts of the application development teams working to standardise the Financial Systems.

The last step was to include the business model information in the data dictionary. Data structures for the business information were designed and incorporated. With this information, the data dictionary could be used as a tool for the future strategic planning efforts of other divisions within Bell Atlantic whose corporate philosophy was closely aligned with that of Financial Systems.

The customized data dictionary of the SFS project became a complete, highly flexible reference resource that used the DB2 catalog information and integrated it with Bell Atlantic's business objectives and information. The resulting dictionary redefined the scope of the classic data dictionary and dramatically extended its functionality by integrating the business and application information with the metadata of the data base into one central repository. ●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From rich soil

CONTINUED FROM PAGE S8

may be corrected using this feature. In the ISPF mode, full-screen display and modification of DB2 tables (such as table "zapping") can be done.

DB2 Alter. One of the most useful products in the secondary DB2 arena is DB2 Alter from BMC Software, Inc. DB2 Alter solves a problem peculiar to DB2 in an efficient and elegant way: It provides the means to automate the alteration of a DB2 data base.

A mature DB2 environment is likely to be thick with tables, plans, views and other data elements. Consider the work required to make a simple change to the table, such as adding a column. Under standard operating procedures, the table must be dropped, the change made to the table and the table restored.

When there are many plans, views and so forth, these procedures become more complex, inviting errors. The errors ultimately show up as tables that are disabled from operation.

When BMC's DB2 Alter is used, the entire process of table dropping and restoration is automated, simplifying the data administrator's job. Even more important, the chances of errors occurring are greatly reduced.

Crystal DB2. System software is not the only area in which the performance issue of DB2 is being addressed. What if you want to size your systems before you build them? You can have your cards read, consult an oracle, or you can use Crystal DB2, from BGS Systems, Inc.

With Crystal DB2, you feed system operating characteristics into the software before you build the system, and Crystal DB2 will tell you what kind of machine resources you will need.

If it turns out that the DB2 application will be a burden on resources, you can alter your design before committing it to code. Then you can ask Crystal DB2 once again what your utilization is going to be.

An interesting aspect of the secondary marketplace for DB2 tools is the speed with which it has grown. For other major IBM products, such as IMS, the secondary marketplace grew over the course of a decade and a half. But for DB2, which realistically has shown a commercial presence for a relatively short time, the marketplace has grown with blinding speed.

It is predictable that, as DB2 matures in its usage as a product, more secondary products will arise. The products mentioned here are only harbingers of what is to come. ●

National Database and 4th/5th Generation Language Symposium

DALLAS, NOVEMBER 16–18, 1987

BOSTON, NOVEMBER 30–DECEMBER 2, 1987

SYMPOSIUM CHAIRMAN:
Dr. George Schussel

Dr. George Schussel, President, Digital Consulting, Inc. is one of the best known and most widely respected lecturers on DBMS and 4th Generation Languages.

Dr. Schussel will lead the Symposium with the expertise and experience which prompted ICP INTERFACE MAGAZINE to call him the "Guru of Data Base Management."

Dr. Schussel created the symposium to provide a forum for decision-makers to make objective comparisons among products and keep up with changes in the software field.

PRODUCT PRESENTATIONS

Over 80 Hours of
In Depth Product
Presentations

SPEAKERS:

- George Schussel
- Larry Ellison
- James Davey
- Al Case
- Ken Orr
- Vaughan Merlyn
- Larry DeBoever

TOPICS:

- Computer Aided Software Engineering (CASE)
- Relational DBMS
- Distributed DBMS
- Prototyping
- AI/Expert Systems
- 4th Generation Languages (4GL)
- The 5th Generation of Software

FREE

A Two-Day Relational DBMS Seminar.
See page 7 for details.

Feature
Article
Pages 4–5

A Digital Consulting, Inc. Conference©

DAY ONE

MORNING SEMINAR

George Schussel, President and founder of Digital Consulting, Inc., and James Davey, DCI's Senior Consultant, present a combined seminar program on DAY ONE of DB 4th/5th GL. This interactive, fast-paced presentation features multiple projectors and screens and communicates an enormous amount of technical and management information within a one-day period. In the morning, you will learn all of the major 4th generation concepts. In the afternoon the discussion will move to a review of the software marketplace, the positioning of different software vendors and a comparison of DBMS and 4th & 5th GL products. The advantages and disadvantages of using each company's products will be covered.

DR. GEORGE SCHUSSEL
SYMPOSIUM CHAIRMAN

Dr. George Schussel, President, Digital Consulting, Inc., is one of the best known and most highly respected lecturers on DBMS and 4th Generation Languages. He received his doctoral degree from Harvard Business School, is a Fellow of the AAAS, holds the CDP, and is on the editorial board of several publications. Dr. Schussel will lead the Symposium with the expertise and experience which prompted ICP Interface Magazine to call him the "Guru of Data Base Management."

JAMES H. DAVEY

Jim Davey is Senior Consultant with Digital Consulting, Inc., specializing in database management systems, logical database design, 4th generation languages and structured analysis and design. He has twenty years of experience in design and implementation of database systems. Before joining DCI, Mr. Davey was Senior Database Consultant with Eastern Technical Associates, Manager of Product Support and Assessment for Prime Computer and Database and Software Support Specialist for Honeywell and General Electric.

SEMINAR OUTLINE

1. **4th Generation Concepts**
   - a. Technical concepts
   - b. Management issues
2. **Fifth Generation Software**
   - a. Expert Systems
   - b. DRDBMS
   - c. CASE Tools
3. **CASE**
   - a. Graphical programming languages
   - b. Repository
   - c. Code generation
   - d. Limitations
4. **A Tutorial on Relational DBMSs**
   - a. Structure
     - –Tables
     - –Normalization
     - –Views
   - b. Integrity
     - –Entity integrity
     - –Referential integrity
     - –Database specific integrity
   - c. Manipulation
     - –Relational algebra
     - –SQL
5. **Relational Integrity**
   - a. Entity integrity
   - b. Referential integrity
   - c. Database specific integrity
6. **The Management Implications of Using Relational Databases**
   - a. Higher productivity
   - b. More data independence
   - c. Better integrity
   - d. Better performance in certain conditions
7. **The Truth About the Relational "Performance" Problem**
8. **What Are "Born-Again" Relational DBMSs?**
9. **SQL—The New Standout**
   - a. Network data language
   - b. SQL Standard
10. **Problems with SQL**
11. **The Single vs. Dual DBMS Strategy**
12. **Distributed Database Issues**
13. **Different Types of 4th Generation Languages**
    - a. Programs
    - b. Information center
14. **How to Categorize and Compare 4GLs**
15. **Prototyping**
    - a. What is it?
    - b. Why is it needed?
    - c. How to do it?
    - d. When to use it and when it doesn't work
16. **The Management Implications of Using 4GLS**
    - a. Can 4GLs be used on complex projects?
    - b. The need for data-driven design
    - c. Why novices may be better than experienced programmers with 4GLs
    - d. Computer resource utilization with 4GLs
    - e. How the use of 4GLs affects the turnover of your programming staff
17. **How to Evaluate DBMS & 4GLs**

SPECIAL UPDATE

IBM's Software Products

DB2, SQL/DS, QMF, IMS, CSP, AS

A critique of IBM software products will be part of the first day's presentation. Our consultants are continually surveying users of IBM's software products. Feedback from current users will be provided for attendees.

DAY ONE

AFTERNOON SEMINARS

SEMINAR OUTLINE

George Schussel

Mainframe Software and Associated Micro-Products

1. **IBM's Database and Programmer Productivity Aids**
   - a. A review and forecast of the total installed base of IBM mainframe compatible DBMS
   - b. Choices for the IMS, DL/1 user
   - c. SQL and DB2: IBM's relational products
   - d. An evaluation of DB2 against Codd's rules
   - e. Software to complement DB2
   - f. The costs of using IBM software
   - g. Performance implications of DB2
   - h. User surveys of DB2 and SQL-DS
   - i. Likely DB2 futures
   - j. IBM's application development tools
   - k. Evaluation of CSP
   - l. What CSP is missing

2. **Integrated Development Software for Mainframes**
   - a. Cullinet/IDMS/R
   - b. ADR/DATACOM
   - c. CCA/204
   - d. Software AG/ADABAS
   - e. Mitrol/MITROL
   - f. Computer Associates/UNIVERSE
   - g. Oracle/ORACLE
   - h. RTI/INGRES
   - i. More

3. **Programmer 4GLs (for mainframes)**
   - a. Software AG/NATURAL
   - b. McCormack & Dodge/MILLENNIUM
   - c. MSA/INFORMATION EXPERT
   - d. More

4. **COBOL Generator/4GLs**
   - a. PACBASE
   - b. ACCOLADE
   - c. INTELLIGENT ASSISTANT
   - d. APS
   - e. TRANSFORM

5. **Database Machines**
   - a. Teradata
   - b. Britton-Lee

6. **Evaluation and Discussion of End-User Software**
   - a. Decision support systems such as System W, IFPS
   - b. PC-oriented tools such as ICMS/GOLDENGATE, PC/FOCUS
   - c. Information Center software such as AS, RAMIS II, NOMAD2 & FOCUS
   - d. English language products such as INTELLECT, ENGLISH
   - e. Query languages like ASI-INQUIRY

7. **Design Aids and Tools**
   - a. CASE-oriented products like KNOWLEDGWARE
   - b. Graphical-design oriented products like TIP
   - c. Workbench development products from CCA and ADR

8. **Non-370 Mainframe Products**
   - a. Unisys, NCR, Sperry

SEMINAR OUTLINE

James Davey

Supermini and Micro Software

1. **Supermini Hardware Vendor Software**
   - a. Digital's VIA, Rdb, RALLY
   - b. Hewlett Packard/IMAGE and HPSQL
   - c. Data General/DG and SQL
   - d. Wang/PACE
   - e. Concurrent Computer/RELIANCE PLUS
   - f. Prime/PRIMEWAY and INFORMATION
   - g. Others

2. **Supermini Integrated DBMS and 4GLs**
   - a. Mainframe Products
     - –Software AG/ADABAS/NATURAL
     - –Info. Builders/FOCUS
     - –Others to come
   - b. Relational Pioneers
     - –Oracle/ORACLE
     - –RTI/INGRES
   - c. Other Contenders
     - 3CI/INFOCEN
     - Software House/SYSTEM 1032
   - d. New DBMSs
     - –Sybase Inc.
     - –GDS/GALAXY
   - e. More

3. **Supermini 4GLs and Application Generators**
   - a. Cognos/POWERHOUSE
   - b. Cortex/APPLICATION FACTORY
   - c. Henco/INFO
   - d. Pro/PRO IV
   - e. More

4. **Supermicro (UNIX and MS-DOS)**
   - a. Informix/INFORMIX-SQL/4GL
   - b. Unify/UNIFY
   - c. RTI/INGRES
   - d. Oracle/ORACLE
   - e. DLC/PROGRESS
   - f. QINT/SQL
   - g. MDBS/MDBS III, KNOWLEDGEMAN & GURU
   - h. dBASE III PLUS
   - i. R:BASE 5000
   - j. Others

RELATIONAL DBMS AND 4GLS: THE NEXT

Now that 4th generation application development tools are well accepted, the question arises "Where are we going to and what will be the characteristics of the 5th generation of application development"? Future issues are a major discussion item at the DB+4/5GL Symposium. A summary of some discussion points from recent symposia are presented below.

RELATIONAL DBMS

Occasionally, one hears comment about "post-relational" DBMS. Adoption of such a technology seems unlikely in the near to mid term future. The advantage of the relational model's mathematical underpinnings and the promised wide adoption of the ANSI standard SQL make it highly unlikely that some other logical view of data for commercial processing will be widely adopted in the next ten years.

It is clear, however, that one weakness of relational modeling lies in its modest ability to capture meaning in the same way that network-oriented views of data can. It's most likely that various "semantic modeling" extensions to the relational model will be proposed and one or more may achieve widespread adoption. The ability to capture more meaning in your database structure can mean significant additional savings at the programming level and superior control for data administration.

A number of new relational DBMS's from companies like Sybase, Tandem and Interbase are now targeting the high performance relational DBMS market. These vendors claim distributed capabilities and significantly increased transaction processing potential. Meanwhile, established relational DBMS's such as ORACLE, INGRES, and INFORMIX continue to improve their transaction processing potential by an average of 30%/year. These software improvements combined with rapidly improving MIPS/$ hardware mean that while INGRES 2.0 on a VAX 11/780 was not feasible for your application, INGRES 5.0 on the VAX 8550 will have an 800% cost per transaction improvement and may therefore be very feasible.

Our conclusion is that while network-oriented data views are likely to remain superior for difficult transaction processing applications for the next few years, an ever increasing majority of transaction processing applications will be amenable to solution by relational DBMS's.

DATABASE MACHINES

One important approach to transaction processing in tough relational processing applications is database machines. Teradata and Britton Lee, offer some significant cost improvements in high volume relational transaction processing. Teradata, for example, has some benchmarks showing a 10–1 price/performance improvement over the use of a straight software only DB2/SQL implementation.

Digital Consulting does not expect to see a relational DBMS machine from IBM. The reason is not technology but business. The widespread advent of personal computers has meant that many mainframe functions have now been transferred to cheaper personal computers. Architecturally, then, one can look at mainframes as evolving into data base machines and network servers. The concept of a database machine is to offload the database accessing and control from the mainframe to a parallel processing, micro computer architecture. If the job of handling the user interface is offloaded onto personal computers while the job of handling database access is offloaded onto back end machines, the question arises, what is left for the mainframe? The answer of course is nothing, and that is the principal reason why IBM won't do anything to encourage the growth of database machines.

PRODUCT PRE

ONE-HOUR PRESENTATIONS WILL BE

Vendor	DB & 4GL Packages
Applications Software, Inc.	INTERROGATE
Applied Data Research, Inc.	DATACOM/DB
	IDEAL
	DATA DICTIONARY
Britton Lee, Inc.	BL8000, BL300
	IDM-2,
	FOCUS-4GL
Cognos, Inc.	POWERHOUSE
Computer Associates International, Inc.	CA-UNIVERSE
CompuServe Data Technology	SYSTEM 1032
	SYSTEM 1022
Computer Corporation of America	MODEL 204 DBMS
	IMAGINE, ACCOLADE
Cortex	APPLICATION FACTORY
Cullinet Software, Inc.	IDMS/R
	ADS/O
	GOLDENGATE
Digital Equipment Corp.	VIA, Rdb and 4 GLs
Gateway Systems Corp.	SYNERGIST
Henco Software, Inc.	INFO - DB+
Hewlett-Packard	ALLBASE
	HP/SQL
IBM Corporation	IMS, SQL/DS, AS, DB2, CSP
Information Builders, Inc.	FOCUS INFORMATION CENTER
	FOCUS APPLICATION DEVELOPMENT
Information Resources, Inc.	EXPRESS, EASYTRAC, FCRS
Integrated Data Base System	IDBS

The products presented represent varied
IBM, DEC, Burroughs/Univac, Honeywell,

SQL

There has never before been a standard data access language. SQL is going to change that. SQL was developed by IBM in the late 1970's and IBM has based its two strategic DBMS products, DB2 and SQL/DS, on SQL. The most successful independent DBMS software vendor, ORACLE, is based on SQL. The American National Standards Institute and the International Standards Organization have adopted SQL as the standard language for relational DBMS access. The United States Department of Defense will require SQL in future procurements.

Relational but non-SQL vendors such as RTI with INGRES and INFORMIX and Computer Associates with UNIVERSE have quickly rushed SQL implementations to market. Non-relational vendors such as Cullinet, Software AG and Computer Corporation of America have announced that they will be supporting SQL.

With all of these things going for it, it's clear that by the 1990's SQL will be the standard language for data manipulation, definition, and

FEW YEARS by GEORGE SCHUSSEL

ESENTATIONS

HELD ON EACH OF THESE PRODUCTS:

Vendor	DB & 4GL Packages
Management Science America, Inc.	INFORMATION EXPERT
Manager Software Products	MANAGER PRODUCTS & SOURCEMANAGER
McCormack & Dodge	MILLENNIUM
Micro Data Base Systems, Inc.	MDBS III
Micro DecisionWare	PC/SQL-LINK
Mitrol, Inc.	MITROL
MultiSoft, Inc.	SUPER-LINK
MUST Software International	NOMAD2
On-Line Software International, Inc.	INTELAGEN RAMIS Workstation UFO Productivity System
Oracle Corp.	ORACLE
Pansophic Systems, Inc.	TELON
Pro Computer Sciences, Inc.	PRO-IV
Rapport Corp.	RAPPORT
Relational Technology, Inc.	INGRES
Rhodnius	EMPRESS RDBMS
Sage Software	APS
Software AG of N.A.	ADABAS NATURAL
Technology Information Products Corp.	INFO MODELING, DATA MODELING
Teradata Corporation	DBC/1012
3CI	INFOCEN
Transform Logic	TRANSFORM
Unilog, Inc.	GEN/1
Unisys	MAPPER & LINC II
Wang Laboratories, Inc.	PACE
Zanthe	ZIM

ardware environments which include:
Data General, Prime, Wang and CDC.

ontrol. This will offer important portability benefits for both human kills and software.

SQL is not suitable as an end-user language. For any but trivial uses QL should be handled by programmers, not end-users. Proficiency vith SQL is best achieved when the user has some academic background in set theory and propositional logic.

Therefore, we expect to see SQL "generators" becoming important. Vhen SQL becomes the generated rather than the written language, sers can keep the advantage of familiar interfaces such as spreadheets, yet at the same time, generate applications that are portable rom one database engine to another.

Viewed a few years from now then, SQL's major importance will be s the standard language for data access communication from one software system to another. SQL ultimately is more important as a software rather than as a human interface.

DISTRIBUTED PROCESSING

In the 1990's leading edge organizations will be using three-tiered computing. The idea behind three-tiered computing is to support personal workstations at the individual or group level, mini-computer data processing at the departmental level, and mainframe hardware to handle common data base applications that run across several departments or companies. There are two software technologies that will allow this. The first is distributed database technology, while the second is cooperative processing.

The idea behind distributed databases is to have a single logical database implemented over diverse machines. Early incarnations of distributed database software are now available from vendors such as Relational Technology, Oracle, and ADR.

Cooperative processing systems such as PC/SQL-link from Micro DecisionWare of Boulder, Colorado or SYNERGIST of Gateway Systems of Lansing, Michigan or SUPER-LINK from Multisoft of Edison, New Jersey represent an alternative technology approach to building distributed applications. The logic behind these systems is to offer 4GL application development on a workstation coupled with an active Data Dictionary on a central minicomputer or mainframe. The Dictionary power is such that reusable functions can be built into the system and that the logic of its architecture supports both development and execution on a distributed basis.

The 5th generation of application development will be heavily characterized by both a development and execution environment that is largely distributed. Distributed DBMS and cooperative processing systems will lead in providing the support necessary for the building of these applications.

STANDARD ENVIRONMENT

The early 1990's will certainly give rise to the recognition of six broadly implemented operating system environments, all of which are so widely used as to be considered "standards":

1. DEC's VMS
2. IBM's MVS
3. IBM's VM
4. AT&T's UNIX
5. Microsoft's MS DOS
6. IBM's and Microsoft's OS/2

The most popularly used software tools will be available in all of these standard operating environments. In other words, the movement over the last few years of popular products toward offering a diversity of operating environments and a diversity of interfaces for users will continue unabated into the 1990's.

CASE AND 4TH GENERATION TECHNOLOGY

By the mid 1990's the building of applications by business analysts using integrated CASE/DBMS/4GL technology and without programmers will be normal and expected. More than any other single technology the dependency on CASE techniques will truly define the 5th generation.

THE ADVENT OF EXPERT SYSTEMS

At the current time very little AI technology has permeated the world of commercial systems. Expert systems offer the greatest promise of changing that.

By the 1990's rule based programming will be available to normal commercial programmers. Like DBMS, transaction processing monitors, and report writers, expert systems will become another tool in the application builder's portfolio.

SPEAKERS

DR. GEORGE SCHUSSEL is one of the world's foremost experts in data base management technologies. He is President and founder of Digital Consulting, Inc., a prominent high technology education and management consulting firm that specializes in software productivity tools and is recognized as the world leader in DBMS and 4GLs.

Hardware and Software Futures and the 5th Generation of Computer Technology

Topics
- The Future of Integrated Circuit Technology
- The Need for Parallel Architectures
- Microcomputer Futures
- An Evaluation of Artificial Intelligence
- Expert and Knowledge-Based Systems
- The Future of DBMS Software

LARRY DeBOEVER is President of DeBoever and Associates and a leading authority on systems integration issues. He has served as Strategic Planning Director for Ungermann-Bass, and was President of Linkware. He is a founder of Pansophic/Christensen Systems and was previously a Vice President of Computer Corporation of America.

Corporate Connectivity

Topics
- The Pressure for Achieving Corporate Connectivity
- Basic Connectivity Technologies
- Obstacles to Connectivity
- Trends in Computer Connectivity
- A "Hypothetical" Case Study

ALBERT CASE, JR., a nationally known lecturer and author, is Director of Technology Transfer for Nastec Corporation, a Computer-Aided Software Engineering firm. Mr. Case has spoken at many national conferences, published articles in several trade publications and has written a book. Al Case is currently the instructor of DCI's "Software Engineering and CASE Technology" seminar.

Trends in Case Technology

Topics
- Setting CASE Expectations: Defining Productivity
- Systems Development Characteristics
- Problems and Their Solutions
- CASE—An Integrated System to Build Systems
- The Scope of CASE: Information Engineering
- Getting Started

KEN ORR is Chairman and Chief Scientist of Ken Orr & Associates, Inc., which specializes in software engineering environments that integrate technology, tools and training for maximum productivity.

Orr is a frequent speaker at international conferences and seminars. He has authored several books and has been a contributing editor to INFOSYSTEMS magazine and has written for other industry trade publications.

Data Architecture, Data Base & Reality

Topics
- Framework: What are the Problems and Solutions?
- Data Architecture—Knowing What To Do
- Information Systems Architecture
- Data Base—Knowing How To Do It
- Reality—Doing It
- Future Technologies

VAUGHAN MERLYN is a well-known authority on Application Generators and 4th Generation Languages, specializing in their use in the Information and Development Centers. He consults for major vendors and prospective users of fourth generation technologies and has also authored the widely-acclaimed report, "Application Development Systems—The Comparative Consumer Report."

Leveraging Application Development Productivity

Topics
- Redefining the Productivity Problem
- Setting Productivity Expectations
- Available Productivity Tools—Their Roles and Pitfalls
- Why Most Development Aids become "Shelfware"
- Avoiding the "Shelfware Syndrome"

LARRY ELLISON, President and Founder, has been the President and a Director of Oracle Corporation since its organization in 1977. Before founding the company, Ellison held key development posts at Amdahl and Ampex Advanced Research. He holds advanced degrees in Physics from the University of Illinois and the University of Chicago.

The Commoditization of Software Technology

Topics
- Costs of Hardware vs. Software
- Coming Hardware and Software Standards
- The Expansion of Software Lifetimes
- The Importance of Software Portability
- Software Standards—A Must

Developing Applications with Relational DBMS

Dallas, November 19–20, 1987 Boston, December 3–4, 1987

FREE Seminar to 3-Day Attendees*

Although relational theory will be covered, the focus of this seminar is a practical one—applications development rather than theory.

Relational technology, especially when paired with powerful application development tools such as fourth generation languages, application generators, information center products and artificial intelligence systems can provide dramatic improvements in application development productivity. The key is that it facilitates understanding between producers of information systems and the consumers of information systems. The underlying simplicity of the relational model enables users to develop a consistent, coherent conceptualization, or cognitive model that provides predictive and explanatory power for understanding data. Another related benefit of relational technology is its flexibility and forgivingness in accommodating database design changes. This encourages the use of prototyping, allowing expansion and refinement of system requirements definition.

The universal acceptance of the relational model has led to fundamental changes in the DBMS/4GL marketplace. By the 1990s, the revolutionary changes in networks, hardware and software will dictate the necessity for relational systems. You can't afford to wait until then to acquire an understanding of this most important enabling technology.

JEFF TASH
Jeff Tash is President and Founder of Database Decisions, Inc., an education and consulting company that specializes in database technology and decision support systems. Previously employed by DEC, IBM, CDC, Arthur Young and most recently affiliated with Codd and Date Consulting Group, Jeff has extensive experience in relational database management, fourth generation languages and artificial intelligence. Jeff has assisted a wide range of Fortune 1000 firms understand the impact of relational technology in their organizations and develop ways to evaluate and utilize relational products to gain a competitive advantage. His knowledge of the computer industry coupled with his extensive professional experience bridges the gap between theory and practice. He provides practical tips and techniques on how to integrate and deploy the new information technology.

SEMINAR OUTLINE

1. **Enabling Technologies**
2. **Application Architectures**
   - –Mainframes vs. Minis vs. Micros (3-tiers)
   - –Batch vs. T/P vs. Timesharing vs. Workstations
   - –Centralized vs. Distributed vs. Cooperative Processing
3. **Application Development Productivity Issues**
   - –Prototyping vs. Traditional Life Cycles
   - –Relational vs. Navigational DBMSs
   - –Single vs. Dual Database Strategy
   - –Development Centers vs. Information Centers vs. Production Centers
4. **Relational Model**
   - –Data Structure
   - –Integrity Rules
   - –Relational Algebra & Views
   - –Codd's Relational Rules
5. **Database Design**
   - -Entity/Relationship Modeling
   - –Normalization
6. **Data Resource Management**
   - –Data Administration
   - –Database Administration
7. **Technical Issues**
   - –Performance & Physical Design Options
   - –Concurrency / Recovery / Integrity / Security
   - –Connectivity & Distributed DBMS
8. **User Interface**
   - –Relational Languages
   - –Screen & Menu Design
   - –Human Factors Engineering
9. **Summary & Recommendations**

***Substitutions will be accepted for this seminar within the same city.**

BENEFITS OF THE SYMPOSIUM

1. **Day One Seminar**—You will learn the key concepts of 4GLs and how to effectively compare products.
2. **Fifty One-Hour Technical Product Presentations**—You will be able to make informed buying decisions.
3. **Hands-On Product Demos**—You will learn the specific functionalities of many products.
4. **FREE Consulting**—DCI staff members, including Dr. Schussel, give solutions for your specific problems.
5. **Networking**—Gain workable, proven solutions and suggestions from other experienced professionals.
6. **FREE Technical Education**—FREE 2-Day Relational DBMS seminar for each 3-Day attendee.
7. **FREE ATTENDANCE** for the fourth registrant from your organization. See back page for details.

WHO SHOULD ATTEND THE SYMPOSIUM

EDP Professionals
EDP & MIS Managers
Data Center Managers
Systems & Programming Managers
Systems Analysts
Software Consultants
Controllers
Users
Financial Managers
Banking Executives
Insurance Executives
Auditors
Planning Executives

HOSPITALITY SUITES

These suites provide a relaxed environment in which you can ask questions and socialize with industry leaders. Enjoy the product demos and the chance to relax and share the company of fellow attendees.

PROCEEDINGS

Each Symposium attendee will receive a copy of the Fall Edition of our "1987 National Database & 4th/5th Generation Language Symposium" Proceedings. This 500-page resource document will serve as a useful reference guide long after the Symposium is over.

TWO WAYS TO REGISTER:

1. Call **617/470-3880** between 9:00 a.m. and 5:00 p.m. Eastern Time
2. Fill out and mail in the coupon below (please include mailing label)

REGISTRATION FEES

Individual Fee, Entire 3 Days	**$895**
Second Registration	**$695**
Third Registration	**$495**
Fourth Registration	**FREE**
Fifth Registration and Over	**$495**
Day One Seminar Only	**$450**

GROUP ATTENDANCE: Previous attendees of our Symposiums have told us that the best way for companies to gain the most benefit from the program is to send two or more attendees. Our discount structure is designed to encourage multiple registrations from the same company. Have you considered sending representatives from different departments, divisions, or locations within your organization?

IN-HOUSE SEMINARS
We can bring many of our seminars in-house to your company. Our in-house seminars are one of the most cost-effective ways to update your managers and professionals about the leading software technologies. For more information, call (617) 470-3870 and speak with our In-House Seminar Coordinator.

DIGITAL CONSULTING, INC.
These seminars will be conducted by Digital Consulting, Inc. (DCI), a leader in the field of EDP management training. DCI is headquartered at 5 Kimberly Terrace, Lynnfield, MA 01940, telephone (617) 470-3870.

CANCELLATION POLICY
Cancellations received two weeks or more prior to the Symposium will be accepted subject to a cancellation service charge of $100. Transfers to a different Symposium date or substitutions will be accepted with no cancellation service charge as long as the fee is paid and the request is received before the date of the original Symposium. Registrants whose cancellation requests are not received two weeks prior to the Symposium (or no shows) are liable for the entire fee.

To receive a current catalog of DCI sponsored seminars and conferences, call (617) 470-3880.

MEETING SITES AND HOTEL ACCOMMODATIONS

The Westin Hotel, Dallas
November 16–18, 1987
The Westin Hotel Galleria Dallas is in the heart of North Dallas—the most exciting growth area in the Metroplex. The finest restaurants, shopping centers, and entertainment circle in the area. It is convenient to major business centers and just minutes away from Dallas's two major airports. The Westin adjoins North Dallas's newest shopping adventure; Galleria. This is a collection of nationally prominent retailers, quaint boutiques, restaurants, cinemas and an ice-skating rink. The Westin is located at 13340 North Dallas Parkway, Dallas, TX 75240. TELEPHONE: 214/934-9494.

The Lafayette Hotel, Boston
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Use project pilots to set application boundaries

BY ROBERT GILMORE

In examining the role IBM's DB2 can play in the development of new applications and in the migration of old ones, careful evaluation of its usefulness will largely depend on how well the pilot applications are identified and implemented.

A project piloting a production-type application is necessary for the success of DB2. An organization must find out for itself how well DB2 functions in its application environment. That means measuring what DB2 can and cannot do as a transaction processor, not simply accepting what has been written and said about it.

Organizations that have never spent much time with their data will find a pilot application project to be an eye-opener. Development issues that have previously been pushed aside must now be confronted and dealt with. The processes of normalization and "intelligent denormalization" of data will require education, direction and guidance from one who has wallowed in the waters of data analysis before. If you are not going to take data analysis seriously, don't bother to expect good performance from DB2.

Laying the groundwork

Political and procedural issues must be considered before bringing DB2 into a firm on a full-scale basis, and some of these can be previewed in the pilot.

With the implementation of DB2, various functional areas within the organization will necessarily experience some change. The data administration organization will be given more responsibility for data analysis and design. This means more time will be spent in the general design phase of the project — time that will be well spent.

The data base administration staff will also be affected. It will need to establish new and different levels of authorization and control as well as a new monitoring and tuning philosophy for the use of DB2 within the firm. Additionally, information centers and walk-up service organizations, faced with the growing sophistication of their clientele, must become more involved with end-user requests for data access and, in most organizations, more involved with access authorization and control.

Because of the increased demand for remote data access, the communications group will require more capacity planning and need to more carefully evaluate line compression software to minimize the impact of additional data transmission.

In addition, when preparing for a DB2 pilot, organizations ideally must attempt to identify new policies, procedures and standards. If possible, the first drafts of any new policies should be available for use by the pilot project team. These will change based on what is encountered during and after the pilot, so they should be documented in a flexible enough manner to allow for change and modification.

New interfaces to the system development methodology processes must also be identified and addressed. Although these new interfaces must be established, they do not necessarily have to be in place before the pilot application.

> AN ORGANIZATION must find out for itself how well DB2 functions in its application environment. That means measuring what DB2 can and cannot do as a transaction processor, not simply accepting what has been written and said about it.

The DB2 pilot application can be accomplished but not without the identification of the following selection criteria.

The team. The individuals responsible for selecting the pilot application should be the DB2 team responsible for evaluating the application. This team should consist of four to six of the best individuals from various functional areas within the organization.

Each team member should possess good verbal and written communication skills and be able to make accurate, objective evaluations. The best candidates for the job will be capable of performing complete analyses and communicating results and recommendations to management.

Duration. The project selected should be moderate in size. Large projects take too long and inevitably may stall because of outside priorities and management's impatience. Projects that are too short generally generate little enthusiasm, and the limited results can make adequate analysis impossible.

Complexity. The pilot project should be fairly complex in terms of data relationships and processing requirements. Data identification and analysis should account for approximately 40% of the project's time frame. All types of data should be used, with an emphasis placed on the different business processes that utilize varying data types from different relations.

Processing requirements should include basic and complex inquiry, procedural and nonprocedural logic and limited and complex update processing. By mixing these, the project should be able to measure what is reasonable in terms of set sizes; the use of index processing; the impact of joins, subqueries and built-in functions; and the ability to process complex business transactions concurrently.

In the pilot project, application processing should consist of a moderate number of transactions, with approximately 50% using embedded SQL statements and the other half broken down as processing requirements dictate.

Familiarity of data. Although data relationships should be fairly complex, the system chosen for a pilot project should use data with which everyone in the firm is familiar. This offers advantages to the overall organization as well as to the pilot project team.

First, familiarity will enable the project team to accurately identify relationships and how data is accessed within the organization. Second, the team will know in advance how data should behave. Most important, the project's results will be easier to communicate and translate to the rest of the organization.

User acceptance. In order for DB2 to establish a meaningful position within the organization, user approval and acceptance is critical. Having users actively participate in the pilot project will be one way of ensuring that they accept and are comfortable with DB2 and its capabilities.

Transaction processing monitors. Although many organizations use IBM's TSO with ISPF to test and develop DB2 applications, such an environment will probably be disastrous for true transaction processing. The pilot project should use the monitor that is the most familiar, stable and, in the long run, strategically supports the production environment.

Training. In implementing a data base management system, a lack of education has historically caused many problems, ranging from lack of understanding of the product's functional capabilities to poor communication between functional areas using the product. DB2 is no different. In fact, since more areas of the organization could use its capabilities, the greater the need for DB2 education becomes.

The pilot team must be trained in all areas of DB2. The team should receive the best training available in logical design and data analysis; data base design and administration; SQL application programming and development; use of IBM's Query Management Facility and, if required, Data Extract; and some techniques in optimization and tuning of DB2 applications. Proper training will ensure the correct steps are taken during pilot application development and that the project team will be able to accurately assess both actual and anticipated results.

Isolation. Although the pilot project should involve a usable and fairly visible application, the initial system chosen should not be an application critical to the success of the business, nor should it involve many interfaces and dependencies. The intent is to obtain a thorough knowledge of the capabilities of DB2; this knowledge can be obscured by outside production and political influences.

The production pilot project is necessary to establish the boundaries within which DB2 will reside. DB2 is a stable DBMS, one that offers some great capabilities. The environments, however, must be identified, established, monitored and controlled and the pilot project carefully identified and planned. Anything short of these requirements might result in a DB2 environment that is unnecessarily unstable, unpredictable and, ultimately, disappointing. •

Gilmore is manager of Consulting Plus, a specialized management consulting service offered by Data Base Management, Inc. in Manchester, Conn.

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Tracking DB2 performance

BY MICHAEL HERMIDA

IBM's DB2 performance is a subject that has drawn much interest in the last few years. Managers, DP staff and even business users are questioning whether DB2 can adequately support their performance objectives for planned applications and if their existing DB2 applications are achieving peak performance.

Among the most frequently expressed concerns are the following:

- Why the response time for one transaction is so much longer than that for a similar transaction.
- Whether overnight batch update activity can be accomplished within the allotted time.
- Why DP costs increased significantly last month.

To adequately track DB2 performance, each DB2 installation should have a performance monitoring plan in place. This plan should specify what data to collect, how frequently to collect it and what reports or displays to use to analyze it.

Performance monitoring is closely related to performance prediction and tuning. Predicting performance helps determine whether an installation's hardware and software capacity can adequately handle its current and projected work load. Performance tuning maintains an installation's stated objectives within the existing DP environment.

Determining objectives

Performance monitoring provides input both to prediction and tuning activities. It involves collecting and analyzing an installation's performance data to understand its work load characteristics and determine whether performance objectives — such as response time and throughput — are being met.

Performance monitoring data falls into two categories — historical data and real-time data. Each category provides valuable information for understanding and tracking system work loads, anticipating and detecting problems and providing clues that will be useful in resolving problems.

Monitoring DB2 performance is, in many respects, similar to monitoring any other data base system. The performance analyst needs to understand how the DB2 work load consumes resources and what factors are causing delays. Although the main concern may be DB2, it is equally important in the DB2 environment to understand IBM's CICS, IMS and TSO performance characteristics.

Because an installation's DB2 work load is closely tied to the SQL statements executed by its transactions and programs, understanding the CPU and wait times associated with these statements is important. This understanding is gained through periodic monitoring of variables such as average CPU and I/O times for transactions and programs. By understanding typical work load characteristics, detecting abnormal conditions becomes easier.

Historical perspective

How is DB2 performance monitored in today's environment? Let's look at historical data monitoring tools first.

During DB2 subsystem operation, an installation chooses the data to be recorded by DB2. The data is classified as statistics data (associated with overall DB2 activity), accounting data (associated with user or transaction/program activity) and performance and global data (detailed trace information).

Requested data is typically written to MVS System Measurement Facility (SMF) data sets. A number of tools are now available to process and report this data, including IBM's Database 2 Performance Monitor (DB2PM), MICS/DB2 from Morino Associates, Inc. and MXG, which runs on the SAS system, available from SAS Institute, Inc.

Using these tools, an installation monitors key performance indicators such as DB2 buffer pool activity, locking contention, the number of types of SQL statements executed, and log, user and plan activity. Standard reports provide information useful to the analyst in understanding the DB2 environment.

Currently, DB2PM is the only tool that reports on performance and global data classes. Although this data is useful in some cases, recording these classes can create significant overhead. Thus they are normally used only in specific troubleshooting or in performing detailed monitoring.

MICS/DB2 and MXG with SAS allow creation of tailored reports combining DB2 data with data from other subsystems. With this data on the same report, the entire monitoring process is made easier.

Other tools for processing historical data are ones that have supported CICS and IMS in the past and have since been updated to provide basic DB2 support of some kind. These processing tools include Monitor for CICS from Landmark Systems, Inc. and IBM's IMS Performance Analysis and Reporting System, IMS DC Monitor and CICS Performance Analysis

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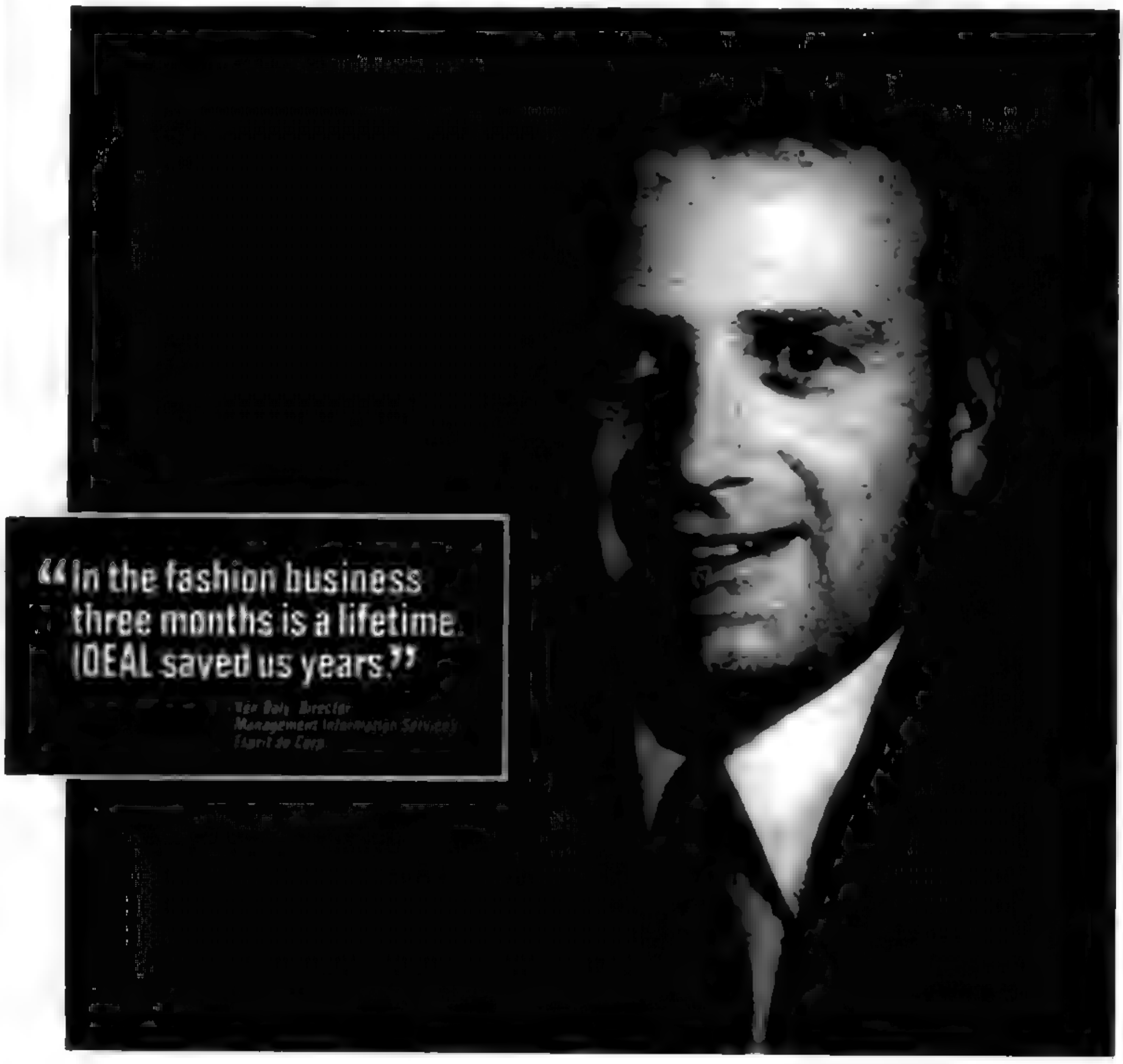
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Reporting System.

These tools provide limited information about DB2, such as the impact DB2 is having on transaction response time and the average time per SQL call.

DB2-SMU from CDB Software is a tool that monitors DB2 data and its characteristics rather than resource usage and delays. Aside from some integrity functions, DB2-SMU reports on free-space distributions, update activity, the estimated effect of data reorganization as well as some index information. The information is helpful in understanding actual table and data set characteristics.

Real-time monitoring

While a number of tools to analyze DB2 historical data are available, an installation receives a limited amount of information regarding current DB2 activity. DB2 display commands provide some basic information on DB2 connections, data usage and locks, but the data is not automatically updated on-line.

Candle Corp. is making progress in providing real-time information through Omegamon and Dexan, which monitor MVS, IMS and CICS environments. In the CICS environment, an indication is given when a transaction is being processed by DB2, and a display can be presented to show what system activity, including DB2, is affecting CICS work. In the IMS environment, timings on termination and SQL calls are available. Exception reports are also provided for some conditions.

Although these products give some real-time insight on DB2 activity and its impact on the existing work load, they do not provide much information on specific DB2 processing in progress. When monitoring a DB2 system in real time, it would be nice to have information available that would pinpoint problems and bottlenecks as they occur.

Wish list

In light of the functions provided by current DB2 monitoring tools, there are some tool requirements that would further simplify the monitoring task:

- Better integration of data on standard reports that associate DB2 activity with CICS, IMS, TSO and MVS activity.
- Additional exception reporting capabilities with flexible reporting criteria.
- Detailed DB2 on-line monitoring that provides current activity and bottlenecks.

It would also be nice to see tools that recommend tuning activities based on analysis of the collected data, either historical or real-time, thereby reducing the time to resolve problems.

With a properly constructed plan and the tools discussed above, any questions an organization might ask about DB2 become easier to answer. •

Attention to naming conventions will ease DB2 decision making

BY JOYCE BISCHOFF

Don't try calling a rose anything else in the DB2 world. The name is the reality in that environment, which is why developing naming conventions is such a critical matter in IBM's DB2.

Unlike older systems, the objects of which are linked by IBM's JCL, DB2 objects are connected within the DB2 subsystem by names that are stored in a central catalog.

Carefully selected names may be used to separate test and production data and identify tables containing summary, extracted or raw data. They may help identify resources belonging to a single application and facilitate communication between users and developers.

At the time of installation, important decisions must be made. Names must be given to subsystems and to the ICF catalog, and each name must be distinct and unique.

If such distinctions are not made, moving from test to production will require painstaking name changes to guarantee that the names will be unique within the subsystem. The ICF catalog name is selected at installation and locked in; this provides the high-level qualifier of all VSAM data set names.

General guidelines

Although DB2 limits the names of data bases, table spaces, plans and storage groups to eight characters, it will allow a maximum of 18 characters for tables, views, indexes and columns. Unfortunately, most application generators will not support more than eight characters. In addition, if an installation plans to define its own VSAM space by bypassing the use of storage groups, index names must be limited to eight characters.

Qualified names must be unique within a DB2 subsystem (see chart). The object creator's ID, as well as the high-level qualifier, can be overridden during object creation to indicate, for example, the table to be used for testing or production or the name of the owning application. Many installations limit the use of the creator's ID to the contents of personal data bases.

Many organizations use a particular character position, often the first, to indicate the object type. For example, D might be used for data base, T for table, V for view and S for table space.

The last character of the object type's name may be reserved for special usage within each object type, such as indicating raw, extracted or summary data. Some installations that put test and production data on the same subsystem use the sixth or seventh character of each name to differentiate between test and production data. In all cases, the names should be as meaningful as possible.

Data bases and storage groups. Although a data base does not physically exist, it is a convenient way to group tables and table spaces for administrative purposes; the owning application may be indicated in the data base name.

Occasionally, installations designate one data base for each table and table space to maximize concurrency during utility usage. For these installations, it would be convenient to give the same basic name to the data base, table space and table, except for the single-character object identifier.

No data base name may begin with DSNDB, as that is a name reserved by DB2 for its own use.

Table spaces. In a production environment, it is usually more convenient to designate one table per table space unless there is a special performance reason for combining multiple tables in a table space. For example, in a payroll system, placing the Employee and Department tables in the same table space might be good for performance because they are accessed together.

The names of tables and table spaces should probably be the same, except for the single-character object identifier.

Indexes. Again, names should relate to the tables on which they are based. The first character might be "I," characters two through seven might match the name of the base table, and the eighth character could guarantee uniqueness in the case of multiple indexes.

Plan and program names. Most organizations maintain existing standards for program names; plan names should probably match the names of the programs that use them.

Synonyms. Synonyms are qualified by the creator's authorization ID and may not be the same as an existing table, view or other synonym in the system.

Column names. Data administrators play a major role in selecting appropriate column names because of the redundant data that is present in foreign keys.

Since DB2 does not support foreign keys, establishing a dictionary relationship between column names and a global business definition might be considered. The list of business definitions should contain one name and definition for each data element the business uses. This could point to each table containing that data element.

VSAM names. The structure of VSAM names is prescribed by DB2 and allows little flexibility for individual organizations. VSAM names must adhere to the following six-level format: d.DSNDBn.b.t.I0001.A001.

In the first level, d represents the eight-character high-level ICF qualifier; in the second level, DSNDBn indicates either the data name or the cluster name. The third level is the data base name, b; the fourth level the table space name, t. Each is limited to eight characters.

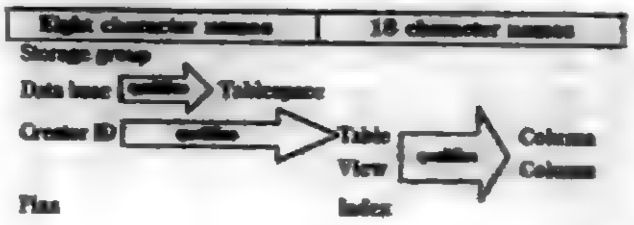
Level five, I0001, is a set one that is mandated by DB2. The sixth level indicates a relative data set or partition number; it is specified by A and followed by the number of the set or partition. Since the first, third and fourth levels are the only ones that allow the users to make any choices, existing chargeback schemes may need to be modified for DB2 data sets.

Selecting DB2 naming conventions that meet a particular organization's needs is a challenging task that presents both the opportunity for better communication with personnel and the potential pitfalls of higher expenses and complex design considerations.

However, if all users involved with DB2 participate in name selection, then naming conventions may be developed that will meet the organization's unique requirements and improve communication between users and technical personnel. •

Naming DB2 objects

All DB2 objects attain their uniqueness through qualification, a process that establishes object names according to levels of data within the subsystem. Typically, each label qualifies the next, with the first level being the most critical.



CW CHART

Bischoff is a staff consultant responsible for DB2 data base administration at Reliance Insurance Co. in Philadelphia.

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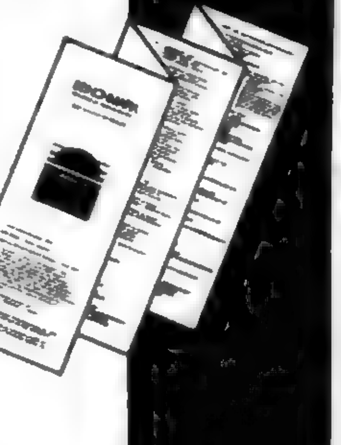

Eliminating ugly surprises in the DB2 environment

BY BARBARA von HALLE and STEVEN H. CAMPBELL

DB2 security implies different things to different organizations. However, the following four goals should underlie the security philosophy of most IBM DB2 sites:

- Establish privileges in a timely manner.
- Restrict privileges.
- Provide an audit trail.
- Separate data and data base privileges.

Achieving these goals is not easy. To start with, the security mechanism of DB2 is quite complex — and full of surprises for the uninitiated. Second, there is a shortage of products to assist in DB2 security administration. Third, it is difficult to make major modifications in DB2 security without unpleasant ramifications. Finally, integration of DB2 with an already established security scheme may require organizational and cultural changes.

Establishing privileges in a timely manner requires implementing a security scheme that does not bottleneck application development or production. Because DB2 security is multifaceted, involving access control for data, application plans, catalog utilities and so on, it can hinder productivity.

One helpful strategy is to evaluate the need for new or redefined organizational roles, specifically the following:

- A DB2 system administrator to act as keeper of DB2 system resources.
- A DB2 data base administrator to provide technical data base support.
- A system security administrator to provide access to underlying data sets and to interfacing systems and to assign DB2 authorization IDs.
- Centralized and decentralized DB2 security administrators to support MIS security requirements and service end users respectively.

Protecting productivity is made easier by understanding an organization's DB2 development and production environments.

Restricting privileges ensures that only authorized individuals can perform critical DB2 activities.

The challenge here is that most DB2 objects are associated with an owner,

Continued on page S16

Von Halle is director of technology planning for Spectrum Technology Group, Inc. in North Branch, N.J. Campbell is senior data base analyst at Public Service Electric & Gas Co., based in Newark, N.J.

VENDOR VIEWPOINT

There's safety on the border

BY ROBERT ASHTON

Installations using IBM's DB2 find it a plus to be able to use the same data base management system for production and ad hoc users. However, because the potential for any user to select and update production data is very real, security and auditing in the DB2 environment are major concerns.

Most installations have MVS security systems that provide control over MVS resources such as data sets, logon passwords and transactions. However, these systems are not adequate to control and audit DB2 resources.

The security system within DB2 provides the power necessary for control of a mixed production and ad hoc environment; however, the level of detail and expertise required can make the system cumbersome to manage. For that reason, installations should consider the organizational and manpower resources required to carry out DB2 security before instituting such an environment.

Security facilities within DB2 provide a high level of control — down to the column level — over each user. This control allows installations to precisely define the type of access each user may maintain over each resource.

Resource control

Control of DB2 resources is implemented using SQL GRANT and REVOKE statements. These statements allow an authorized security administrator to provide each user with specific privileges over specific resources. Users are uniquely identified by an eight-character authorization ID.

DB2 does allow for seven types of resources, each of which has been allocated a specific number of associated privileges. Buffer pools, for example, have only one privilege, while tables have seven and data bases have 15.

Because of the potentially large number of DB2 users and resources in a production environment, the resource privilege requirements for user classes within each application should be documented. This documentation greatly reduces the manpower required to authorize new

Continued on page S16

Ashton is founder and president of DBView, Inc., a firm specializing in DB2 systems software in Waltham, Mass.

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M. Bryce & Associates, Inc. (513) 755-4567	Pride series	Yes	NA	NA	NA	NA	Information Resource Manager for recording logical and physical structures for relationships	Yes	Flow diagrams, logical and physical data models, enterprise and application models, system models	Hardware-dependent	No	No	Yes	$25,000-$250,000
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IBM Contact local IBM dealer	Cross System Product	Yes	Yes	Yes	No	No	None	Yes	User-defined	Yes	Yes	Yes	Yes	Contact vendor
	Application Development Facility	Yes	Yes	Yes	No	No	None	NA	NA	NA	NA	NA	Yes	Contact vendor
	Query Management Facility	Yes	Yes	Yes	No	No	None	Yes	Pie charts, bar charts, connected point, user-defined	Yes	Yes	Yes	NA	Contact vendor
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Management Science America, Inc. 404-239-2482	Information Expert	Yes	Yes	No	No	No	Software for direct access and manipulation of DB2 data	No	NA	NA	NA	NA	Yes	Contact vendor
McCormack & Dodge Corp. (800) 343-0325	Millennium/SDT DB2	Yes	Yes	Yes	No	No	None	No	No	No	No	No	Yes	Contact vendor
Must Software International (203) 762-2515	Nomad	Yes	Yes	Yes	Yes	Yes	Forms-generation tools, interfaces to IDMS, IMS, Teradata Model 204, translator for SAS	Yes	Connected point, bar chart, scatter diagram, pie chart	Yes	Yes	No	Yes	$31,500-$120,000 (based on machine size)
On-Line Software International, Inc. (800) 799-6300	UFO Productivity System	Yes	Yes	Yes	NA	NA	Development of specialized applications for end users to execute and access DB2	NA	NA	NA	NA	NA	Yes	$30,000 or $45,000
	Ramis Information System	Yes	Yes	Yes	Yes	Yes	PC downloading, natural language comprehension system	High-, low-resolution graphics	Connected point, histogram, bar chart, scatter diagram, pie chart	Yes, high-resolution	Yes	No	Yes	$49,000 (DOS), $86,000 (CMS), $115,000 (OS)
Panasophic Systems, Inc. (312) 572-6000	Telon	Yes	Yes	Yes	No	No	—	No	No	No	No	No	Yes	$130,000-$190,000
SAS Institute, Inc. (919) 467-8000	The SAS System	Yes	Yes	Yes	Yes	Yes	Operations research, project management, interactive matrix programming, statistical quality control, menu-building capabilities for end-user applications, forecasting, graphics	Yes	Connected point, bar chart, scatter diagram, pie chart, choropleth, surface, prism, block map	Yes	Yes	Yes	Yes	Contact vendor
Sage Software, Inc. (301) 230-3200	APS Development Center	Yes	Yes	Yes	Yes	No	DB2 catalog importer, SQL generator, DB2 data base painter, macro facility	No	NA	NA	NA	No	Yes	$3,500 (on PC), $400,000 (on mainframe)
Sterling Software, Inc. (Answer Systems division) 818-716-1616	Mark series of application development systems-RS/1	No	Yes	Yes	Yes	No	Answer series for information retrieval, micro-to-mainframe communications	Yes	Pie chart, bar chart	No	Yes	No	Yes	From $55,000
Transform Logic Corp. (602) 948-2600	Transform/DB2	Yes	No	No	No	No	None	No	No	No	No	Yes	Yes	Contact vendor

[1] Data manipulation language

The companies included in this chart responded to a recent telephone survey conducted by *Computerworld*. Further product information is available from vendors.

Surprises

FROM PAGE S14

who is known by an authorization ID. The ID is appended to the object name forever; there is no rename capability. This means corporate files labeled with an authorization ID carrying an individual's name will always use that name, even if that person leaves the company. Moreover, moving data from one object to a differently named object is not a trivial task.

One solution is to set generic IDs for specific administrative roles such as DB2 system or data base administrators.

Providing an audit trail means, at the very least, producing hard-copy documentation of critical support activities. What makes this task difficult is that no historic audit trail facilities exist in DB2. The DB2 catalog merely reflects the current status of objects and authorities.

One option for getting around this deficiency is to require that all critical operations — CREATE, DROP, ALTER, GRANT and REVOKE — occur only in batch, thereby providing hard-copy output. This method will only work, however, if the generic authorization IDs used are not valid TSO IDs.

One way to do this is to use a system security package, restricting editing of IBM's JCL to one group and submission of it to another group. Another is to develop homegrown automated audit facilities, such as the build-your-own audit trail guide offered by Price Waterhouse.

Separating data and data base privileges means establishing a clear distinction between the ability to see and update DB2 data and the ability to provide technical support. For example, data base administrators might execute utilities, create objects, fine-tune and modify data bases but not view or update data. Security administrators, on the other hand, typically grant and revoke privileges but should not create objects or implement modifications.

DB2's group authorizations do not readily support separation of data and data base privileges. Some group privileges, such as intermixing data and data base privileges, provide too much authorization, and others do not provide enough. Probably the best way of handling this issue is to grant the minimum set of privileges to each authorization ID and to avoid granting group privileges whenever possible.

If some group authorizations are unavoidable, consider creating a restricted group privilege with a tailored DB2 plan — such as a modification of IBM's DSNTEP2 — that accepts only a subset of commands.

Developing a solid DB2 security scheme can be confusing and discouragingly complex, but an incomplete or inappropriate scheme can be disastrous. The time spent will be well worth the investment. •

Safety

FROM PAGE S14

users and redefine privilege requirements.

Because of the background required, DB2 security is initially performed by the data administration group. However, the security group should be involved in DB2 user authorization and be familiar with DB2 privileges, resource types and SQL.

Auditing considerations

For many applications, it is necessary to track update and query activity for each user. Although DB2 does not make auditing these easy, it is possible to provide some auditing capabilities through journaling and measurement traces, as found in the following sources:

Catalog tables. The DB2 catalog tables provide a complete list of current user privileges. The catalog's critical limitation is that it can only list existing privileges; no historical information is provided.

Accounting data. DB2 can generate accounting data for each DB2 transaction. The value of this information is limited, however, in that it does not identify the DB2 resources on which the transaction was performed.

Trace data. DB2 can selectively gather detailed trace data to aid in improving the performance of DB2 applications. This data can be used to track each SQL call for a specific user or transaction type. This trace contains the information needed to determine which user has queried or updated DB2 data by resource name and adds significantly to CPU and I/O overhead.

Application journaling. DB2 applications can be written to include their own journaling files that track data access or user updates. The drawback of this is that data accessed directly from TSO will not be recorded. The only way to ensure the audit trail's usefulness is to restrict TSO access to the production DB2 system.

The security system within DB2 is powerful enough to control data security, but the level of detail and expertise required can make the system cumbersome to manage. Auditing within DB2 must also change to meet the needs of security-sensitive applications. Although third-party software products reduce these problems, an overall security architecture addressing all levels of access across the entire IBM architecture would improve the ability of sites to establish and maintain security standards. •

Data dictionary products

Brownstone Solutions, Inc.
(212) 775-1040
(203) 358-0845
The Datadictionary/Solution

Based on the entity-category-relationship model, the Datadictionary/Solution allows users to define information assets in terms of entities and relationships. All entity, relationship, category and textual data is stored in IBM DB2 tables. The dictionary provides full SQL power to access data from within the on-line dialogue and from extensions.

Dictionary entities and relationships may be reorganized on-line. Data may be viewed in a spreadsheet format or enlarged to concentrate on a specific area. A variety of user exits are available to customize screens and intercept processing at key points.

M. Bryce & Associates, Inc.
(813) 786-4567
Pride Information Resource Manager

The Pride Information Resource Manager catalogs and controls data, system and organizational resources. The product generates SQL data base, table space, table, view and index statements for use by IBM DB2 and other data base management systems supporting standard SQL.

The Pride Information Resource Manager supports data base, system and enterprise engineering functions. Interactive facilities, security, status check, impact analysis and housekeeping are also provided. The software is written in ANSI-standard Cobol and is available in several hardware and software configurations, including IBM's MVS and MVS/XA as well as compatibles.

DSIMS Corp.
(214) 630-7837
DSIMS Data Dictionary

Formerly marketed as UCC-10 by Uccel Corp., the product was purchased and renamed by DSIMS in late 1985. DSIMS Data Dictionary controls the data resource with centralized definition of entities and relationships, including unlimited documentation of entities and key word cross-references. Release 2.0 will offer support for IBM's DB2.

The product contains security and edit routines, multiple logical dictionaries, data base management system control information, single-entry update and generation of data structures. Release 2.0 will include reporting capabilities from any entity within a DB2 structure and interfaces to external text editors. The dictionary is compatible with all IBM VS and MVS operating systems and operates in on-line environments using IBM's IMS/VS, DB/DC or CICS/VS with DL/1. Batch operation requires IBM's IMS/DB (DL/1).

IBM
Contact local IBM office
Data Base Relational Application Directory

Data Base Relational Application Directory (DBRAD) is an extension of IBM's DB2 systems catalog that contains additional information on organizational data, including object definitions and storage locations, subordinate objects contained within objects and relationships between objects.

Also included in the product are batch-mode facilities and security provisions. The product will generate summaries and reports from DBRAD tables on application interrelationships. The dictionary was designed for use in IBM's MVS and VM environments.

Manager Software Products, Inc.
(617) 863-5800
Dictionary Manager

Dictionary Manager serves as an interface between IBM's DB2 and Data Manager, providing users of DB2 and IBM's SQL/DS with the ability to administer information resources within their organizations. The product is a dictionary-driven interchange system supporting the exchange of definitions between multiple dictionaries and directories. Using Dictionary Manager, all corporate information can be stored in Data Manager while maintaining the DB2 catalog.

Users define their own translation rules converting Manager Corporate Dictionary definitions to the syntax and format of any chosen target dictionary or directory. Cullinet Software, Inc.'s IDMS Schema, Subschema and DMCL input statements may be generated directly from dictionary definitions. An IBM Integrated Data Dictionary interface is optional.

Sage Software, Inc.
(301) 230-3200
APS Application Dictionary

APS Application Dictionary is a centralized repository and control point responsible for integrating data from all APS product groups. The product runs on IBM's MVS, MVS/XA, VM and PC-DOS, with independent Cobol or Cobol II applications generated for IBM data base management and data communications systems including DB2, IMS, VSAM and CICS.

Source codes, data base descriptions, report and screen layouts, application system entities and user-developed macro instructions are automatically stored and maintained within the system. A batch facility includes summaries and documentation of program specifications, prototype documentation and data base and file reports. On-line Help functions provide on-screen Help panels and generate error messages.

Cullinet Software, Inc. IDMS support is available through the Macro Facility.

Tata Consultancy Services (a division of Tata Sons Ltd.)
(212) 557-8038
Casepac

Casepac, an advanced data dictionary for IBM mainframe environments, supports 22 categories of data belonging to the conceptual, logical and physical models of systems. Users interface with Casepac in an on-line mode through screens and commands with IBM's ISPF and DB2 for data base management functions.

The dictionary aids in documentation, system integrity checks, data consistency and security. The Casepac data base can be built up by automatic extraction of information from existing systems or by user inputs for new systems.

Technology Information Products Corp.
(617) 273-5818
Tip Repository

Tip Repository supports data administration and information resource management functions within the organization, providing dictionary capabilities independent of any specific data base management system while providing the necessary DBMS interfaces.

Tip Repository provides on-line data entry and update capabilities as well as a Convert facility for direct dictionary entry from existing systems such as Cobol data divisions or DBMS control blocks. The product maintains an inventory of programs, systems, files, screens, users and records for the MIS organization, including update, inquiry and report capabilities. The product was designed for IBM, Honeywell Bull, Inc. and Unisys Corp. mainframe systems.

Texas Instruments, Inc.
(703) 849-1400
Information Engineering Facility

The Information Engineering Facility (IEF) being developed by TI was designed to be a fully integrated set of tools for systems development and maintenance. The architecture provides five integrated tool sets for planning, analysis, design, code and data base generation.

The operating environments for IEF mainframe components running on IBM's MVS are IBM's DB2, TSO and ISPF Version 2. Workstation components include IBM's PC-DOS or Microsoft Corp.'s MS-DOS 3.0 and higher, TI's Business Pro and IBM Personal Computer ATs and compatibles. Micro-to-mainframe communications are supported using Digital Communications Associates, Inc. Irma cards.

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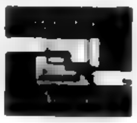

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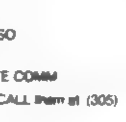

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The successful candidate should have:

- 2-4 years of VAX System Management experience
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- Strong programming knowledge
- A 4 yr. degree (Preferred), majoring in Computer Science or Computer Engineering

Please submit a resume to:

NFO RESEARCH, INC.
P.O. Box 315
Toledo, OH 43654
Attn: Human Resources Dept.

EOE

Analyst/Programmer - Develop, modify and implement financial databases, do financial modeling for management information systems, use KMAN software package, COBOL, PC, write program specifications as needed. BS/Computer Information Systems or Computer Science. 1 year experience doing above or 3 months experience as Analyst/Programmer using KMAN software package plus Master's degree in Computer Information systems. 40 hours per week. $29,121 per year. Job Location: NY Metropolitan area. Applicants must be authorized for employment in U.S. Send resume in duplicate to: SL #15, NYS Department of Labor, Room 501, One Main St., Brooklyn, NY 11201

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MANAGER (PROJECT LEADER) - Support design, development and support of communications programs. Require Master's in Computer Science or Electrical Engineering and three years experience as Manager (Project Leader) of programming development or technical computer group. DEC/SNA and OSI protocols and product development. Salary $56,500 per annum. Job location/interviews: Anaheim, CA. Send this ad and resume to: Job #NOF798, P.O. Box 9560, Sacramento, CA 95823-0560 no later than September 29, 1987

SYSTEM PROGRAMMER/ ANALYST

Develop and implement computer-based system programs and analysis methodologies for business, scientific and data processing applications using IBM MAINFRAME and PC. BS in Computer Science, Engineering or Math, proficient in Assembler, Fortran, COBOL languages. Work experience not required. $2850 per month. 40 hours per week. Job site/interview: Santa Monica, CA. Send ad and resume to:

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Computerworld
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Systems Engineer, 40 hrs/wk, 7am-4pm, $2729.66/mth. Maintaining the operation & performance of DEC Vax systems running VMS operating systems. Installing/maintaining programming languages and support software such as FORTRAN, Pascal and DECnet. Creating user accounts, implementing all system managerial tasks, i.e., timely backups, software/hardware installations, and DEC-net network management. Assisting in the designing/implementing of all systems and organizing of systems level software. Implementing network installations and configures network to optimize areas of poor performance. Assisting with the development of Computer Aided Manufacturing goals and plans. Ed: M.S. in Computer Science, and 1 of direct exp. or 1½ yrs. of exp. in the related occupation of Mfg. Engineer. Send resumes with S.S. #'s to: Indiana State Employment Services, 10 N. Senate Ave., Indianapolis, IN 46204, Attn: W.F. Shepherd, I.D. no 3095807

Computer Systems Engineer/Programmer. Analyze user requirements and develop software programming for implementation of hospital admission, accounting, billing and financial systems including electronic communications with insurance intermediaries. Implement compliance with company standards for systems analysis, documentation, programming, testing and release; perform systems engineering, environmental and systems performance testing, installation and software configuration management according to structured methodologies. $27,000.00/per year. 40 hours per wk. 8:30a.m.-5:30p.m. Req'd Master's Degree in Computer Science. 1 year exp. or 1 yr. Graduate Assistant/Software Engineer and must have work or academic experience with micro-computers, modems, UNIX op sys, Pascal, Basic, C, FASPORT, RFE, ISAM, Relational Data Base. Send resume to: Jack Hitzheim, Tennessee Job Service, 1295 Poplar, Memphis, TN 38104

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DATA PROCESSING PROFESSIONALS

Fresno County offers a large scale sophisticated IBM environment without the hassle of big city commuting. We need experienced programmers, systems analysts, and systems programmers. Candidates need strong backgrounds in online applications, systems analysis and/or programming, and current experience in a large IBM mainframe OS/MVS environment using COBOL, CICS, INTERACT, TSO and PANVALET. DataCom/DB, IDEAL experience a plus. Systems Programmer candidates need strong MVS/SP installation and tuning experience. MVS/XA exp. a plus. (A System Analyst/Programmer candidate with prior DP Standards exp. would fill a vital opening in the Internal Support group.) Competitive salaries are complemented by a great benefit package.

Immediate openings:

Sr Prog. $2465-$3018	3 yrs exp
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Sys. Ana. II $2465-$3018	2 yrs exp
Sr. Sys. Prog. $2974-$3618	3 yrs exp

Fresno is located in the Central San Joaquin Valley midway between Los Angeles and San Francisco at the base of the Sierra Nevada mountains. While we cannot offer relocation assistance, we can offer a professional, challenging work environment and an opportunity to choose a rural or urban lifestyle at very affordable prices. For an application, contact: Fresno County Personnel, 2220 Tulare Street, 3rd Floor, Golden State Plaza, Fresno, CA 93721, phone (209) 488-3384. Fresno County is an Equal Employment Opportunity/Affirmative Action/Handicap Employer.

COMPUTER SYSTEMS ANALYST AND PROGRAMMER – IMI Systems Inc., a company that services in computer and telecommunications consulting, seeks Computer Systems Analyst/Programmer. Must be able to determine hardware and software requirements of clients, direct preparation of systems studies, analysis and detailed proposals for the development of applications systems in a database environment, verify technical specifications. Design and implement systems. Monitor and evaluate technical capabilities and performance of EDP staff. Detect, diagnose and correct problem areas. Design and modify banking system, communications systems and management systems, using MVS, TSO/SPF, CICS, TCAM, VSAM, IDCAMS, COBOL, PL 1, BAL SL 5 programming languages. Bachelor's degree in Computer Science, Electric Engineering, Mathematics or related degree and 2 years experience in job offered is required. 6 years experience in job offered accepted in lieu of degree or 4 years experience with Associate's Degree. No experience required with advanced degree. 40 hours per week. $34,000 per annum. Please send resumes to: Marvin Goldberg, IMI Systems Inc., Dept. 1024, 2070 Chain Bridge Road, Vienna, VA 22180. An Equal Opportunity Employer m/f.

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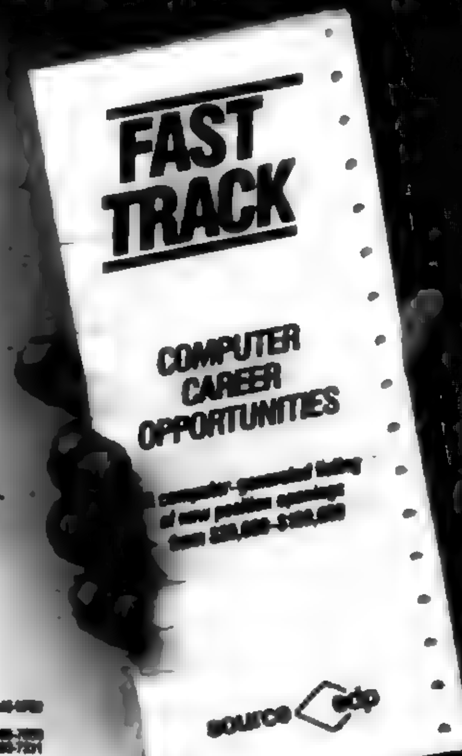

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The International Atomic Energy Agency, an organization in the UN family seeks a Database Support Programmer for its Computer Section, Data Services Group.

The successful applicant should have a university degree and at least 2 years practical experience in programming using NATURAL and ADABAS.

The successful applicant should also be familiar with IBM JCL and TSO/SPF. Experience in designing and giving training courses to end-users is desirable, and knowledge of IBM PC's, MS-DOS, d-Base III and LOTUS 1-2-3 would also be an advantage.

Initial contract for three years. Emoluments US $ 35.000,- p.a. tax free. Additional allowances if married. Travel and removal expenses paid. Installation and Repatriation Grant. Six weeks annual leave.

Interested persons are invited to send their C.V. to IAEA, Division of Personnel, P.O. Box 100, A-1400, Vienna, Austria, quoting Vacancy Notice No 87/079.

"...Computerworld has proved to be one of the most effective media for reaching our high-tech target groups."

— Michael Gill
Senior Vice President/
Creative Director
Thompson Recruitment Advertising

Michael Gill is Senior Vice President and Creative Director of Thompson Recruitment Advertising, based in Los Angeles, California. In 1986, Thompson won more EMA awards than its three largest national competitors— combined. The company's advertising goal is a simple but demandiing one: To create the most effective recruitment advertising in the marketplace.

Thompson can point to many reasons for its success. And one of the first that comes to mind, Michael says, is Computerworld and its Employment Today section.

"Today's job market continues to change rapidly. It's no longer enough to merely post a job and hope that people will come running. This new competitive marketplace demands that we use many new approaches and do a lot more research. Simple demographics just aren't enough any more. Fortunately, Computerworld understands this need for research that goes beyond numbers alone.

"For us, Computerworld has proved to be one of the most effective media for reaching our high-tech target groups. We've discovered that it is must-reading for many of the high achievers that our clients want to attract.

"In fact, we recommend Computerworld to our clients because we know that it will reach prospects most effectively. Among other benefits is the quality of the publication itself, which reinforces the quality of our campaigns.

"The successful recruiter knows that today's marketplace is highly competitive, and that tomorrow's marketplace will be even more so. At Thompson, we expect that tomorrow, as today, Computerworld will be an invaluable ally in helping us to achieve our mission of creating the most effective recruitment advertising in the marketplace."

Computerworld. We're helping employers and top professionals get together in the computer community. Every week. Just ask Michael.

For all the facts on how Computerworld can put you in touch with qualified personnel, call your local Computerworld Recruitment Advertising sales representative.

COMPUTERWORLD

BOSTON: 375 Cochituate Road, Box 9171,
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Paramus, NJ 07652, (201) 967-1350

WASHINGTON, D.C.: 3110 Fairview Park Drive, Suite 1040,
Falls Church, VA 22042, (703) 876-5100

CHICAGO: 2600 South River Road, Suite 304,
Des Plaines, IL 60018, (312) 827-4433

LOS ANGELES: 18004 Sky Park Circle, Suite 100,
Irvine, CA 92714, (714) 261-1230

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IMS Systems Programmer

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Non profit association at Chicago O'Hare location seeks individual to manage newly established in-house data processing dept. Position involves modifying and managing in-house data base system, administering systems operations, and training association users. The successful candidate should have 4 years DP experience, including programming and data base administration. Bachelor's Degree required. Experience with HP 3000 and HP Rapid a plus. Send resume with salary requirements to:

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Ad closing is every Friday, 6 working days prior to issue date.

Rates: Open rate is $176.40 per column inch. Minimum ad size is 2 columns inches (1 column wide by 2 inches deep), and costs $352.80 per insertion. Additional space is available in half-inch increments. Per agate line the cost is $12.60.

Discounts are available when you run more than 35 column inches of advertising in a year anywhere in Computerworld. Box Numbers are available. $15.00 per insertion.

To reserve space for your ad, or if you'd like more information on Classified Advertising in COMPUTERWORLD, call our office.

(617) 879-0700
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COMPUTERWORLD's COMPUTER CAREERS!

As the industry grows, so will **COMPUTERWORLD.** This is not a phrase we took lightly. We will continue to offer the high quality news coverage and editorial content that has attracted our readers since our beginning. But we also must continue to grow. What does that mean to you, our advertisers? Good news...in the form of wide exposure. We now will offer a feature topic to each weeks Recruitment ads. This will allow for us to target your specific market. In addition to the attractive format, it is easy to read. We offer a variety of topics which we have listed below:

SEPT.

9/21	Opportunities in the health field industry
9/28	Planning an MIS Career Path SHOW DISTRIBUTION:- TCA & INFO '87

OCT.

10/5	Opportunities in Finance and Investment
10/12	Contracting Advantages/ Disadvantages
10/19	Running MIS for the Airline Industry
10/26	Unethical vs Ethical ways to get a job SHOW DISTRIBUTION: UNIX Expo

So, as a nationwide publication, we give you the exposure you want. As a weekly publication, we give you the immediacy your advertisements need.

COMPUTERWORLD publishes every Monday with an ad deadline of 10 days prior to each issue date. You may send in copy to be pub-set or camera-ready material (velox or negative) via the mail. We provide telecopier service and will also take ads over the phone. We now have an answering machine which will take your calls/reservations even after business hours on the east coast. Please call either number listed below and indicate you would like Classified Advertising and you will be immediately connected to the machine. It's as easy as that!

Our mailing address is

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Classified Advertising
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01701-9171

Or call for more information at

1-800-343-6474 or,

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As the world's largest publisher of computer-related newspapers, only IDG Communications can give you this unique method of targeting your recruitment advertising to the professionals you want to reach, where you want to reach them.

You choose the newspapers. There are eight computer and communications-oriented newspapers in the network, reaching every type of computer and communications professional. Depending on who you are looking for, you can choose the publications that suit your needs.

You choose the region. You can advertise nationally in any one newspaper at regular rates, or any combination of publications at special rates. Or you can choose to concentrate in one or more of three regions — East, Midwest and West. You automatically get a three-newspaper buy, *Computerworld*, *InfoWorld* and *Network World. Then you can add on one or more other publications. For example, if you are in the Boston area, you might want to add the Boston edition of Computer Currents.* Or if you are looking for a VAX programmer in the Midwest, you may want to add Digital News Midwest edition.

You don't have to pay for readers you don't want. When you advertise in the Sunday paper, most of the people you are reaching have nothing to do with computers. But you have to pay for them anyway, since rates are based on total circulation. The Computer Careers Network rates are also based on total circulation, but all of that circulation and readership are computer or communications-involved professionals.

You can reach professionals who aren't actively looking. Our research indicates that roughly 10% of computer professionals may be actively looking for a job at any given time. The other 90% will not be reading the Sunday classifieds. But more than half of computer professionals would consider other job options at any given time if they became aware of them, and those are the hidden stars that you can reach in the pages of their professional newspapers — the ones they read for the information they need to stay ahead.

Circulation plus projected pass-along audience

	EAST	MIDWEST	WEST	TOTAL U.S.
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Subtotal	**573,358**	**405,542**	**311,174**	**1,290,074**
Digital News	106,468	52,252	53,280	212,000
Federal Computer Week	74,412	20,883	25,083	120,378
Computer Currents				
Northern California Edition			225,000	225,000
Southern California Edition			234,000	234,000
Boston Edition	120,000		120,000	
Total	**874,238**	**478,677**	**848,537**	**2,201,452**

Special low introductory offer — $8.00 per line!

Regional Buys

Here's how to place your recruitment advertising regionally:

The basic recruitment "package" automatically delivers your advertisement in three leading computer newspapers — *Computerworld*, *InfoWorld*, and *Network World* — AND in the region of your choice. Whether you choose the East, West, or Midwest, you pay just **$8.00 per line.** And if you want, you can add a second region to your three-book buy for a total cost of **$15.00 per line.**

This basic package includes three of the eight newspapers available to you through the IDG Communications Computer Careers Network. You can also schedule *Digital News*, *Federal Computer Week* and *Computer Currents* (Northern California, Southern California, or Boston edition) — to help you reach all the right people in all the right places.

Regional Combination Buys

	1 REGION	2 REGIONS
[redacted]	[redacted]	[redacted]
PLUS		
1 addition	$10 00	$17.00
2 additions	$12 00	$19.00
3 additions	$14 00	$21 00
4 additions	$15 00	$22.00
5 additions	$16 00	$23 00

Please note: This special introductory offer is valid only through December 31, 1987. Individual contract rates do not apply, and no lower rate is available.

National Buys

And here's how you can buy nationally to get the maximum reach possible:

Sometimes you need national exposure for your recruitment advertising. That's when you can put these advertising opportunities to work for you.

Combination buys. These special combination buys allow you to recruit computer professionals nationally using the combination of newspapers that's right for you.

Choose from: *Computerworld*, *InfoWorld*, *Network World*, *Digital News*, or *Federal Computer Week*.

National Combination Buys

	RATES PER LINE(1, 2)
Combination of 2	$15.00
Combination of 3	$17.00
Combination of 4	$19 00
Combination of 5	$20.00

1) *Computerworld* contract advertisers — Determine your discounted line rate, by deducting the difference between *Computerworld's* open line rate and your current contract rate from the above combination rates

Example
$12 60 open line rate
– 11 35 contract rate
$ 1 25 difference

Your discounted rate of a combination of two publications would be $15.00 – $1 25 = $13 75

2) If your combination buy does not include *Computerworld*, your Computer Careers national rate may be lower. To calculate, start by adding the stand-alone rates of the respective publications (*InfoWorld* — $9.29, *Network World* — $5.00, *Digital News* — $5.00 *Federal Computer Week* — $3 60) Then deduct 10% from the total

Example
$ 9.29 InfoWorld
+ 5.00 Network World
$14 29 Total
– 1 43 less 10%
$12 86 discounted rate

Computerworld, a weekly newspaper with a total audited reach of more than 650,000 (U.S.) computer-oriented professionals, carries more recruitment advertising than any other specialized business publication. Every week, it delivers the latest news to information systems executives and specialists at medium to large organizations, as well as the executives at the computer industry vendor organizations that serve them. Its readers include MIS directors and managers, systems analysts, programmers, sales and marketing professionals and other computer-involved executives.

InfoWorld is the weekly newspaper edited for personal computer professionals at organizations using multiple systems. It has a total audience (subscribers and pass-along readers) of 420,000, including PC managers, software developers and other PC-oriented professionals.

Network World is the news and features weekly for larger users of communications and networking. Its 220,000 readers (including subscribers and pass-along readers) include voice and data communications managers and specialists as well as communications consultants.

Digital News is a biweekly newspaper for computer professionals who work with the VAX line of computers from Digital Equipment Corporation. Total readership, including subscribers and pass-along readers, is over 210,000, including computer executives and managers, systems analysts, programmers, engineering executives and staff, and other VAX-oriented computer professionals.

Federal Computer Week is edited for information systems executives and staff who work in and sell to the federal government. Its weekly circulation includes MIS executives and managers, as well as systems analysts, programmers, software developers, communications specialists and other information systems professionals. Total readership (including paid and pass-along) exceeds 120,000.

Computer Currents is a group of regional publications edited to meet the needs of business and professional users of personal computers in the region covered.

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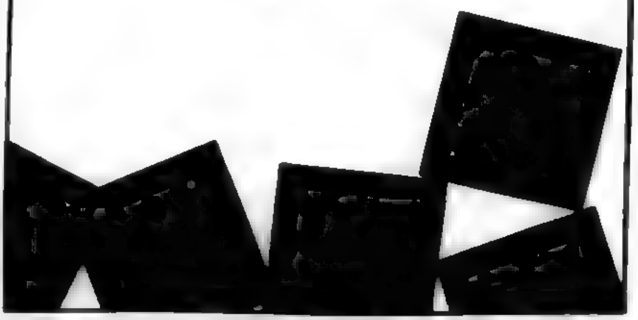

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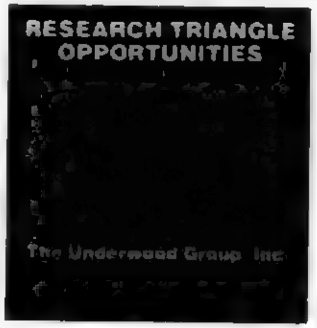

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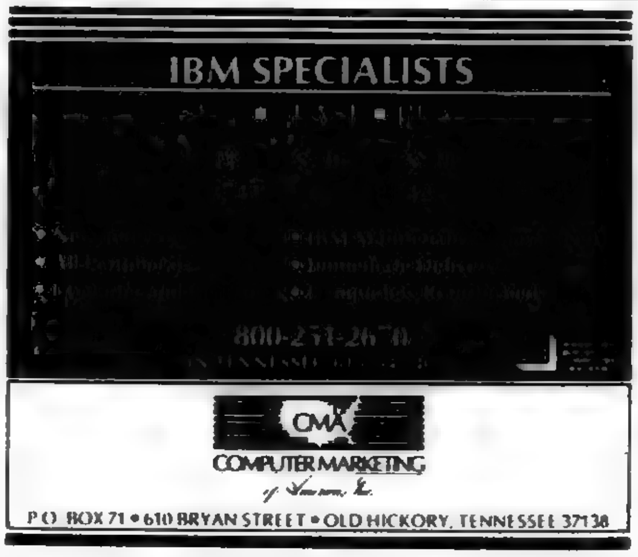

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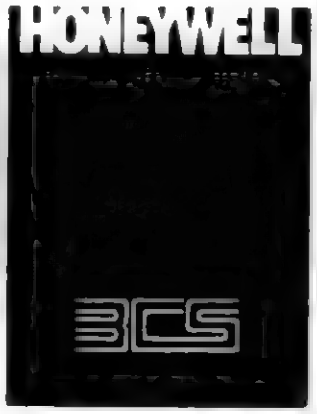

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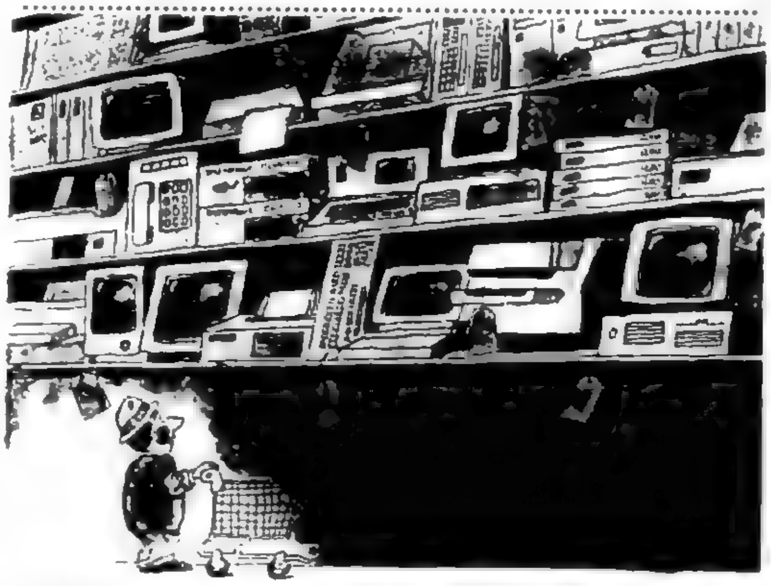

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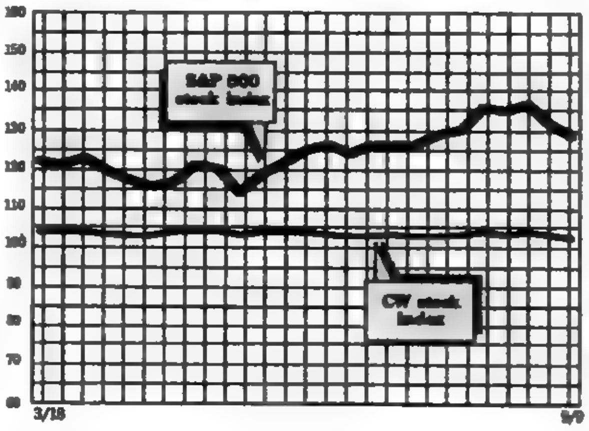

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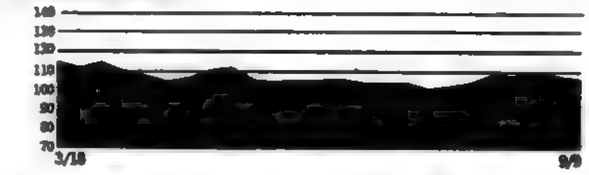

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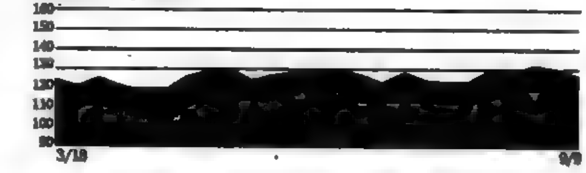

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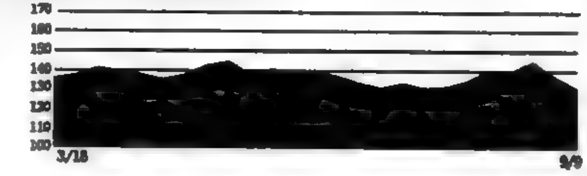

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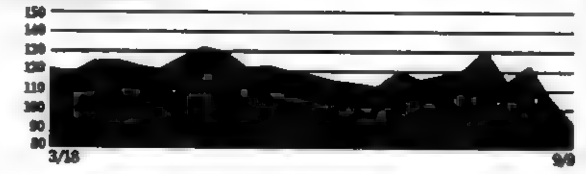

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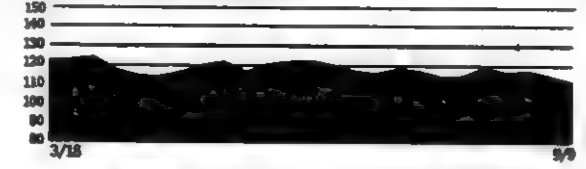

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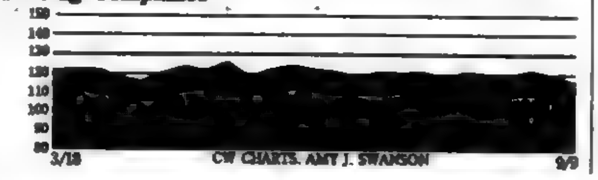

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Communications and Network Services

EXCH		52-WEEK RANGE (1)		PRICE CLOSE SEPT. 9 1987	WEEK NET CHANGE	WEEK PCT CHANGE
N	AMERICAN INFO TECHS CORP	100	77	93.13	+1.5	+1.6
O	ANDREW CORP	19	14	15.00	-1.0	-6.3
O	ARTEL COMM CORP	5	2	2.63	+0.1	+5.0
N	AT&T	35	22	32.25	-0.9	-2.6
O	AVANT GARDE COMP INC	7	3	5.25	-0.1	-2.3
O	AVANTEX INC	19	13	14.25	-0.6	-4.2
N	AYDIN CORP	28	18	32.13	+0.0	+0.0
N	BELL ATLANTIC CORP	77	62	73.88	+0.4	+0.5
N	BELLSOUTH CORP	44	35	39.63	-0.6	-1.6
O	BRIDGE COMMUNICATION	27	11	28.50	+1.0	+3.9
O	COMPRESSION LABS INC	12	4	5.50	+0.0	+0.0
O	COMPUTER NETWORK TECH	6	3	3.13	-0.3	-7.4
O	CONTEL CORP	40	27	35.88	-0.9	-2.4
O	DATA SWITCH CORP	9	6	7.13	+0.1	+1.8
O	DIGITAL COMM ASSOC	49	18	41.25	+1.8	+4.4
O	DYNATECH CORP	44	27	30.25	-0.5	-1.6
O	EQUATORIAL COMM CO	6	2	3.13	+0.0	+0.0
O	GANDALF TECHNOLOGIES	11	5	6.50	-0.8	-10.3
N	GENERAL DATACOMM INDS	14	8	7.63	-0.5	-6.2
N	GTE CORP	45	34	41.13	-0.3	-0.6
O	INFOTRON SYS CORP	12	7	8.75	-0.3	-2.8
N	ITT CORP	66	47	61.88	-1.1	-1.8
N	M A COM INC	16	12	15.00	+0.0	+0.0
O	MCI COMMUNICATIONS CORP	10	5	8.75	-0.1	-1.4
O	MICOM SYS INC	18	10	12.00	-1.4	-10.3
O	NETWORK SYS CORP	19	9	10.00	-0.8	-7.0
N	NORTHERN TELECOM LTD	24	14	21.88	-0.8	-3.3
O	NOVELL INC	27	10	23.25	+1.8	+8.1
N	NYNEX CORP	77	59	71.88	+1.0	+1.4
N	PACIFIC TELESIS GROUP	32	23	28.75	-0.1	-0.4
N	PARADYNE CORP	9	4	7.25	-0.4	-4.9
A	PENRIL CORP	6	4	4.63	+0.1	+2.8
N	PLESSEY PLC	41	24	30.81	-0.7	-2.2
N	SCIENTIFIC ATLANTA INC	20	9	17.63	-0.6	-3.4
N	SOUTHWESTERN BELL CORP	42	33	39.25	+1.0	+2.6
O	3 COM CORP	24	9	19.25	+0.6	+3.4
N	TIMEPLEX INC	41	15	26.88	-3.1	-10.4
O	UNGERMANN BASS INC	16	7	9.25	-0.4	-3.9
N	U S WEST INC	59	46	54.75	-0.6	-1.1

Computer Systems

EXCH		52-WEEK RANGE (1)		PRICE CLOSE SEPT. 9 1987	WEEK NET CHANGE	WEEK PCT CHANGE
O	ALLIANT COMPUTER SYS	37	15	17.00	-0.8	-4.2
O	ALPHA MICROSYSTEMS	7	3	4.88	-0.1	-2.5
O	ALTOS COMPUTER SYS	17	10	12.25	-0.8	-5.8
A	AMDAHL CORP	45	18	40.63	-1.9	-4.4
O	APOLLO COMPUTER INC	25	11	20.13	-0.5	-2.4
O	APPLE COMPUTER INC	55	16	52.75	+0.8	+1.4
N	BOLT BERANEK & NEWMAN	30	19	21.00	-0.3	-1.2
O	BRITTON LEE INC	5	3	3.50	-0.4	-8.7
N	COMPAQ COMPUTER CORP	60	14	56.75	-1.5	-2.6
O	COMPUTER AUTOMATION INC	17	2	14.00	+0.8	+5.7
A	COMPUTER CONSOLES INC	12	6	5.88	-0.6	-9.6
O	CONCURRENT COMP CORP	24	13	20.00	-1.5	-7.0
N	CONTROL DATA CORP DEL	37	24	33.50	-2.1	-6.0
O	CONVERGENT TECH	12	4	7.13	-0.6	-8.1
O	CONVEX COMPUTER CORP	22	8	14.50	+0.1	+0.9
N	CRAY RESH INC	135	80	96.63	-7.9	-7.5
O	DAISY SYS CORP	13	7	7.00	+0.0	+0.0
N	DATA GEN CORP	39	25	30.88	-0.8	-2.4
N	DATAPOINT CORP	9	4	8.13	-0.5	-5.8
N	DIGITAL EQUIP CORP	198	98	182.00	-5.9	-3.1
N	FLOATING POINT SYS INC	17	8	9.13	-0.3	-2.7
N	GOULD INC	26	16	21.63	-0.9	-3.9
N	HARRIS CORP	43	27	37.00	+0.0	+0.0
N	HEWLETT PACKARD CO	69	37	64.00	-1.1	-1.7
N	HONEYWELL INC	91	58	84.25	-0.3	-0.3
N	IBM	176	116	157.25	-5.3	-3.2
O	INFORMATION INTL INC	17	13	12.75	-0.6	-4.6
O	IPL SYS INC	3	2	3.00	+0.3	+9.1
O	MASS COMPUTER CORP	12	5	10.50	-0.3	-2.3
N	MATSUSHITA ELEC INDL LTD	178	93	170.00	+9.0	+5.6
O	MEGADATA CORP	7	2	5.50	-0.3	-4.3
O	MENTOR GRAPHICS CORP	37	13	34.50	+0.0	+0.0
N	NBI INC	14	8	11.38	+0.0	+0.0
N	NCR CORP	87	42	80.50	-1.0	-1.2
N	PRIME COMPUTER INC	31	16	26.13	-1.3	-4.6
O	PYRAMID TECHNOLOGY	12	4	7.75	-0.5	-6.1
O	STRATUS COMPUTER	41	18	28.75	-0.5	-1.7
O	SUN MICROSYSTEM INC	46	13	37.38	-0.6	-1.6
O	SYMBOLICS INC	7	4	4.25	-0.1	-2.9
N	TANDEM COMPUTERS INC	38	16	29.75	-0.3	-0.8
N	TANDY CORP	58	31	46.88	-1.4	-2.9
N	ULTIMATE CORP	33	13	30.00	-1.1	-3.6
N	UNISYS CORP	48	22	41.50	-2.0	-4.6
A	WANG LABS INC	19	11	17.50	-0.6	-3.4

Software & DP Services

EXCH		52-WEEK RANGE (1)		PRICE CLOSE SEPT. 9 1987	WEEK NET CHANGE	WEEK PCT CHANGE
O	ADVANCED COMP TECH	5	3	3.63	+0.3	+7.4
N	ADVANCED SYS INC	29	12	27.75	+0.3	+0.9
N	AGS COMPUTERS INC	22	8	19.50	-0.3	-1.3
O	AMERICAN MGMT SYS INC	19	7	17.38	+0.8	+4.5
O	AMERICAN SOFTWARE INC	22	8	12.63	-1.4	-9.8
N	ANACOMP INC	11	3	9.13	-0.3	-2.7
O	ANALYSTS INTL CORP	9	3	7.75	-0.3	-3.1
O	ASHTON TATE	30	12	24.25	+0.0	+0.0
O	ASK COMPUTER SYS INC	17	10	14.00	-0.6	-4.3
O	AUTODESK INC	34	10	27.00	+0.0	+0.0
N	AUTO DATA PROCESSING	55	30	48.25	-0.1	-0.3
O	BOOLE & BABBAGE INC	12	4	10.00	+0.0	+0.0
N	COMPUTER ASSOC INTL INC	33	10	30.25	+0.4	+1.3
O	COMPUTER HORIZONS CORP	15	10	11.25	-0.1	-1.1
N	COMPUTER SCIENCES CORP	66	30	58.75	-2.5	-4.1
N	COMPUTER TASK GROUP INC	18	11	13.38	+0.1	+0.9
O	COMSHARE INC	28	11	23.00	-2.0	-8.0
N	CULLINET SOFTWARE INC	14	6	12.88	-0.6	-4.6
O	CYCARE SYS INC	12	7	9.25	-0.3	-2.6
O	DUQUESNE SYS INC	33	12	16.25	+0.0	+0.0
O	ENDATA INC	15	5	13.88	-0.3	-1.8
N	GENERAL MTRS (CLS E)	49	24	46.00	-1.0	-2.1
O	HOGAN SYS INC	17	8	8.38	-2.6	-23.9
O	INFORMIX CORP	23	7	21.75	+1.3	+6.1
O	INTELLICORP INC	11	4	7.13	+0.1	+1.8
O	KEANE INC	10	5	7.50	+0.4	+5.3
O	LOTUS DEV CORP	37	11	28.75	-2.4	-7.6
O	MANAGEMENT SCI AMER	21	11	13.00	-0.4	-2.8
O	MICRO PRO INTL CORP	8	2	5.31	-0.1	-2.3
O	MICROSOFT CORP	128	28	112.75	-2.3	-2.0
O	NATIONAL DATA CORP	34	17	31.75	-0.5	-1.6
O	ON LINE SOFTWARE INTL INC	22	6	20.00	-0.6	-3.0
O	ORACLE SYS CORP	30	7	25.38	-1.1	-4.2
N	PANSOPHIC SYS INC	22	12	21.00	+0.5	+2.4
O	POLICY MGMT SYS CORP	30	15	23.00	-1.8	-7.1
O	PROGRAMMING & SYS INC	13	8	12.75	+0.8	+6.3
O	REYNOLDS & REYNOLDS CO	39	27	33.75	-1.8	-4.9
O	SEI CORP	16	8	16.00	+0.0	+0.0
O	SHARED MED SYS CORP	53	23	28.63	-1.5	-5.3
O	SOFTWARE AG SYSTEMS INC	19	10	12.63	-0.8	-5.6
O	SOFTWARE PUBG CORP	17	5	9.50	-0.1	-1.3
A	STERLING SOFTWARE INC	17	9	9.00	-0.9	-8.9
O	SUNGARD DATA SYS INC	21	10	17.00	-0.8	-4.2
O	SYSTEMATICS INC	30	14	28.25	-0.8	-2.8
N	UCCEL CORP	52	20	0.00	-20.0	-100.0
N	URS CORP	20	12	19.13	-0.6	-3.2
O	VM SOFTWARE INC	45	15	18.25	-1.3	-7.1

Semiconductors

EXCH		52-WEEK RANGE (1)		PRICE CLOSE SEPT. 9 1987	WEEK NET CHANGE	WEEK PCT CHANGE
N	ADV MICRO DEVICES INC	25	13	20.13	-0.5	-2.4
N	ANALOG DEVICES INC	24	14	19.38	1.4	-6.6
O	ANALOGIC CORP	13	10	12.00	+0.1	+1.1
O	INTEL CORP	65	18	63.13	+1.1	+2.7
O	LSI LOGIC CORP	17	8	12.63	+0.0	+0.0
O	MONOLITHIC MEMORIES INC	19	10	0	-10.0	100.0
N	MOTOROLA INC	72	34	64.25	+0.0	+0.0
N	NATL SEMICONDUCTOR	17	8	16.50	-0.1	-0.8
N	TEXAS INSTRS INC	78	35	70.00	-1.5	-2.1
A	WESTERN DIGITAL CORP	25	13	23.88	-2.5	-9.5

Peripherals

EXCH		52-WEEK RANGE (1)		PRICE CLOSE SEPT. 9 1987	WEEK NET CHANGE	WEEK PCT CHANGE
N	AM INTL INC	9	5	7.25	-0.4	-4.9
O	AST RESH INC	23	11	16.88	-0.1	-0.7
O	AUTO TROL TECH CORP	9	3	5.88	-0.1	-2.1
O	BANCTEC INC	16	8	11.50	-0.8	-6.2
O	CIPHER DATA PRODS INC	18	9	10.88	+0.8	+7.4
A	COGNITRONICS CORP	5	2	4.00	+0.0	+0.0
N	COMPUGRAPHIC CORP	28	16	26.25	+0.8	+3.1
N	COMPUTERVISION CORP	23	13	14.25	-0.4	-2.6
N	COMPAC CORP	20	12	0.00	+0.0	+0.0
A	DATAPRODUCTS CORP	16	10	11.13	+0.0	+0.0
A	DATARAM CORP	9	7	7.25	+0.0	+0.0
N	DECISION INDS CORP	13	7	11.00	-0.3	-2.2
N	EASTMAN KODAK CO	104	52	98.38	-0.1	-0.1
O	E M C CORP MASS	29	7	24.25	-2.8	-10.2
O	EMULEX CORP	10	6	7.50	-0.1	-1.6
O	EVANS & SUTHERLAND	40	20	30.25	-0.5	-1.6
O	ICOT CORP	13	5	6.00	+0.0	+0.0
O	INTERLEAF INC	20	8	17.75	-0.8	-4.1
O	IOMEGA CORP	10	2	2.88	+0.0	+0.0
O	LEE DATA CORP	10	5	5.63	+0.1	+2.3
O	MASSTOR SYS CORP	6	3	4.38	-0.3	-6.7
O	MAXTOR CORP	34	11	11.50	-1.5	-11.5
O	MICROPOLIS CORP	44	14	33.88	-1.4	-3.9
O	MINISCRIBE CORP	18	5	13.00	-0.6	-4.6
N	MINNESOTA MNG & MFG CO	84	50	75.38	-2.8	-3.5
A	MSI DATA CORP	23	10	20.50	1.0	-4.7
O	PRIAM CORP	6	2	3.00	-0.1	-4.0
O	PRINTRONIX INC	14	10	11.00	-0.1	-1.1
N	QMS INC	26	11	21.88	-0.8	-3.3
O	QUANTUM CORP	35	15	17.00	-0.8	-4.2
N	RAMTEK CORP	6	4	6.25	+0.1	+2.4
N	RECOGNITION EQUIP INC	27	12	16.75	-0.8	-4.3
O	REXON INC	14	5	8.25	-0.8	-8.3
O	SCAN TRON CORP	17	11	11.75	-0.9	-6.9
O	SEAGATE TECHNOLOGY	48	13	28.63	-1.5	-5.0
N	STORAGE TECH CORP	5	2	2.88	-0.1	-4.2
O	TANDON CORP	7	2	3.50	-0.3	-6.7
A	TEC INC	7	3	4.63	+0.1	+2.8
N	TEKTRONIX INC	43	30	37.63	-0.1	-0.3
O	TELEVIDEO SYS INC	3	2	2.94	+0.1	+2.2
N	TELEX CORP	102	55	67.50	-2.0	-2.9
O	WYSE TECH	38	18	32.25	-0.6	-1.9
N	XEROX CORP	88	51	76.00	-2.8	-3.6
O	XIDEX CORP	17	11	11.38	+0.3	+2.2

Leasing Companies

EXCH		52-WEEK RANGE (1)		PRICE CLOSE SEPT. 9 1987	WEEK NET CHANGE	WEEK PCT CHANGE
N	COMDISCO INC	35	15	31.00	-2.1	-6.4
N	CONTINENTAL INFO SYS	14	7	10.25	-0.6	-5.7
O	PHOENIX AMERN INC	8	3	4.63	+0.3	+5.7
O	SELECTERM INC	7	5	5.00	-0.3	-4.8
N	U S LEASING INTL	56	40	48.00	-1.8	-3.5

EXCH: N—NEW YORK; A—AMERICAN; O—NATIONAL;
O—OVER-THE-COUNTER; S—SPLIT

O-T-C PRICES ARE BID PRICES AS OF 3 P.M. OR LAST BID
(1) TO NEAREST DOLLAR

Hogan's no hero

Hogan Systems anticipates quarterly loss; stock plummets

In the midst of one of the software industry's most impressive turnarounds in years, Hogan Systems, Inc. recently dropped a major bombshell, saying it anticipates a loss for the current quarter ending Sept. 30. Wall Street was not pleased.

Last week, the price of Hogan's over-the-counter stock continued the slide that began Sept. 4, when Hogan made its surprise announcement. On that day, the firm's stock plunged by nearly 20%, falling 2⅛ points to 8⅞.

After Labor Day, Hogan continued to slip. Hovering at or near its low trading point of the past year, Hogan dropped an additional three-eighths of a point in three trading days to close Thursday at 8½.

Digital Equipment Corp., proving that an overall market decline has more effect than fanfare does, fell 3⅛ points to 182⅜ last Tuesday as Decworld '87 opened in Boston but rebounded, rising 7¼ points Thursday to close at 189¼.

In other stock market action, Micropro International Corp.'s stock jumped 1 1/16 Thursday. With the stock closing at 5 5/16 Wednesday, the jump was almost 20%.

CLINTON WILDER

Behind the scenes at DEC's show of shows

BY SUZANNE WEIXEL
CW STAFF

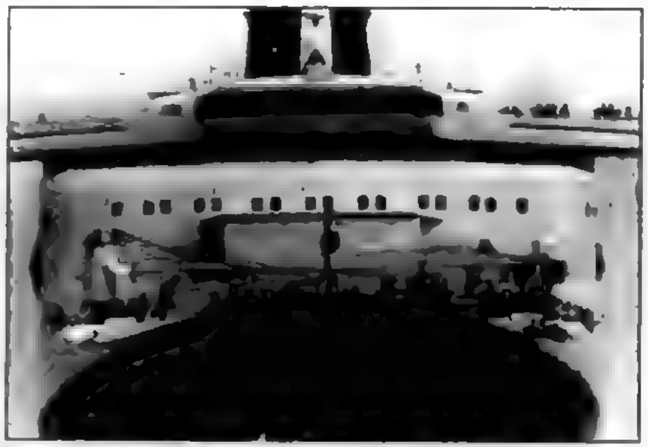
BOSTON — With all the grace of the massive cruise ship *Queen Elizabeth 2* being tugged into narrow Boston Harbor, Decworld '87, Digital Equipment Corp.'s international customer event, got under way last Tuesday.

When DEC President and Chief Executive Officer Ken Olsen flipped the switches to turn on the Network Management Center, the lights lit up, the monitors came to life, and the show was launched. Olsen admitted that the wires had been checked and the system powered up earlier. After all, he said, "We're confident, but not *that* confident."

Considering the sheer magnitude of the show, both caution and bravado were in order, particularly for attendees.

The exhibit space alone consists of 120,000 sq ft in Boston's harbor-side World Trade Center, complemented by hotel and conference space in the *QE2* and the *Oceanic* liner.

With more than 120 sessions and 40 special events scheduled to take place throughout the pier-front facilities, attendees found themselves walking seemingly endless miles just to get to the show floor — in many cases, immediately after sitting in interminable traffic jams driving through town.



The *QE2 docks in Boston* [illegible] *for Decworld '87.*

Activities planning

Planning for Decworld started a year ago, according to Dallas Kirk, program manager for the show. In all, he said, about 25,000 DEC employees contributed to the exposition. DEC first started converting the World Trade Center into a DEC showroom Aug. 1, installing the computers — 490 of them — in about 10 days.

The objective of the show, Kirk said, was to provide an opportunity for customers to see DEC's "network at work" in an atmosphere of a standard DEC customer/sales representative visit.

In addition to organizing the show sessions and displays around what Olsen referred to as "elegant solutions for specific customer problems," each customer was accompanied by his sales representative for the duration of his visit.

Planned activities

In an attempt to keep chaos at bay, most of the expected 27,000 by-invitation-only customers were encouraged to plan in advance what they would do at Decworld, Kirk said.

Working with their sales representatives, they examined their companies' specific needs and determined which seminars, exhibits and demonstrations would benefit them most.

Meanwhile, customers seemed to be proceeding with caution. Attendees from Southwestern Bell Corp. in St. Louis, busy dragging their luggage from one end of the World Trade Center to the other, said they were there primarily for the chance to see all of what DEC can provide, then possibly to consider potential solutions.

Microvaxes

FROM PAGE 1

the Microvax II's 0.9 MIPS.

According to Jesse Lipcon, a DEC corporate consulting engineer, the performance gains were achieved by speeding up the cycle time of the CPU chip from 400 nsec in the Microvax II to 90 nsec in the new models. The new machines use CMOS technology and include 1K byte of on-chip cache memory and 64K bytes of cache on the CPU board. He said Cobol performance was improved by DEC moving six instructions from software emulation into hardware.

Outperformed Model 60

Lipcon claimed the new systems outperformed the 9370 Model 60 in several benchmarks. He said the new Microvaxes beat the 9370 by factors of 1.23 in single-precision Linpacks, 1.12 in double-precision Linpacks, 1.5 in single-precision Whetstones, 1.25 in double-precision Whetstones and 1.9 in Dhrystones.

Analysts and DEC customers attending Decworld '87 generally praised the announcement.

Michael Geran of the New York investment firm E. F. Hutton & Co. said, "It's good for DEC, and it's good for the customer. It allows DEC to sell price/performance and not just price. The Microvaxes are the equivalent or better when compared with the 9370 Model 60, at a lower price. How much better is it? We'll see."

DEC played out the "gutsy scenario," according to analyst Bob Randolph of the Framingham, Mass., market research firm International Data Corp. He said the safe strategy would have been to cripple the Microvax 3500 and 3600 so they only performed at about 1.5 MIPS. Now, he said, DEC is providing more power but is "taking a chance on wiping out the 8250 and 8350."

Randolph said the price/performance of the new systems "gives DEC a lot more to talk about" in competing with IBM for the departmental systems market.

"The surprise for me is that they are keeping the Microvax II around. It leads me to believe that the Microvax II has become a cash cow for them, and they are not ready to let it go," Randolph added. He noted that the Microvax II has been largely an OEM product and that OEM customers may not be ready to change their product lines along with DEC.

One of the early field-test users of the Microvax 3600 reported that the system showed particularly strong performance gains in memory- and disk-intensive applications.

"Almost everything we saw, whether in development or production mode, pointed right at three times [the performance of] the Microvax II," said Neil Baldridge, vice-president of development for Compu-Share, Inc. in Lubbock, Texas, a third-party supplier of DEC-compatible accounting and distribution software.

"DEC's All-In-1 people said they could put 60 users on it, and I think that is conservative. I can envision a Cobol environment where you would see 100 active users," Baldridge said, adding that Compu-Share frequently supported more than 40 users.

He also noted that Compu-Share gambled by using a field-test processor in production work but that no significant problems occurred.

M&D runs benchmark

In another test, applications vendor McCormack & Dodge Corp. in Natick, Mass., ran a benchmark on a Microvax 3600 at DEC and found that the CPU ran 1½ times faster than the Vaxstation 2000 and 2.7 times faster than the Microvax II.

The benchmark involved running M&D's G/L Plus general ledger system. The test showed that connect time, or overall throughput (from a terminal to the CPU and back), for the Microvax 3600 was 1.8 times better than it was for the two earlier systems, according to Marc Desrosiers, VAX strategic marketing manager for M&D.

However, other DEC customers reported last week that they want more information about the new systems.

"We're looking at it mostly from the development point of view. I'm particularly interested in whether we can upgrade our existing Microvax II. Even if they offer an upgrade path in the next year, that would be nice," said George Conant, vice-president of engineering for Xyplex Corp. in Concord, Mass.

Hank Sulzycki, manager of technical support for Gannett Co.'s offices in Silver Spring, Md., said his company is considering the Microvax 3500 and 3600 for remote locations. "We haven't committed to using them, but we are looking at them. I like the price/performance: a 3-MIPS machine for under $75,000," Sulzycki said.

DEC's counteroffer

Third-generation Microvaxes

	DEC Microvax 3500	DEC Microvax 3600	IBM 9375 Model 60	IBM 9377 Model 80
MIPS*	[illegible]	[illegible]	1.3	2.6
Memory range (in bytes)	16M to 32M	32M	8M to 16M	8M to 16M
Base price	$74,800 (16M bytes)	$99,800 (32M bytes)	$93,000 (8M bytes)	$190,000 (8M bytes)

* Million instructions per second

INFORMATION PROVIDED BY INTERNATIONAL DATA CORP
CW CHART

Memories differentiate new machines

Digital Equipment Corp.'s Microvax 3500 and Microvax 3600, which were announced last week (see story page 1), are said to differ from each other mainly in their memory and disk configurations in addition to cabinetry.

In addition, the systems use disk and tape storage products introduced last week.

The Microvax 3500 is a 27-in.-high pedestal-style system featuring 16M to 32M bytes of memory, one or two 280M-byte RA70 disk drives and a 296M-byte TK70 cartridge tape drive.

The RA70 is the first 5¼-in. disk drive designed and made by the company.

The TK70 effectively replaces the 96M-byte TK50 tape drive.

The Microvax 3600 includes 32M bytes of memory and the TK70 and supports the RA70 as an option. However, the standard disk drive is the new 622M-byte, 14-in. RA82.

The Microvax 3600 is housed in a 41-in.-high cabinet and can be expanded with a second cabinet that houses two additional disk drives and a second tape drive.

Prices for the systems range from $74,800, for a Microvax 3500 with minimum memory and disk and tape storage, to $180,000.

DEC said a limited number of shipments will begin by the end of the year, with volume shipments commencing in 1988.

Jesse Lipcon, a DEC corporate consulting engineer, said there are no technical barriers to upgrading a Microvax II to a Microvax 3500 but said DEC has no immediate plans to offer such an upgrade.

JAMES CONNOLLY

SNADS, Disoss gates top Decworld rollouts

BY PATRICIA KEEFE
CW STAFF

BOSTON — Decworld '87 attendees in search of a network management system were greeted mostly by a handful of newly enhanced older products bolstered by statements of direction.

"I think what users got was more promises; DEC has a better story to tell," said Francis Dzubeck, president of Communications Network Architects, Inc., a consulting firm in Washington, D.C.

Digital Equipment Corp. did unveil some additions to its network strategy, such as much-needed gateways to IBM's Systems Network Architecture Distributed Services (SNADS) and Distributed Office Support System (Disoss), a distributed naming service and a 10M bit/sec. Ethernet network for unshielded twisted-pair cabling. But many analysts dismissed DEC's "nonannouncement" as disappointing.

DEC's networking presentation highlighted Phase V of the company's Digital Network Architecture (DNA). First announced in 1985, DNA will move the first four Decnet layers into compliance with the comparable layers of the ISO's Open Systems Interconnect (OSI) model.

The following were among the products unveiled:

- Decnet System Services (DSS), a set of layered networking software products said to enable users to access information on remote computers using remote disks and printers in a networked environment.
- Mailbus, a set of distributed applications said to link users of DEC's All-In-1, IBM's SNADS and Disoss and other CCITT X.400-compliant E-mail systems in a global electronic messaging network.
- A 10M bit/sec. OSI-standard Ethernet offering for installations using installed unshielded twisted-pair wiring (see story this page).

DEC's communications announcements focused on providing transparent links between DEC users and non-DEC messaging and computer systems. But it was not enough to impress the analysts.

DEC President Ken Olsen

"All they've done is buy time for themselves, and they are getting as good as IBM at doing that," said Gigi Wang, a senior analyst with The Yankee Group in Boston.

One piece of the puzzle barely addressed by DEC was support for IBM's Netview, which is important to users with DEC minicomputers and IBM mainframes.

"DEC doesn't have anything to counter Netview. It still doesn't have a native-mode implementation of IBM communications like most other vendors do," said John McCarthy, director of research at Forrester Research, Inc. in Cambridge, Mass.

Analysts also criticized DEC's announcement of support for Disoss, claiming most users really need access to IBM's Professional Office System (Profs). "Certainly, DEC customers are screaming for Profs. Perhaps [DEC] feels too strong in the mid-range, so they think they don't have to talk to IBM's mid-range flagship," speculated David Terrie, president of Newport Consulting in Scituate, Mass.

Keeping a commitment made more than two years ago, in July 1985, DNA Phase V (also called Decnet/OSI Phase V) complies with layers one through four of the OSI network model. Phase V is compatible with existing Decnet installations.

Closer to home, DEC's VMS-oriented DSS offering consists of three products: VAX Distributed Name Service (DNS), VAX Distributed File Services (DFS) and VAX Distributed Queuing Service (DQS). The three packages range in price from $250 to $14,400, depending on configuration.

Crucial application

Perhaps the most crucial of the three DSS applications, DNS provides consistent, network-wide naming of resources. DFS reportedly provides VMS users with high-speed, transparent access to files stored on remote VMS systems in a Decnet network. And DQS is said to allow any VMS user on any system within Decnet to access any VMS printer.

Compatible with Decnet/OSI Phase V, Mailbus is an electronic mail service that isolates users from protocols, enabling them to exchange information between local and remote systems without regard for how the information reaches its destination.

Mailbus complies with X.400 and features two gateways: the VAX Message Router/S, which enables All-In-1 or PC All-In-1 and SNADS users to exchange data and documents, and the VAX Message Router, which provides store-and-forward message transfer. The gateways also allow other mail systems to tie into Mailbus. Pricing starts at $1,200.

The Message Router/S gateway reportedly allows IBM electronic-mail users, such as users of IBM's Personal Services/Disoss, to exchange mail messages, documents and Microsoft Corp. MS-DOS files with DEC electronic-mail users across an OSI-compliant network.

The VAX Message Router/S gateway ranges in price from $2,250 to $54,000.

The VAX Message Router consists of three core components: the Message Router Base, containing the message-transfer system, a new gateway directory service and new management services; the Message Router VMS Mail Gateway, which interfaces VMS Mail to the VAX Message Router; and the Message Router Programmers Kit, which provides a set of high-level interfacing routines that allow a systems programmer to write applications to run on the VAX Message Router.

The VAX Message Router provides two key enhancements: improved network management services for automated system management and a configuration procedure that simplifies DEC's low-management-default network.

Pricing ranges from $1,200 to $5,400 for the Message Router Base; from $1,320 to $7,920 for the Message Router VMS Mail Gateway; and from $8,400 to $50,400 for the Message Router Programmers Kit.

Wired up — reluctantly

Digital Equipment Corp. threw its hat into the corporate wiring closet last week and unveiled its own high-speed Ethernet for ordinary telephone wiring.

Speaking at a Decworld '87 press conference, DEC President Ken Olsen exhibited mixed feelings about the latest extension to DEC's family of Ethernet products.

To hear Olsen explain it, DEC is offering 10M-bit Ethernet over unshielded twisted-pair wiring to customers foolish enough to snub coaxial cable. "Coax is so much easier," he said, "but alas, a number of our customers put twisted-pair in their buildings, and they are too embarrassed to take it out; so we've adapted Ethernet to twisted-pair."

There seemed no doubt where DEC's loyalties lay. "That [achievement] doesn't mean it's the best choice. It costs more, it's awkward, it's not as useful, and it has limitations on it," Olsen added.

Initial shipments for DEC's Unshielded Twisted-Pair Ethernet Adapter are slated for January. The adapter utilizes most installed telephone wiring and will connect the vast majority, some 85%, of most desktop devices with operating distances ranging from 50 to 70 meters, DEC said.

Pricing ranges as follows: $1,600 for the Model H3300-AA, a complete starter kit for eight stations; $392 for the Model H3310-AA, an office adapter eight-pack; and $600 for the Model H3330-AA, an eight-pack for the wiring closet and satellite equipment room.

PATRICIA KEEFE

DEC claims edge over Sun, Apollo

BY JAMES CONNOLLY
CW STAFF

BOSTON — While much of the focus at Decworld '87 was on new versions of the Microvax, Digital Equipment Corp. also moved to immediately catch up with Sun Microsystems, Inc. and Apollo Computer, Inc. in the technical workstation market.

As with its earlier Vaxstation II and Microvax II families, DEC built the Vaxstation 3200 and 3500 around the CPU used in the Microvax 3500 and 3600. DEC said the result is an edge in price/performance — particularly when performance is measured in real applications rather than synthetic benchmarks — in comparison with the Sun-3/260, Sun-4 and Apollo DN4000.

"For Digital, I think it is great. For a long time they only had something at the entry level. For the first time they can say they really have a range of systems," said analyst Vickie Brown of Framingham, Mass.-based market research firm International Data Corp. (IDC).

Brown said the price and performance of the new Vaxstations are competitive with the Sun-3/260 and Apollo DN4000, although she declined to give an advantage to any of the three vendors. The Sun-3/260 and DN4000 are rated at 4 million instructions per second (MIPS) by their makers. Analysts rated the new Vaxstations at 3 MIPS, in comparison with the 0.9 MIPS of the older Vaxstation II.

DEC announced an entry-level price of $19,900 for a monochrome diskless Vaxstation 3200 with 8M bytes of memory. A Vaxstation 3500 with eight graphics planes, a 19-in. color display, 16M bytes of memory, software licenses and basic disk and tape storage costs $58,400.

IDC's Brown noted that the Vaxserver announcements may be intended to help DEC show a greater installed base of workstation products. Research firms such as IDC have traditionally counted DEC minicomputers used as servers in the general-purpose, medium-scale market.

Drives fit new Microvaxes

BOSTON — Digital Equipment Corp. wrapped up its Decworld '87 product introductions by announcing the RA70 280M-byte 5¼-in. disk drive, designed specifically for use with the newly unveiled Microvax 3500 and 3600.

DEC also announced the RA82 14-in. 622M-byte Winchester disk drive and the TK70 296M-byte streaming cartridge tape subsystem for use with Q-bus systems. The subsystems are part of the Digital Storage Architecture interface family.

According to F. Grant Saviers, vice-president of Storage Subsystems, the RA70 represents a two-generation leap in DEC's storage technology. The first 5¼-in. disk designed and manufactured by DEC, the RA70 employs thin-film media to yield an area density of 30.4M bit/sq in. It offers an average seek time of 19½ msec and an average access time of 27 msec.

The RA82, similar to DEC's SA482 14-in. hard-disk offering, features an average seek time of 24 msec and an average access time of 32 msec.

A single RA70 comes standard with the Microvax 3500. It is also available as an option for both the Microvax 3500 and 3600 systems for $9,000. A single RA82 comes standard with the Microvax 3600. An optional package of three is available for $65,500.

Firm sued over Lisp Machine crash

Key employees allegedly carried off secrets after deserting at crucial time

BY STANLEY GIBSON
CW STAFF

CAMBRIDGE, Mass. — A suit filed here recently charges that key former employees of Lisp Machine, Inc. illegally used trade secrets to develop an expert system intended to compete with a Lisp Machine program.

The suit also claims that six former employees left the company knowing that when they did, crucial funding for Lisp Machine would be denied, causing the firm to declare bankruptcy.

The suit was filed by Gigamos Systems, Inc. in Lowell, Mass., which acquired the assets of Lisp Machine in June following a bankruptcy proceeding. The defendant is Gensym Corp. in Cambridge, the company founded by six former employees of Lisp Machine, and Edward Fredkin, renowned artificial intelligence pioneer and former professor at MIT.

The former employees and Fredkin are charged with breach of contract, misappropriation of trade secrets, unfair competition and related offenses.

Gensym said it plans to file a countersuit against Gigamos that claims interference by Gigamos with Gensym customers.

Gensym declined to specify what kind of interference it will allege.

A showing of code

Following the filing of Gigamos's suit, the court issued a temporary restraining order that requires Gensym to deliver an unaltered copy of its G2 program to the court. The order otherwise allows Gensym to operate in the ordinary course of business.

William O'Brien, Gigamos's chief operating officer, said he believes the G2 program will show that Gensym used code that is used in Picon, a program he said was developed by Gensym's founders while they were employed at Lisp Machine.

However, Robert Moore, president of Gensym, said he welcomed the chance to present the code in court. "The code is absolutely different. G2 is written in Common LISP. Picon is in Data LISP," he pointed out.

Moore said Gigamos filed the suit because the G2 product was shown at the recent American Association for Artificial Intelligence show in Seattle, where it attracted a lot of attention. "The substance is that we built a competitive product," he said.

A dramatic exit

The suit also alleges that the Gensym founders left Lisp Machine when additional financing to keep the company was pending, knowing that if they left, the financing would not go through. It alleges the departure caused the downfall of Lisp Machine several months later, but Moore claimed that the company did indeed get additional funds, although not as much as it had hoped to receive.

The suit also alleges that the former Lisp Machine employees signed agreements that bound them not to disclose proprietary information. While O'Brien said the agreement covers inventions made for one year after leaving Lisp Machine, Moore said the clause only mandated that proprietary information would be respected.

3Com now supports 10M-bit Ethernet over twisted-pair

BY PATRICIA KEEFE
CW STAFF

SANTA CLARA, Calif. — 3Com Corp. last week extended its family of 10M-bit Ethernet products by adding support for unshielded twisted-pair wiring.

Three products based on technology co-developed with Digital Equipment Corp. (see story page 125) were unveiled: Pairtamer, Multiconnect and Lanscanner.

All three products are said to support 10M-bit Ethernet over ordinary telephone wire while also allowing network administrators to assess the usability of installed wiring and to diagnose and pinpoint problem areas. The products are compatible with AT&T's Premises Distribution System, the IBM Cabling System, coaxial and fiber-optic cable as well as older telephone wiring, 3Com said.

A major difference between 3Com's approach and that of similar products is the ability to multidrop or daisychain workstations, 3Com President William Krause claimed.

Pairtamer is an adapter that allows IEEE 802.3-standard Ethernet to be installed on one of the unused pairs from the three or more pairs of unshielded twisted-pair wires in a typical telephone cable. The adapter replaces the modular phone outlet normally used to connect the PC to the network.

The Multiconnect repeater ties local work groups either to other wiring centers and work groups or to an Ethernet backbone. A base repeater contains slots for 15 modules.

Lanscanner is a hand-held, battery-powered instrument that measures wire characteristics and determines the ability of a particular wire to handle data transmission.

Scheduled to be available in December, pricing is as follows: $325 for the Pairtamer set, including two adapters and an interface card to Multiconnect; $1,095 for the Multiconnect base unit and each expansion unit; $995 for Lanscanner; and $175 and $230, respectively, for connections to thick and thin Ethernet.

Two fiber-optic modules are available from Codenoll Technology Corp. in Yonkers, N.Y.

Second-class postage paid at Framingham, Mass., and additional mailing offices.
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INSIDE LINES

Watch what we say, not what we do. Although DEC is often asked about its response to IBM's 9370, "We don't think there's anything to respond to," President Ken Olsen said last week during Decworld '87. But in the printed announcements of the next Microvax models, the 9370 is mentioned time and time again.

May need an extension. While IBM's OS/2 Extended Edition remains a mystery as far as availability goes (speculation pegs delivery at anywhere from first-quarter 1988 to sometime in 1989), what it will lack in ability is becoming clearer. According to one source who has seen the data base component, OS/2 Extended Edition lacks a full implementation of SQL. The source also characterized the product's report writer as weak, claiming it is unable to handle duties such as invoices.

Meanwhile, in the LAN o' plenty . . . Sources close to IBM say they are hearing hints that IBM will not endorse or use Microsoft's LAN Manager component of OS/2. Instead, they hear, the computer colossus will develop its own LAN manager — in effect building a proprietary wall around an otherwise open operating system. Only time will tell.

Reliving history. Computer Consoles Chairman and CEO John F. Cunningham, who bailed out of Wang as that company was heading down, said last week that Computer Consoles' previous profit projections are no longer attainable and that the company will cut its computer products division work force by 20%. As a restructuring measure, company officials said the 5-year-old division will focus efforts on its Unix-based Power 6 hardware line and its Office Power office automation systems in hopes of cutting division losses next year.

Let's get this straight. The Semiconductor Industry Association in the U.S., which used to bemoan low prices on Japanese semiconductors, last week passed a resolution stating that the Japanese are now artificially inflating prices. Although, as a result, U.S. consumers of Japanese semiconductors will pay higher prices, the association said U.S. semiconductor vendors still don't have unfettered access to the Japanese market, so trade sanctions should be maintained.

Dbo zpv sfbe uijt (a=b). Bridge Communications will soon be announcing what it claims is the first encryption product for a TCP/IP local-area network.

Another world. Novell is busy gearing up for Networld, its own trade show to be held in Dallas in October. Among the products Novell is said to be lining up is Netware for DEC's VMS, which won't ship until the first half of next year. Meanwhile, Novell subsidiary CXI, Inc. is expected to come out with a communications package that will replace Novell's old Ascom asynchronous gateway (an outmoded device, one industry source says, that was originally written from a Digital Research CP/M product). As a result, Netware network connections to asynchronous hosts should be vastly improved, he said.

Pitch a tent in the desert. The Interface Group, sponsor of Comdex, is crowing that the show has been completely sold out for the first time — all 7,200 booths. Show organizers say they are "desperately seeking more exhibit space," claiming that the Las Vegas extravaganza will be the biggest in the show's nine-year history.

D'language of choice. While the two top micro software firms, Lotus and Microsoft, gear up to enter the data base market — we just don't know exactly when — users and observers are asking what languages the products will support. According to a source knowledgeable about Ashton-Tate's Dbase, both companies have been checking out the wares of Dbase-compatible program makers, such as Fox Software and Wordtech, as a means of implementing the Dbase language. If Lotus were to announce a product that was language-compatible with Dbase, it would look odd in view of the lawsuits that Lotus has filed against firms that clone its products.

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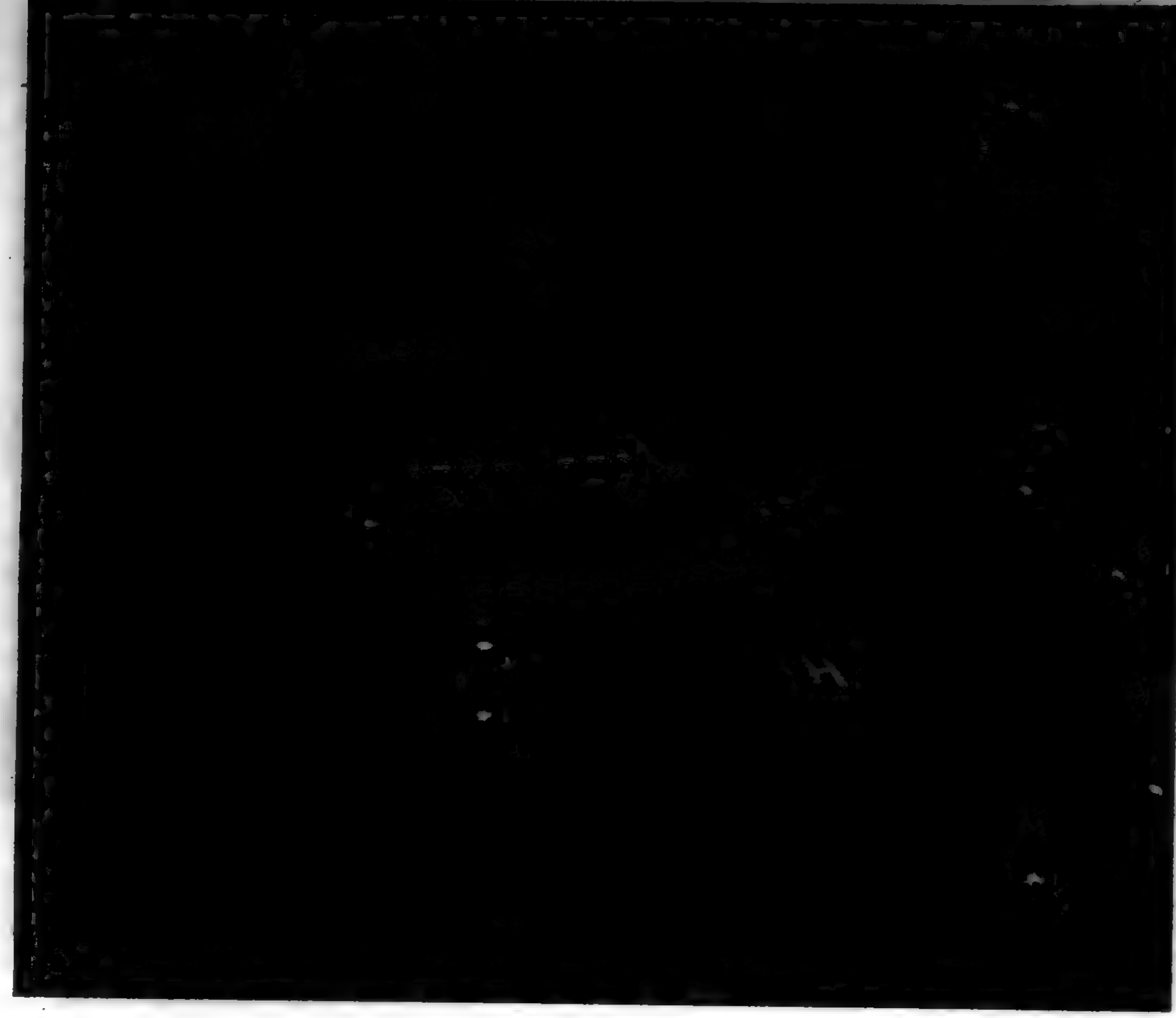

Hayes Microcomputer Products, Inc., is one of the premier successes in the electronics world. Hayes pioneered the personal computer modem a decade ago and still continues as the industry leader.

The company's rapid growth, however, has brought about its own set of growth needs. To help manage its expanding business Hayes needed flexible applications software. So they selected systems from Management Science America, Inc.

"The foremost reason we selected MSA was that the company is stable, with software on the market that offers tried and true solutions," comments Ken Voelker, Director of Hayes Information Management Group.

MSA's Manufacturing System provides Hayes the solution they wanted for integrating information in three key areas. Inventory Control has enabled Hayes to reduce warehousing, insurance and carrying costs, and free up capital for non-inventory investments. Material Requirements Planning saves Hayes significant time and money by generating requisitions automatically and sending them directly to Purchasing, providing buyers with more lead time to negotiate. And, because the Order Processing System has visibility into both inventory and manufacturing schedules, Hayes can take customer orders and make timely delivery.

Hayes views its relationship with MSA as a long term partnership. Adds Voelker, "We use MSA's Financial and Human Resource Systems as well as the Manufacturing System. We have an ongoing commitment from MSA and are confident we can depend on them for additional systems to meet our needs."

Connecting with MSA Software was a smart move for Hayes. It can be for your company, too. Call Robert Carpenter at (404) 239-2000.

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COMPUTERWORLD

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In Depth — A survey shows how companies really do strategic planning. **Page 97.**

HP parallels IBM's PS/2 family with Vectras ranging from floor-standing 80386-based systems to low-end 8086 models. Page 6.

Plans for U.S. plant closings and termination of old systems are revealed to Honeywell Bull customers. Page 13.

Soft-Switch links disparate office systems in an electronic mail product that connects IBM's SNADS to the 9370. Page 4.

Limited freedoms for the regional Bell holding companies are expected to prompt further acquisitions and joint ventures. Page 2.

Amdahl counters IBM's 3725 communications processors with successors to its 4705E model. Page 148.

Management profile: The man in the systems seat at Wall Street's junk-bond king. Page 107.

Codex maps out ambitious network management scheme, but the pieces will need time to fall into place. Page 8.

Fujitsu given key to IBM's software vault

BY CLINTON WILDER
CW STAFF

NEW YORK — In an extraordinary resolution of the five-year struggle over rights to IBM's MVS operating system, federal arbitrators last week granted Fujitsu Ltd. unprecedented access to IBM systems software source code.

Although Fujitsu will pay a substantial, but still undetermined, fee for that access, the arbitration settlement breaks new ground by ordering IBM to make the source code available for a period lasting between five and 10 years in a tightly monitored "secured facility." The arbitrators also absolved Fujitsu of any alleged theft of trade secrets from IBM, removing a major cloud from Fujitsu's marketing efforts overseas.

In theory, the settlement would seem to break IBM's stranglehold on mainframe operating systems by allowing Fujitsu to develop and market alternative systems derived from access to IBM technology. While Fujitsu may not realize significant market share gains in IBM systems software, its mere presence in the market should rein in IBM's price increases and other actions the company has been able to take as a sole supplier.

Lid on price hikes?

"IBM mainframe customers won't flock to Fujitsu [operating systems]," said Stephen Smith, an analyst at Paine Webber, Inc. "But, IBM has been raising prices, and my view is that this puts something of a lid on that."

Users interviewed last week agreed that it is unlikely that IBM mainframe customers will opt to purchase IBM-compatible Fujitsu systems software in the near future, despite the stated intent of the arbitrators (see story page 149).

"The order will foster competition with respect to IBM-compatible mainframe operating system software," wrote American Arbitration Association arbitrators John L. Jones and Robert H. Mnookin in their opinion.

"If I were IBM, I'd be very disappointed with this," Smith said. "Fujitsu was basically vindicated."

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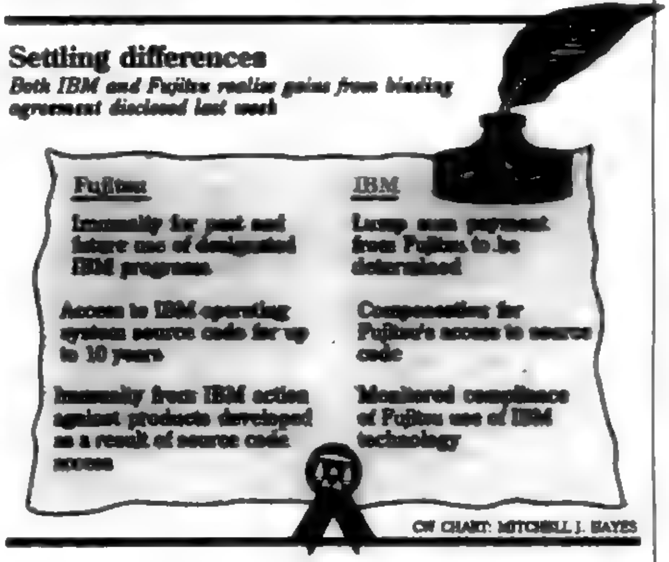
Settling differences

Both IBM and Fujitsu realize gains from binding agreement disclosed last week



Fujitsu	IBM
Immunity for past and future use of designated IBM programs	Lump sum payment from Fujitsu to be determined
Access to IBM operating system source code for up to 10 years	Compensation for Fujitsu's access to source code
Immunity from IBM action against products developed as a result of source code access	Monitored compliance of Fujitsu use of IBM technology

CW CHART: MITCHELL J. HAYES

ADR opts for query standard

BY ALAN ALPER
CW STAFF

NEW YORK — Applied Data Research, Inc. last week endorsed the IBM-sanctioned SQL language but chose a version of SQL that is incompatible with IBM's.

In its most significant data base move since being acquired by Ameritech 18 months ago, ADR said it will support the ANSI-standard SQL in Datacom/DB and Ideal, its flagship data base products.

At the same time, the company announced a personal computer-based computer-aided software engineering package

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SQL to get short shrift in Dbase IV

Update expected to offer language subset, limited access to host data bases

BY DOUGLAS BARNEY
CW STAFF

TORRANCE, Calif. — Ashton-Tate will not include a full version of IBM's SQL in its next-generation Dbase package, according to third parties and former Ashton-Tate employees. The lack of a full SQL will limit the product's ability to communicate with host data bases.

While a more complete implementation of SQL is expected in Ashton-Tate's future products for Microsoft Corp.'s MS OS/2 operating system, the next Microsoft MS-DOS version of Dbase, commonly called Dbase IV, will include only a subset of SQL, these sources said. Ashton-Tate has not formally announced Dbase IV. Company officials were unavailable for comment last week.

Ashton-Tate previously disclosed plans to provide embedded SQL, under which SQL statements can be executed from within programs, in future versions of Dbase. But according to numerous knowledgeable sources, Dbase IV will only translate a subset of SQL statements into the Dbase language and will not allow Dbase commands to be translated into SQL. As a result, Dbase IV cannot be effectively used to query host-based SQL data bases, such as IBM's DB2. Users can, however, use SQL to query Dbase IV data and generate applications.

While many microcomputer users said they care little about SQL, support for the language is considered critical to Ashton-Tate's long-term success. SQL is an emerging standard that has been endorsed by virtually all the major relational data base vendors and will be a major component of IBM's Systems Applica-

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'Never mind!' Businesses cool off on site license issue

BY ED SCANNELL
CW STAFF

The cries of large corporations for site licensing agreements from microcomputer software companies have died down to a whisper. The once-bright prospect of making unlimited copies of software programs for a one-time fee has been dulled by the everyday realities of administering and supporting these agreements.

As a result, it is unlikely that the so-called Big Three software companies — Lotus Development Corp., Ashton-Tate and Microsoft Corp. — will announced site licensing programs in the near future, observers say. Although the arrival of more expensive Microsoft MS OS/2-based applications next year will prompt some vendors to revamp their licensing policies, many corporate buyers have realized that the licenses require a lot of effort for limited return.

"It doesn't work," says Ron Goldfarb, manager of office automation for Pratt & Whitney Administration. "It turns out that no one is really sure how many copies of a given program they need. It seems like the paperwork on a site license is more

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Loosened restrictions spell growth for Bells

BY MITCH BETTS
CW STAFF

WASHINGTON, D.C. — The regional Bell holding companies are likely to use the tiny amount of freedom granted by U.S. District Judge Harold H. Greene to form joint ventures with information service companies or to acquire nontelecommunications firms, analysts said last week.

In his Sept. 10 ruling, Greene gave the Bell companies permission to provide transmission gateways for videotex, electronic mail, on-line data retrieval and other information services. In addition, Greene abolished all restrictions on investments in businesses outside the communications industry.

Mark Winther, market analyst for Link Resources Corp. in New York, predicted there will be more joint ventures like the one between Ameritech and Inet Company of America, a Chantilly, Va.-based firm that is providing a network gateway for online data bases and electronic mail [CW, Aug. 31].

Investment options

While some Bell companies will invest in enhancing their local networks with new features, others will concentrate on plain telephone services and invest their profits in financial services, computer software and other businesses, according to Jerome G. Lucas, president of Telestrategies, Inc., a consulting firm in McLean, Va.

"Judge Greene made it very easy for them to diversify into nontelecommunications activities," Lucas said. Greene abolished the entire prohibition on nontelecommunications businesses, including the requirements to obtain waivers on a case-by-case basis and limit outside business revenue to 10% of total revenue.

Wall Street sources suggested that the seven regional Bell companies, with easy access to capital, will seek acquisitions in the range of $200 million to $300 million. For example, Ameritech, a holding company based in Chicago, bought the computer software vendor Applied Data Research, Inc. for about $215 million early last year.

Because Greene blocked the Bell companies from getting into long-distance or equipment manufacturing businesses [CW, Sept. 14], there will be even more incentive to diversify into new businesses, analysts said.

In a 223-page antitrust opinion reviewing the Modified Final Judgment that broke up the old Bell System three years ago, Greene said that most of the restrictions on the Bell holding companies must be retained because the divested Bell operating companies could still use their monopoly power over the local networks to harm competitors.

The Bell companies were particularly disappointed by Greene's decision to allow them access to only a small part of the information services industry.

Greene's ruling permits the Bell companies to transport information services but not to provide or modify the information content. Specifically, he said the companies can provide only data transmission, address translation, protocol conversion, billing management and two introductory pages for an electronic information service.

By preventing the Bell companies from providing information services such as electronic Yellow Pages, Greene's decision denies them access to 80% of the $2-billion information services market, said George R. Dellinger, telecommunications analyst for Washington Analysis Corp.

"That's why they're kicking and screaming, moaning and whining," Dellinger said.

Clearing up fuzziness

Greene, acknowledging that there may be some fuzzy distinctions between transporting and providing information services, started a supplemental proceeding that allows interested parties to offer suggestions on how to draw the line. That proceeding is expected to last a few months and result in an order that more clearly defines what the Bell companies can do in the information services market.

"There is a tremendous lack of clarity about what they can and cannot do, especially in the voice messaging, electronic mail and electronic data interchange fields," observed Steven Sieck, vice-president of electronic services for Link Resources.

The Information Industry Association supported Greene's decision, although the trade association is expected to seek safeguards against any anticompetitive behavior by the Bell companies.

Analysts predicted the Bell companies will appeal Greene's ruling to the federal appeals court but said they doubted the decision will be overturned there.

On another front, some members of Congress have expressed interest in pushing legislation to provide the Bell companies with more freedom or at least in turning the regulatory decisions over to the Federal Communications Commission.

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Soft-Switch assembles E-mail backbone

BY STANLEY GIBSON
CW STAFF

BOSTON — Moving to take a leadership role in corporate network building, Soft-Switch, Inc. last week unveiled an electronic mail backbone product that brings IBM's Systems Network Architecture Distribution System (SNADS) to the VM operating system for the first time.

Running the new Soft-Switch Central/VM software package, a VM host — most likely the IBM 9370 — will switch E-mail and editable documents from multiple vendors through Soft-Switch gateways.

"Large accounts need a backbone environment. The 9370 is clearly going to be IBM's communications gateway box," declared Michael Zisman, Soft-Switch chairman and chief executive officer.

IBM currently does not offer its SNADS protocol under VM but offers it as part of its Distributed Office Support System (Disoss), which runs under MVS. In addition, SNADS is included in IBM's Personal Services/36 for the System/36 and Personal Services/38 for the System/38. Professional Office System (Profs) is IBM's E-mail protocol supported under VM.

Ties separate mail packs

Soft-Switch also announced products that will bring Hewlett-Packard Co.'s Desk, Novell, Inc.'s The Coordinator, 3Com Corp.'s 3+ Mail and Profs to the VM-based SNADS network.

Soft-Switch will use its own existing products to link Digital Equipment Corp.'s All-In-1, Wang Laboratories, Inc.'s Wang Office and NBI, Inc. and Xerox Corp. mail systems into Soft-Switch Central/VM.

Soft-Switch announced it will be a value-added reseller for Lotus Development Corp.'s Lotus Express, a package of communications software for MCI Communications Corp.'s MCI Mail.

In addition, Soft-Switch announced the creation of its Engineering Services Group, which it said will design customized networks for major customers.

Zisman also said that in the fourth quarter, his firm will offer a bridge that will link HP Desk with All-In-1.

"The announcement is very positive for them. One of the main complaints about the way you had to arrange a multivendor environment in IBM world is that you had to do it on a host," said David Terrie, president of Newport Consulting in Boston. "IBM has said it will be distributing things, but Soft-Switch is getting a jump on them."

Terrie said the system could by improved to enable automatic updating of directories of the various systems working in a Soft-Switch network.

Currently, updating is done on each system by a network administrator, he said, adding that a distributed naming system announced by DEC at the recent Decworld '87 show is more advanced and that IBM is trailing in this area.

Competition from DEC

The Soft-Switch rollout came one week after DEC unveiled its Mailbus, the facility linking All-In-1, SNADS and Disoss and CCITT X.400-based E-mail systems.

Zisman acknowledged that Mailbus will offer stiff competition. "It's an alternative to a SNADS backbone," he said.

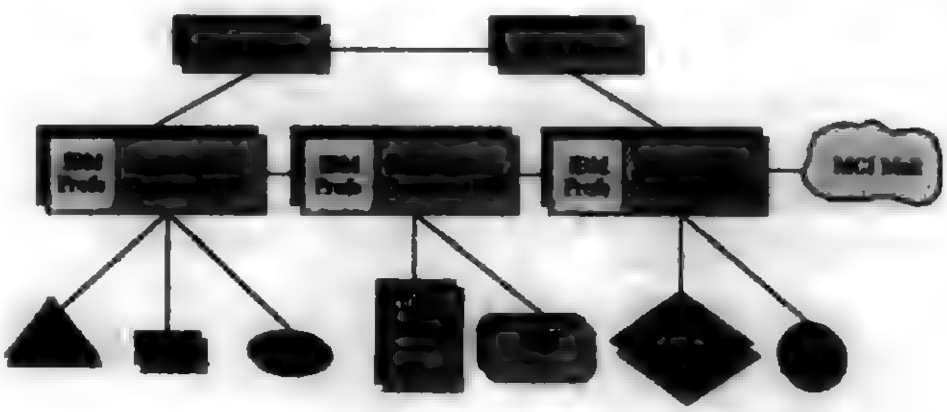
Conspicuous by its absence in Soft-Switch's plans was Data General Corp.'s Comprehensive Electronic Office system. "We don't run into DG very often in the large-account marketplace," Zisman explained.

Zisman said Soft-Switch is committed to supporting X.400 but that the international E-mail standard is not yet a strong factor in the U.S. "The market is not driven by X.400 in the U.S.," he said. However, he added, the strong presence of SNA within major companies dictates the increasing use of SNADS, and as time goes on, X.400 may be used between companies.

Soft-Switch Central/VM and all the gateway products are available immediately. Prices for the products announced last week range from about $40,000 to $400,000, according to the number of nodes on which a specific software package will run. The high-end price is a ceiling for interconnecting DEC, Wang, IBM and HP systems with an unlimited number of nodes within a corporation, according to Soft-Switch.

Marriage broker

Soft-Switch intends to use IBM's 9370 and VM software as the hub components of multivendor networks



INFORMATION PROVIDED BY SOFT-SWITCH, INC.
CW CHART

Intergraph plans to buy Clipper chip

Wants to secure supply of 32-bit microprocessor after earlier shortages

HUNTSVILLE, Ala. — Intergraph Corp. announced plans last week to acquire the Fairchild Camera & Instrument Corp. Clipper microprocessor, which it has been using in its line of engineering workstations.

The purchase is subject to the pending acquisition of Fairchild's semiconductor business by National Semiconductor Corp. Financial terms were not disclosed by Intergraph.

Intergraph, located here, is a maker of computer-aided design and manufacturing systems.

The Clipper chip is a 32-bit reduced instruction set computing-based microprocessor that reportedly processes data at a rate of 5 million instructions per second.

Fairchild has been selling Clipper to Intergraph and a handful of other companies, most of which Fairchild has not named.

"As of now, we haven't indicated that we will cancel anyone's supply, but I can't tell you what our future plans are," said James Dorton, assistant treasurer at Intergraph.

No direct competitors of Intergraph use the Clipper chip, Dorton added.

Keeping up with demand

Dorton said Intergraph viewed the Clipper purchase as a good business decision and one that would "secure the supply" of the chip.

In late 1986 and early this year, Fairchild had difficulty keeping up with demand for Clipper, and its customers — particularly Intergraph — were unable to meet their own shipment schedules as a result.

Dorton said that Fairchild had rectified the situation by June and that the early delays were not the primary reason for purchasing the microprocessor.

The agreement primarily concerns Clipper technology and does not include any wafer-fabrication facilities that Fairchild had used.

Currently, most of the Clipper chips are built by Fujitsu Ltd. in Japan on a subcontracting basis. Dorton said the arrangement will stay intact for the near future.

Chrysler drives into leasing

Consolidation in the computer leasing business continued with two recent acquisitions.

Greenwich, Conn.-based Chrysler Asset Management Corp. entered the field with the acquisition of NFC Leasing, Inc., a Hinsdale, Ill.-based lessor of mainframes and peripherals. The purchase price was not disclosed. NFC Leasing had revenue of $59.8 million and an asset portfolio of $47.5 million for its fiscal year ended March 31.

In another recent deal, Redondo Beach, Calif.-based computer lessor Capital Associates, Inc. acquired Leastec Corp. of Walnut Creek, Calif., for an undisclosed amount. Leastec reported a portfolio of $37 million for the year ended Aug. 31.

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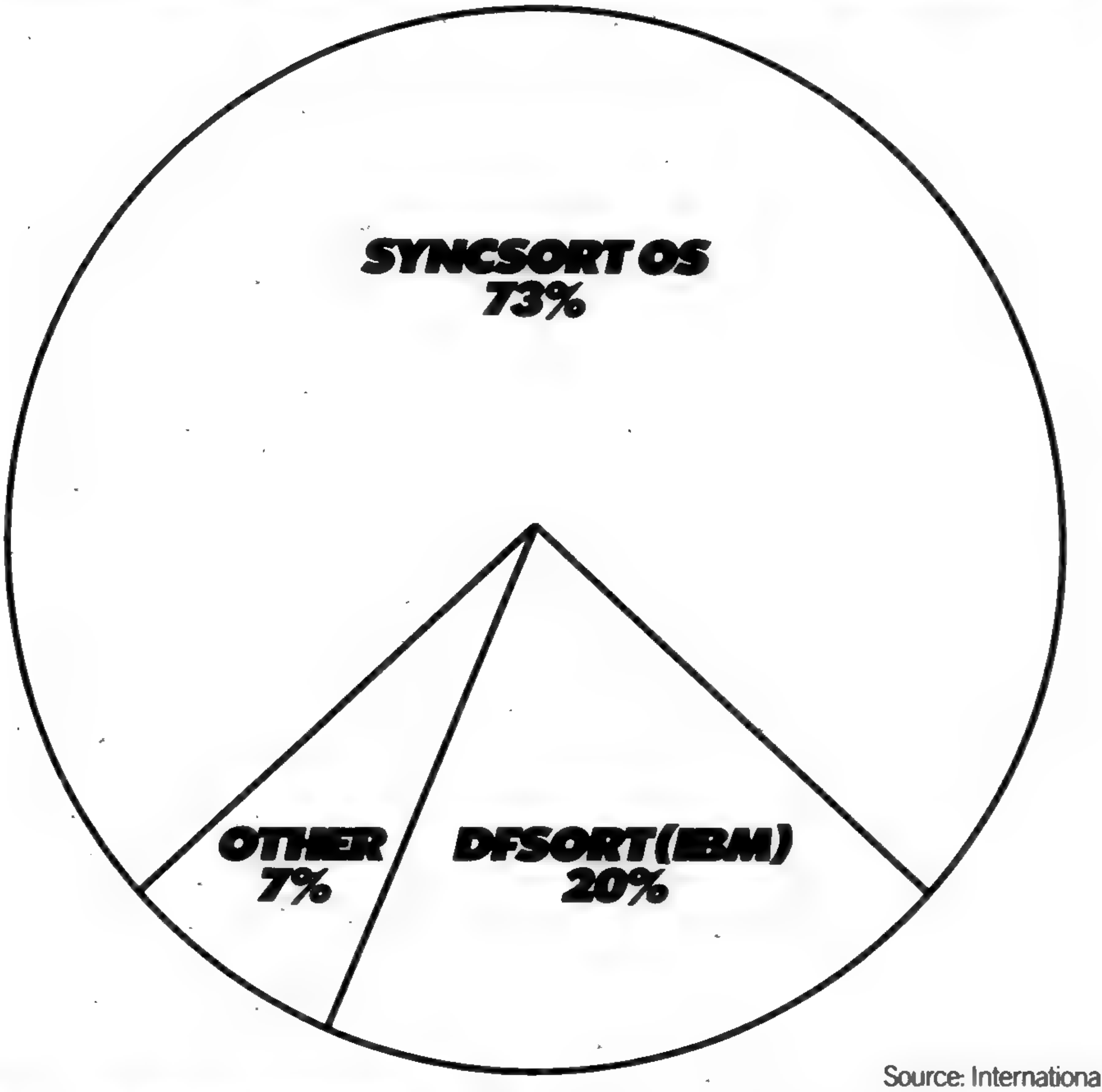

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HP adds five units to Vectra PC line

Responses to PS/2 accommodate programs on 5¼-, 3½-in. disks

BY JEFFRY BEELER
CW STAFF

SUNNYVALE, Calif. — Hewlett-Packard Co. today will parallel IBM's Personal System/2 family by extending its Vectra personal computer line with five units based on Intel Corp. 8086, 80286 and 80386 processors.

Unlike the PS/2 machines, however, the new Vectras reportedly accommodate programs residing on 5¼- and 3½-in. diskettes simultaneously.

HP said it plans to formally introduce the machines today at an HP users group meeting. The systems range from the desktop Vectra CS, with a 7-MHz 8086, to the Vectra RS/16 and RS/20, which incorporate 16- and 20-MHz 80386s, respectively. The latter units are the first offered by HP in a floor-standing configuration, which is commonly used in file server applications.

HP will also replace its existing Vectras with two 80286-based models, the 8-MHz Vectra ES and 12-MHz Vectra ES/12.

The announcement of the five Vectra family additions coincides with the release of an enhanced version of Microsoft Corp.'s Windows. Scheduled to be available on the workstations by year's end, the upgrade will support memory management utilities and other features that previously existed only on HP's proprietary version of Windows, according to HP marketing manager Jim Carlson.

As part of today's introduction, HP is also slated to introduce bundled packages. One, designed for desktop publishing, combines the Vectras with Windows, Aldus Corp.'s Pagemaker and an HP laser printer, Carlson said. It will be priced from $4,389 to $6,479.

The other packaged system, priced from $3,135 to $5,125, marries the workstations to a built-in Starlan board to turn them into communications servers for local networks.

All five extensions to the Vectra PC line support Microsoft's MS-DOS 3.2 and, except for the entry-level Vectra CS, will also run OS/2, the operating system being jointly developed by IBM and Microsoft.

Like their PS/2 equivalents, the latest Vectra family members support 3½-in. diskettes, but they also come standard with 5¼-in. drives.

Users have a choice of configuring their Vectras with any combination of 5¼- and 3½-in. diskette drives.

"HP's decision to allow its workstations to talk to both the old and new kinds of disks is a very good idea," said Steve Susa, manager of technical systems for Interex Corp., the company's international users group.

Conform to EMS

Except for the Vectra CS, all five of HP's latest workstations conform to Version 4.0 of the Lotus/Intel/Microsoft Expanded Memory Specification (EMS). The support enables Vectra users to expand their micros to as much as 16M bytes of memory, said Thomas Buiocchi, a product manager with the firm's Personal Office Computer Division.

The Vectra CS conforms to the Lotus/Intel/Microsoft EMS Version 3.2 specification, which allows the product to hold up to 8M bytes of main memory.

DEC emulation

All five Vectra models come with an AT&T-style keyboard, provide HP and Digital Equipment Corp. terminal emulation as standard features and support disk caching, which can boost performance by as much as 100%, Buiocchi said.

The products also use a surface-mounting technique of attaching chips to their motherboards — an approach that cuts heat dissipation by 20% and minimizes parts counts, he added.

Intended mainly as a local network server and personal engineering workstation, the floor-standing Vectra RS/20 incorporates up to two 103M-, 155M- or 310M-byte hard-disk units with a 17-msec average seek time. A version with 1M byte of memory, a 1.2M-byte floppy disk drive and a 40M-byte hard disk costs $7,495. A comparably configured Vectra RS/16, which is also packaged as a tower but has a 16-MHz processor, costs $6,495.

A minimum-configuration Vectra CS with an 8086 chip, 640K bytes of random-access memory and a 360K-byte floppy disk drive sells for $1,195. The 80286-based Vectra ES and ES/12 with 1.2M-byte floppy disk drives and 640K bytes of main memory start at $2,595 and $2,995, respectively.

HP said initial availability for the five Vectra machines will begin around Oct. 1 and extend through the first quarter of next year.

Vectra grows up

HP's five additions to Vectra PC family range from entry-level to high-performance

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Vectra CS	8086	7.16	640K to 8M	5¼-in. 360K-byte, 3½-in. 1.44M-byte	20M-byte	$1,195- $1,895 (640K bytes)
Vectra ES	80286	8	640K to 8M	5¼-in. 360K-byte, 5¼-in. 1.2M-byte, 3½-in. 1.44M-byte	20M-byte	$2,595- $2,795 (640K bytes)
Vectra ES/12	80286	12	640K to 8M	5¼-in. 360K-byte, 5¼-in. 1.2M-byte, 3½-in. 1.44M-byte	20M-byte	$2,995- $4,195 (640K bytes)
Vectra RS/16 (floor-standing)	80386	16	1M to 16M	5¼-in. 360K-byte, 5¼-in. 1.2M-byte, 3½-in. 1.44M-byte	40M-byte	$6,495 (1M byte)
Vectra RS/20 (floor-standing)	80386	20	2M to 16M	5¼-in. 360K-byte, 5¼-in. 1.2M-byte, 3½-in. 1.44M-byte	40M-byte, 103M-byte, 155M-byte, 310M-byte	$7,495 (1M byte) $11,995 (2M bytes)

INFORMATION PROVIDED BY HEWLETT-PACKARD CO.
CW CHART

HP launches 24-wire dot printer

BY JAMES CONNOLLY
CW STAFF

VANCOUVER, Wash. — Hewlett-Packard Co. is expected to commit to 24-wire dot matrix printer technology today with the introduction of a $1,695 printer designed to support multiple personal computers or minicomputers.

With a draft-quality print speed of 480 char./sec. and a letter-quality speed of 240 char./sec., the Ruggedwriter 480 is targeted at applications ranging from PC spreadsheets and graphs to high-speed data processing center print jobs.

The printer was designed to be more reliable than and twice as fast as HP's previous mid-range printers, the 12-wire HP 2932 and 2934.

Carol J. Peterman, impact product line manager for HP, positioned the Ruggedwriter 480 with the HP Laserjet in a performance range covering individual printing and work group printing.

Reliability claimed high

The printer, which uses an HP-designed printhead, is expected to have a 20,000-hour mean time between failures, HP said. Peterman said this reliability rate is four times that of other dot matrix printers in its class. HP claimed print speed and reliability advantages in comparison with the Epson America, Inc. LQ-2500, the NEC America, Inc. P5 and P9, the Okidata 393 and the Toshiba America, Inc. 351.

However, a research analyst for Newtonville, Mass.-based market research firm Datek Information Service, Inc. said HP was comparing its printer to products more commonly used in less demanding, single-user applications than in work group situations.

Analyst Scott Puopolo said more appropriate comparisons would be with the NEC P8300 or the Mannesman Tally Corp. 330, both of which are heavy-duty DP-oriented 24-wire printers. He said that even in the latter comparisons, HP appears to hold a price advantage.

Puopolo said HP "has hit on a good combination" in its Ruggedwriter 480 design. He praised the paper-handling features, including the Laserjet's optional sheet feeder.

The list price is $1,695. An 18K-byte font-cartridge accessory costs $150, and the automatic sheet feeder costs $250.

Deliveries are scheduled to start Oct. 1.

COS packages help vendors test OSI compliance

BY MITCH BETTS
CW STAFF

MCLEAN, Va. — The Corporation for Open Systems (COS) last week announced four more software packages that were designed to test whether vendors' products conform to Open Systems Interconnect (OSI) protocols.

The new software packages will test compliance with the Internet, FTAM, Message Handling System (MHS) and token-bus (IEEE 802.4) protocols, according to COS officials speaking at a press conference.

COS, a nonprofit consortium working to accelerate the use of OSI standards, developed the test suites to help vendors design systems that meet standard OSI specifications for interoperability.

Conformance testing

COS will also use the software packages in its testing center to certify that products conform to the standards.

Lincoln D. Faurer, president of COS, said the products are being unveiled in order to help COS members participate in an interoperability demonstration that is called the Enterprise Networking Event '88 International and is slated to be held in Baltimore in June 1988.

COS began shipping its first product, the Transport Protocol Conformance Test System, earlier this month [CW, Sept. 14]. That product costs $20,000 to $35,000 for COS members and $40,000 for nonmembers.

The four additional products are the following:

- The 802.4 (token-bus technology) Test System will reportedly be available at the end of October, with prices starting at $6,000.
- The Internet Protocol Test System will begin shipping in late November; it costs $5,000 to $14,000 for COS members and $16,000 for nonmembers.
- The FTAM Protocol Test System will begin shipping in late November; it costs $30,000 to $85,000 for COS members and $100,000 for nonmembers.
- The MHS Protocol Test System will begin shipping in late December; it costs $25,000 to $115,000 for COS members and $135,000 for nonmembers.

Under the Sun

The COS software products run on a Sun Microsystems, Inc. Sun-3/160 workstation.

Officials said the products will be sold this fall to COS members attending the Baltimore event and will be released for sale to other vendors in February, March and April next year.

Faurer said COS will not begin conformance testing until shortly after the June 1988 event in Baltimore because the organization's small staff will be unable to devote its attention to in-house testing until after the event.

Windows opens to relational

BY DOUGLAS BARNEY
CW STAFF

FOSTER CITY, Calif. — One of the first relational data base packages to run under Microsoft Corp.'s Windows 2.0 operating environment will be announced this week by Blyth Software, Inc., sources at the firm confirmed.

The announcement will occur at Microsoft's Redwood City, Calif., introduction of Windows 386, a version of Windows that acts as a control program for Intel Corp. 80386-based microcomputers.

Compaq Computer Corp. has been expected to announce an agreement under which a special version of Windows 386 will be bundled with the Compaq Deskpro 386. It was unclear at press time whether Compaq would announce such an agreement.

The $795 Blyth package, Omnis Quartz, is a rework of the firm's popular data base for Apple Computer, Inc.'s Macintosh. Microsoft Windows 2.0 is scheduled to ship by next month. A runtime version of Windows 2.0 will be bundled with Blyth's Omnis Quartz, the vendor said.

Interface lauded

While Windows requires a large investment in hardware, including an Intel 80286-based machine, a mouse and high-resolution graphics, packages like Omnis Quartz reward the user with ease of use and more elegant screens. "You have got to love the interface," said Rick Sherlund, a software analyst for Goldman, Sachs & Co.

But the Windows requirement may hinder the market for Blyth. "I have never met a Windows user," said Adam Green, a Lexington, Mass.-based data base consultant.

The move to Windows is also expected to ease the porting of Omnis Quartz to Microsoft's OS/2 Version 1.1, which is expected to be released sometime next year.

The Blyth package provides what-you-see-is-what-you-get capability, which enables users to view a report on the screen the way it will be printed. It also makes use of pull-down menus and provides layered windows for entering and viewing data.

The package reportedly can work with data sets of up to 2.5G bytes. Omnis Quartz also includes a procedural language with 180 commands. Omnis Quartz will ship by the end of this year, and a local-area network (LAN) version will be available in the first quarter of 1988, according to Blyth. Pricing for the LAN version has not been set.

Blyth is gearing up for a public offering next month and is expected to raise $5 million to $7 million. The firm had some $4 million in revenue in its last fiscal year.

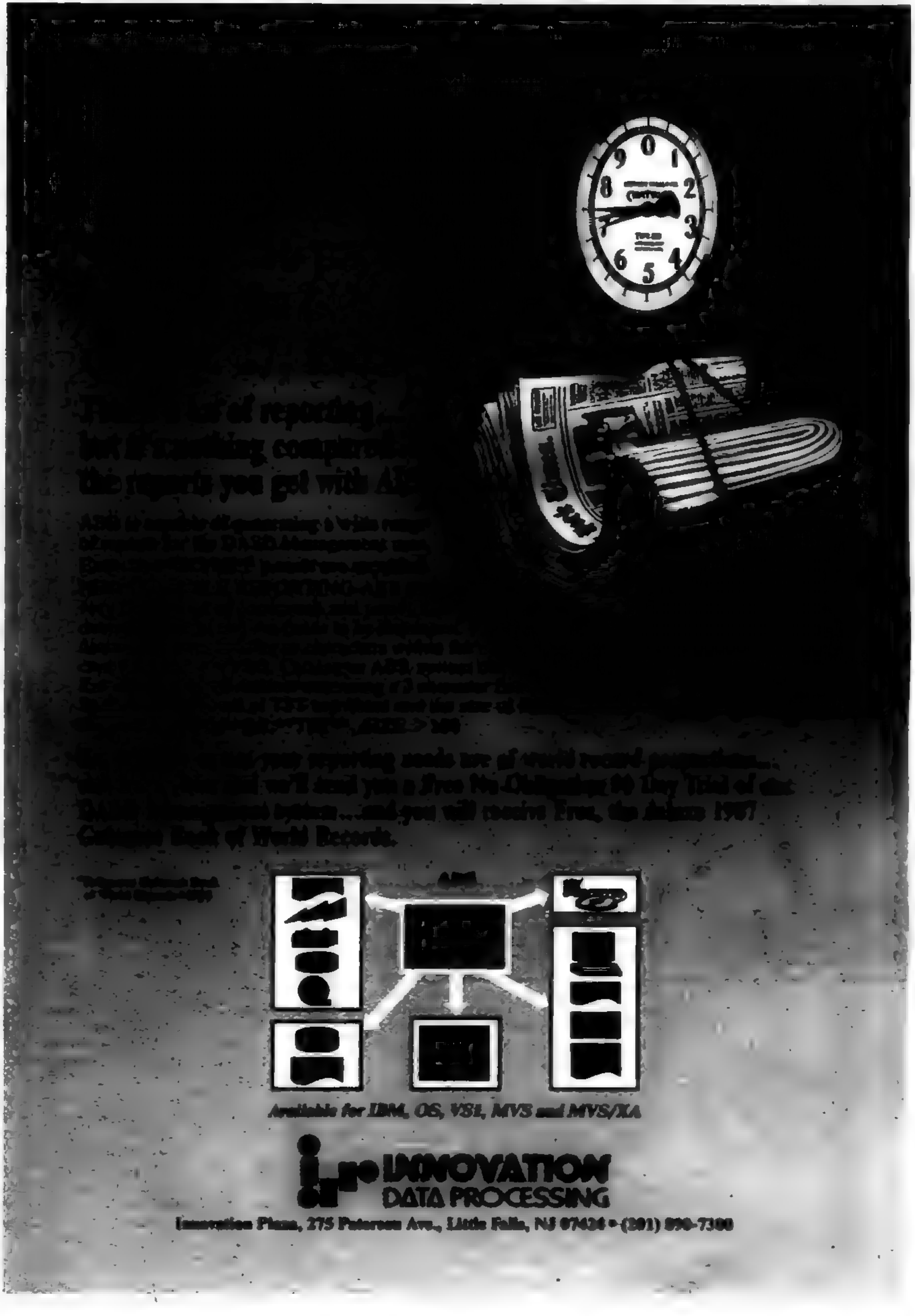
Graphwriter goes 1-2-3

CAMBRIDGE, Mass. — Lotus Development Corp. last week revamped its Graphwriter charting package to work more closely with 1-2-3, the firm's flagship product.

The $495 Graphwriter II is marketed as an automated charting system for 1-2-3, with the ability to create up to 100 updated charts with a single command when properly configured. In addition to linking charts to 1-2-3, the package can also link charts to Ashton-Tate's Dbase.

Lotus has also adopted its 1-2-3 interface, including its menus and command structure, for use in Graphwriter II. The package now provides the ability to place multiple charts on a single page. In addition, it supports a greater number of output devices, such as laser printers and image recorders.

Graphwriter II is scheduled to ship next month. Registered users can upgrade for $75, Lotus said.



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Codex muscles up net management plan

BY PATRICIA KEEFE
CW STAFF

CANTON, Mass. — Codex Corp. last week unveiled the Codex 9800 Series Integrated Network Management System, its most ambitious network management scheme to date. However, users will have to wait until at least the end of 1988 before Codex is ready to supply most of the pieces to its modular system.

Said to feature an integrated open architecture based on the emerging International Standards Organization standards, the 9800 Series will reportedly be able to manage large, complex heterogeneous networks utilizing multiple technologies and a broad range of equipment from a mix of carriers and data processing vendors.

From a single workstation, it will combine a graphically oriented, consistent method of configuring, monitoring and controlling devices with an integrated data base and applications tools for event, fault, performance and configuration management, the vendor claimed.

Phase-in

"The broad spectrum of functionality needed to manage these networks will be phased in over the next several years," conceded Mark Davies, vice-president and general manager of Codex's Wide-Area Network Operations.

The first phase of the high-end 9800 Series is not scheduled for release until January 1988 and will reportedly support only multiplexers on Codex systems. Management of Codex modems is set to follow sometime in the first quarter. By the end of 1988, Codex claimed, the 9800 Series will be able to manage multiplexers, modems, CCITT X.25-compatible equipment and voice/data products.

Besides aligning its current product line under the 9800 Series, Codex is also promising to integrate support for products from selected vendors, including IBM's Netview. Part of that integration is expected to come in the form of strategic alliances.

Despite the multiyear delivery schedule, the 9800 Series will be available for shipment under the Codex Early Support Program in January 1988, with a base price of $61,900.

Analysts who attended a product briefing last week said they were cautiously optimistic about the 9800 Series, noting that Codex is the largest independent supplier of communications equipment. "I think their strategy is well thought out and sophisticated," said Kathryn Korostoff, a senior analyst with International Data Corp. (IDC) in Framingham, Mass.

Judgment reserved

Korostoff said the Codex presentation fell short in explaining how the 9800 Series will accomplish its goals. Despite expressing support for the concepts that underlie the 9800 Series, several analysts said they will reserve judgment until the product ships next year.

Codex's scheme is fairly straightforward, according to Frank Dzubeck, president of Communications Network Architects, Inc. in Washington, D.C. Codex will layer its own presentation mechanism over Netview and the Open Systems Interconnect (OSI) model, essentially covering the market.

"If it'll work with Netview, it'll work with OSI," he added.

The 9800 Series utilizes an Apollo Computer, Inc. Domain Series 3000 engineering workstation, which is based on Motorola, Inc. 68020 and 68881 processors, and includes a graphics processor, a 155M-byte Winchester disk drive and 4M bytes of memory. Also to be featured are windowing capabilities, color graphics and a mouse that lets the operator select, inventory, configure, monitor and test specific devices or groups of devices in the network.

ADR opts

FROM PAGE 1

for use with Datacom/DB, an expert system for MVS performance management and capacity planning, and a voice messaging system (see story this page).

ADR, which has been stung by IBM's aggressive moves in the data base market with the SQL-compatible DB2 [CW, Aug. 31], will move toward a policy of peaceful coexistence with DB2 under the enhanced software. With SQL support, the Ideal fourth-generation language can be used to create applications to run against IBM's DB2 as well as Datacom/DB.

The ADR software is not currently compatible with IBM's own version of SQL. However, ADR officials said they believe IBM will eventually adhere to the evolving ANSI standard, which is expected to be published next month.

"Everyone involved believes [SQL] will converge around one standard," noted William Clifford, executive vice-president and chief financial officer at ADR. "We believe it will happen, and we believe IBM wants it to happen as well."

IBM seems to be headed toward ANSI SQL compatibility. Release 3.0 of its DB2 incorporates a version of SQL that is more similar to the ANSI standard than previous releases. IBM has also said it is committed to supporting the ANSI standard.

SQL compatibility will allow Datacom/DB to run applications developed for other SQL-based systems, and it provides a framework for defining ADR's continuing implementation of new relational features for its data base management system, the firm said. Moreover, since SQL is a key sublanguage in IBM's Systems Applications Architecture, support of it will ensure that Datacom/DB will be able to remain compatible with future IBM developments.

By adding SQL support to Ideal, ADR is offering customers a way to build applications for DBMSs that can be ported to similar systems, including DB2. A customer's investments are protected because he can build applications today that can be used in the future, regardless of what DBMS he ultimately chooses, Clifford said.

Ideal Version 2.0 can run against DB2 because it is tightly coupled with DB2 through the DB2 catalog, the firm said.

'The right direction'

"This is a big step in the right direction," noted Peter Burris, an analyst with International Data Corp. in Framingham, Mass. "Given the current situation in the data base world, ADR is saying, 'We're not going to fight it, but [we are going to] do everything that we can to provide a higher performance data base than DB2 and provide better support, but at the same time maintain compatibility with DB2.' "

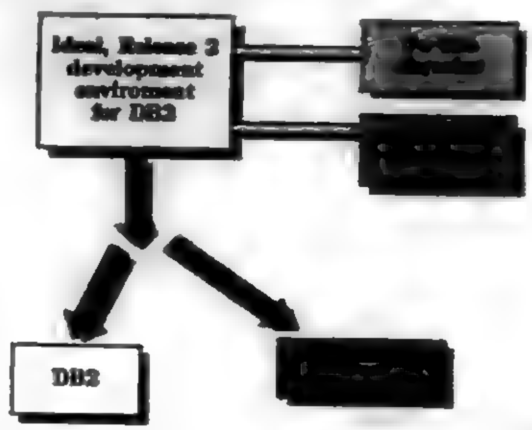
Burris said he does not feel the firm's flexible data base strategy will provide impetus for Datacom/DB users to abandon ADR's product in favor of DB2. If anything, Burris said, the approach will open new vistas for ADR. "Before, they didn't have SQL, and there were some questions about how relational Datacom/DB was, so they were getting locked out," he noted.

Datacom/DB Release 8.0 operates under IBM's MVS and MVS/XA or VSE and VM/CMS on IBM 9370, 4300, 3080 and 3090 and plug-compatible systems. It will reportedly be available in the second quarter for license fees of $145,900 for MVS and $114,500 for VSE VM/CMS environments.

Ideal Version 2.0, which operates on the same machines as Datacom/DB, but only in MVS and MVS/XE environments, will reportedly be available in the first quarter next year. Permanent license fees are $175,000, the firm said.

An Ideal relationship

Applications developed in Ideal, Release 2, with or without SQL, can be run with either IBM's DB2 or ADR's Datacom/DB



CW CHART

Datacom/DB CASE

Applied Data Research, Inc. (ADR) last week introduced its first computer-aided software engineering tool for automating the data base design and modeling of its Datacom/DB data bases.

Scheduled to be available in the second quarter of next year, Depictor resides on an IBM Personal Computer or compatible workstation with 640K bytes of random-access memory (RAM) and a hard disk. It accesses data base definitions using ADR's Datadictionary. The PC component is based on technology supplied by Cadware Group Ltd. in New Haven, Conn.

Permanent license fees are $24,000 for IBM VSE and VM/CSE environments and $28,500 for IBM MVS environments, including one copy of PC software.

ADR also unveiled an expert system for MVS performance management and capacity planning. Mindover MVS is a PC-based expert system that evaluates 14 domains of a mainframe's performance, including CPU and I/O, before drawing conclusions and offering recommendations.

Developed internally by ADR's MVS experts, the expert system requires an IBM PC AT or compatible running Microsoft Corp.'s MS-DOS 3.0 with 580K bytes of RAM and 4M bytes of hard-disk storage. Scheduled for first-quarter 1988 delivery, Mindover MVS lists for $42,500.

A version of the firm's Email electronic-mail product was also introduced. Email-Voice adds messaging in the form of synthesized speech and human voice replies to standard E-mail functionality. Because Email-Voice is fully integrated with ADR's Ideal and Dataquery software, information from the corporate data base can be stored as an Email message and played back in either a human or computer-synthesized voice.

The voice messaging system requires ADR's Email and speech synthesis/digital sampling system and interface products developed by Speech Plus, Inc., a company in which regional Bell holding company Ameritech owns a minority interest. Combined prices start at $54,000 for VSE, $64,500 for VM/CMS and $67,500 for MVS environments.

ADR also disclosed an aggressive financing plan offered through Ameritech Credit Corp., its parent company's equipment leasing subsidiary. Through Ameritech, ADR hopes to offer finance charges approximately 1½ points lower than those offered by independent vendors and flexible payment schedules, said Steve Gerrard, vice-president of ADR's Software Products Division.

"This puts us on an even keel with IBM in dealing with customers, since we'll be using our parent company like IBM uses IBM Credit Corp. — as a bank," Gerrard said. "It also provides us with some means of differentiation from other independent software companies."

ALAN ALPER

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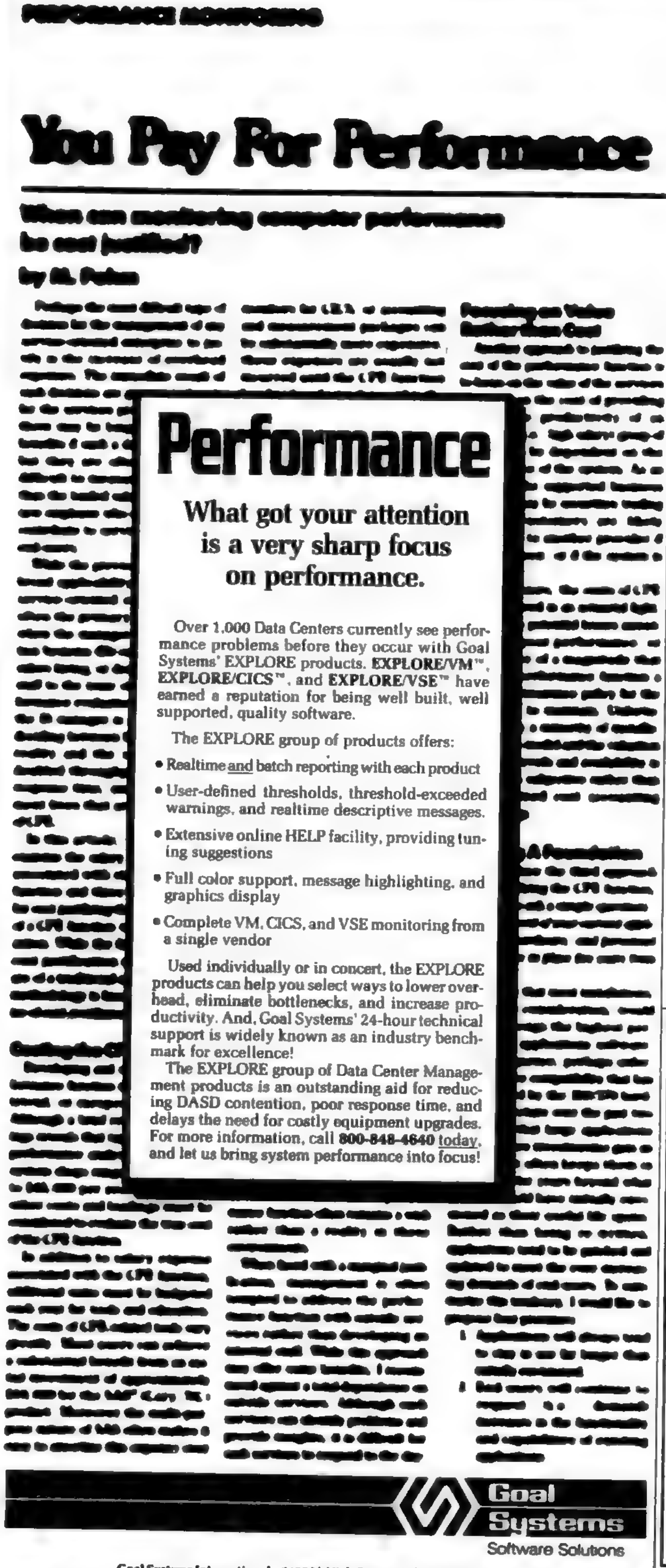

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Net analysis field grows

Ungermann-Bass cultivates Net/Scope tool

BY PATRICIA KEEFE
CW STAFF

SANTA CLARA, Calif. — Ungermann-Bass, Inc. last week introduced Net/Scope, a turnkey network management system said to enhance the ability of network managers to quickly diagnose problems and analyze network performance.

With Net/Scope, Ungermann-Bass jumps into the mushrooming market for network analyzer packages. Other recently introduced packages include The Sniffer from Network General, Inc. in Sunnyvale, Calif.; Lanwatch from FTP Software, Inc. in Boston; and Lanalyzer from Excelan, Inc. in San Jose, Calif.

As a major addition to the Net/One network management family, key Net/Scope features include the ability to capture information and gather statistics, alert and filtering capabilities and unattended network monitoring.

The information capturing capability reportedly enables a network manager to selectively review any network data packet, store packets for later review and create software "triggers" that start or stop data storing.

Selective review of network traffic, either workstation-to-workstation or segment-to-segment, allows Net/Scope to quickly identify any source of network data problems, the vendor claimed.

The alert capability reportedly provides immediate warning of any observed network errors.

Net/Scope is an extension of the vendor's current Net/One network management family. Network planners and engineers can gather in-depth information about their networks that is unavailable using Ungermann-Bass's Network Management Console (NMC) or Network Control Console alone.

The package includes Net/Scope software, a network interface unit and documentation. The interface unit can be added to an NMC to enable the Net/Scope program to use the NMC's utilities.

Changes role of PC

Net/Scope turns a personal computer into a network management workstation. IBM's Personal System/2 family is not supported. Security is preserved by limiting Net/Scope's operation to those PCs equipped with the network interface unit.

Networks supported include IEEE 802.3 Ethernet, Net/One broadband and Net/One fiber-optic interfaces, as well as the lower two layers of Digital Equipment Corp.'s Decnet.

Net/Scope scrutinizes the bottom layers of the International Standards Organization's Open Systems Interconnect model for nets using Transmission Control Protocol/Internet Protocol and Xerox Corp.'s Xerox Network Systems protocol.

Available now, Net/Scope costs $7,500 for the NM0150 baseband model and $8,150 for the NM0160 broadband model, which includes a modem. These prices include a $5,000 software right-to-use charge.

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Name

Title

Dear IBM,

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Attached is a blank check. I keep reading that you've already announced that you're going to announce SQL for OS/2 and the Personal System/2.

When you do, fill in the check amount. Hope to hear from you sometime in the next couple years.

Name

Title

Company

Street

City

Northern Telecom offers net control

BY ALAN ALPER
CW STAFF

NEW YORK — Northern Telecom, Inc. last week unveiled Meridian Customer Defined Networking, an assemblage of products, applications and support tools said to allow large organizations to configure their own hybrid networks.

The networking architecture is based on a modified version of DMS-Supernode, a modular digital central-office switch being marketed to telephone companies and interexchange carriers [CW, July 13]. Also packaged with the switch, called Meridian Supernode, are applications and network control components to configure and manage hybrid networks.

Meridian Customer Defined Networking is based on industry-standard protocols and features an open architecture that facilitates peer-to-peer internetworking among an organization's private and public networks.

"It gives large organizations, for the first time, end-to-end applications across hybrid networks and access to network management and service capabilities similar to those used by telephone companies and interexchange carriers," said Ed Tagg, group vice-president of data communications and networks.

Northern Telecom said it hopes the products will appeal to large corporations and government agencies that use a combination of public and private network facilities and services. "Market research shows, in fact, that over three-quarters of all corporate networks today are hybrid networks," noted Desmond Hudson, Northern Telecom's president.

Analysts said the approach will be useful to larger corporations that already act as their own telephone companies.

Hudson said Meridian Customer Defined Networking will primarily be marketed by systems integrators but that if customers want, it can be installed directly by Northern Telecom.

The firm reportedly had intended to disclose a systems integration relationship with Electronic Data Systems Corp. (EDS) last week at a press conference in New York but abruptly canceled the announcement, saying the agreement had not been concluded. Hudson declined to say what the EDS agreement would entail or when it is expected to be concluded.

EDS acknowledged that it is testing Northern Telecom's Meridian products but declined to say whether an agreeement is forthcoming.

Building net for GM?

EDS is believed to be using Northern Telecom equipment to build a corporatewide network for its parent, General Motors Corp. The agreement under discussion would reportedly make EDS a systems integrator using Meridian Customer Defined Networking to construct custom networks for other corporations and government institutions.

Meridian Supernode, available now, is fully compatible with Northern Telecom's Meridian SL-1 and SL-100 integrated services networks, DPN packet-switching systems and Meridian Digital Centrex lines.

Roland Zalite, Northern Telecom's director of strategic marketing, said that a customer with 10 locations on a network served by an SL-1 integrated services network would have to spend about a half-million dollars to upgrade its architecture to provide some of Meridian Customer Defined Networking's capabilities.

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Wang enrolls in ISDN net trials

LOWELL, Mass. — Wang Laboratories, Inc. last week announced it has joined McDonald's Corp. and Illinois Bell Integrated Services Digital Network (ISDN) trials at McDonald's facilities in and around Oak Brook, Ill.

Wang actually joined the ISDN trials at McDonald's in June and has agreed to participate through the end of the trial, which concludes in mid-1988.

Wang is supplying its recently announced Wang Professional Computer 280s to demonstrate voice and data applications available through the ISDN standard for workstation connection, known as the ISDN Basic Rate Interface.

The PCs are equipped with interface cards that conform to the Basic Rate Interface and provide McDonald's users access to simultaneous voice and data communications over standard, or unshielded, twisted-pair telephone cable.

The PCs are located in five separate buildings and are able to communicate with a Wang VS 100 minicomputer at the McDonald's Oak Brook headquarters.

The interface cards connect to the telephone lines via a modular jack and allow connection between the personal computers and the Wang VS via an AT&T #5 ESS switch located in Illinois Bell's Oak Brook central office. The transmission adheres to the ISDN 2B + D signaling format.

The interface cards are not yet available.

Honeywell Bull to ax U.S. plants, old systems

Says closings will streamline operations; Level 62 and DPS 4 users get migration path

BY JEAN S. BOZMAN
CW STAFF

CINCINNATI — Honeywell Bull, Inc. plans to close some U.S. manufacturing plants this fall and to phase out its aging Level 62 and DPS 4 machines in favor of the firm's newer DPS 7000 line.

Honeywell Bull President and Chief Executive Officer Jerome Meyer revealed those plans here last week at a meeting of the North American Honeywell Users group (NAHU), where he outlined strategic directions being taken by the 6-month-old company formed by Compagnie des Machines Bull of France, Honeywell, Inc. and Japan's NEC Corp.

In his speech, Meyer said the company plans to streamline through plant closings during the next three to six months. "We need to get our capacities in line," Meyer said following his speech. "We have redundant production capabilities around the world. And in the U.S., we have much more than we need over the next five years." He did not provide details of the expected closings.

To users of the Level 62 and DPS 4 systems, Meyer said, "We have a program that's going to bring you over to the DPS 7000." The installed base of the older machines is relatively small, with about 200 Level 62 systems in the U.S. However, users will be forced to migrate to the GCOS 7 operating system, using software being developed in England.

There are only 55 DPS 4 machines installed in the U.S., Honeywell Bull spokesmen said, and several hundred more in Europe. In contrast, there are more than 2,000 DPS 7s worldwide and more than 50,000 DPS 6 machines. Several DPS 4 users said they were surprised by the official confirmation that their system would be phased out. "I'm just sitting here in shock," said Craig Wiester, data processing manager at Sico, Inc. in Minneapolis. "They're forcing us into a conversion situation."

Major enhancements expected

The DPS 6 and DPS 7 — the mainstays of the Honeywell Bull line — will receive major enhancements next year, *Computerworld* has learned. The widely installed DPS 6 is slated to get a new high-end machine, called the HRX, running at about 8 million instructions per second (MIPS).

That compares with a performance rating of about 3 MIPS for the DPS 6 Plus. The HRX will reportedly have up to four processors connected to one bus.

Two models of the DPS 7000, designed and built in France, will reportedly be marketed in the U.S. next year, the Honeywell spokesmen said. Called the Models 1017 and 1027 in Europe, the machines will be in the IBM 3090 Model 150 and Model 180 power range. The highest rated DPS 7 sold here, the DPS 7000 Model 50, is roughly equivalent to the IBM 4381. Separately, Meyer indicated that there is also a forthcoming high-end processor from NEC, which owns 15% of Honeywell Bull.

Honeywell Bull, with 20,000 employees, will have achieved $2 billion in sales by April 1988, after one year of operations, Meyer said. Much of its income is coming from the company's role as exclusive supplier of computer systems specified under part-owner Honeywell's federal contracts, he added.

Users seemed cautiously optimistic about the steps their vendor is taking. But there is, increasingly, the fear that the French owners from Groupe Bull will use their 1988 option to increase Bull's share of the firm from 42.5% to more than 60%.

Jerome Meyer

One problem with French development is that it takes time for Americans to learn about new products. "Typically, we do run a little bit behind the Europeans in finding out about new products," said David Adkins, data processing director for Placer County in Auburn, Calif., a NAHU session leader.

A striking example of the knowledge gap is the high degree of French familiarity with upcoming products now being tested in France. Two NAHU attendees from the Banc Nacional de Paris said they knew of a DPS 4 migration package being developed by a Honeywell Bull software team in Britain.

Such gaps in knowledge are being recognized by European users, including Roland De Conihout, president of the EFOBHUA/CUBE users groups in Paris, who addressed NAHU.

"The international aspect of Bull is becoming something important in Honeywell's strategy, and we feel that we, as users, can't afford to be outside this trend," he said. "We have tried to devise more contact between users on both sides of the Atlantic Ocean."

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Multimate stakes claim in LAN market

BY STEPHEN JONES
CW STAFF

TORRANCE, Calif. — In an attempt to bolster its waning presence in the word processing market, Ashton-Tate last week announced a local-area network (LAN) version of its Multimate Advantage II word processor.

The $1,495 package, which includes one server and five workstation modules, is available immediately. Additional workstation modules cost $150 each.

Multimate Advantage II LAN operates on a variety of networks, including the IBM Personal Computer LAN, Novell, Inc.'s Advanced Netware/86 and 286 and 3Com Corp.'s 3+. In addition to the capabilities of the stand-alone version, the LAN package features document sharing, file locking and individual customization of system defaults.

Irene Patti, product manager at Ashton-Tate's East Hartford, Conn., operation, claimed the LAN version will be a "strong contender" in the Fortune 1,000 market, in which the use of LANs is skyrocketing. Beta-test versions of the package have apparently already won over some big corporate users who gave Multimate Advantage II LAN high marks.

"Speedwise, it's a superstar, very fast; and the added network features are almost transparent to the user," said Warren Winter, systems planner for Pfizer Corp.'s purchasing division in New York.

Winter, who has used a beta-test version of the product for a month, said the program's user interface is more friendly than its predecessor's, the Multimate Advantage 3.6 LAN version. That package's file locking would boot a user to the DOS level; the new version keeps the user in the program with a "wait" message on a document-summary screen.

Dbase IV

CONTINUED FROM PAGE 1

tions Architecture, a proposed common interface for applications.

Additionally, SQL is important as Ashton-Tate moves into direct competition with the likes of Oracle, Relational Technology, Lotus, Microsoft and IBM — all of which compete in or intend to enter the SQL arena.

SQL support 'mandatory'?

"It's mandatory that Ashton-Tate support SQL — there's really no choice," said William Shattuck, an analyst with Montgomery Securities, Inc. in San Francisco. "Now it's a question of how they're going to position themselves against the eight or 10 other companies that are in the same market."

Rick Sherlund, a software analyst with Goldman, Sachs & Co., agreed. "Don't bother putting it out if it doesn't have SQL," he advised.

But sources said Ashton-Tate does plan to give the product some SQL capabilities. "It was one way only: SQL to Dbase. They had an SQL-to-Dbase translator, and that is all that they had ever accomplished," a former key Ashton-Tate Dbase developer said of the firm's progress as of this summer.

Others agreed. "It allows programming in SQL but does not allow Dbase to query a host data base. That won't happen until they separate the engine," said Tom Rettig, founder of Tom Rettig Associates, a vendor of Dbase tools.

According to the ex-Ashton-Tate developer, the package's SQL will be consistent with IBM DB2 but not the ANSI standard. As a result, it may allow DB2 to query Dbase. This, however, is considered less useful than using Dbase to query the mainframe.

Others key features that Dbase IV will lack are data recovery, commit and rollback, which most SQL products currently contain, sources said.

The Dbase architecture, the defections of key developers and Ashton-Tate's late start in serious SQL development have limited what can be done with SQL. 'They are restricted by the current Dbase architecture. It is not sufficient for a full implementation of an SQL engine," said Rich Finkelstein, vice-president of the Codd & Date Consulting Group's Midwest Region in Chicago.

"There may be some very major restrictions, like lacking unions [more than two table joins]," Finkelstein said. "I believe they will come out with a subset of the SQL language, which means that the users will not realize anywhere near the power of the full SQL engine."

Dbase IV was originally thought to be scheduled for announcement in early November, with shipment by early 1988, but that introduction may be held up due to technical problems, some of which involve SQL. "They were supposed to ship an alpha version on September 15 but missed it," a third-party developer said, adding that the system would freeze when various commands were invoked.

In order to hasten its SQL development, Ashton-Tate acquired a team of SQL developers and an SQL product from Wordtech Corp. in April. The Wordtech SQL product was announced in August 1986 but never shipped.

West Coast correspondent Stephen Jones contributed to this report.

Compuware Takes The Mystery Out Of CICS

Compuware takes the mystery out of CICS by making three exceptional interactive testing and debugging tools to gain control over it. Exceptional because their powerful individual functions help stabilize applications and systems. But what's truly unique about them, is how well they work together. So that, as a threesome, they have all the smarts to form a systems control center — at one terminal.

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Dell targets corporate micro market

BY JULIE PITTA
CW STAFF

AUSTIN, Texas — Dell Computer Corp. last week trimmed prices on some existing microcomputers and added a number of configurations to its product line as part of the company's efforts to penetrate the corporate marketplace.

Prices on seven models of Dell's PC's Limited line were reduced by as much as 12%. Dell cut the prices on four of its Intel Corp. 80386-based microcomputers, which began shipping in May, as well as on two Intel 80286-based systems and one Intel 8088-based personal computer.

Under the new price structure, Dell's five 8088-based systems range in price from $799 for a monochrome system with a 360K-byte floppy disk drive to $1,899 for a 40M-byte hard disk drive IBM Enhanced Graphics Adapter (EGA) system, previously priced at $2,149.

Additionally, Dell added an 8088-based PC for a monochrome system with a 40M-byte hard disk drive.

Prices for Dell's four 8-MHz 80286-based PCs now range from $1,799 for a monochrome system with a 20M-byte hard disk drive to $2,499 for an EGA system with a 40M-byte hard disk drive, previously priced at $2,649.

Added were two 12-MHz 80286-based microcomputers — a monochrome system with a 150M-byte hard disk drive, priced at $4,399, and an EGA system with a 150M-byte hard disk drive, priced at $4,899.

Dell's six-model 80386-based line was enhanced by four price cuts. The price on a previously introduced 40M-byte monochrome system was rolled back to $4,299 from an original $4,499, while an 80M-byte monochrome version was reduced to $4,699 from $4,899.

Prices were also cut on two EGA 80386s. A 40M-byte hard-disk version was trimmed to $4,799 from $4,999, while a 70M-byte hard-disk model was reduced to $5,199 from $5,399.

Graham Beachum, Dell senior marketing and sales vice-president, said he expects the price reductions to increase the company's share of the corporate market. He projected that Dell's 80386 line will represent the greatest percentage of its systems sales.

"We're out to target IBM," Beachum said, noting that Dell's systems are compatible with the OS/2 operating system being developed by IBM and Microsoft Corp. "I haven't found a lot of MIS directors sitting on the edge of their seats for the IBM Personal System/2."

Tech graphics tool arrives

BY ED SCANNELL
CW STAFF

RICHARDSON, Texas — Micrografx, Inc. this week is set to introduce a program that is compatible with IBM's Personal Computer series and addresses the needs of both graphic artists and users who do technical illustrations.

Designer, a vector-oriented resolution-independent program, permits users to create complex artwork and illustrations by tracing scanned images or to construct complicated architectural designs. The company said it thinks Designer will accomplish on the IBM-compatible side what Adobe Systems, Inc.'s Illustrator has accomplished in the Apple Computer, Inc. Macintosh-compatible world.

Designer covers the needs of a niche market that previously has not been addressed in the IBM-compatible market, the vendor said. Previously, developers have written programs targeting just graphic artists or just technical draftsmen but never a program that addresses the needs of both, according to Paul Grayson, Micrografx chairman and chief executive officer.

"For example, we have graphic artists at McDonnell Douglas that want to import scanned images and trace over them using spline curves. But on the other hand, we have users at Boeing that want technical drafting features, like the ability to do autodimensioning," Grayson said.

Written for Windows

One advantage Designer has over its competitors, according to Grayson, is that it is written to work with Microsoft Corp.'s Windows graphical operating environment. He said this will be more attractive to new users than the "mainframe-style interfaces" used by packages such as Autodesk, Inc.'s Autocad.

"We think we have a unique definition of drawing and drafting systems for nonengineers, although we think it is useful for engineers as well," Grayson said.

Some of the program's design features include the ability to import, merge or save bit-map images from scanners and to do polygon and curve editing.

Designer carries a suggested retail price of $695 and is bundled with Windows Convert, an Autocad translator. The program is scheduled for release in the fourth quarter.

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AT&T Mail reaches out farther

MORRIS PLAINS, N.J. — AT&T last week introduced interconnection of AT&T Mail to other electronic mail systems, including Digital Equipment Corp.'s Mailbus.

Gateway400 is a service enhancement incorporated in the AT&T Mail messaging system and is said to link to other systems that use the CCITT X.400 recommendation for message-handling systems.

Using Gateway400, AT&T Mail subscribers can exchange messages with E-mail users served by Telecom Canada's Envoy 100, making it the first commercial international electronic mail link of its kind, AT&T claimed.

AT&T Mail will also link to DEC's Mailbus, which can interconnect multiple E-mail systems, including IBM's Systems Network Architecture Distributed Services and Distributed Office Support System, or Disoss. AT&T subscribers will be able to exchange messages with users of DEC's All-In-1 equipped with the appropriate X.400 software.

As new interconnections are made with other vendors, AT&T Mail subscribers will be able to extend electronic order-entry and information-exchange applications into other countries, AT&T claimed. Within the U.S., subscribers can access messages electronically at their personal computers and terminals, and they can hear Mail Talk's synthesized voice read their messages over any Touch-Tone phone.

To communicate to non-AT&T Mail subscribers, messages that are electronically input are delivered automatically in hard copy by AT&T Mail to the U.S. Postal Service, a courier or telex. In addition to messages, subscribers can send binary files like spreadsheets and computer files. AT&T Mail charges, which are based on the length of the message a subscriber sends, typically range from 40 to 80 cents within the continental U.S. Sending messages to Envoy 100 users in Canada will cost an additional 25 to 30 cents per message, according to AT&T.

MS-DOS 'host' lets terminals double as PCs

BY ED SCANNELL
CW STAFF

NEWPORT BEACH, Calif. — A privately held networking company last week introduced a microprocessor-based system designed to provide Microsoft Corp. MS-DOS applications to as many as 100 ASCII terminals while retaining their terminal functions.

The Centaur II mainframe, unveiled by Data Voice Solutions Corp., uses up to 100 NEC Corp. V40 application processors — compatible with the Intel Corp. 8-MHz 8086 — to provide ASCII terminal users with applications designed for the Microsoft operating system, such as Lotus Development Corp.'s 1-2-3.

Supporting most ASCII terminals through Novell, Inc.'s Netware operating system or through a private branch exchange (PBX), the product can also be linked to a variety of minicomputers and IBM mainframes.

PC functions at mainframe level

The system centralizes microcomputer functions at the host level while retaining compatibility with MS-DOS, according to Jerry Kappenman, Data Voice's senior vice-president of product marketing.

Currently, corporate users who access minicomputer and mainframe applications through ASCII terminals are forced to buy microcomputers if they want MS-DOS compatibility. Centaur II eliminates this need by essentially turning users' terminals into workstations that run MS-DOS-compatible software. Conversely, users retain connectivity to their host system.

"No one that we can see is bringing DOS to the 24 million terminals out there. That is a major market," Kappenman said.

Centaur II can contain between one and 100 applications processors, each of which is a "PC on a card," Kappenman said.

Terminals attached to the system use the applications processors to run MS-DOS programs. They can be wired directly to the processors on a one-to-one basis using standard telephone wiring, a data switch or voice/data PBXs to increase the number of terminals supported.

Centaur II supports most ASCII terminals, including Digital Equipment Corp.'s VT100 and compatibles. "This allows DEC users to keep their investment of method of doing things and to also become casual users of popular DOS programs like 1-2-3 and Dbase III," Kappenman said.

It also allows IBM's Personal Computers and Personal System/2s to be connected as on-line workstations using Novell-compatible interface hardware such as Ethernet, Arcnet or IBM's Token-Ring Network.

Prices for the Centaur II mainframe, which is housed in a standard 19-in. rack, range from $50,000 for a 30- to 40-user configuration to $185,000 for a version that can support as many as 500 occasional users.

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Celerity dives into near-supercomputer fray

BY JAMES CONNOLLY
CW STAFF

SAN DIEGO, Calif. — Celerity Computing last week launched a drive from its base in superminicomputers into a higher level of technical computing with the introduction of its first near-supercomputer.

The Celerity 6000 is a 64-bit departmental multiprocessor that the vendor positioned against the near-supercomputers sold by Alliant Computer Systems Corp. and Convex Computer Corp. and IBM 3090 Model 200E mainframes with the IBM Vector Facility.

Celerity officials claimed an installed base of 160 systems as of June, with 95% of those machines being used in scientific and engineering applications. "We're getting out of the superminicomputer arena and into the supercomputer market," said Robert P. Ollerton, director of product marketing for Celerity. He said the company will continue to offer its two primary superminis, the C1230 and the dual-processor C1260.

A first

Like the 3-year-old C1200 line, the 6000 is Unix-based and uses reduced instruction set computer technology. The 6000, available with up to four scalar processors or up to two vector processors working in combination with two scalar processors, is the first Celerity to perform parallel processing by breaking down a problem to run simultaneously on several CPUs, according to Ollerton.

Ollerton claimed that a key consideration in the 6000's design was Celerity's desire to balance performance. "Some computers have great vector and crummy scalar performance. Some people have great vector and scalar performance but poor I/O," said Ollerton, claiming that the 6000 can handle 40 million floating point operations per second (MFLOPS) per processor, move 40 million 64-bit words per sec. from memory and translate 40 million addresses per sec.

He said simulations show the 6000 with four scalar processors can process more than 60 million Whetstone instructions per sec., compared with about 40 for an Alliant FX/8 with eight compute elements. He said the 6000 with one vector processor and one scalar processor performs 8 MFLOPS in a 100-by-100 full-precision Linpack benchmark, compared with 12 MFLOPS for an IBM 3090 and just under 8 MFLOPS for an Alliant FX8.

The 6000 has a cycle time of 25 nsec and a 90M byte/sec. I/O subsystem. It is available with up to 832K bytes of cache, 1G byte of memory and 44G bytes of disk storage.

Due to ship in November, the 6000 costs $250,000 with 32M bytes of memory, a Unix license, 690M bytes of disk storage, a tape backup and a console.

X Windows gets push from MIT

BY DAVID BRIGHT
CW STAFF

BOSTON — Hoping to further boost its X Windows system as a de facto standard, MIT announced last week at the Decworld exposition here a new version said to incorporate richer graphics and more design extensibility.

X Windows is a portable architecture for developing network-based windowing applications for workstations. The architecture was originally developed at MIT, but since January, it has gained support from several major manufacturers, including IBM, Apollo Computer, Inc., Data General Corp., Hewlett-Packard Co. and Sun Microsystems, Inc., in addition to Digital Equipment Corp.

MIT also announced that it is forming a consortium of industrial companies to continue X Windows development. DEC, host for the announcement, said it is enthusiastically supporting X Windows but would not say when it plans to introduce related products and applications.

Sun initially was promoting its competing, Postscript-based Network Extensible Window System (NEWS); but last April, the firm joined the X Windows movement, saying it would merge NEWS with the new version of X Windows.

Version 11 of X-Windows represents "a fairly complete redesign," said MIT's Robert Scheifler, who will be director of the consortium. While Version 10 was "very much a university research project," Version 11 has a more industry-related focus, he said.

For example, Scheifler said, the new version should help smaller companies because it allows for greater flexibility in designing extensions.

Now that X Windows is a de facto standard, added MIT's Steven Lerman, the next major step is to build an application [illegible].

"We are zealous advocates of the X Windows system," stated Richard Treadway, work-system software program manager at DEC. "X Windows on workstations is the design center for all new application development" and "will play a pivotal role in the transition from timesharing to distributed computing."

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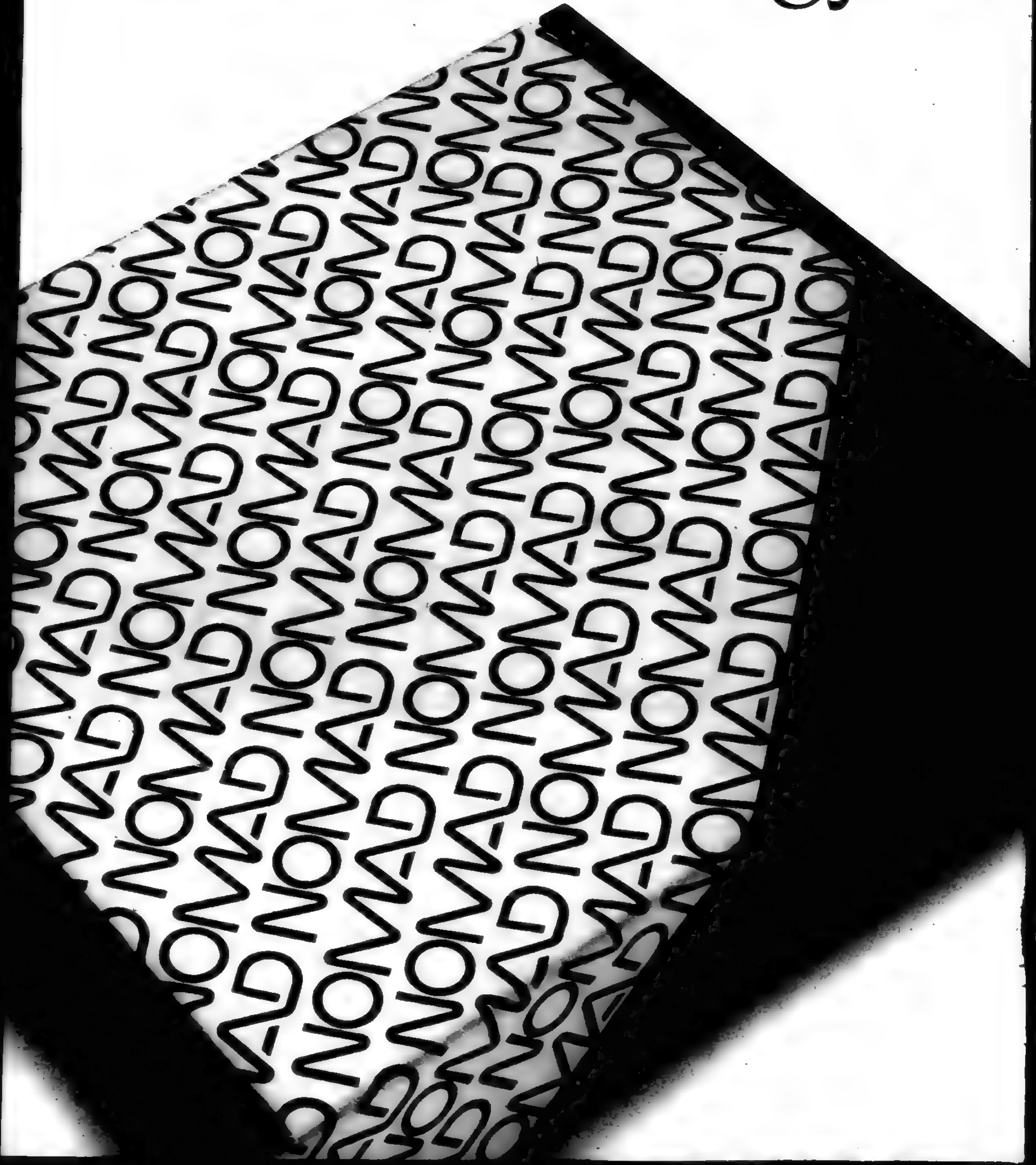

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EDITORIAL

No Greene light

If you could group the seven regional Bell holding companies into one, the resulting $67 billion entity would have greater financial might in the communications arena than IBM holds in the mainframe computer industry. It is in this light that Judge Harold H. Greene's recent ruling on further deregulation should be read; further illumination can be obtained from the carefully crafted arbitration ruling delivered last week in the settlement of the IBM and Fujitsu Ltd. dispute.

Settling a confrontation that dates back to 1983, the arbitration panel, in essence, found that competition in the mainframe market requires the ability to offer IBM-compatible operating system software; access to the mainframe market is, in effect, bottlenecked by the proprietary control IBM exerts over that market. The panel has guaranteed Fujitsu access to IBM software technology — strictly supervised to prevent copying — in order that the Japanese firm can develop the interface characteristics to enable its software to run on IBM machines and, by logical deduction, enable it to keep Fujitsu machines fully compatible with the IBM standard.

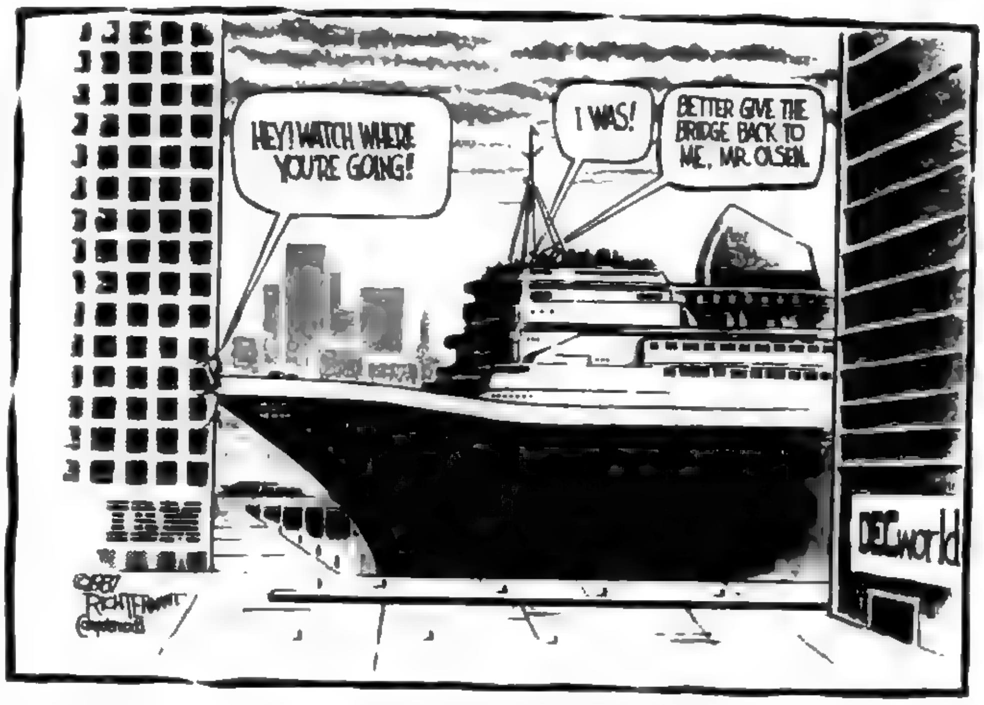
That ruling recognizes that, no matter how well intentioned it is, a business that completely dominates a particular industry must make accomodations to foster the dynamic of competition on which the free-market system thrives.

The 1982 decree separating the holding companies from AT&T did not instantly create a fully competitive communications industry. Greene's decision of two weeks ago is based on the view that what exists today are seven mini-Bell systems, each invested with the monopoly power and inherent potential for abuse on the regional level that dominated the U.S. for decades under the national Bell system.

Each of the seven entities maintains a monopolistic control of the local-exchange bottlenecks through which almost all locally generated communications traffic must pass to connect to a long-distance carrier. This provides the potential to hamper independent companies' use of the networks if their products were to compete with a similar offering from the network's owner. Additionally, Greene declared that if the regionals were able to buy equipment from their own subsidiaries, they would close off 70% of the market.

The regionals complain bitterly that the long-distance market is open to everyone but them and that technology and local regulatory agencies are rapidly eroding their monopolistic power over regional networks. However, Greene rightly held that, for practical purposes, it is economically impossible to duplicate the point-to-point connection that the Bell networks provide until future technological developments provide an alternate connection scheme.

Rather than whittling AT&T down to size, it is more likely the regional companies, with the benefit of local exchange monopolies, would squeeze out some 530 independents lacking those added resources.


HEY! WATCH WHERE YOU'RE GOING!
I WAS!
BETTER GIVE THE BRIDGE BACK TO ME, MR. OLSEN.
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LETTERS TO THE EDITOR

Protect thyself

In "Users' rep ranks PC vendors, decries Lotus copy protection" [CW, Aug. 17], you ran a generally informative article concerning the Capital PC User Group, Inc. The article clearly focused on the importance of service in the microcomputer industry. It also refers to President Jerry Schneider's concern for copy protection by Lotus Development Corp, but only as a general item in line with nine other discussion areas. One wonders why copy protection ended up as a headline, when one of the major reasons for the growing technical support concerns is directly related to the inordinate number of pirated software programs.

He also implied that protecting a program was a disruption, a nuisance and caused many problems for the user. How these occur was not made clear.

The technical effectiveness of most copy protection programs has improved to where there is virtually no legitimate argument against it. Serious software developers cannot afford to release an unprotected program if they expect to receive an acceptable return on their investment.

Many technical support calls are directed to software developers that are a direct result of pirated copies. The sales successes hopefully realized by nonprotection are coming back in significantly increased support costs and decreased revenue due to the lost sales. One certainly invites a practical suggestion for Lotus, other than copy protection, that will ensure the position they now maintain.

Jim Christoffersen
Vice-President of Sales
Vault Corp.
Newbury Park, Calif.

Changes due

In regard to "Women making strides in MIS" [CW, Aug. 17], may I state that, once again, *Computerworld* has come to the point of the problem, though perhaps not the obvious one. If women were really making strides in MIS, then the second headline would have read "Old chauvinism fading as women attain management positions" instead of ". . . as young men attain management positions."

Speaking as a woman educated and trained in data processing, I can tell you that working with a "young man" who has little experience and training can be very frustrating, especially when you are in the middle of a conversion from an IBM System/36 to a Digital Equipment Corp. Microvax II, and he knows nothing about either. I can tell you that I am one woman who will not just stay and put up with it, and neither should anyone else. That is how we can bring about a change — how unfortunate for all involved.

Catherine L. Gilbert
Jackson, Miss.

This week in history

Sept. 19, 1977
Computers come aboard many of the boats in the 23rd America's Cup Challenge in Newport, R.I., in a big way. Both finalists — the American defender Courageous and Australian contender Australia — sport sophisticated systems, while 50% of the original half-dozen entrants say they place great reliance on computers for accurate speed, wind and position information.

Sept. 20, 1982
IBM discharges and sues three high-ranking employees for allegedly misappropriating secret information about the IBM Personal Computer. The suit is also filed against Bridge Technology, Inc., a company IBM claims was founded by the ex-employees and which tried to sell design information about unannounced PC products.

School daze

As an MIS educator witnessing the confusion surrounding the curriculum and decline in enrollments, I was very interested in the feature articles on the crisis in MIS education [CW, June 15 and 22].

Some of what was said was confusing. Particularly so were the statistics compiled from 700 MIS business professionals regarding the educational competencies of recent MIS hires printed in a sidebar in the second part of the series. Forty-five percent cited interpersonal, business and verbal and written communication capabilities as the most deficient skills among computer science graduates.

However, the questions posed were about computer science programs, not MIS programs. Thus, it was not clear if MIS graduates, as opposed to computer science graduates hired by MIS departments, also have the same deficiencies. MIS graduates from business schools typically have a more thorough grounding in business and

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The false profits of vendor strategies

FRANCIS GENS

IBM's disk and controller announcement this month was impressive. While the increased 3090 channel speed and higher performance and capacity disk drives are strong offerings, the product most likely to cause plug-compatible manufacturers concern is the 3990 disk controller.

And, in a tip of their cap to the installed base, IBM even announced support of "standard" 3380s (AAs and Bs) — which are now 2-generation-old devices — on the new controllers.

One thing that IBM did not announce, however, was increased channel speed for 3080 series mainframes. This shouldn't be too surprising.

> WILL the assumptions that IBM is building into its midrange processor strategy still hold true in 1991?

Since used 3080 series machines actually compete with 3090s, nearly everyone agrees that it would be stupid for IBM to enhance the 3080 series with 4.5M byte/sec. channels (or with anything, for that matter).

Would you believe, however, that in 1985 a knowledgeable IBM spokesman publically stated a strategy in which the 3080 series would be enhanced feature by feature along with the 3090, at least until 1989? Here's the story:

A large, diversified financial services company held a planning meeting for its senior MIS executives in southern Florida in April 1985. Following my presentation on "Industry Trends," an IBM speaker known as a straight shooter spoke on "IBM Mainframe Directions."

Since the 3090 Model 200 would not start shipping in volume until August of that year, and the 150 and 180 models would not be announced for almost another year, it was important to convince customers that the 3081 and 3083 were not dead products.

This IBM employee was convincing. The key statement in his speech was, "With the exception of expanded storage and engineering/scientific computing [the Vector Facility was not yet announced], any enhancements to the 3090 will also be available on the 3080 series— until 1989/1990."

Most of us in the audience couldn't believe what we had heard. The statement was repeated in the question-and-answer period. Was IBM saying the 3090 was only going to differ from the 3080 series — aside from the expected difference in processing power and main memory — in two seemingly esoteric areas? This plan seemed both generous (protecting 3080 series users' investment like never before) and dumb (risking negatively affecting 3090 series sales).

'Catches'

Among the 3090 enhancements that many expected were 4.5M byte/sec. channels. One of the things the IBM spokesman's statement seemed to suggest, therefore, was that IBM would also offer high-speed channels on the 3080 series. Since this idea seemed so crazy, I began to think of "catches": IBM would probably price the 3080 series enhancement so high it would be impractical; or it would announce the 3080 channels but delay delivery so long that customers wouldn't wait.

Well, a lot happened in the subsequent two years. The booming mainframe market of 1983 and 1984 turned into the doldrums of 1985, 1986 and 1987. And IBM did such a good job convincing customers that the 3080 was a solid box that many bought inexpensive, used 3080s instead of 3090s. In the slowed-down mainframe market, IBM discovered it couldn't afford the generous 3080 series enhancement policy that it had articulated in April 1985.

Let's face it, when business is tight, does it make sense to spend development (and support) dollars enhancing a product that you no longer actively sell and that may actually compete (on the used market) against your current product? Absolutely not. The fact is that anyone with any sense based 3080 acquisitions on an assumption that the family would be completely replaced by 1986, enhancements or no enhancements.

Yet the people sitting in that Florida meeting no doubt made large acquisition decisions that were at least partially influenced by that information and the per-

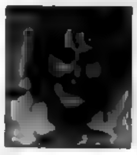
Continued on page 22

Gens is vice-president of technology assessments for the financial services group of International Data Corp. in Framingham, Mass.

Hypercard in hyper(con)text

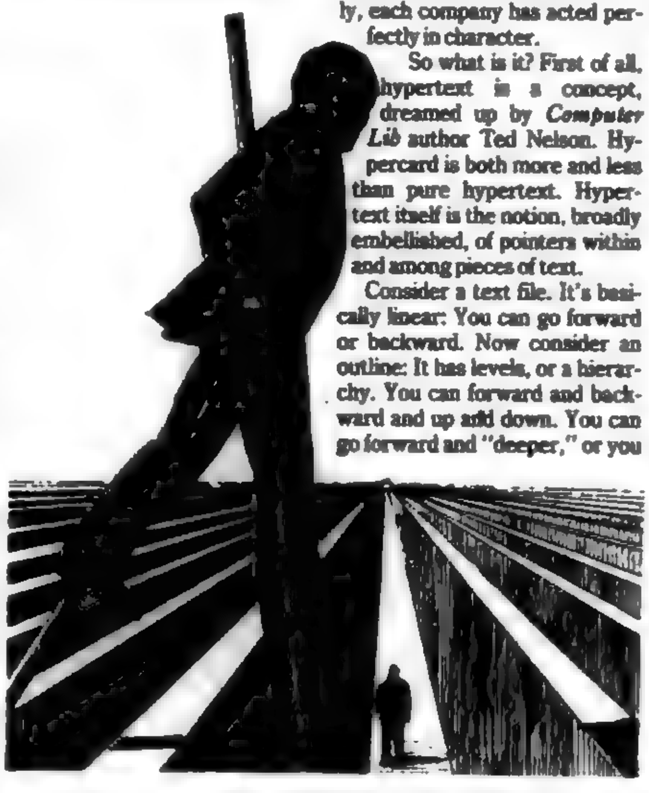
Apple's fast, flexible file manager offers endless programming

ESTHER DYSON



Standing outside The Computer Attic in the Palo Alto dusk not long ago, I pointed to an ad for Apple's Hypercard ("Here now! Only $49.95") and asked the stranger beside me if she knew what it was. No, she didn't. But a thought came to her: "Maybe it makes it go real fast."

Well, not quite. If Apple Computer, Inc. can adequately explain Hypercard in particular, and hypertext in general, it will provide a real service. Many fans of the concept are pleased with Apple's entry, since it will broaden the market for a powerful new capability.



Aside from its intrinsic value, the most striking aspect of Hypercard is how vividly it expresses the Apple and Macintosh spirit. As IBM starts to catch up with the Macintosh in terms of friendliness (with a little help from its third-party friends), Hypercard is the new systems underpinning that will keep the Macintosh ahead in the next round of environment wars.

Hypercard is a very personal tool; on the positive side, it makes the user feel powerful and the computer seem responsive. On the negative side, it doesn't do very much by itself; except for the search-and-sort facilities of the file manager, the user must build all the links by hand.

In contrast, consider IBM's OS/2 Extended version, which perfectly expresses the IBM spirit. Like Hypercard, it's a way of extending the operating system to give its vendor a unique, semiproprietary advantage. (I expect to see knock-offs of both products shortly).

But while Apple empowers the user, IBM empowers the DP manager, who wants to be able to manage large relational data bases and set up communications links with mainframes and other systems. With Hypercard and OS/2 Extended, respectively, each company has acted perfectly in character.

So what is it? First of all, hypertext is a concept, dreamed up by *Computer Lib* author Ted Nelson. Hypercard is both more and less than pure hypertext. Hypertext itself is the notion, broadly embellished, of pointers within and among pieces of text.

Consider a text file. It's basically linear: You can go forward or backward. Now consider an outline: It has levels, or a hierarchy. You can forward and backward and up and down. You can go forward and "deeper," or you can go forward at the same level and skip over lower levels.

However, the text file is still basically linear. If you were to "stretch" the outline, moving everything to the same level, you would still have a linear document, perhaps with numbers marking the different levels.

Hypertext enriches that idea with the notion of skipping around at will within the document or out to others; there's no reasonable way to "stretch" it into linear form or catch all that richness on paper. The closest we get is footnotes, cross-references and parenthetical phrases (a pale, paper form of hypertext).

Every time a document says "See also," a hypertext would have a pointer to that other document itself. You could examine it and then move on from there, or you could go back to where you were. ("This background material is interesting, but I want to get back to the story.")

Linked bits

Traditional hypertext considers all text as linked bits of text. Documents are assembled from needs. After all, the encyclopedia rarely begins at "A"; it begins wherever you start your search for information.

For example, you could turn a reference or etiquette manual into hypertext, with links from soup spoons (in the appetizers chapter) to dessert spoons (from the dessert chapter). In other words, hypertext allows you to structure text in many different ways and lets the user maneuver easily through it.

An extended form of hypertext (or hypermedia) can also incorporate pointers to maps, graphs, tables, musical selections or anything else that can be represented or controlled electronically. Some systems control video monitors: Press the right button, and you get a video clip.

Now let's look at Hypercard in this context. Rather than freeform bits of text, outlines and other media, Hypercard uses "cards" as its nodes. Instead of hypertext, you get Hypercard, with pointers between these cards, which are are basically screenfuls of data. These cards can also have fields and can be sorted, indexed and searched by the data in these fields.

Hypercard is a handy system with the direct manipulation powers and intuitive feel of hypertext, yet with the power of a fast, if simple, file manager. You can create and use arbitrary hypertext links, or you can use the file manager to find things not previously linked by hand.

Hypercard offers one more fundamental advantage over hypertext in general (in addition to the rich graphics, Macintosh menus and all the other valuable items I would classify more as texture than a feature): That advantage is programmability.

Hypercard's pointers can be linked to programs as well as to data objects, and there's a language (Hypertalk) for the user to build his own programs, as well as assemble program modules that come with Hypercard.

Thus, you can push a button and run a program, like "Send a letter incorporating the data I have just filled in on this form." The program could then load in the data and generate a form letter. This program could also be copied, with the boilerplate of the letter altered, and attached to another form.

Continued on page 22

Dyson is editor and publisher of "Release 1.0," a leading newsletter about the personal computer business and the transformation of artifical intelligence into a commercial technology. She is also president of New York City-based Edventure Holdings, which publishes "Release 1.0" and holds the annual PC Forum.

Hypercard

CONTINUED FROM PAGE 21

Another program might be a request for someone's name. Hypercard will use that name to search a card file for phone numbers, then automatically dial that number. Hypercard gives the user a sense of power and offers as much programming capability as he is prepared to use. The possibilities are endless.

Indeed, that is the difficulty many people have encountered in describing Hypercard. Because it is so flexible, it has little fixed character of its own. It is strictly a powerful tool with some sample applications thrown in. It can do anything you want — if you think to tell it to.

False profits

CONTINUED FROM PAGE 21

ceived IBM promise.

Making a big thing of a relatively small incident may seem ingenuous; after all, every vendor routinely makes promises that somehow just don't come true. However, it is now more important than ever to look closely at situations such as this one. Tough competition among IBM, Digital Equipment Corp. and others are leading all vendors to lay out fairly detailed long-term strategies and, therefore, implied promises.

Just how heavily should customers depend on — and invest in — their suppliers' long-term directions? Even if the supplier is sincere in its promises, what are the guarantees that market conditions will not force a change in direction, leaving customers holding the bag? Will the assumptions that IBM is building into its mid-range processor strategy still hold true in 1991? How heavily should customers depend on DEC's ability to deliver a 25 to 30 million instructions per second processor in the timeframe at which it has been hinting?

There is a moral to this story.

To customers: All vendors, including IBM, change their strategic directions when market conditions change. In other words, there is no such thing as an ironclad Statement of Direction.

To vendors: Don't make promises the market might not allow you to keep.

Continued from page 20

communication skills as a result of the required business curriculum.

Furthermore, the article in the series' second part stated that many MIS departments prefer to hire computer science graduates for their technical skills. Managerial skills are then taught in-house. To buttress that claim, the article mentioned results from the same survey that indicate 77% of the respondents would hire computer science graduates over liberal arts graduates. My confusion is that MIS business graduates are not liberal arts graduates. Therefore, I do not know if MIS departments prefer to hire computer science graduates over MIS graduates.

I understand that the statistics I would prefer to see are not easy to compile. MIS professionals and educators know that the field is young and its direction unclear. Perceptions vary widely about the optimal technical/managerial mix. This is particularly apparent with the advent of decentralized, end-user initiated computing.

Another objection I have is that the articles seemed to vacillate between undergraduate curriculum and MBA curriculum. Entry-level expectations, salary levels and the value of work experience must be different with educational status.

However, one idea that came through frequently in both articles was that we may be neglecting technical training, particularly mainframe computing skills. Although telecommunications was not mentioned per se, it is probably correct to say that the majority of MIS graduates are not well trained in this area.

The articles also mentioned the importance of work experience either prior to or concurrent with a degree program. I know that my students who lack job experience also lack clout and self-confidence about their abilities. It appears that this is a ripe arena for expanded university-business cooperation in developing internship and co-op programs.

Jill Smith, Ph.D.
Assistant Professor
Management Information Systems
East Texas State University
Commerce, Texas

Prove it

I was disappointed that a story about security on one of TRW, Inc.'s on-line systems failed to live up to its headline, "TRW wards off data intruders" [CW Aug. 3]. The story quoted two of TRW's own people who said how good their system was but danced all around the specifics of how it worked and never got around to actually showing what it could really do. Whatever happened to good old-fashioned press skeptisicm?

TRW has recently gone into the business of selling credit reports — which is probably why they are looking for publicity — and it's certainly in the best American tradition for a company to try to generate good press, but could we have a bit more substance, please, and more of a "prove-it" attitude in future efforts of companies to promote themselves?

Art D. Hakenower
Brockton, Mass.

Computerworld *welcomes comments from its readers. Letters may be edited for brevity and clarity and should be addressed to Bill Laberis, Editor,* Computerworld, *P.O. Box 9171, 375 Cochituate Road, Framingham, Mass. 01701.*

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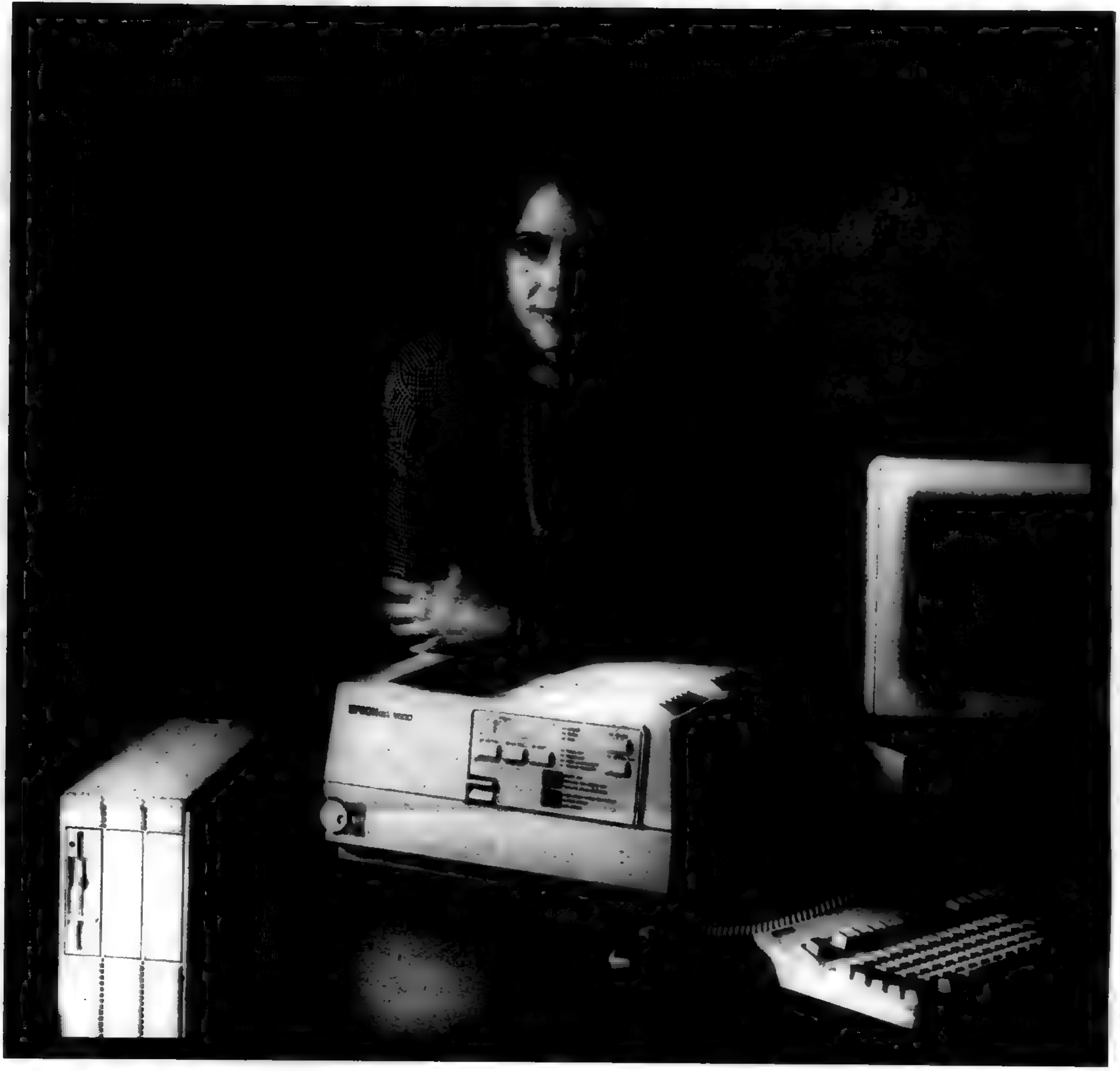

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MOST DBMS PRODUCTS ARE BUILT ALONG THE SAME LINES.
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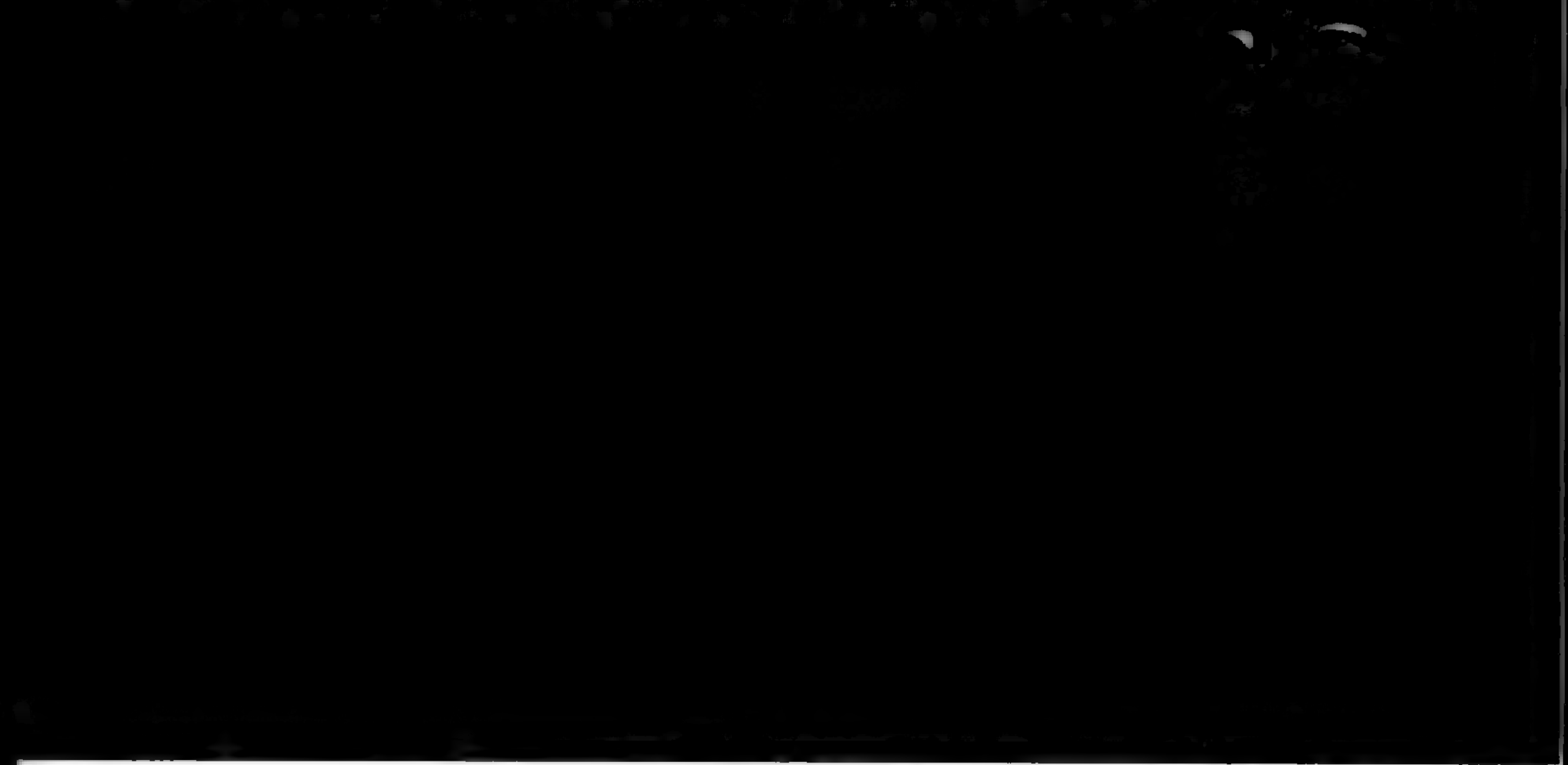

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Charles Babcock

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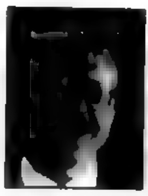


In watching the software industry restructure, one is struck by a fundamental change that has crept up without fanfare: the emergence of standards.

At a recent breakfast meeting, an executive of a mainframe software company put his finger on what is different in the industry during the last two years compared with most of its history. "This is the first time that standards are more important than innovation. In the past, standards have always been subverted by innovation," the exec said.

In fact, much of the software industry rests on the standard that was launched in the marketplace in 1964, the IBM 360 processor and its multipurpose operating system. The 360 series grew into the 370 family and helped establish IBM's dominance in the mainframe market.

Having a general-purpose computer rather than devices built for specific tasks was an innovation in 1964 and still provides a clue to the marketplace's standard-setting process. In pole vaulting or broad

Continued on page 36

CASE package goes real-time

Nastec option can reside on LAN, mainframe for multiple access

BY CHARLES BABCOCK
CW STAFF

SOUTHFIELD, Mich. — A computer-aided software engineering (CASE) tool said to allow application developers, real-time system developers and data base administrators to work within the same framework is now available from Nastec Corp.

Nastec, the producer of the widely used CASE 2000 Design-aid structured analysis and design tool, has added a real-time option supported by the Design-aid data base. The multiuser data base can reside on a local-area network or IBM mainframe where separate teams of developers may access it.

Applications, real-time systems and the data bases that support them are frequently developed by different groups, each following their own procedures and employing different CASE tools. When structured analysis and real-time and data modeling are done in the same data base, the different teams can validate the specifications they are using, Nastec officials claimed.

Graphics tools

The real-time option, priced at $1,500 per copy, provides a systems engineer with the diagramming and graphical tools needed to model a real-time system. In addition to standard data flow symbols, the user has symbols for controllers, event stores, triggers, event flows, continuous data flows and actions.

The diagramming interface provides pop-up menus and a mouse for moving symbols around the screen or changing them, Nastec spokesmen said.

The option can check state-transition diagrams against flow diagrams and verify that events are consistent between them. It can also verify that the same processes are activated in both, according to Clark Keller, Nastec marketing director.

The addition of the real-time option allows developers to model three different views of a system: its processes, through process modeling; its data, through data modeling; and its behavior, using the real-time option, Keller said.

System/38 gets SQL interface

BY JEAN S. BOZMAN
CW STAFF

SCHAUMBURG, Ill. — An SQL interface for the IBM System/38's internal data base is being released here by a small firm that used an assembler compiler to gain entry to the closed system.

The product, called Sequel/38, was developed by Advanced Systems Concepts, Inc. (ASC), a 5-year-old firm that has 1,500 of its licensed System/38 packages installed in the U.S. and abroad. ASC claimed it is the only nonprocedural SQL interface to address the System/38's data base built into the System/38 operating system. The data base uses a file format that is different from IBM's DB2 or IMS.

"The System/38 allows you to create a file which is not relational in structure at all," said ASC Vice-President Ira Cohen.

Cohen said it also allows one "to build logical views on it. Our

Continued on page 36

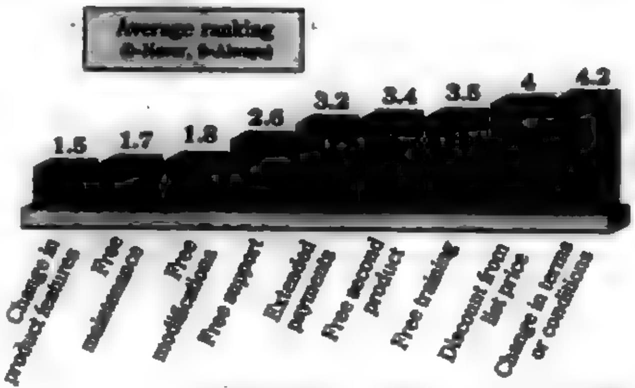
Inside

- ANSI panel seeks public comment on SQL addition. Page 32.
- Altai meets competition with expanded job scheduling package. Page 34.
- McDonnell Douglas adds Intelligent 3270 ability to Series 7000. Page 38.

Data View

Contract concessions

Software vendors rank the concessions they yield to customers



INFORMATION PROVIDED BY CULPEPPER AND ASSOCIATES, INC.
CW CHART

BBN releases VAX tool kit

CAMBRIDGE, Mass. — BBN Software Products Corp. recently introduced a programmer's tool kit for creating custom scientific, engineering and manufacturing applications under the company's Digital Equipment Corp. VAX-based RS/1 software system.

Called RPL Programmer's Toolkit, the product runs with RS/1 Release 3.0 on DEC VAX and Microvax systems running DEC's VMS and Ultrix operating systems.

Continued on page 34

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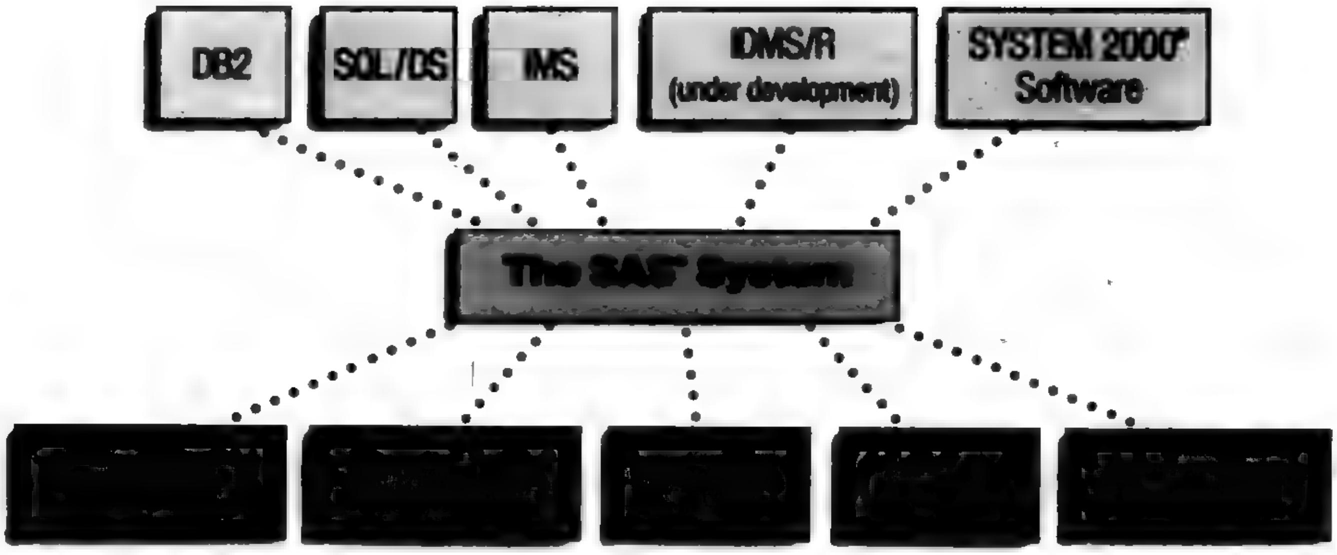

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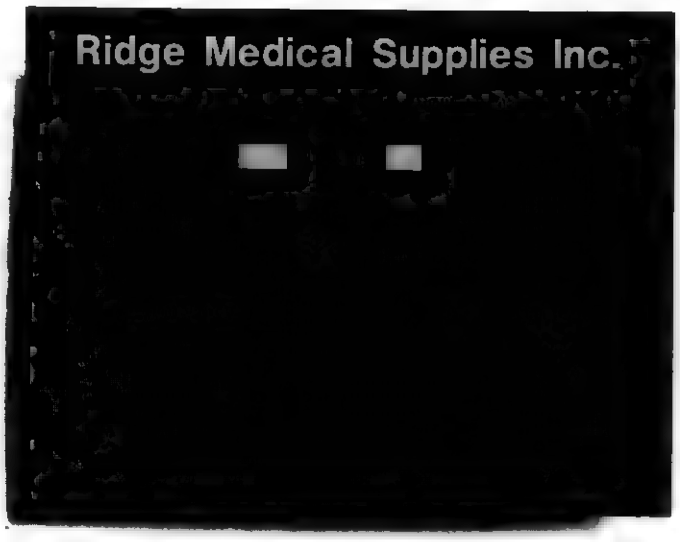

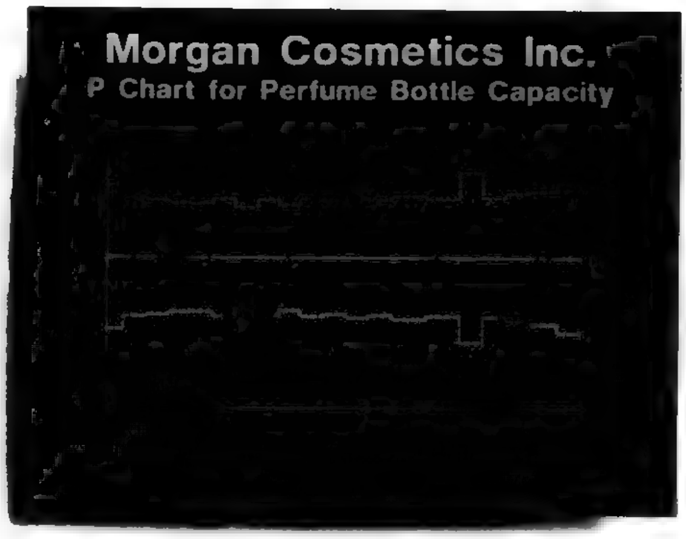

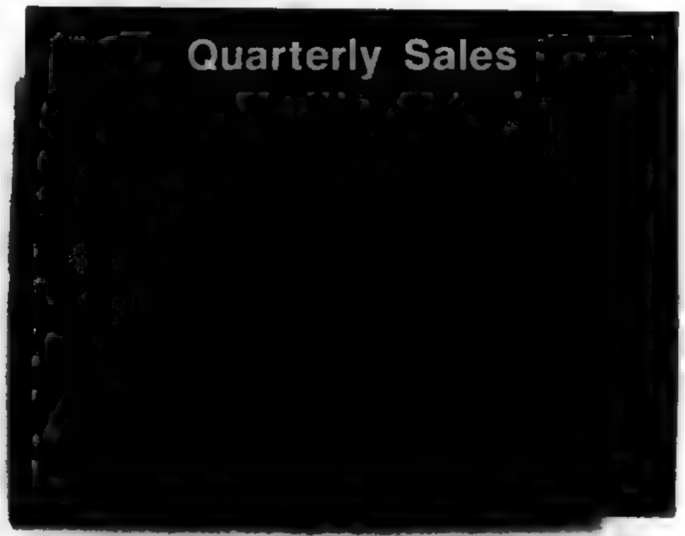

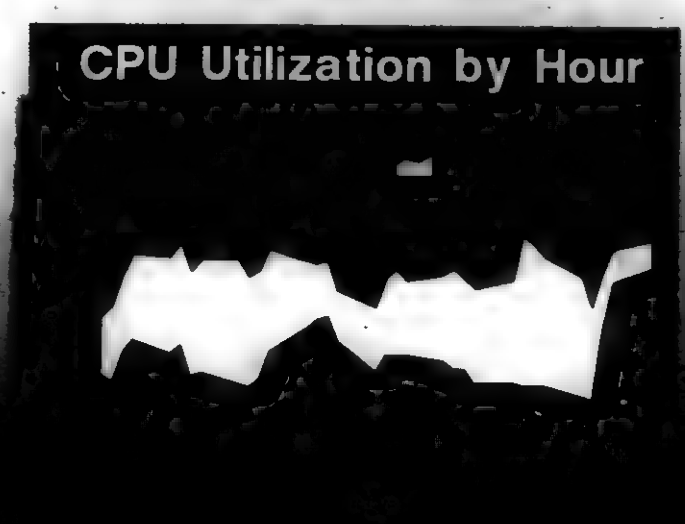

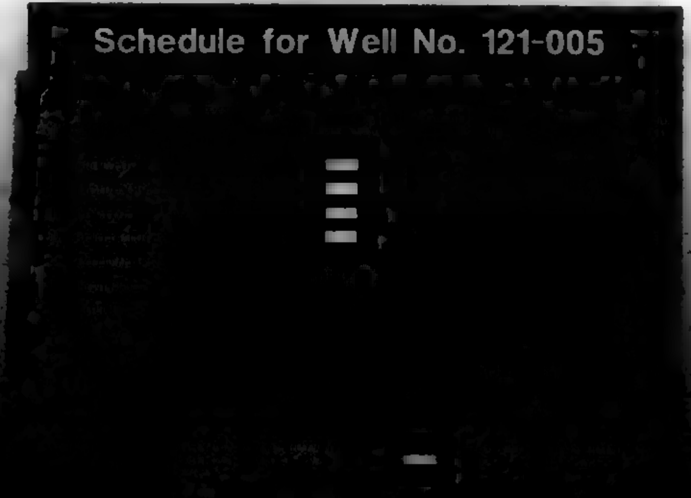

SOFTWARE NOTES

IBM names Ferdinand DB2 manager

IBM has named a new DB2 product manager in Santa Teresa, Calif., to replace Marilyn J. Bohl, who resigned in April to join Digital Research, Inc. The newly appointed product manager is **Gary J. Ferdinand**. Ferdinand was formerly the MVS Systems Structure manager with IBM in Poughkeepsie, N.Y.

A story in the Sept. 7 edition of *Computerworld* cited a data base painter for DB2 from **Sage Software, Inc.** The product was described by Sage officials in much the same terms as a data dictionary that governed the application development process. In fact, the product is the enhanced version of a data dictionary developed by **Deere & Co.** in Moline, Ill., and later sold to Sage, according to Deere official Bruce Larson, who spoke recently at a DB2 users' conference in Toronto.

Infodata Systems, Inc. in Falls Church, Va., has signed a joint venture agreement with **Northwestern National Life Insurance Co.** to market a life insurance system that underwriters can use as an on-line reference tool in evaluating insurance policy applications.

Tandem Computers, Inc. has signed an agreement with **Momentum Systems Corp.** in Morris Plains, N.J., formerly Mohawk Data Sciences Corp.'s Systems Division, to jointly market Momentum's Key Base data-entry software. Key Base software allows up to 750 users to share a common data-entry data base.

Digital Equipment Corp. and **Verimation AB** in Rockleigh, N.J., are working on an interface program that would enable users to send electronic mail between DEC's All-In-1 system and Verimation's Memo. The link should be ready by year's end, the companies said. Verimation is jointly owned by **AB Volvo** and **L. M. Ericsson.**

Software Techniques, Inc. in Cypress, Calif., and **UIS Ltd.** in the UK have teamed up to develop and market software utilities for Digital Equipment Corp. VMS systems. The companies say they plan to roll out products for tape and disk management, file tracking and system accounting by year's end.

SPSS, Inc. is reselling **Access Technology, Inc.'s** 20/20 spreadsheet system for mainframes and minicomputers. SPSS claims users of its SPSS-X and SPSS-Tables will be able to pass data to and from 20/20. SPSS also claimed that many users have requested advanced statistical and forecasting capabilities and this system is one way of providing them.

Spokesmen at **SAS Institute, Inc.** in Cary, N.C., say the company's SAS System now runs on the IBM 9370 under VM/SP 4.5 and 5.0 as well as VM/IS and DOS/VSE.

GE Information Services, a division of General Electric Co., recently said it will market and support EDI/36 and EDI/38 electronic data interchange (EDI) software for the IBM System/36 and 38 from **ACS Network Systems** in Concord, Calif. EDI permits the exchange of standard business forms or documents over public teleprocessing networks.

Although the acronym-happy software industry rarely takes inspiration from housewares, **Silden Software** in Encino, Calif., has come up with an IBM System/36 package that has a familiar ring to it. A system that automatically signs off terminals after a preset time lapse during which they have remained idle is called EZoff.

Mainframe security experts Jack Bologna and Charles Varga of **Cossac Associates** in Plym-

Continued on page 34

NATURAL 2 and the bottom line.

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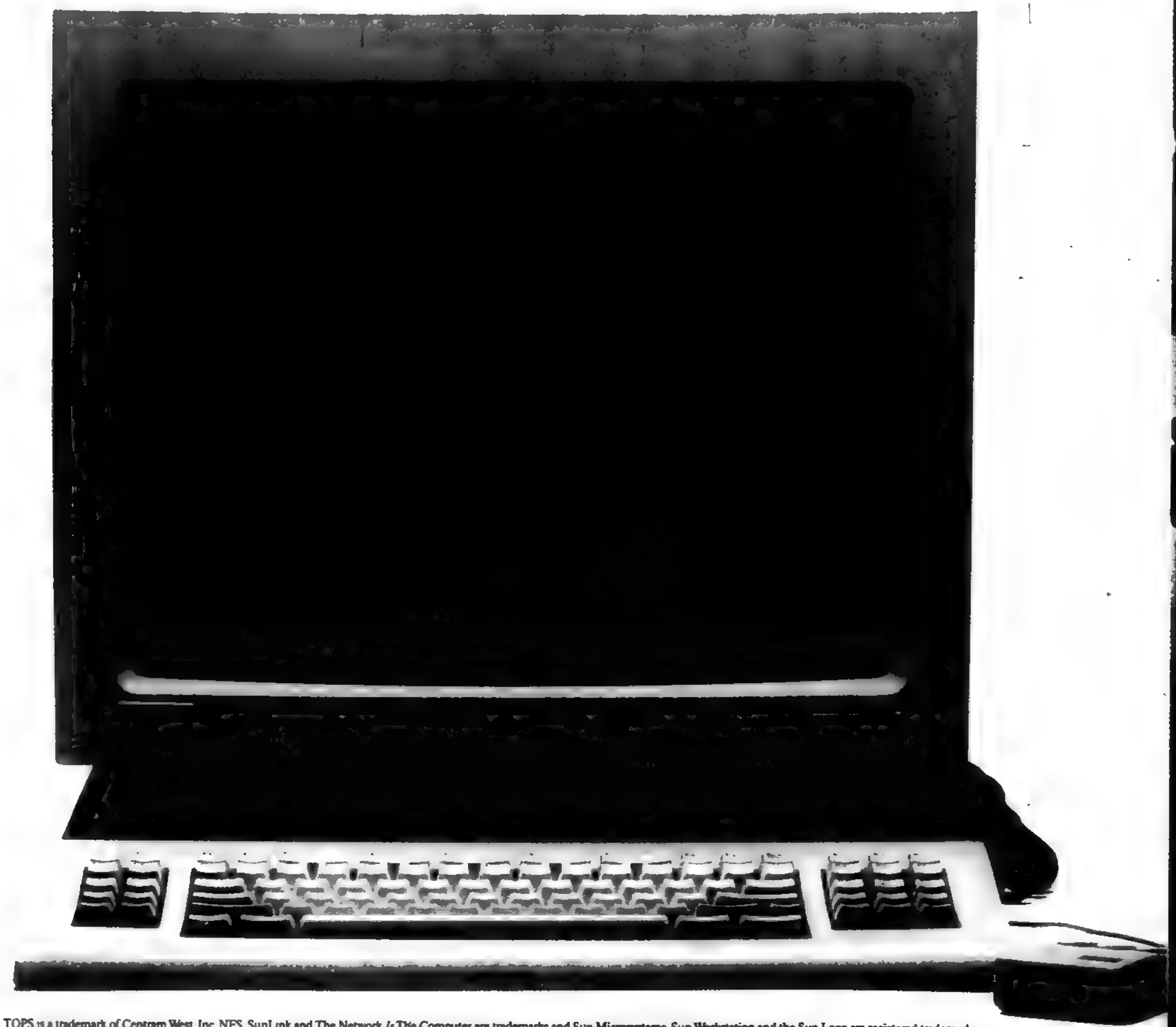

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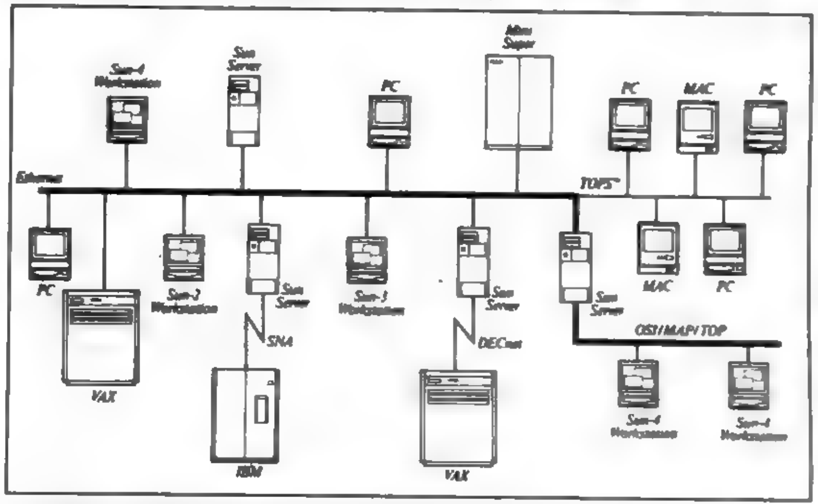

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ANSI seeks public comment on standards additions

BY CHARLES BABCOCK
CW STAFF

WASHINGTON, D.C. — A panel of the American National Standards Institute (ANSI) is seeking public comment on an integrity enhancement feature addition to SQL.

The proposed addendum would offer additional statements in SQL to specify referential constraints between tables without cascade effects and check constraints to be applied to rows of a table. It would also provide a default value for a column when a row is inserted into a table.

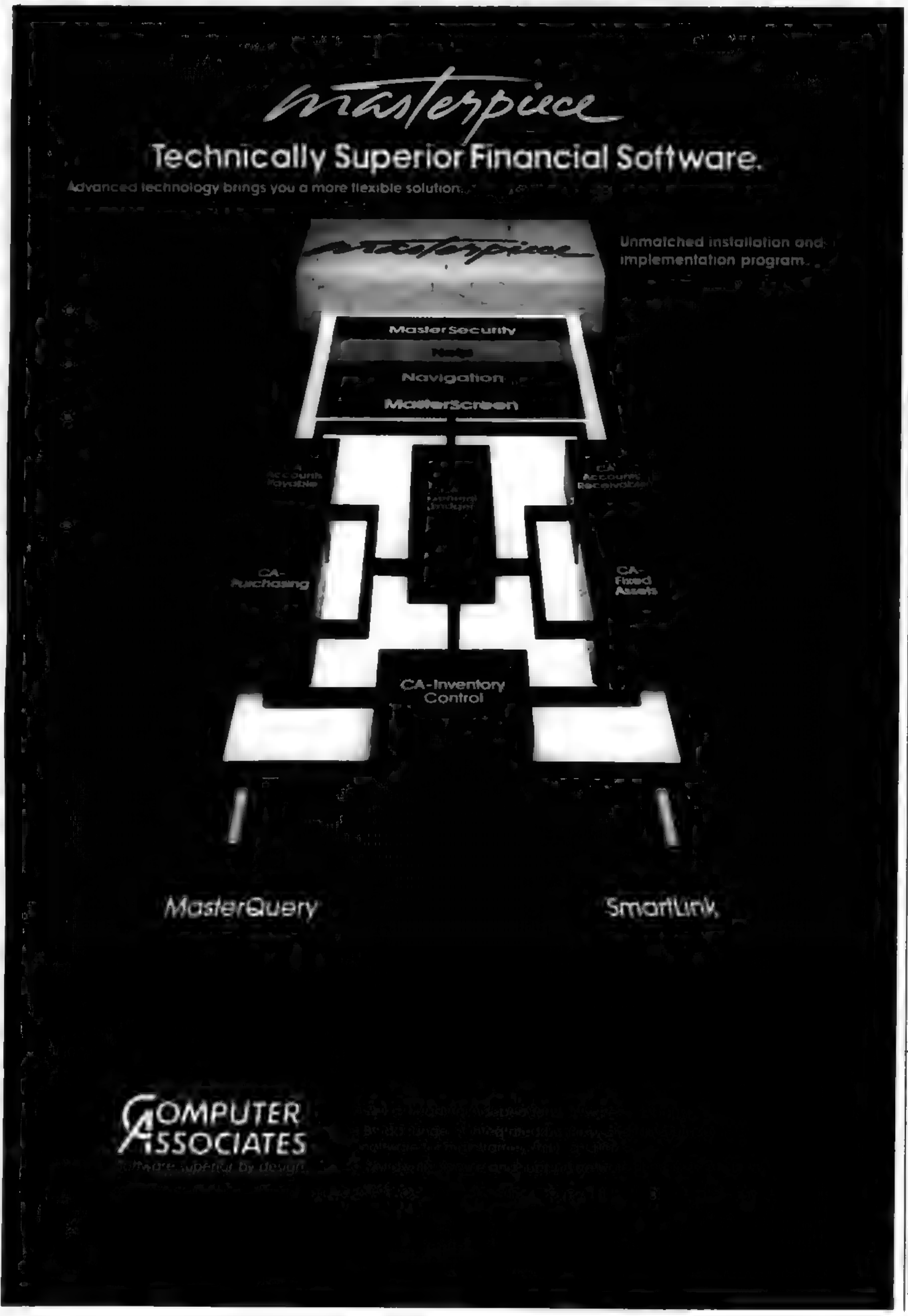
Comment is sought on the addendum for a four-month period ending Jan. 11. Copies are available for $25 from Global Engineering Documents, Inc. The proposed addition is designated X3.135.1-198x.

The addendum, if approved by X3, ANSI's accredited standards committee on information processing, would be added to ANSI-standard SQL as approved late last year.

The X3 committee has also announced a review period through Oct. 28 on a generic command set for magnetic tape drives. Changes during the final editing of X3.147-1986, a standard already approved by ANSI, necessitated a second review.

The standard facilitates the development and utilization of tape peripherals on computers by providing a common logical interface. The interface would permit the interconnection of intelligent tape peripherals with different hardware systems.

The standard is intended for use with the Intelligent Peripheral Interface (IPI) Physical Interface and the IPI Device Generic Command Set for Magnetic and Optical Disks, according to Del Shoemaker, chairman of X3T9, the technical committee that proposed the standard. Copies may be obtained from Washington, D.C.-based Global Engineering Documents at $15 each.



Abaqus modified for VAX

PROVIDENCE, R.I. — Hibbitt, Karlsson and Sorensen, Inc. has modified its Abaqus nonlinear analysis software to run on the Digital Equipment Corp. VAX 8300, 8350 and 8800 dual processors.

The dual-processor version of Abaqus can improve speed and performance by 50% to 90% over the standard package, the software vendor claimed.

Abaqus is an application tool designed for computer-aided mechanical engineering users in aerospace, automotive, electronics and major discrete manufacturing industries.

The software package uses finite-element analysis for solving such mechanical engineering problems as heat transfer, dynamic analysis with multiple impacts, soil or rock mechanics analysis and large-strain applications with rubber materials.

Pricing for Abaqus on the VAX 8800 is $1,950 per month. The price of Abaqus on the VAX 8300 and 8350 is $1,500 per month. Monthly charges include all maintenance and software upgrades, according to Hibbitt, Karlsson and Sorensen.

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Altai job scheduler vies for place in market

ARLINGTON, Texas — Altai Software has recently expanded its mainframe job-scheduling utility to include a facility for routing a job to a processor with the smallest work load.

The feature is one of several that the small systems utility firm said it hopes will allow it to compete more effectively with the job scheduling packages offered by Computer Associates International, Inc. in Garden City, N.Y., and Uccel Corp., which is now part of Computer Associates.

Formerly known as Southwest Software, the Arlington-based firm took on the name of its parent company, Altai, Inc., in order to escape a regional association and to market its scheduler, called Zeke, across the country, according to Altai officials.

Pools systems for scheduling

Release 3.3 of Zeke is said to be able to pool real or virtual systems for scheduling purposes and select a system on which to run a job. It can also select a free initiator or partition within the system, preventing one system or part of one system from sitting idle while another is backed up with work, according to Altai President James P. Williams.

Release 3.3 can assess the status of up to 24 systems in a pool, he said.

The updated product also includes enhanced operator and scheduler commands to cross-reference jobs that need to run prior to the latest addition to the schedule. The commands can also submit IBM's JCL to IBM's MVS for syntax checking.

Zekeset available in VSE version

In addition, the Zekeset program, formerly part of the MVS version, is now available in the IBM VSE version. It allows system commands and replies to be embedded in a job stream and allows users to open and close CICS files during the processing of a batch job.

Also, ZekeCMD is a new subroutine that can be called by a user-written program to pass commands directly to Zeke to control or change the system schedule.

The MVS version of Zeke was first introduced in 1985, and the VSE version was introduced in 1982. The company has sold 400 licenses for the product.

Make Contact

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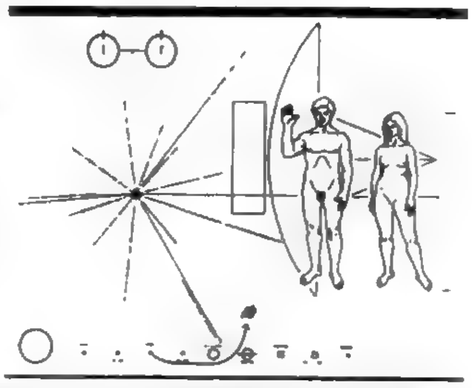

VAX tool kit

CONTINUED FROM PAGE 25

The tool kit, which ranges in price from $2,000 to $10,000 depending on the target VAX model, contains a number of capabilities said to significantly reduce programming time and errors.

Key features include automated procedure editing and loading, runtime profiling, code preprocessing, indexing and cross-referencing and batch loading of group and public procedures. The tool kit also includes a code preprocessor for defining and using macros and for specifying conditional compilation of code.

Modeling, graphics functions

Built around the high-level RPL programming language, the core RS/1 system includes statistical analysis, data management, modeling and graphics functions.

When procedure changes occur, the automated procedure-loading function recognizes the changes and recompiles the procedure, thereby keeping programs up to date, according to BBN Software spokesmen.

Runtime profiling provides call-count and CPU runtime statistics for RPL procedures, reportedly pointing out procedures that may need fine-tuning.

The indexing and cross-referencing utilities are said to aid in automatically creating indexes of application procedures and tables of call dependencies, respectively.

Macros ease coding, maintenance

According to BBN Software, the use of macros simplifies coding and enables easier maintenance. Macros can be defined in separate files and included with one-line commands in the procedure source code file.

With the batch feature, developers can upload finished applications from private accounts to group or public-access accounts for sharing among users.

The tool kit is available now, the vendor said.

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IBM names

CONTINUED FROM PAGE 28

outh, Mich., are offering a computer security program. The program asks 218 true/false or multiple-choice questions about computer security policies and controls. The PC-based program, which will retail for $150, will provide a printed report on how adequate security is at a given installation. It is said to take the place of more expensive mainframe security risk analyses.

Tata Engineering and Locomotive Co. in Pimpri, India, has sent out a letter to software consultants saying it would like to find "well-established software consultancy organizations with specific interest in manufacturing applications." In the letter, the firm says, "We believe we have got a bank of good skills which are in big demand in the USA and which can be easily marketed." The letter came from the office of J. S. Parihar, a division manager with the firm.

Access Technology, Inc. is currently offering its 20/20 spreadsheet for the Sun Microsystems, Inc. workstation environment. The spreadsheet runs under Suntools and operates in multiple Sun windows, Access Technology spokesmen said.

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Standards

FROM PAGE 25

jumping, the standard is set by the athlete who excels at pushing back the limit of human exertion against a single goal.

IN THE INDUSTRY, standards are set by a less specific and more common-denominator brand of excellence: What is the best general-purpose tool for a variety of users?

In the computer industry, standards are set by a less specific and more common-denominator brand of excellence: What is the best general-purpose tool for a variety of users?

Relational data base represents a standard, not only because it has mathematical definition, but also because it offers a combination of flexibility and set-at-a-time processing that was hitherto difficult to achieve. Users may not perceive all the subtleties of the relational model, but they do understand they can more efficiently attack business problems than they could in the past, and the marketplace quickly accepts a new general-purpose standard.

IBM's DB2 has the mainframe share of this market to itself for the moment. But the independent software industry has the means to fight back through SQL, the data access and manipulation language that is now incorporated into an ANSI standard.

The Esvel technology purchased by Cullinet Software, Inc. last year springs from the same relational data base research as DB2, as do Ingres and Oracle from Relational Technology, Inc. and Oracle Corp., respectively. Oracle was the first product to implement SQL, followed by IBM's SQL/DS for the VM and VSE operating systems and then DB2.

Cincom Systems, Inc.'s Supra, with a higher fidelity to the relational model than DB2, offers another alternative. The Esvel technology reportedly meets 11 of the 12 basic rules of the relational data base, the highest rating of any product on the market, according to Paul Hessinger, a DB2 consultant with Computer Task Group, Inc. Hessinger said that rating is unofficial; the official one will have to come from the Codd and Date Consulting Group when it decides to make it public.

More relational products are sure to follow, given the speed of the independent software suppliers once a standard has been set. Perhaps the danger here is not that we will ignore a new standard so much as allow it to become too confining once users start adhering to it.

Babcock is *Computerworld's* senior editor, software & services.

Interface

FROM PAGE 25

product will allow the user to extract the data from the data base he's created on the System/38."

Sequel/38 is intended for ad hoc queries, based on the idea that it will shorten the backlog of end-user requests. "It could also be used to handle recurring requests for information that should not require the writing of a program," said President Kenneth Kelley.

Written in standard SQL, the product is being shipped now to take advantage of the existing System/38 line, ASC officials said. IBM executives have said that a follow-on machine, code-named Silverlake, should arrive in the second half of 1988 [CW, Sept. 7]. It took ASC about six months to develop the SQL package, Cohen said.

Sequel/38 will not compose SQL queries that can run on relational systems on other IBM computers, but it will allow a programmer to conduct ad hoc queries to the System/38 data base with the same SQL statements used on the larger IBM machines.

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NEW PRODUCTS

Systems software

An automated SYSOUT management program for IBM's MVS batch-processing environment has been released by **Beta Systems Software, Inc.**

Designed to replace manual SYSOUT handling with on-line access and management, the program, called **Oscar**, allows instant access to output of batch jobs. It provides job log and listing information that the user can customize. Oscar is implemented using the ISPF standard and allows concurrent archiving to two files.

Oscar includes an on-line history index, a browsing feature for viewing output information and a scan facility that identifies character strings.

A permanent license fee for Oscar for a single site costs $18,000.

Beta Systems Software, Suite 1333, 1485 Enea Court, Concord, Calif. 94520.

An enhanced version of the **Omegamon** performance management software said to provide DB2 support for IBM's IMS 2.2 has been announced by **Candle Corp.**

Version 300 for IMS is said to provide DB2 support for IMS's real-time and historical environments. It offers new wait reasons, exceptions and commands that allow users to report on DB2 activity that impacts IMS transactions, including the status of connections between DB2 and IMS and the number of calls to DB2.

Version 300 also offers support for IMS's extended recovery facility, which enables users to define two IMS systems.

Omegamon Version 300 for IMS costs $19,500.

Candle, 1999 Bundy Drive, Los Angeles, Calif. 90025.

McDonnell Douglas Computer Systems Co. has announced **Intelligent 3270** capability on its Series 7000 Integrated Business System, said to allow a local Series 7000 application to be linked to an IBM mainframe application.

Using Systems Network Architecture/Synchronous Data Link Control (SNA/SDLC) communications, the feature enables windowing; user-transparent inquiry and retrieval of data base information; use of the user application for monitoring the status of the SNA communication link; and handling of the local presentation and storage of 3270 screens.

A typical small remote job-entry configuration costs $4,255.

McDonnell Douglas, 17481 Red Hill Ave., Irvine, Calif. 92714.

Additional mechanical computer-aided engineering (CAE) software packages for Sun Microsystems, Inc.'s Sun-3 workstations have been announced by **Structural Dynamics Research Corp.**

I-Deas Geodraw is a two-dimensional drafting system. **I-Deas Model Solution** is an on-line solver for linear-static, dynamic and potential flow analysis. This module is integrated with Supertab, the I-Deas finite element modeler. **I-Deas Optimization** is a structural analysis optimization module that automates redesign tasks.

The addition of these products results in two mechanical CAE solution packages — I-Deas for Design is a package for mechanical design engineers, and I-Deas for Analysis is for engineering analysts. The two products cost $16,200 and $10,600, respectively.

I-Deas Geodraw, Optimization and Model Solution cost $3,800, $1,500 and $2,300, respectively.

Structural Dynamics Research, 2000 Eastman Drive, Milford, Ohio 45150.

A product said to assure the integrity of data sets in a single or multiple IBM MVS or MVS/XA operating environment has been introduced by **Duquesne Systems, Inc.**

The **Enhanced Data Set Integrity** verifies that attributes specified in a job's JCL match those in the Data Set Control Block. It also verifies that only authorized utility or application programs open certain data sets.

If two users try to simultaneously open the same data set, the product guarantees that all update operations are serialized and protects the overall integrity of the data set.

Activity statistics such as counts of attribute and utility failures and user conflicts are also available.

Enhanced Data Set Integrity operates in a stand-alone or integrated mode. It costs $3,000 per CPU.

Duquesne Systems, 2 Allegheny Center, Pittsburgh, Pa. 15212.

A menu-driven program for on-line queries and reporting has been introduced by **Decision Technology, Inc.**

On-Cue generates and submits a batch job request and returns it to the user. Users can view the output of a report in one window while displaying the request in another. A hard copy can be routed to an available printer. Filled-in screens can be saved in a user library, and security for sensitive data is provided. Users can create columnar report requests.

On-Cue is available for use on IBM DOS/VSE and MVS operating systems using CICS or TSO. A VTAM version provides support for more than 200 users in a single MVS space.

Decision Technology, Princeton Corporate Center, 1020 U.S. Rt. 1, Princeton, N.J. 08540.

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Applications packages

Computerline, Inc. has ported its **Plantrac** project management software to Digital Equipment Corp. VAX computers running DEC's VMS operating system.

Plantrac/VMS is an integrated critical-path method system that can manage up to 250,000 activities in a project. Each subproject is available for individual analysis. Users may link up to 100 subprojects and allocate across projects. Other features include a graphic module supporting color printing, screen displays and plotting and a report generator.

Plantrac/VMS supports an unlimited number of simultaneous users. It is compatible with other versions of Plantrac.

Plantrac/VMS costs from $2,995 to $6,995.

Computerline, P.O. Box 308, 52 School St., Pembroke, Mass. 02359.

A version of the **Mass-11** word processing software for Digital Equipment Corp. VAX computers, said to support 43 Adobe Systems, Inc. Postscript fonts in an unlimited range of point sizes, has been announced by **Microsystems Engineering Corp.**

Mass-11 Version 7-A allows the fonts to be printed in outline form or in various shades from black to white, the vendor said. Users may change typefaces and point sizes anywhere within a document.

Other features include the ability to convert documents from IBM Displaywrite and IBM 5520 formats; to import spreadsheet work sheets into a document and preserve the cell separations with tab markers; to specify where graphics are to appear on a page; and to search for a 50-char. string.

Prices for Mass-11 range from $5,750 to $17,250.

Microsystems Engineering, Suite 400, 2400 W. Hassell Road, Hoffman Estates, Ill. 60195.

A software package called **Wiring Diagram Design** has been announced by **Computervision Corp.**

The software allows users to automate the wiring design, engineering and documentation of systems that incorporate both electronic and mechanical elements. It runs on the vendor's Caddstation product family.

The product captures both graphic and nongraphic information of system and features data extract and data merge functions for report generation, the vendor said.

Other features include more than 500 component library symbols, editing functions and the abiity to create parts from portions of a drawing.

The Wiring Diagram Design package is priced at $5,000.

Computervision, 100 Crosby Drive, Bedford, Mass. 01730..

Enhanced integrated plotting packages for IBM mainframes and RT Personal Computers and Digital Equipment Corp. VAXs and Microvaxes have been announced by **Versatec**, a Xerox Corp. company.

Versaplot Random Enhanced 2.1 software features the ability to plot 2,048 line colors and 2,048 area-fill colors per plot. Users can utilize 256 predefined colors or redefine default colors. The software also allows definition of a pixel array with a color associated with each pixel. Raster data from various sources can be merged.

Versatec has also announced Veraplot 9.3 software for its Versacolor thermal-transfer color plotter. The software outputs raster data and was designed for VAX and Microvax computers.

License fees range from $2,000 to $5,500.

Versatec, 2710 Walsh Ave., Santa Clara, Calif. 95051.

A system of integrated applications for manufacturers and distributors has been developed in Speed II, a fourth-generation language from Tom Software, Inc., by **A&M Data Systems, Inc.**

The system, called **Jcamms**, runs on Wang Laboratories, Inc. VS minicomputers. It combines Speed II with a set of Tom Software's accounting applications and specialized applications. Applications available include accounts payable and receivable, bill of materials, general ledger, sales analysis, purchasing and receiving, production control and payroll.

The modular system features system integration, a parameters file for customizing applications, transaction-control and audit-trail functions, on-line help and security to the field level.

Prices start at $2,000 per application.

A&M Data Systems, 76 N. Broadway, Hicksville, N.Y. 11801.

An enhanced version of **VAX Xway** spreadsheet model and data-conversion application software has been announced by **Digital Equipment Corp.**

Version 1.1 is said to expand the software's capabilities to include support of the latest release of Lotus Development Corp.'s 1-2-3 software and Digital's VAX Decalc Version 3.0 and VAX Decalc-Plus Version 3.0 spreadsheet software.

VAX Xway runs on all VAX computers operating with Version 4.4 or higher of Digital's VMS operating system. It costs $450 for the Vaxstation I system, $1,800 for the Microvax II computer and $10,800 for the VAX 8800 system.

DEC, Maynard, Mass. 01754.

Languages

A shared-memory multiprocessor Common LISP system called **Butterfly LISP** has been announced by **BBN Advanced Computers, Inc.**

The language runs on the vendor's Butterfly parallel processors. It supports Scheme and Common LISP dialects in both interpreted and compiled modes and has been extended to support a multiprocessing environment.

Other features include a performance analysis facility, the ability to use a mouse to point to a thread of control in order to display the source code that created it, graphics display of run-time information about the state of each processor, support for a window-type user interface and the ability to call C language primitives.

Butterfly LISP costs $12,000.

BBN Advanced Computers, 10 Fawcett St., Cambridge, Mass. 02238.

Utilities

Wright EDI, an Electronic Document Interchange (EDI) software package designed to run on IBM's System/36 and 38, has been announced by **Louis A. Wright & Associates, Inc.**

The system contains a communication module that passes information over telephone lines, either by direct dialing or through networks. The translator module converts the information into or out of the EDI standard forms, and the transaction set module defines how the translations are to be done.

Features include the ability to capture and print inbound information and an on-line inquiry capability.

Wright EDI costs $4,000 for the System/36 and $5,000 for the System/38.

Louis A. Wright & Associates, 44567 Pinetree Drive, Plymouth, Mich. 48170.

Two office system administration products for the IBM Distributed Office Support System (Disoss) and Personal Services/370 environment have been announced by **TBS Software, Inc.**

The **Disoss Document Storage Reporter** and the **PS/370 Document Storage Reporter** provide information about documents stored in the Disoss library and the PS/370 pool. The products provide for determination of library storage utilization; information is available about every document stored in Disoss or PS/370.

Single CPU licenses are priced at $1,500 for each product or $2,500 for both.

TBS Software, 28 Viamede Circle, North York, Ontario, Canada M2K 2A8.

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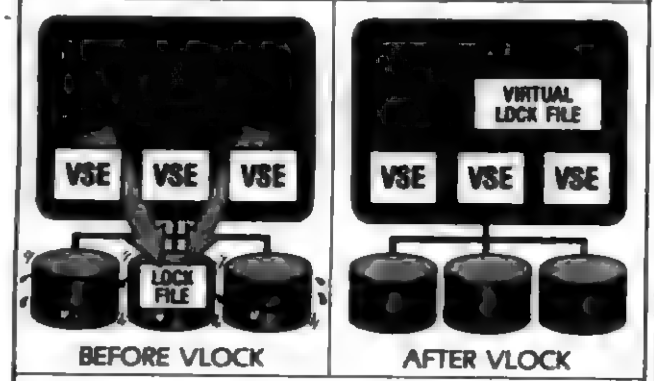

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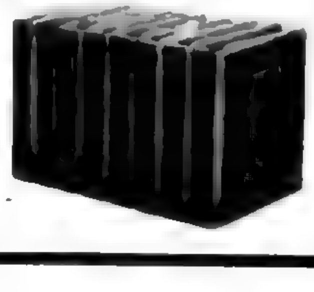

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Software said to enable a user to run IBM's CICS continuously has been announced by **Teltech Corp.**

The **Automatic Dynamic Allocation Management System for CICS** is said to utilize dynamic allocation and deallocation of files and transactions to service on-line and batch program requests without the user terminating and restarting the system.

A permanent license costs $5,000 for IBM MVS operating systems.

Teltech, 39 Broadway, New York, N.Y. 10006.

VSAM/Easy, a tool designed to simplify VSAM access, has been announced by **MB & Associates.**

VSAM/Easy allows users to access VSAM files interactively or in batch mode from a program written in any language, including Cobol, PL/I and assembler as well as Natural language, according to the vendor.

Other features include full access to VSAM and IBM's CICS temporary storage; VSAM read, add, modify and delete; record access by either full or generic key; fixed- or variable-length record support; forward or backward record browse; automatic record positioning; automatic loading into empty files; automatic CICS syncpointing on logged files; and automatic determination of VSAM file and record attributes.

VSAM/Easy costs $9,900.

MB & Associates, Suite 200, 7921 Southpark Plaza, Littleton, Colo. 80120.

A testing and maintenance support tool that automates the management of regression tests has been announced by **Software Research, Inc.**

Software Maintenance and Regression Test Systems (SMARTS) is said to read a user-designed test description file to determine what actions to take for the test or group of tests. Then it issues the prestated actions, runs a difference check on the output against the baseline and accumulates a record of the test results.

In addition to the built-in automatic differencing, there is an "evaluate with user" option for testing interactive products.

SMARTS is available for Unix-based systems as well as IBM Personal Computer- and Microsoft Corp. MS-DOS-based systems. It costs from $475 to $6,750.

Software Research, 625 Third St., San Francisco, Calif. 94107.

An updated version of the IBM DB2 productivity tool, **DB/Pro Edit**, designed to increase productivity by using an IBM Interactive System Productivity Facility (ISPF) editor command format, has been released by the **Updata Software Co.**

DB/Pro Edit Version 2.0 can now create new DB2 indexes. To further simplify the creation of indexes, the updated version allows the user's existing index definitions to be used as templates for new indexes.

According to the vendor, Version 2.0 also enables the user to test SQL SELECT statements with a host of variables via an ISPF edit session.

DB/Pro Edit is available for an annual license fee of $4,500.

Updata, 960 Holmdel Road, Holmdel, N.J. 07733.

A software utility for IBM's Series/1 that was designed to operate the In-Coming Trunk (ICT) Tapesaver tape backup system has been announced by **H&A Computer Products.**

The **Tapesaver Utility** backs up and restores data by volume or by file. Written in Emulation Design Language, the Tapesaver also provides tape maintenance and listing functions to certify and initialize tapes or to create tape and disk directory listings.

No system generation is required for installation. The utility can be run by an operator in interactive menu prompt mode or unattended under batch control.

Features include enhanced file management, automatic file generation and wild-card naming for file referencing.

The company's ICT Tapesaver tape drive system costs $4,600. The Tapesaver Utility software alone costs $490.

H&A Computer Products, 522 Washington St., San Francisco, Calif. 94111.

An enhancement to the Blox/Template User Interface Management System that allows a user to design and test a user interface to an interactive graphics application program has been announced by **Template Graphics Software.**

Using the **Rapid Prototyping Manager** (RPM) enhancement, the designer can define menu, message and work areas; define and locate menus; add text, icons or labels to menus; and define foreground and background colors.

The what-you-see-is-what-you-get, or WYSIWYG, feature allows the user to judge the quality of the interface.

The Blox/Template System runs on all Digital Equipment Corp. VMS, Sun Microsystems, Inc., Masscomp and Silicon Graphics, Inc. computer systems.

The RPM enhancement is included in the cost of Blox/Template 2.0. License costs range from $9,600 to $50,000.

Template, 9645 Scranton Road, San Diego, Calif. 92121.

As an enhancement to its VAX Accent R fourth-generation language for Digital Equipment Corp. computers and its relational data base management system, **National Information Systems, Inc.** has introduced **PM Debugger**, a debugging environment.

According to the vendor, program execution can be suspended at 16 break

Continued on page 44

The C-815 Supra 24-pin printer
My life in the fast lane

I used to spend a lot of my time waiting for our old printer to finish cranking out the paperwork for our busy corporation.

But since we bought the C-815 Supra from C. Itoh Digital Products, I never have a moment to spare. I'm living life in the fast lane.

Multi-applications solution
Our department managers love the C-815 Supra. It's like having two printers in one. It prints high volume data processing output, like invoices and spreadsheets, at speeds up to 570 characters per second (cps). And for word processing, the Supra prints sharp, clear, high-speed letter quality at 162 cps.

What really sold our DP/MIS management on the Supra was *Byte Magazine* and *Infoworld* listing the C-815 as the fastest 24-wire printer in their independent tests. And they were right. The Supra's speed and versatility increased our productivity.

Forms expert
Our executives are really impressed with the Supra's dependable, rugged paper handling. It manages continuous forms, labels, letterhead and up to 6-part invoices with its rear or bottom feed paper paths. In addition to its standard pull tractor, the C-815 also features a single-bin automatic sheet feeder that's upgradable to dual bin.

Whether it's high volume spreadsheets and multi-part invoices or letter quality business letters and presentations, the Supra is fast and reliable.

Sound investment
The finance department says the Supra is a great investment since C. Itoh has a long-standing reputation for high quality, durable printers. And because it has built-in emulations for the IBM ProPrinter XL,™ Toshiba P351™ and Qume Sprint 11,™ we don't have to invest in any new systems or software. It works with our new IBM PS/2™ family and such popular software packages as Lotus 1-2-3,™ WordPerfect™ and Chartmaster.™

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Continued from page 42

points; fields can be displayed at each break point to see if values are being set as expected. Up to 16 watch points can also be set.

Program statements can be traced as they are executed. A program can be executed one statement at a time, and the values of fields can be displayed or changed as desired.

Accent R is available for the complete DEC VAX line. Prices range from $4,000 to $99,500.

National Information Systems, Suite 130, 20370 Town Center Lane, Cupertino, Calif. 95014.

A data compression routine for IBM's CICS has been announced by **MacKinney Systems**.

The **CICS/CPR** examines each terminal I/O area for IBM 3270-type devices before data is sent to the terminal and converts all repetitive characters to repeat-to-address order sequences, thereby decreasing response time for remote 3270s and reducing channel contention for locals.

CICS/CPR runs on any release of CICS Version 1.5 and up for DOS, OS or MVS using BTAM or VTAM.

CICS/CPR is priced at $1,295 or $595 for annual lease.

MacKinney Systems, Suite 112, 2674-A S. Glenstone, Springfield, Mo. 65804.

An option that the vendor said can add an automated report distribution system to its SPRI spooling system has been announced by **Software Pursuits, Inc.**

SPRI/Express extracts selected reports and report segments as they are placed in queues and collates them into customized report packages for distribution, according to the vendor.

Sections of the same report can reportedly be placed by the user in any number of distribution packages.

In addition, each package has the ability to be sequenced independently.

Features are said to include a user-constructed distribution table and a multiple-routing capability.

SPRI/Express for the SPRI spooling system runs under DOS/VSE, VSE/SP and the vendor's MVT/VSE operating system.

SPRI/Express costs $200 per month on a two-year lease or $240 per month on a month-to-month basis.

Software Pursuits, Suite 200, 1420 Harbor Bay Pkwy., Alameda, Calif. 94501.

Development tools

Cadre Technologies, Inc. has ported its **Teamwork** product line of computer-aided software engineering (CASE) tools to the Sun Microsystems, Inc. Sun-4/200 workstation series.

Cadre's Teamwork family includes support for the automation of information modeling, real-time systems analysis and systems design phases of the software development life cycle. It also offers a data base and integration tool that allows users to integrate other Sun software development tools with the Teamwork products.

Teamwork products cost from $900 to $7,500.

Cadre Technologies, 222 Richmond St., Providence, R.I. 02903.

A version of the **Smalltalk-80** object-oriented development environment that runs on Sun Microsystems, Inc., Hewlett-Packard Co., Apple Computer, Inc. and Apollo Computer, Inc. workstations has been announced by **Parcplace Systems.**

Smalltalk-80 DE Version 2.2 is said to provide Unix environments with interprocess communication via sockets and access to Unix C shells. On the Apple Macintosh, it provides access to Desk Accessories and provides the ability to cut and paste between the Smalltalk-80 system and the clipboard.

Other features include access to RS-232 ports; support for color displays; 54 type fonts; and access to Adobe Systems, Inc.'s Postscript printing.

Smalltalk-80 costs from $2,995 to $3,995 on Unix workstations and from $695 to $995 on the Macintosh.

Parcplace Systems, 2400 Geng Road, Palo Alto, Calif. 94303.

SCIENCE/SCOPE®

Hughes Aircraft Company is reducing software costs to customers by up to 40 percent via the comprehensive Hughes Software Engineering Environment (SE²®). SE² is an integrated system of computers, workstations, communications, specialized software tools, and comprehensive training and user support. The system lets engineers and managers focus their efforts on software development, quality, and productivity, without having to supervise a complex computer facility. Operating successfully for several years on many diverse domestic and international real-time, computer-controlled projects, SE² provides a complete life cycle of software development and support. Hughes is continually updating SE², including a 1986 upgrade to comprise a total Ada® capability.

A composite material made of graphite epoxy is ideal for use in space because it is stronger than steel yet lighter than aluminum. Unlike metal, it does not expand from exposure to heat or cold, and its reduced weight translates into lower costs and larger payloads. For example, saving just one pound in a space vehicle means a reduced launch cost of several thousand dollars or added fuel for longer operations. Until now, however, graphite composites have proved difficult to mold to shapes more complex than a simple cylinder. But research and development by Hughes has opened the way for the fabrication of a variety of new forms, including tubes with integrated end fittings in a one-piece design, support beams, and ring structures up to seven feet in diameter.

A new software development tool significantly reduced fault locating time for the Hughes APG-70 radar aboard U.S. Air Force F-15E dual role fighters. Unlike previous systems requiring software check-out after the completion of hardware, the Hughes Digital Software Integration Station (DSIS) can test and de-bug software while the hardware is being built, resulting in substantial development cost and schedule savings. Further economies result from the radar's built-in test capability. It has ten times the software and six times as many test targets as its predecessor, the APG-63 radar. The APG-70's increased reliability and maintainability are expected to triple the time between unit replacements.

Galaxy II and INTELSAT satellites are now transmitting U.S. television programming to Japan using a hookup provided by Hughes. NHK, Japan's leading television broadcaster, transmits from its New York studio to Hughes' Brooklyn, New York ground station. The signal is sent to Hughes' Filmore, California ground station via Galaxy II, and then beamed to an INTELSAT satellite over the Pacific Ocean. The signal is then relayed to a Japanese ground station north of Tokyo and fed into the local NHK studio. The daily broadcasts include segments of major U.S. and European news and entertainment programs, plus live on-the-scene reports from NHK bureaus in North America and Europe. Galaxy II is one of three domestic satellites owned and operated by Hughes Communications, Inc., a subsidiary of Hughes.

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MICROCOMPUTING

SMALL TALK

William Zachmann

Meet the new breed of Unix

As a person dealing with computers in an organization, chances are that it won't be long before you are confronted with Unix, if you haven't been already. While Unix wasn't ready to play the role AT&T cast it for three years ago, this operating system is certainly ready to take its place on the information industry's stage today.

Given that this meeting is almost inevitable, Santa Cruz Operation's (SCO) SCO Xenix 286 System V, as well as a 386 version, may be a manager's first serious look at today's new breed of Unix.

While Unix has suffered from having too many flavors with too few standards, that situation may be changing. An extremely important convergence point on the road to a single standard in the future has been AT&T's Unix System V Interface Definition. A recent milestone in this area has been the convergence between Xenix and Unix System V, Release 3 in the form of, you guessed it, SCO Xenix V for 286- and 386-based systems.

Continued on page 47

Insiders wary of Postscript

Issues of licensing, compatibility, competition come to the fore at show

BY JAMES A. MARTIN
CW STAFF

SANTA CLARA, Calif. — Legal questions and compatibility issues in the expanding market for printers compatible with Adobe Systems, Inc. Postscript page-description language (PDL) were key concerns at the recent Seybold Desktop Publishing Conference here.

Postscript has clearly emerged as a standard, and Palo Alto, Calif.-based Adobe has already placed the copyrighted PDL manual in the public domain. However, the company's stand on Postscript-clone vendors — firms that create their own proprietary Postscript interpreters and drivers for laser printers — has left many nervous.

These vendors said they are concerned that Adobe has not been specific enough about licensing elements of Postscript. Although the language is not proprietary, vendors questioned whether Adobe will make any attempt to stop the clones.

In addition, some printer makers were questioning whether Postscript can retain its leadership position in the face of an onslaught of faster language interpreters from U.S. and Japanese companies.

"Adobe has no intention of preventing anyone from writing Postscript interpreters," said Charles M. Geschke, Adobe executive vice-president, in a seminar on Postscript clones. Adobe will offer a royalty-free license to Postscript-compatible vendors, he added, so they can "make use of our copyrighted manual to write software that embodies the list of Postscript commands."

However, Geschke warned vendors regarding the importance of properly licensing type libraries.

"When we started Postscript, we were explicit in our intention to go back to the owners of the trademarks in the type industry and license the use of those names," he said. "That is incredibly important, because they have made tremendous investments and should be compensated."

Geschke added that compatible vendors "should be very careful about not infringing those trademark rights. The end user or the OEM could, in fact, be in an awkward position if that delicate issue is not handled correctly."

In August, Adobe announced a license agreement to develop and manufacture Postscript versions of The Linotype Co.'s Mergenthaler type library, considered to be the premier type library in the industry. The

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Inside

- Micrografx tool copies Clipart images to Microsoft Windows. Page 46.
- Tandy takes on PC heavyweights. Page 49.
- Northern Computer Systems releases 386-based 32-bit workstation. Page 52.

Data View

PC world market

1986 Vendor shares in units shipped

IBM	22%
Apple Computer, Inc.	14%
Tandy Corp.	8%
Compaq Computer Corp.	3%
Hewlett-Packard Co.	3%
Leading Edge Hardware Products, Inc.	2%
Zenith Data Systems	2%
AT&T	2%
Others	44%

INFORMATION PROVIDED BY INTERNATIONAL DATA CORP

CEO cites Tandy line's business value

In his six years as Tandy Corp.'s chief executive, John Roach has established a reputation as an outspoken member of the computer industry. The plain-speaking Texan came to Tandy 20 years ago to manage its data processing business. Rising steadily, he took over the company's top slot after the death of its founder Charles Tandy in 1978.

The 48-year-old Roach eschews some of the trappings of the typical chief executive, preferring to answer his own phone, eat in the Tandy cafeteria and drive an American-made car. To mark Tandy's 10th anniversary in the microcomputer market, Roach recently spoke with *Computerworld* correspondent Julie Pitta regarding the company's efforts to move into the business arena (see story page 49) and the challenges Tandy will face during the next 10 years.

John Roach

How important is the Fortune 500 market for Tandy? How do you plan to penetrate that market? The Fortune 500 market for us, unlike certain other manufacturers, is just another important segment of the market for Tandy and not the most important segment. We address it both through our Computer Centers and our outbound sales force, which addresses all business markets and not just the Fortune

Continued on page 48

VS COBOL Workbench with CICS Option is the Optimum Environment for Creating CICS Applications

With the CICS option, VS COBOL Workbench gives the programmer a dedicated development and testing environment on a PC for the creation of CICS applications. Slow response times and conflicts with the mainframe are removed.

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Combined with our 32 bit architecture, XM allows you to break the 640K barrier imposed by DOS. Run your VS COBOL Workbench programs in protected mode and switch to real mode for DOS services.

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In one product: ANIMATOR for source code debugging, STRUCTURE ANIMATOR for displaying the structure of your programs and debugging at the structure level, ANALYZER for path and performance analysis, SESSION RECORDER for regression testing. All these and more to improve productivity and produce quality applications.

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Rediscovering 2-year-old 1-2-3 compiler

BY DOUGLAS BARNEY
CW STAFF

CHICAGO — While the notion of a compiler that works with Lotus Development Corp.'s 1-2-3 gained attention this summer with the annoucement of @Liberty from Softlogic Solutions, Inc., an existing product was almost overlooked.

Baler, a $495 1-2-3 compiler from Brubaker Software in Lafayette, Ind., has been on the market for two years. Dave Butler, manager of financial systems for Follet College Bookstores, a divison of Follet Corp. here, has been using the package for a year and said he has saved money and avoided headaches in the process.

Spreadsheet compilers allow managers to develop specific models and distribute them to end users at little cost. This approach provides a model to users that cannot be modified. The end users, however, are still able to fill work sheets with data they need to analyze.

The inability of end users to modify a distributed model is handy for their managers. "It gives you some security," Butler said. "You can limit applications to only what you want."

Follet's model involves balancing checks for auditing. "The inability for end users to modify it gives our auditors a lot of comfort," Butler said. The model was essentially "designed to allow the transmission of cash register information to the corporate office for keypunch into the corporate ledger on a mainframe," Butler explained. Data integrity is key for such an application.

Another reason for Follet to go with Baler was purely economic. "We have a lot of small branch units, and we could not justify a spreadsheet for each store," Butler said. So far, Butler has distributed some 20 copies of the model to the firm's college bookstores around the country. The plan eventually calls for 60 copies of the model to be in place.

According to Butler, compiling a spreadsheet with Baler was easy. "They have a lot of compiling routines in batch routines. You don't need programming experience," he said.

But perhaps the most important advantage is that bookstore clerks can use a compiled spreadsheet more easily than developing a model.

"The people in the stores don't have the ability to create a model," Butler said. A compiled spreadsheet also requires less memory than the full version of Lotus's 1-2-3, he added.

Compiled spreadsheets are now an essential part of the Follet College Bookstores' operation and fulfill a need that Lotus's 1-2-3 would be unable to fill. "If we didn't have this, we would have had a custom program written. We would not have bought Lotus," Butler said.

Softlogic's @Liberty sells for $100 and allows for up to 10 compiled spreadsheets to be distributed.

Program draws Clipart images on Windows

RICHARDSON, Texas — Micrografx, Inc. has introduced a program compatible with Microsoft Corp.'s Windows that allows users to select and copy Micrografx's Clipart images to the Windows Clipboard.

Christened Portfolio, the program is bundled with a pictorial index of Micrografx's Clipart, along with suggestions on how to best use it.

Portfolio has a suggested retail price of $99.95 and includes the company's General Library and a coupon for one free Clipart library.

The company also unveiled a Holiday Clipart Library that users can incorporate into holiday correspondence, newsletters and other types of publications, according to a company spokesman.

The color images of the Holiday Clipart Library are object-based. They are compatible with Adobe Systems, Inc.'s Postscript, a popular page-description language, and best-selling applications such as Aldus Corp.'s Pagemaker and Autocad from Autodesk, Inc.

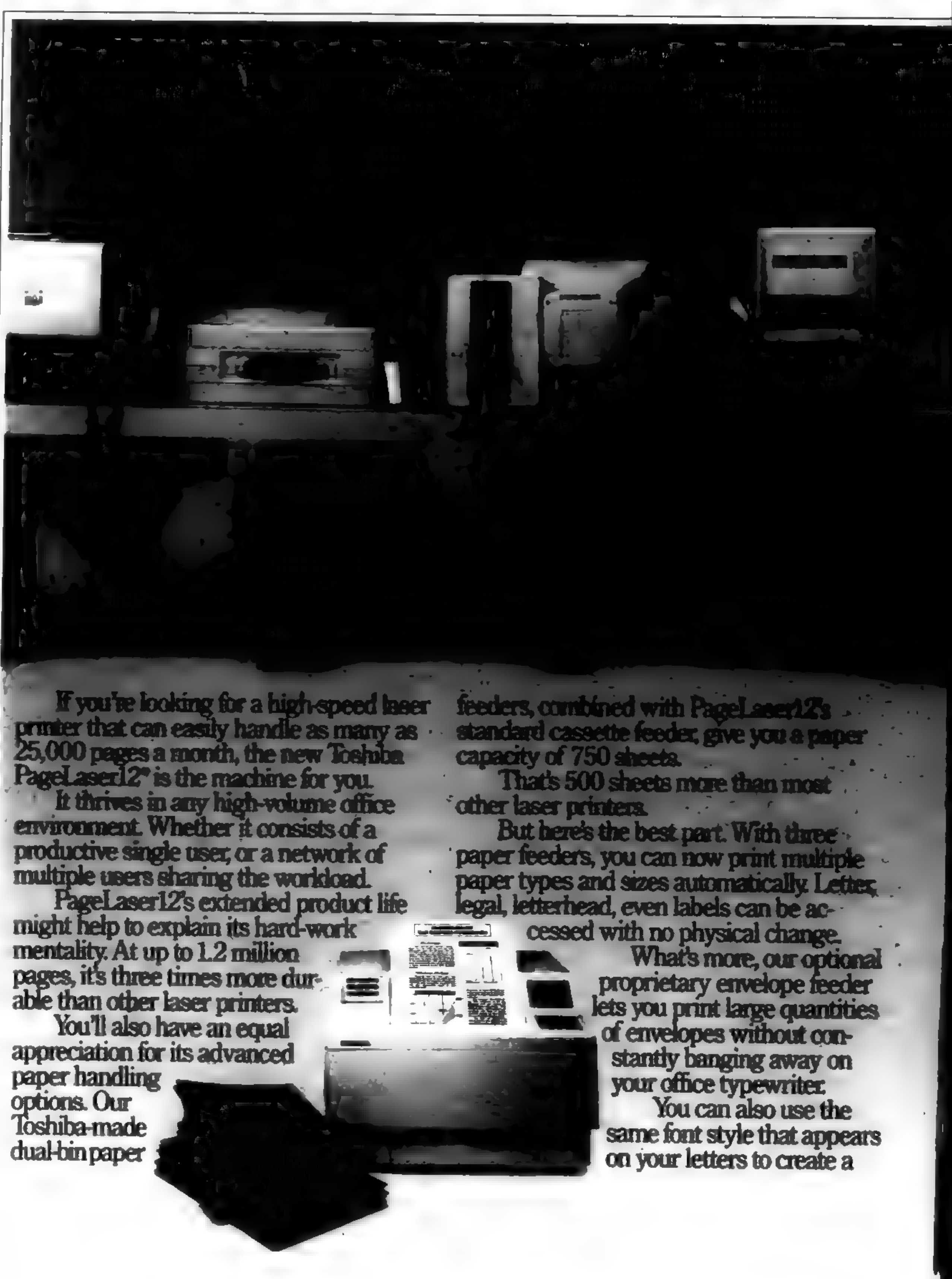
The images are also compatible with Micrografx's In a Vision and Draw graphics programs.

Each image in the series was handcrafted by professional artists using Micrografx's lastest spline-curve technology. Users can access this technology through the company's Custom Clipart Service.

There are several hundred images included in the Holiday Clipart collection, including artwork for each major U.S. holiday. Images are included for Thanksgiving, Christmas, New Year's, Easter, Memorial Day, the Fourth of July, Labor Day and Halloween.

Besides the Holiday Clipart library, Micrografx offers 10 other Clipart libraries, including Maps, Computers and Office, Signs, Flags, Space and Astrology, Architectural and Chemical, the company said.

Holiday Clipart carries a retail price of $49.95.



If you're looking for a high-speed laser printer that can easily handle as many as 25,000 pages a month, the new Toshiba PageLaser12* is the machine for you.

It thrives in any high-volume office environment. Whether it consists of a productive single user, or a network of multiple users sharing the workload.

PageLaser12's extended product life might help to explain its hard-work mentality. At up to 1.2 million pages, it's three times more durable than other laser printers.

You'll also have an equal appreciation for its advanced paper handling options. Our Toshiba-made dual-bin paper feeders, combined with PageLaser12's standard cassette feeder, give you a paper capacity of 750 sheets.

That's 500 sheets more than most other laser printers.

But here's the best part. With three paper feeders, you can now print multiple paper types and sizes automatically. Letter, legal, letterhead, even labels can be accessed with no physical change.

What's more, our optional proprietary envelope feeder lets you print large quantities of envelopes without constantly banging away on your office typewriter.

You can also use the same font style that appears on your letters to create a

New breed

CONTINUED FROM PAGE 45

The result of a cooperative agreement between SCO and Microsoft Corp., SCO Xenix 286 and SCO Xenix 386 are presently available directly from SCO as well as through system vendors serving as OEMs, such as Compaq Computer Corp., Wyse Technology, Zenith Data Systems, Ing. C. Olivetti & Co. and Texas Instruments, Inc.

SCO Xenix 286 and 386 are Unix System V, Release 3-licensed versions of Xenix that conform to the Unix System V Interface Definition.

The 286-based version is priced at $595 for the operating system, $595 for the development system and $195 for a basic text-processing system. The combined basic system is also available, for a list price of $1,295. For the 386-based version, prices are $695 for the operating system, $695 for the development system, $195 for the text-processing system and $1,495 for the whole kit and kaboodle. The software will run on most IBM Personal Computer AT-compatible 286- and 386-based systems.

I have worked with SCO Xenix 286 Version 2.2 for several weeks on a 386-based system from PC's Limited without any difficulty. SCO Xenix has proved to be a reliable operating system. It offers an excellent low-cost opportunity to get back up to speed on the current state of Unix.

Even more important, it offers an immediate solution for people who want to turn 286- and 386-based personal computers into multiuser work horses for practical applications. There's little wonder why many value-added resellers targeting small businesses and departmental applications on PC platforms have turned to SCO Xenix .

Xenix vs. OS/2

It has been particularly interesting to contrast SCO Xenix with the prerelease version of Microsoft's MS OS/2 provided with the OS/2 System Developer's Kit. Even a little experience with the two systems is enough to show that both will have their place in corporate use.

SCO Xenix is clearly the operating system of choice when more traditional, multiuser, multiterminal configurations are desired. It will have clear advantages when it is desirable to use existing software written for the Unix environment.

OS/2, however, has obvious advantages as a single-user environment. Its task-management strategies and priority algorithms are optimized for the single-user, multitasking model. OS/2 will also be a very attractive operating system for transaction-oriented network servers, especially when high-level interaction is important between workstation and server processes. What's more, although more complex than MS-DOS or IBM's PC-DOS, OS/2 is less complex to use than Unix. On the other hand, OS/2 still isn't ready for general release, but SCO Xenix V is currently shipping.

Its ability to effectively tap the minicomputer-like power of 386-based systems selling at microcomputer prices makes SCO Xenix an extremely valuable tool for organizations concerned with getting the most value per dollar for computing resources. The result is likely to be a lot of software like SCO Xenix finding a home in corporate America.

Zachmann is vice-president of research at International Data Corp.

Postscript

CONTINUED FROM PAGE 45

agreement expands Linotype's type library with Postscript fonts and ensures that Linotype will only sell the Postscript version of its library to Adobe licensees, thereby enabling Adobe to tighten its grip controlling the encroachment of clones.

Aside from legal issues, clone vendors must offer compatibility, increased performance and expandability to accept standards other than those offered by Postscript. There are concerns that Japanese standards might be widely adopted in the future and could either coexist with or overrule Postscript's placement in the market.

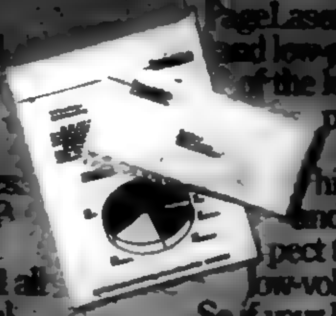
"It's clear that Postscript has won the battle for now," said Bill Hilliard, product manager for Phoenix Technologies Ltd. in Norwood, Mass. "But it could become the Apple II of PDLs. It may go on forever, but something else might come along in the future to take away its position."

In Japan, there are three different PDL character code standards, all of which are faster than Postscript. As a result, it is not clear which standard might ultimately be accepted on a national or international basis, Hilliard added.

Already, some vendors are developing bilingual PDLs to ensure wider compatibility. Control-C Software, Inc. in Portland, Ore., announced at the conference that its Postscript-compatible language would also support Interpress, Xerox Corp.'s language.

Most important in playing the Postscript-compatibility game is being compatible with Apple Computer, Inc.'s Laserwriter printer, which is the largest customer for Adobe's Postscript thus far.

"You have to behave the same as Laserwriter, in the long run," said Andy Johnson-Laird, chairman of Control-C. "If you don't, Aldus Corp. [developer of Pagemaker] will get irritated or the end users will. Postscript should remain invisible to most end users, and most users will need compatibility with the Laserwriter."



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For more details, call 1-800-457-7777 for the name of the Toshiba printer and computer dealer nearest you.

Then see how well PageLaser12 performs in your surroundings.

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Tandy line's value

FROM PAGE 45

500. We also have regional marketing people that are also focused exclusively on the Fortune 500.

Why should MIS directors buy Tandy equipment?
They should believe our advertising claim that there is no better value in the marketplace. I think Tandy's challenge is to convince the MIS director that we sell fine quality machines at the most affordable prices in the market today. The average MIS director doesn't know that.

What are your goals for selling to MIS in large corporations?
Our market share is small — in the few-percent range. We would be very pleased to double that in the next year. That would be significant business for us and would mean that we've made significant inroads.

How important is it for you to clone IBM's Micro Channel? How will you answer IBM's Personal System/2?
I think every new piece of hardware that comes into the market, regardless of the manufacturer, has features that the whole industry reviews and has to determine the importance of for the long term. Of course, customers themselves have an important vote as well. The Micro Channel, as well as VGA [IBM's Video Graphics Array], are things that we will seriously consider. In fact, VGA is an option on our 386-based machines today.

As far as the whole bus structure question is concerned, when you look at the next generation of operating environments, the applications software that runs on those machines is essentially hardware-independent and, as a result, doesn't know what kind of bus that it's dealing with. The real significance of that is that all manufacturers now have the ability to bring some real innovations to hardware design as long as the operating environment is compatible with it and the software is compatible with it. It's not clear what you can do with the Micro Channel that you can't do with another bus structure.

Will IBM's OS/2 Extended Edition run on Tandy systems? Does it matter?
The answer to the question of OS/2 Extended has not seen the light of day. The rumor is that it needs an exceptionally large amount of memory to handle all these extended functions. IBM's literature says OS/2 Extended will run on the Intel 286-based PC XT and AT machines. So, if you believe their literature, it would appear to run on all other machines as well. There is some question as to whether the user will readily devote that level of overhead for [OS/2 Extended's] memory requirements. I think OS/2 Extended is a two- or three-years-out type of issue. Anyone who focuses on it is the ultimate victim of fear, uncertainty and doubt.

Does it matter [that OS/2 Extended run on Tandy systems]? I'm not sure, but it probably does.

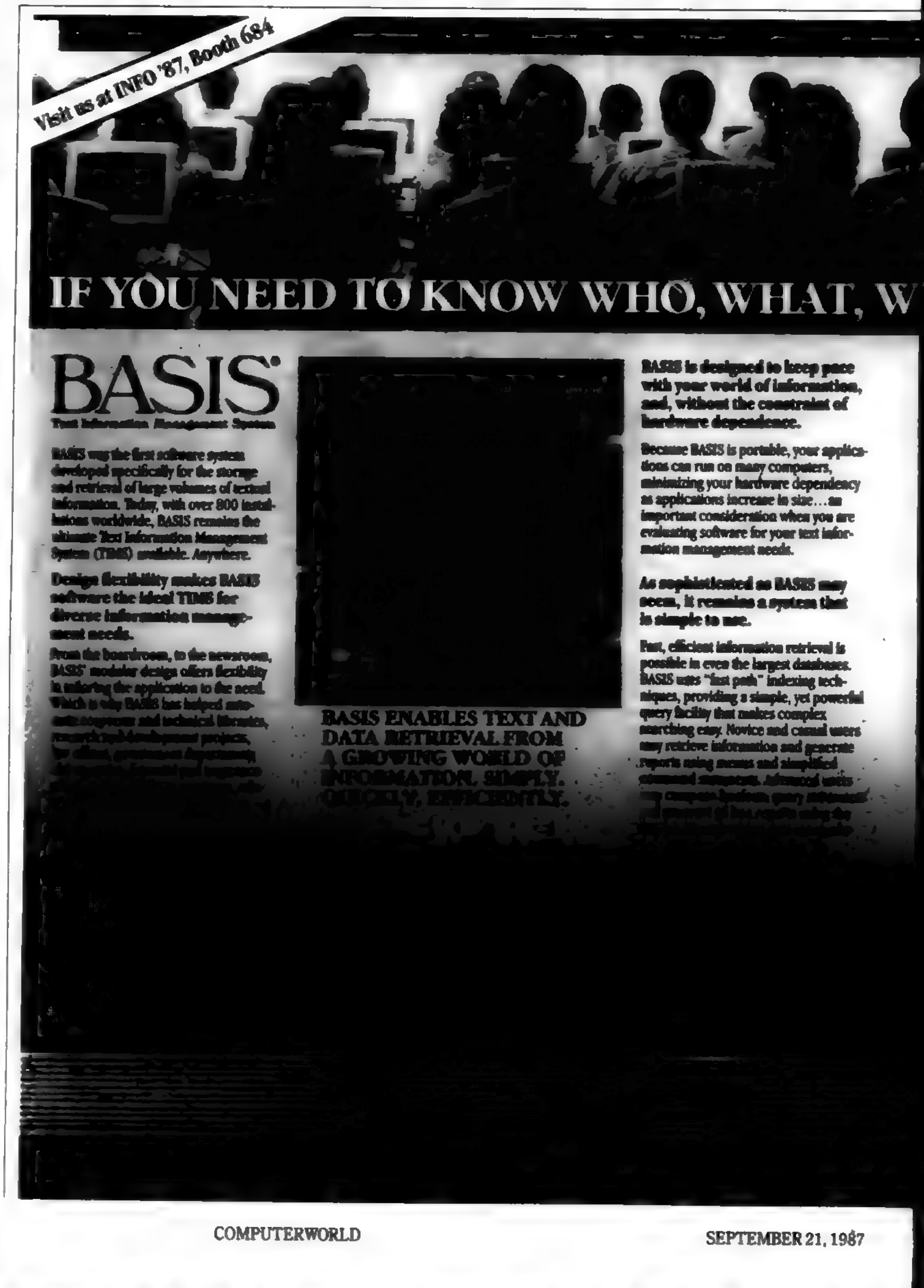
Why didn't Tandy move to full Microsoft Corp. MS-DOS compatibility sooner? How badly were you harmed by that decision?
While it can be argued that we were a little slow in having full [personal computer] compatibility, when we did introduce it in November 1984, we did it in a significant way. We were anything but a hardware clone. We had better graphics, we had sound, we had a smaller footprint, we had more application-specific integrated circuits.

In effect, while we offered interface compatibility, our machines were higher tech and more reliable than those common in the market at that time. Because of our history, it did probably take us a little longer to achieve full compatibility than we might have [otherwise]. But our sales have been very robust. I can't say that it didn't harm us back in 1984, but today, it's a [whole] new ball game.

What have been Tandy's most important accomplishments during the last 10 years? What do you hope to accomplish during the next 10?
In the microcomputer area, our No. 1 accomplishment was making microcomputers nationally available. One of the more interesting things that we did next was our barnstorming campaign in 1978 and 1979. We rented hotel rooms around the country and invited the general public in to see a microcomputer and touch a microcomputer and to see that no one had ever been injured using one. We also made significant inroads in the education market. We gave free computer-literacy training to 400,000 school teachers. Also, we transitioned into the MS-DOS world, offering machines that were compatible — but not clones — by adding value with features and software.

The next 10 years will probably be more interesting than the last 10. It's getting to be a significant-size business. With all the advances being made in hardware and software, the end user is going to be the big beneficiary. We think with our design capability and with our low-cost manufacturing capability, we'll be a viable competitor.

What's the most important thing you've learned during the last 10 years?
Longevity and being a survivor is as important as anything. We've seen a lot of friends come and go.



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PC push ends Tandy's small-potatoes image

Trumpets IBM-compatible line, sheds 'Radio Shack image' to compete with heavyweights

BY JULIE PITTA
CW STAFF

Once known as a microcomputer supplier for home and small-office use, Tandy Corp. is garnering the attention of cost-conscious corporate buyers with its line of IBM-compatible personal computers.

"They offer compatibility at a competitive price from a name-brand vendor," said Bill Lempesis, an industry analyst for Dataquest, Inc. in San Jose, Calif.

"They can compete in the corporate market based on their pricing," he added.

Lempesis said Tandy is taking the proper steps to become a viable supplier to large businesses and that it revamped its "Radio Shack image" last January by adding a direct sales force to address major accounts.

Didn't get no respect

"For a while, they were the Rodney Dangerfield of computing," Lempesis conceded. "They didn't get respect from large businesses. But they've put in place a framework to sell to business. They've added three-piece suits, and they've become a little more professional."

So far, Tandy has made only modest inroads in the business arena. In 1986, the firm shipped 3.4 million microcomputers to small and large businesses, about 5.5% of that market. That placed Tandy in fifth place behind IBM, Apple Computer, Inc., Compaq Computer Corp. and AT&T.

Lempesis said he expects Tandy to increase its share of the market with its new emphasis on the large-business buyer.

Once an IBM-only shop, Wells Fargo Bank NA has opted to use Tandy for its microcomputer needs. James Saavedra, senior vice-president and manager of Wells Fargo's wholesale loan services division, said the bank evaluated low-end systems from IBM, AT&T and Compaq before choosing Tandy.

Looking for dispersed support

"We were looking for a major vendor that could support a large corporate installation in a variety of locations," Saavedra said. "Tandy came out the winner."

Wells Fargo will use Tandy's Intel Corp. 80286- and 80386-based microcomputers in 50 commercial lending offices scattered throughout California, as well as in Dallas, New York, Atlanta and Chicago. Saavedra said Wells Fargo was drawn to Tandy because of its ability to provide on-site service.

The Tandy microcomputers will be used as nodes in local-area networks and linked via an IBM Systems Network Architecture gateway to IBM mainframes. Account officers will use the Tandy microcomputers to access customer information and to perform financial and credit analysis.

Saavedra said he expects to have between 300 and 500 Tandy systems by early 1988, replacing and augmenting Wells Fargo's existing IBM Personal Computer XTs and ATs.

"Based on price and performance, we think they've offered us the best option for what we're trying to do," Saavedra said.

GE makes the switch

General Electric Co. has also recommended Tandy systems as the IBM-compatible microcomputer of choice for its 200 to 300 subsidiaries.

Previously, GE had selected Leading Edge Hardware Products, Inc. as its vendor for IBM compatibles. However, GE switched to Tandy about six months ago because it offered a broader line of products.

Jeff Ehrlich, director of product technology for GE's Corporation Information Technology group in Bridgeport, Conn., which is responsible for buying recommendations, said Tandy offered GE the right combination of pricing, performance, service and support plus the ability to deal with a large corporation.

"A lot of companies may have price and performance and even decent service and support, but they can't do business with a company the size of General Electric," Ehrlich explained. "They can't do a billing, they can't do a bid or draw up a purchase agreement. If we're going to do a corporate deal, we have to be able to do business with the vendor."

Ehrlich said GE will use Tandy PCs in "every application imaginable." Currently, there are "hundreds of Tandys" scattered throughout GE companies, and hundreds more will be purchased through the year, he added.

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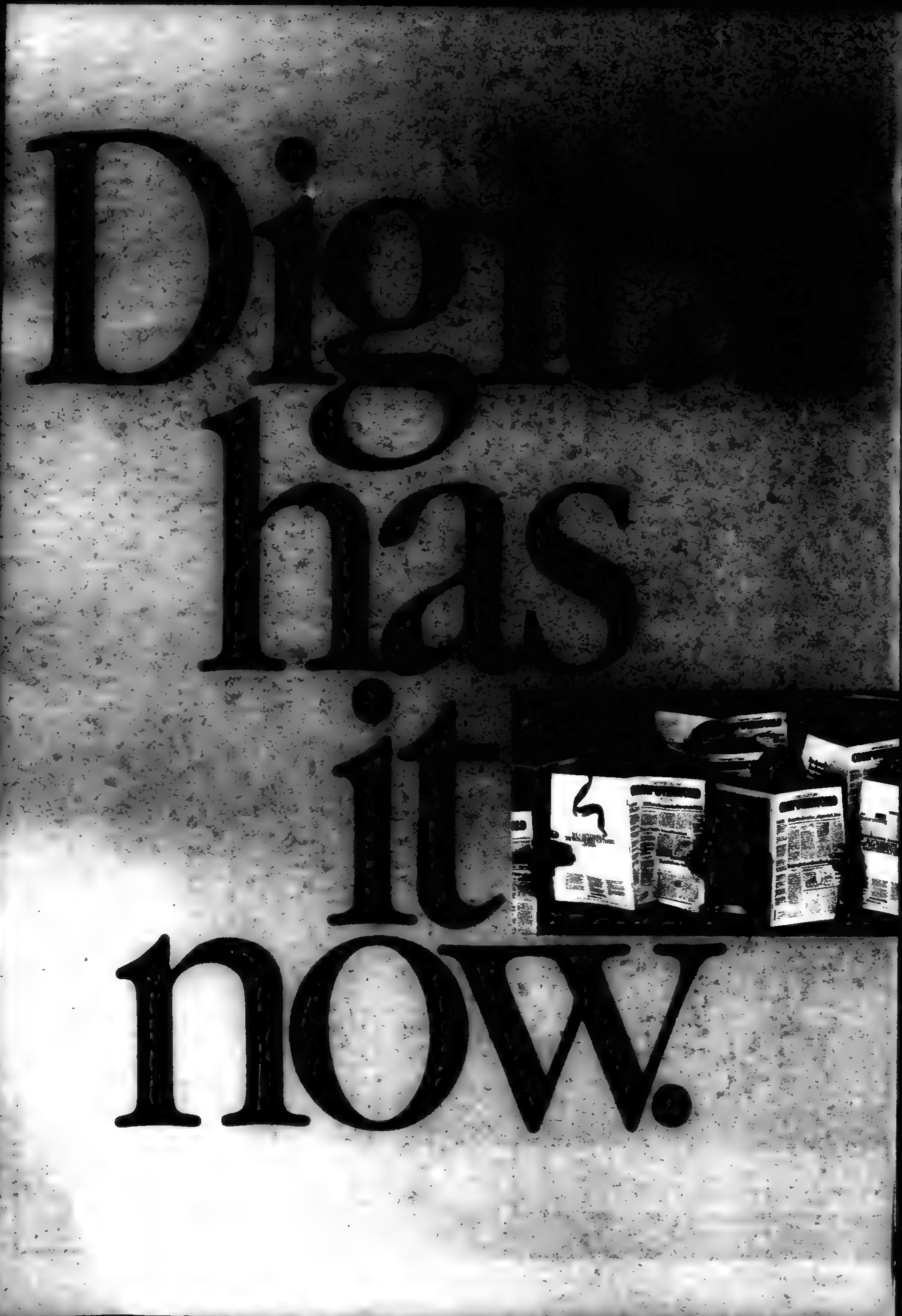
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NEW PRODUCTS

Systems

NEC Information Systems, Inc. has introduced the **Powermate 386** personal computer based on the Intel Corp. 80386 chip.

The Powermate 386 includes a processing unit with 1M byte of random-access memory, a 1.2M-byte floppy disk drive, a 40M-byte hard disk drive and a keyboard. It can accommodate five 5¼-in. internal disk storage devices and has eight full-size expansion slots, two RS-232C serial ports and one parallel port.

NEC's *Powermate 386*

Available options include NEC's Multisync 14-in. display monitor and three graphics boards.

The Powermate 386 is priced from $5,095.

NEC Information Systems, 1414 Massachusetts Ave., Boxboro, Mass. 01719.

A 32-bit workstation that runs under AT&T's Unix System V, Release 3 or Microsoft Corp.'s MS-DOS 3.2 operating system has been announced by **Mad Intelligent Systems, Inc.**

Based on the Intel Corp. 80386 microprocessor, the **D3000** workstation runs with a 16-MHz clock. The Unix workstation features 4M bytes of memory; a 1.2M-byte, 5¼-in. floppy disk drive; two serial and two parallel ports, the vendor's Advanced Graphics Controller; a keyboard; a mouse and Unix System V, Release 3 with the Xwindows system.

Options on the product include a choice of a 44M-, 72M- or 140M-byte hard disk drive and a 16- or 19-in. red-green-blue color monitor or 19-in. high-resolution monochrome monitor, the vendor said.

Prices start at $5,000.

Mad, 2950 Zanker Road, San Jose, Calif. 95134.

A turnkey desktop publishing package called the **CPT Integrated Desktop Publishing System** has been introduced by **CPT Corp.**

The system is based on the CPT 9000 IBM Personal Computer AT-compatible workstation. Also included are a mouse, a scanner, a laser printer, Microsoft Corp. MS-DOS and Xerox Corp.'s Desktop Publishing Series' Ventura Edition, developed by Ventura Software, Inc.

According to the vendor, MS-DOS applications can run concurrently with CPT's text-processing software.

Features include both 5¼- and 3½-in. disk drives as well as a 20M- or 40M-byte hard disk drive.

Prices for the Integrated Desktop Publishing System range from $10,400 to $12,500.

CPT, P.O. Box 295, 8100 Mitchell Road, Minneapolis, Minn. 55440.

The **Acer 1100** business computer, based on the Intel Corp. 80386, has been announced by **Northern Computer Systems.**

The Acer 1100 32-bit system runs at 16 MHz. The base system includes 1M byte of random-access memory, one 40M-byte hard drive, one 1.2M-byte floppy drive, two serial and one parallel port, eight expansion slots and a 101-key enhanced keyboard. Options include color and monochrome graphics adapters

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and monitors.

The Acer 1100 is priced from $3,995.

Northern Computer, 14960 Martin Drive, Eden Prairie, Minn. 55344.

The Ivy Portable 386 Series of IBM-compatible microcomputers, which uses the Intel Corp. 80386 16 MHz 32-bit microchip, has been announced by **Ivy Microcomputer Corp.**

The Ivy 386 portables are said to run the Unix 386 operating system. The Model 40 features a 1.2M-byte floppy drive, a 40M-byte hard drive, 1M byte of random-access memory on an eight-slot motherboard, a 9-in. amber display with Hercules Computer Technology, Inc.-compatible graphics adapter card, a parallel port and an IBM Personal Computer AT-style keyboard.

The Model 80 features an 80M-byte hard drive, and the Model 130 features a 130M-byte hard drive instead of the 40M-byte drive.

The Model 40 costs $3,495; the Model 80 costs $3,995; and the Model 130 costs $5,495.

Ivy Microcomputer, 15 Ararat St., Worcester, Mass. 01606.

Software applications packages

An entry-level computer-aided drafting and design program called **Cub** has been announced by **Innovative Computer Aided Technology, Inc.** (ICAT).

The two-dimensional product, designed for use on IBM Personal Computers and compatibles, features double-work parametric mathematical calculation; automatic associative dimensioning; multiple pick-and-reject operation; detail-transfer capability from another drawing or standard library; window pan and zoom at any time; standard library-creation capability; automatic isometric view generation; and overlay of drawing.

Cub is priced at $2,500. As a turnkey package with an IBM PC AT compatible, a match coprocessor, a 20M-byte hard disk, an enhanced graphics adapter display and software, it costs $6,595.

ICAT, Suite 2, 14979 Prairie Ave., Lawndale, Calif. 90260.

An enhanced version of **Borland International's** relational data base management system software designed for the Apple Computer, Inc. Macintosh has been introduced.

Reflex Plus is said to feature predefined software templates, a choice of an entry form showing either one record at a time or all records at once in a tabluar view format and 55 built-in functions. Entry forms are said to support calculated fields and to automatically perform mathematical calculations during data entry. Users can select record sizes of 1,000, 2,000 or 4,000 char.

Reflex Plus is priced at $279.

Borland, 4585 Scotts Valley Drive, Scotts Valley, Calif. 95066.

Software said to provide a simulation capability for modeling manufacturing systems has been announced by **Pritsker & Associates, Inc.**

Xcell+ combines computer graphics and an interactive menu-driven model builder to allow construction of simulation models and animation simultaneously. It offers fill-in-the-blank data entry and online Help as well as built-in manufacturing constructs and such output reports as work-in-process inventory cost and workstation utilization.

Xcell+ runs on IBM Personal Computer ATs, Hewlett-Packard Co. Vectras and compatibles. It costs $8,000. A limited version with black-and-white graphics is available for $4,000.

Pritsker & Associates, P.O. Box 2413, 1305 Cumberland Ave., W. Lafayette, Ind. 47906.

Response, an integrated contingency planning system for data processing and corporate disaster recovery planning, has been announced by **Mosaic Computer Security, Inc.**

Response, which runs on IBM Personal Computers or compatibles, includes facilities for determining critical applications, calculating off-site storage requirements, defining team procedures and generating relevant documentation.

Features include customized templates for data entry, file encryption, micro-to-mainframe communications and an automated maintenance program.

Response is priced at $12,000 per site.

Mosaic, 1982 Massachusetts Ave., Cambridge, Mass. 02140.

Software languages

VCL, an implementation of Digital Equipment Corp.'s VAX/VMS command language designed for Microsoft Corp. MS-DOS and Unix-based systems, has been announced by **Boston Business Computing, Ltd.**

VCL features DEC DCL commands and switches, DCL syntax, an extensible command set, logicals, symbol names, command history and line editing. It also offers a Teach mode said to display the equivalent MS-DOS or Unix command for every DCL command entered.

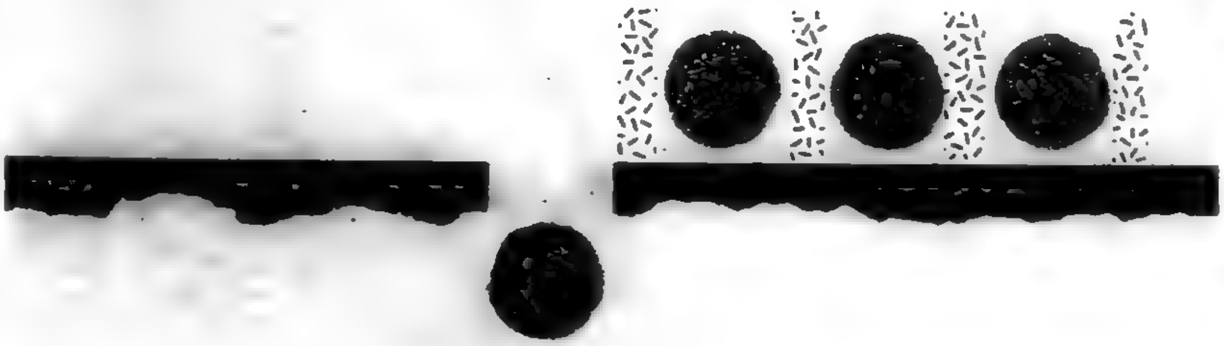
VCL is priced at $195.

Boston Business Computing, Riverwalk Center, 360 Merrimack St., Lawrence, Mass. 01843.

Software utilities

Two utility subsystems that generate IBM's Message Format Service (MFS) and Basic Mapping Support (BMS) screen

Continued on page 55



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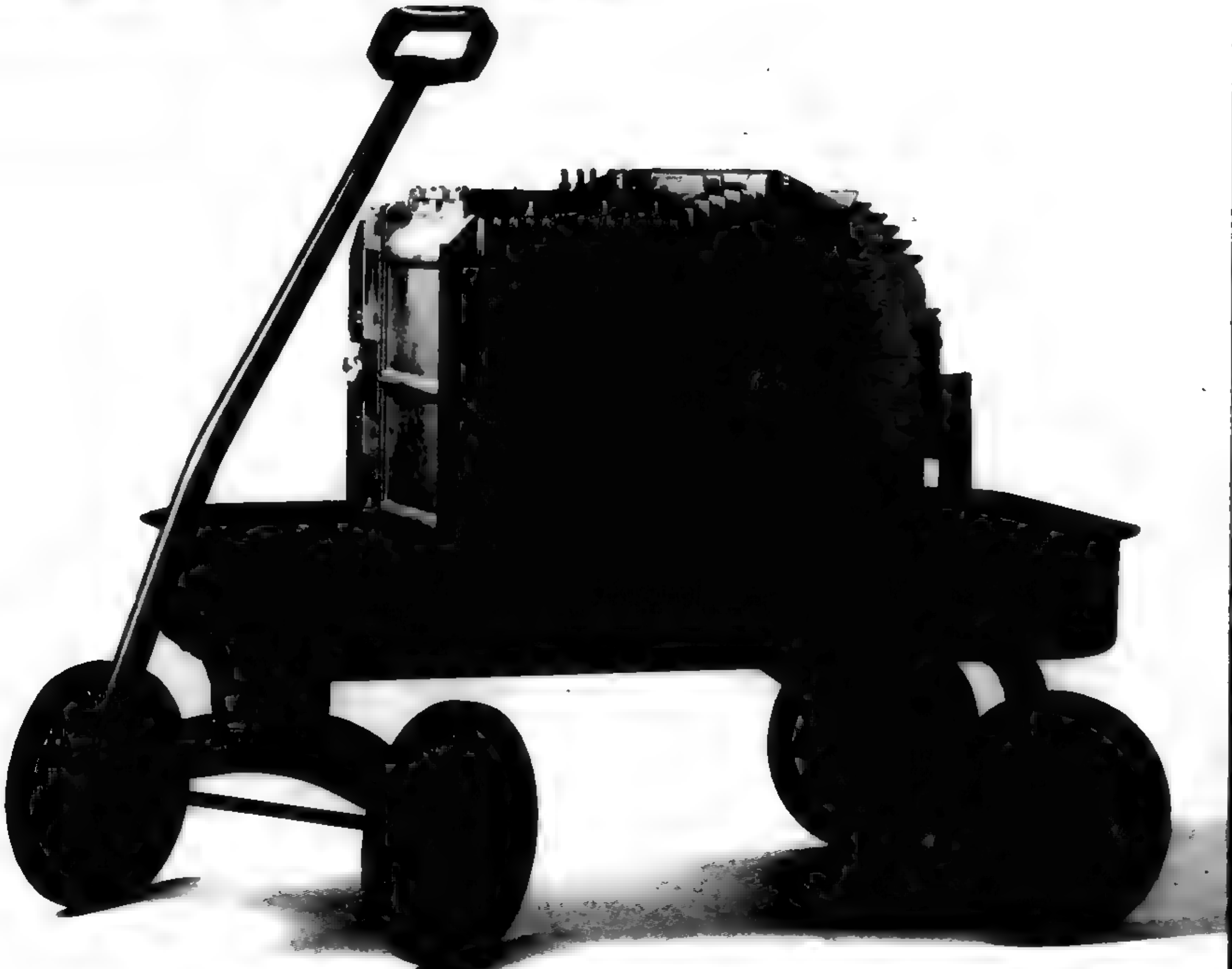

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Continued from page 53

macros based on Index Technology Corp.'s Excelerator computer-aided software engineering (CASE) development tool have been announced by **The Hobbs Group.**

BMSgen and **MFSgen** produce the source macros for IBM's IMS/DC and CICS screen languages from Excelerator CASE Design and Prototype Software interface files. Both allow Excelerator designers and analysts to prototype and design screens in Excelerator, generate the Excelerator screen interface file, run BMSgen or MFSgen to create the required source macros and transfer the designs to the mainframe computer.

Priced at $225 each, the utilities run on IBM Personal Computer XTs, PC ATs or compatibles.

The Hobbs Group, P.O. Box 02171, 7017 S.E. 35th Ave., Portland, Ore. 97202.

Component-level **troubleshooting software** designed for testing the IBM Personal Computer AT has been introduced by **Techpro Corp.**

The software runs on a Fluke 9010A Micro-System Troubleshooter and includes diagnostics and guided fault-isolation programs to troubleshoot the integrity of the AT I/O Channel Connectors, the data and address buses, critical control signals, I/O chips and system memory.

The package, including two minicassette tapes for the Fluke 9010A, costs $3,000.

Techpro, P.O. Box 5294, Springfield, Va., 22150.

Bridgeware, software said to create Prolog data bases that can be used as knowledge bases in expert and other intelligent systems, has been announced by **Microbase Software Systems, Inc.**

Bridgeware operates as a stand-alone application. It works with plain ASCII files and can access data from most packages and languages, including Ashton-Tate's Dbase, Lotus Development Corp.'s 1-2-3, Basic, Pascal, C and mainframe data bases. According to the vendor, it is capable of combining information from several applications into a single knowledge base.

Bridgeware runs on IBM Personal Computers and compatibles under Microsoft Corp. MS-DOS 2.0 or higher. It costs $69.96.

Microbase, Box 550, Medford Office Center, Medford, N.J. 08055.

Development tools

An enhanced version of **Baby/36** software, which emulates the operating system of the IBM System/36 on IBM Personal Computers and compatibles and local-area networks (LAN), has been announced by **California Software Products, Inc.**

Release 3.5 features revision of the data file-conversion utility to let it function as a systems-support program. Other features include a rewritten source-entry utility and an 8-million-record limit. It supports IBM Proprinters and has a keyboard profiler and a utility software package, including a set of diagnostics tests.

Upgrades to Baby/36 Release 3.5 cost $200. Baby/36 costs from $650 for execution-only versions to $3,500 for complete systems. LAN versions range from $1,500 to $4,500 plus $100 per linked device.

California Software, 525 N. Cabrillo Park Drive, Santa Ana, Calif. 92701. 714-973-0440.

A computer-aided software engineering (CASE) tool, called **TIP/PC**, has been announced by **Technology Information Products Corp.**

TIP/PC is a version of Index Technology Corp.'s Excelerator analysis and design workbench, customized to support the TIP's development, planning and analysis methodologies. It supports all five graphic types and 15 individual textual description components necessary for the development and analysis of the models used in TIP's proprietary methodology.

TIP/PC is priced at $9,200.

Technology Information, 12 New England Executive Park, Burlington, Mass. 01803.

A code-generating graphics editor called **Drawbridge** has been introduced by **Courseware Applications, Inc.**

According to the vendor, Drawbridge automatically generates the source code required to create graphics displays. It allows the user to view the image as it is created and to modify the display with various editing features.

Graphics objects available include arcs, boxes, circles, lines and polygons. They may be in color and can be either outlined or painted. A built-in text editor allows the addition of text to graphics displays.

Drawbridge runs on IBM Personal Computers and compatibles with 256K bytes of memory. It costs $129.

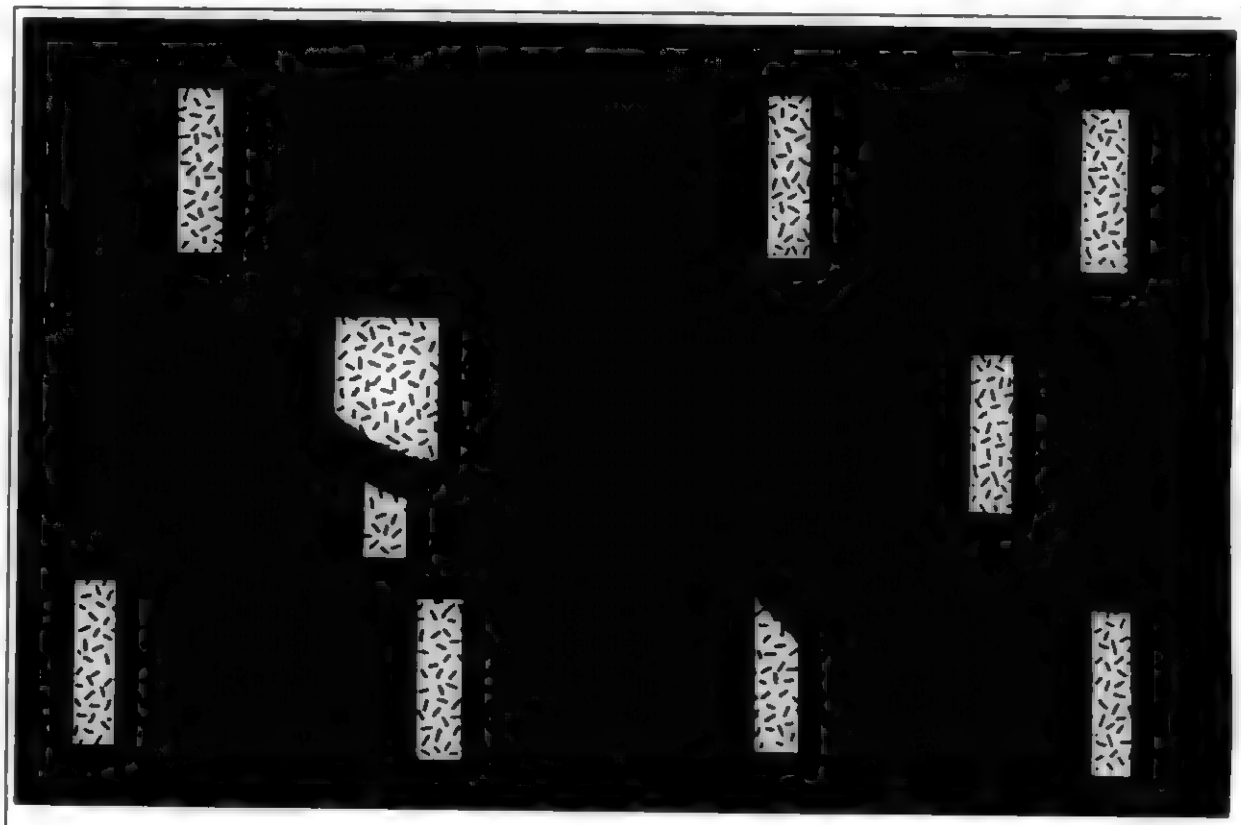
Courseware, 475 Devonshire, Champlain, Ill. 61820.

Data storage

A line of certified backup-tape media products featuring a lifetime replacement warranty has been announced by **Emerald Systems Corp.**

Designed for use with the company's tape backup subsystems, the **Lifetape** backup media includes certified 60M-byte cassettes and 60M- and 120M-byte ¼-in. cartridges. According to the vendor, all Lifetapes are tested for defects, dropouts and over or under runs, as well as for mechanical integrity of the outer shell and

Continued on page 56



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With VERIFY, you enter or capture application data just once. The automated logging function permanently stores the screen dialogues on a file. You can then browse and customize your test stream dialogues with a variety of powerful on-line edit and utility functions. VERIFY is then ready to retest any portion of your system, giving you the flexibility to control the application mix, input values and arrival rate of the transactions to be re-executed on CICS.

Through an on-line menu display, you can see the exact differences VERIFY discovers during its interactive comparison. And respond immediately with two full menus of mismatch processing options.

In addition, VERIFY provides several levels of in-depth security for your data, with options like on-line "ownership" of test streams, dark field protection, and customized limitation of VERIFY usage. It's easy to install too, because VERIFY is distributed on a "link and go" tape.

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Continued from page 55

drive mechanisms. The warranty program allows any registered Lifetape media product to be replaced at no charge should failure occur.

The ½-in. nine-track tapes cost $39 each; a five-pack of cassette tapes costs $160; a five-pack of 60M-byte color-coded data cartridges costs $195; and a five-pack of 120M-byte color-coded data cartridges costs $250.

Emerald Systems, 4757 Morena Blvd., San Diego, Calif. 92117.

Nth Group has announced its **small computer system interface (SCSI) tape backup systems** for the IBM Personal Computer and compatibles.

The 60M-byte SCSI tape-backup system is available in an internal and an external model. It comes with SCSI Host adapter and software. The software provides image and file-by-file operation along with tape director and erase utilities. The backup systems operate under IBM's PC-DOS and Microsoft Corp.'s MS-DOS.

The internal model is priced at $699. The external model costs $849.

Nth Group, P.O. Box 1287, West Hills, Calif. 91304.

Information Storage, Inc. has reduced the price of its write-once read-many (WORM) optical-storage drive subsystem products for IBM Personal Computers and compatibles.

The external subsystem, the **ISI 525 WC Optical Disk Subsystem**, featuring 230M bytes on double-sided media cartridges, drive, controller card, software and cable, now costs $2,795. The internal mount configuration costs $2,595.

The vendor also announced its **Gigabyte Optical Subsystem**, a 5¼-in. WORM drive offering more than 500M bytes of storage per side. It is priced at $4,495 and will be available in the fourth quarter.

Information Storage, 2768 Janitell Road, Colorado Springs, Colo. 80906.

A desktop, tape subsystem that allows IBM Personal Computers, PC XTs and ATs to read and write nine-track mainframe ½-in. tapes has been introduced by **M4 Data, Inc.**

The turnkey system includes M4 Data's desktop 9800 tape drive, a controller card that plugs into a PC expansion slot, software and interface cabling.

Features include self-loading and self-threading. Software utilities include allowing for reading a variety of file-structured tape data formats and providing ASCII/EBCDIC code conversion at the PC for reading mainframe- generated tapes and for creating tapes for mainframe use.

The tape subsystem is priced at $3,895.

M4 Data, Building 14, 3815 N. U.S. 1, Cocoa, Fla. 32926.

A series of internal hard disk drives for Apple Computer, Inc. Macintosh computers has been announced by the **Rodime, Inc.** Peripheral System Division.

The series includes the **Rodime 450 RX** 45M-byte drive, the **Rodime 1000 RX** 100M-byte drive and the **Rodime 1400 RX** 140M-byte drive.

The 450 RX was designed for both the Macintosh SE and the Macintosh II. It has an average seek time of 28 msec and employs an embedded small computer systems interface (SCSI) controller. Up to seven peripherals can be daisy-chained.

The Rodime 1000 RX and 1400 RX are 5¼-in. hard disk drives for the Macintosh II. Both offer average seek times of 28 msec, and both have embedded SCSI controllers.

Prices for the 450 RX, 1000 RX and 1400 RX are $1,595, $2,995 and $3,495, respectively.

Rodime, 29525 Suite 214, Chagrin Blvd., Pepper Pike, Ohio 44122.

Printers/Plotters/Peripherals

An integrated desktop publishing system made up of of a microcomputer, a laser printer and an image scanner has been unveiled by **Canon U.S.A., Inc.**

The system, called the **Canon Express Desktop Publisher** features software

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Most importantly, you'll find out about the new connection between IBM and Apple®. About the new network from 3Com® called 3+ for Macintosh that works with both Macintosh and PCs. About DOS compatibility cards and the new option of 286 emulation.

You'll even learn how Macintosh talks with IBM mainframes.

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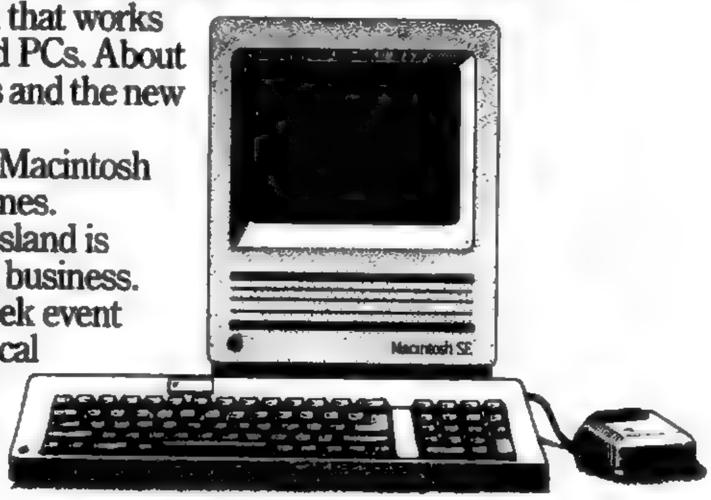
For our Macintosh Week event schedule, contact your local Businessland Center. To find the one nearest you, call (800) 323-1000.



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The *Canon Express Desktop Publisher*

capabilities that include integration of word processing with page composition and layout. Text editing is done on the composed page in a what-you-see-is-what-you-get format.

Hardware components include a Canon A-200EX microcomputer with a 20M-byte hard disk. The scanner has scanning densities of 300, 200, 150, or 75 dot/in. and can operate at a speed of 12 sec./page at 300 dot./in.

The Desktop Publisher, including Canon Expression Software, costs $9,950.

Canon U.S.A., Systems Division, One Canon Plaza, Lake Success, N.Y. 11042.

A 14-in. high-resolution color monitor, the **Model CM-1493**, has been introduced by **Tatung Co. of America, Inc.**

The monitor is said to be compatible with all models of the IBM Personal System/2 family and to accept analog output from the PS/2's built-in Video Graphics Array and Multiple Color Graphics Adapter.

The monitor has a 0.31mm dot pitch and provides resolutions of 720 by 400 pixels in text mode and 640 by 480 pixels in graphics mode. It offers 256 simultaneously displayable colors from a palette of 256,000.

The Model CM-1493 is priced at $689.

Tatung, 2850 El Presidio St., Long Beach, Calif. 90810.

A 300 dot/in. intelligent image and text scanner has been announced by **Microtek Labs, Inc.**

The **MS-300C** offers a choice of eight halftone screen patterns and 15 brightness and contrast settings. The device can scan both halftone photographs and line-art drawings in one pass. Windows can be drawn to specify the areas that include photographs or drawings.

Interfacing the Apple Computer, Inc. Macintosh is through a 57K-byte serial port or an optional small computer systems interface port. To interface to IBM Personal Computers, a parallel interface card is included.

The MS-300C costs $1,695.

Microtek Labs, 16901 S. Western Ave., Gardena, Calif. 90247.

A print server that allows up to eight users to simultaneously access up to four printing devices has been announced by **AST Research, Inc.**

The server, called **Premium Connection**, was designed for use with AST's Turbolaser printer but can work with any serial or parallel printer or plotter, the vendor said.

Three models are available. All feature two full-length, eight-bit IBM Personal Computer slots, two plug-in expansion adapters, 512K bytes of random-access memory, four asynchronous serial sharing ports, one serial printer port and one parallel pinter port. Model 1 loads software and fonts from a host computer. Model 2, with a 1.2M-byte floppy disk, and Model 3, with a 20M-byte hard disk, are self-contained.

Models 1, 2 and 3 cost $1,150, $1,495 and $1,995, respectively.

AST Research, 2121 Alton Ave., Irvine, Calif. 92714.

An IBM-compatible full-page document reader with document formatting capabilities has been announced by **Saba Technologies, Inc.**

Page Reader supports the formats of such word processing programs as Micropro International Corp.'s Wordstar, Microsoft Corp.'s Word, Ashton-Tate's Multimate, Wordperfect Corp.'s Wordperfect and IBM's Displaywrite. Features include the ability to transfer columns of words and numbers into Lotus Development Corp.'s 1-2-3 and to capture such business graphics as charts and graphs.

Page Reader has a built-in sheet feeder that enables it to read stacks of up to five typewritten pages. While the scanner is operating, users can continue to use the personal computer for other tasks.

Page Reader costs $1,299.

Saba Technologies, 9300 S.W. Gemini Drive, Beaverton, Ore. 97005.

A 19-in. monochrome display featuring 1,600- by 1,200-pixel resolution and available for both IBM Personal Computers and compatibles and Apple Computer, Inc.'s Macintosh II has been introduced by **Cornerstone Technology**.

The **Vista 1600** noninterlaced display offers a 67Hz refresh rate and full-page viewing. The IBM-compatible product emulates the IBM Color Graphics Adpater standard and is compatible with environments such as Microsoft Corp.'s Windows and Digital Research, Inc.'s Graphics Environment Manager.

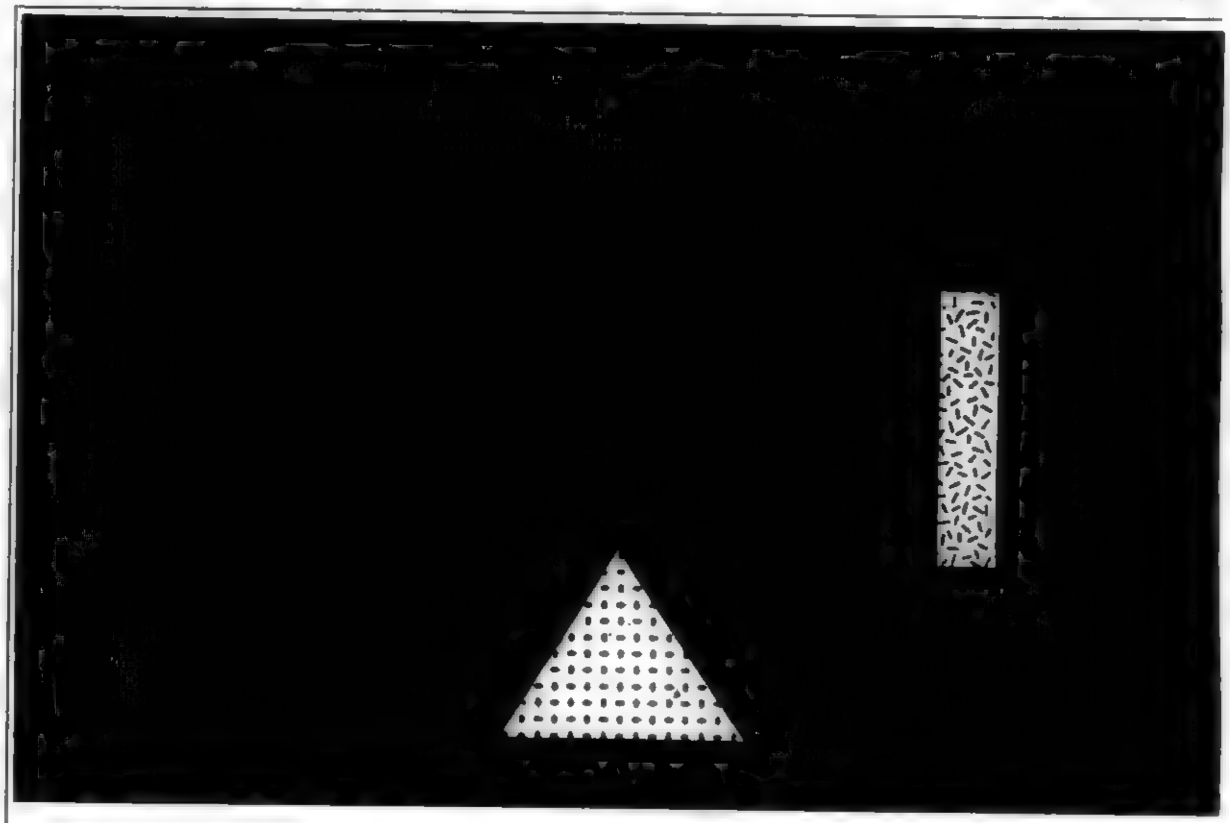
The Vista 1600 includes a display generator controller card that occupies a single expansion slot. Prices start at $2,195.

Cornerstone, 175A E. Tasman Drive, San Jose, Calif. 95134.

Board-level devices

General Computer Corp. has announced the **Hypercharger 020**, Hy-

Continued on page 59



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Continued from page 57

perdrive FX/40, Hypernet 2.0 and the **Hyperdrive FX/20** Apple II software conversion kit for the Apple Computer, Inc. Macintosh and Apple II personal computers.

Hypercharger 020 is an enhancement board for the Macintosh SE featuring a 16-MHz Motorola, Inc. 68020 microprocessor. It costs $1,499. The Hyperdrive FX/40 is an external 40M-byte small computer systems interface (SCSI) hard disk for the Macintosh. It costs $1,799.

Hypernet 2.0 is an upgraded version of the vendor's file-serving software. It costs $299. The Hyperdrive FX/20 Apple II conversion kit includes software that allows an external 20M-byte SCSI hard disk to work with the Apple II product family. It costs $29.99.

General Computer, 215 First St., Cambridge, Mass. 02142.

Conographic Corp. has announced the **Conodesk 6000** controller board, which it claimed is compatible with Adobe Systems, Inc.'s Postcript language.

The Conodesk 6000 offers 40 page/min. or better raster operations; selectable print resolutions of 300 by 300, 400 by 400 or 600 by 300 dot/in.; intelligent laser-print engine controller; page-description language interpreter; scanner interface; up to 2M bytes of extended memory specification random-access memory available to the host personal computer; Hewlett-Packard Co. Laserjet compatibility; and outline to bitmap rendering.

The vendor said the Conodesk 6000 will be available in September and is priced from $1,995.

Conographic, 17841 Fitch, Irvine, Calif. 92714.

Hewlett-Packard Co. has upgraded its **HP 9000 Series 300** DOS coprocessor to support 16 localized keyboards.

The Series 300 DOS coprocessor is a combined hardware and software product that allows Series 300 technical workstations to run IBM Personal Computer AT-compatible applications. The enhanced product also includes HP-UX mouse emulation of the Microsoft Corp. Mouse and improved system integration under HP Windows. Other features include the ability to temporarily freeze the DOS process.

Revision 1.1 of the HP 9000 Series 300 DOS coprocessor system is priced at $1,295.

HP, 1820 Embarcadero Road, Palo Alto, Calif. 94303.

An extended enhanced graphics adapter (EGA) card that supports both a high resolution of 800 by 600 pixels and a mid-range resolution of 640 by 480 pixels has been announced by **NSI Logic, Inc.**

Called **Smart EGA Plus**, the half-size board uses multisynchronous monitors to run software written for IBM's Personal System/2 video graphics array standard. It is based on a proprietary very large-scale integration graphics chip, which employs gate array technology.

Smart EGA Plus is priced at $499.

NSI Logic, Cedar Hill Business Park, 257-B Cedar Hill Road, Marlboro, Mass. 01752.

The 16- to 20-MHz zero-wait state **386 Performer** motherboard has been announced by **CSS Laboratories, Inc.**

The 386 Performer is an IBM Personal Computer AT-size version of the Intel Corp. 80386. It is keyboard-selectible for 8M or 16MHz and features one 32-bit memory slot and five 16-bit and two 8-bit expansion slots. On-board memory is 1M-byte static-column random-access memory (RAM), upgradable to 2M bytes.

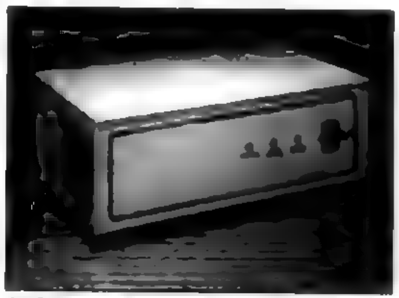
The 386 Performer costs $1,980 with 1M byte of 100-nsec static-column RAM.

CSS Laboratories, 2134 S. Ritchey St., Santa Ana, Calif. 92705.

Auxiliary equipment

A 500W backup power unit designed to protect microcomputers from loss of data or damage caused by short circuits, power fluctuations or outages has been introduced by **Safe Power Systems, Inc.**

The Safe 500 Watt backup power system provides filtered AC current and up to 20 minutes of runtime for fully loaded hard-drive personal computers during electrical blackouts. Features include alarms and lamps that automatically indicate power loss, overloads and low battery status as well as automatic synchronised transfer time of less than two msec.



Safe's ***backup power system***

The Safe 500 Watt costs $795.

Safe Power Systems, 528 W. 21st St., Tempe, Ariz. 85282.

An uninterruptible power supply that provides five minutes of on-line power backup for personal computers in sets of two each has been introduced by **Clary Corp.**

According to the vendor, the **Model PC-1125** provides 765W of peak repetitive power for dual primary loads and 360VA of isolated, conditioned power for dual secondary loads such as printers, modems and remote screens.

The Model PC-1125 costs $890.

Clary, 320 W. Clary Ave., San Gabriel Calif., 91776.

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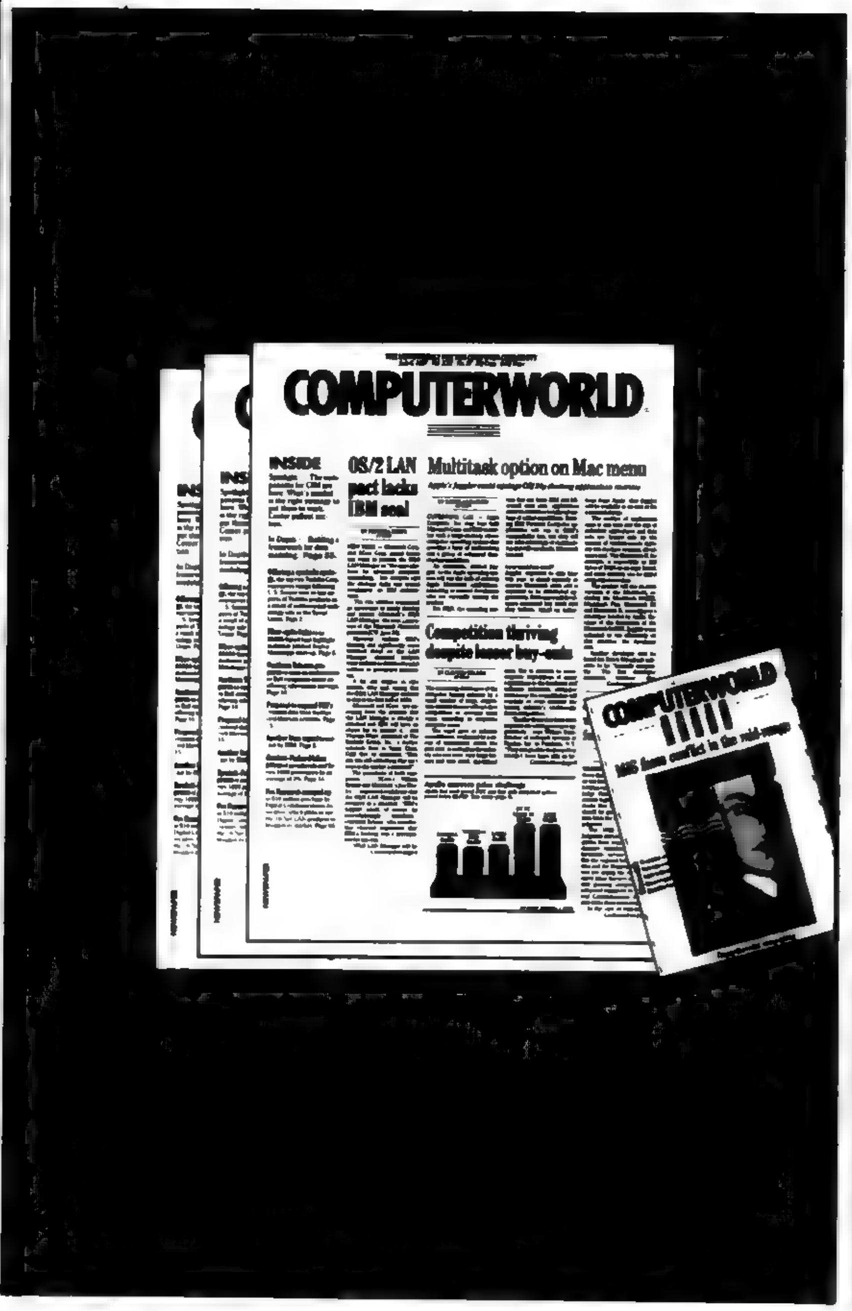

COMPUTERWORLD

INSIDE

OS/2 LAN pact lacks IBM seal

Multitask option on Mac menu

Competition thriving despite lesser buy-outs

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   - 50. Business Service (except DP)
   - 60. Government—State/Federal/Local
   - 65. Communications Systems/Public Utilities/Transportation
   - 70. Petro Chem, Mining, Construction, Agriculture
   - 80. Manufacturer of Computers, Computer-Related Systems or Peripherals
   - 85. DP Service Bureau/Software/Planning/Consulting
   - 90. Computer/Peripheral Dealer/Distributor/Retailer
   - 75. User: Other ________
   - 95. Vendor: Other ________ (Please specify)

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   - 19 Vice President, Asst. VP
   - 21 Dir., Mgr., Suprv., IS/MIS/DP Services
   - 22 Dir., Mgr., Suprv., of Operations, Planning, Adm. Services
   - 23. Dir., Mgr., Suprv., Analyst, of Systems
   - 31 Dir., Mgr., Suprv., of Programming
   - 32. Programmer, Methods Analyst
   - 35. Dir., Mgr., Suprv., OA/WP
   - 38. Data Comm. Network/Systems Mgt.

   OTHER COMPANY MANAGEMENT
   - 11. President, Owner/Partner, General Mgr.
   - 12 Vice President/Asst. VP
   - 13. Treasurer, Controller, Financial Officer

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   - 41 Engineering, Scientific, R & D, Tech. Mgt.

   SALES
   - 51 Manufacturing Sales Reps., Sales/Mktg. Mgt.

   OTHER PROFESSIONALS
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   - 70. Medical, Legal, Accounting Mgt.
   - 80. Educators, Journalist, Librarians, Students
   - 90. Others ________ (Please specify)

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   - A. Mainframes/Superminis
   - B. Minicomputers/Small Business Computers
   - C. Microcomputers/Desktops
   - D. Communications Systems
   - E. Office Automation Systems
   - F. No Computer Involvement

[illegible]

DATA STREAM

Merv Adrian

Gateway tips to consider

While local-area network (LAN) gateways have been around for quite a while; their sales curve began increasing steeply in the last year or so as mainframe-based shops began installing LANs in large numbers.

Like any new technology, LAN gateways impose several tasks on the information systems professional, such as a new set of technical concepts to master, specifications to understand and products to compare. In the case of gateways, there are a number of issues one should address to make an accurate decision.

- **Number of users to be supported.** Don't skimp on this; it's a lot harder to add capacity later on to a LAN because there are fixed sizes associated with the products you buy. Although only one connection might be needed to add sessions, that connection might be a direct line to your front-end processor, and it might be in short supply. Connections to cluster controllers may be easier, assuming there are ports there. Include in your capacity planning any printer sessions you

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Bridge offers encryption tools

Family of TCP/IP-based LAN products paves safe path to net devices

BY PATRICIA KEEFE
CW STAFF

MOUNTAIN VIEW, Calif. — The Government Products Division of Bridge Communications, Inc. is slated to announce today the Bridge Secure Network System (BSNS), a family of encrypted LAN products based on Transmission Control Protocol/Internet Protocol (TCP/IP), the industry standard.

"The use of TCP/IP allows us to offer a secure communications path to devices on the BSNS and to be fully interoperable among multivendor systems in a nonsecure mode on any TCP/IP LAN — Bridge or non-Bridge," said Tom Russell, Government Products Division manager.

Concern about losses resulting from security breaches has mounted with the proliferation of effective network analysis tools that let outsiders tap in and monitor data on the network, Russell said. BSNS products use multiple encryption schemes to minimize the possibility of data compromise in these environments, he added.

Starting a family

The Secure Communications Server/50 (CS/50) and Secure Network Control Station/AT (NCS/AT) are the first two members of the BSNS family of local-area network (LAN) products, which was designed to provide data security and access control for network users and resources.

Secure CS/50 is a compact server said to support two asynchronous terminals, printers, host ports or personal computers. Secure NCS/AT is an IBM Personal Computer AT Xenix-based network management station that reportedly allows centralized control and monitoring of LAN-attached computer resources.

Based on the TCP/IP set, both products come with three different interfaces: standard Ethernet, IEEE 802.3; Bridge's 5M bit/sec. carrier-sense multiple access/collision detection broadband network interface; or a thin Ethernet, IEEE 802.3 10 Base 2. On the Secure CS/50, thin Ethernet is embedded, eliminating the need for an external transceiver and cable.

Both products reportedly provide user authentication, se-

Continued on page 65

DEC drafts three-year strategy

With Decworld '87 as the backdrop, Digital Equipment Corp. last week unveiled the following rough sketch of its strategy for enhancing its Decnet architecture during the next three years:

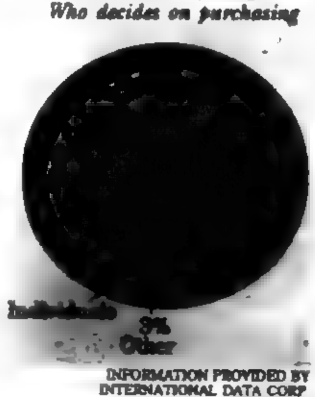
- Provide greater flexibility in linking computers and desktop devices together by expanding the choice of communications media available to the user.
- Enable users to connect both DEC and non-DEC systems into enterprisewide networks as easily as plugging in a telephone.
- Ensure interoperability of non-DEC systems in Decnets.
- Allow for management of enterprise networks, including voice and data, in both local- and wide-area environments.
- Enable users to build and manage very large, geographically dispersed computer networks and let inherent flexibility accommodate changes in technology or in a firm's organization.
- Allow users to share information on systems worldwide.

Inside

- The Wollongong Group to strut TCP/IP support at FCC conference. Page 63.
- IBM investigates intelligent networking with Sweden's Ericsson. Page 63.
- C&C/Comendec package links VAXs to Arcnet. Page 71.

Data View

Network cable
Who decides on purchasing



INFORMATION PROVIDED BY INTERNATIONAL DATA CORP
CW CHART

Datapoint connects to SNA, OSI standards

BY PATRICIA KEEFE
CW STAFF

SAN ANTONIO, Texas — Datapoint Corp. recently announced the Vista-Gate Network Communications Server, which is said to provide compatibility with IBM's Systems Network Architecture (SNA) and the ISO's Open Systems Interconnect environments.

The product also reportedly serves as a platform for future advanced protocol support, such as for IBM's Professional Office System (Profs).

Vista-Gate was co-developed with Communications Solutions, Inc. in San Jose, Calif., and TITN, Inc. in Hayward, Calif.

Direct access to Profs will be announced within the next six months, according to a Datapoint spokesman. Datapoint At-

Continued on page 65

MAINFRAME

printf("Hello, world\n");

Meet the Industry's New Standard for Mainframe C Compilers

SAS Institute Inc. announces a mainframe version of the Lattice® C compiler—your key to truly portable applications.

With our compiler, you can develop C programs on IBM 370 machines, interface easily with non-C programs and software packages, and protect your programming investment across operating environments. Virtually every new computer supports C, and portable programs created with the mainframe compiler under OS or CMS will run on any other machine with a C compiler.

The mainframe compiler uses standard IBM linkage conventions. Assembler programs, MAIN routines in other high-level languages, and packages such as IBM's ISPF and GDDM can be invoked directly from C.

And you can use C, instead of assembler, to develop small and fast subroutines called from other languages.

We designed the compiler listing and cross-reference to make programs easy to follow and errors easy to find. An extensive library offers functions from Kernighan and Ritchie and the Lattice PC C compiler. The run-time library produces explicit numbered error messages and a traceback of active function calls if an error occurs.

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TCP/IP supports Streams, OSI

BY PATRICIA KEEFE
CW STAFF

PALO ALTO, Calif. — The Wollongong Group, Inc. said it will demonstrate Transmission Control Protocol/Internet Protocol (TCP/IP) support for both AT&T's Streams and the ISO's Open Systems Interconnect (OSI) model next week at the Federal Computer Conference in Washington, D.C.

Wollongong is slated to introduce Streams-based TCP/IP communications software for systems running AT&T's Unix System V, Release 3.1, as well as demonstrate an OSI-to-TCP/IP gateway, designed to permit a smooth migration to ISO-based environments in the future.

Wollongong Integrated Networking Solutions (WINS)/Streams, the new software, combines TCP/IP support for standard user protocols with Streams, the framework for implementing network protocols developed by AT&T as part of Unix System V, Release 3.

Central to WINS/Streams' flexibility are portions that are implemented as independent multiplexed Streams drivers, which Wollongong claimed are unavailable in this manner from any other supplier.

Opens RFS gate

This independence enables concurrent use of AT&T's Remote File Sharing (RFS), which allows transparent resource and file sharing among heterogeneous Unix machines and other TCP/IP user-level services. As an additional option to TCP/IP, Wollongong has implemented the OSI layers.

WINS/Streams also provides programming libraries for the AT&T standard Transport Level Interface and the University of California at Berkeley's Socket Library.

Pricing for WINS/Streams is not yet available.

Software support

To assure that network managers will be able to migrate existing TCP/IP systems to future OSI protocols, Wollongong said it will display an enhanced version of its WINS/TCP software running TCP/IP and OSI concurrently under Unix System V, Release 3.1, which supports both RFS and Streams.

In this enhanced version, Wollongong said it will augment TCP/IP protocols at layers one through four on WINS with equivalent OSI layers to create software that contains both protocol sets.

Also demonstrated will be OSI layers five through seven in the form of FTAM over TCP/IP, the vendor claimed.

The WINS family supports AT&T's 3B computers, National Semiconductor Corp.'s Series 32000 computers, IBM Personal Computers running Microsoft Corp.'s MS-DOS, Digital Equipment Corp. VAXs and Microvaxes running VMS or Unix System V, Hewlett-Packard Co.'s HP 9000 Series 500 computers running HP-UX and Cray Research, Inc. supercomputers.

IBM, Ericsson explore joint networking deal

BY AMIEL KORNEL
IDG NEWS SERVICE

PARIS — IBM tightened its web over the European telecommunications equipment market with the recent announcement, made here, that it has launched a joint study with Sweden's L. M. Ericsson in the area of intelligent networking.

In a prepared statement, IBM Europe said the two companies will seek ways of combining IBM's expertise in data base and data network management technology with Ericsson's Axe switching technology.

The object of the study is to develop technical solutions based both on standard IBM and Ericsson systems and specialized software for the intelligent network concept.

The nonexclusive agreement provides for architecture definition activities between IBM systems and Ericsson switches, connectivity tests between IBM equipment and the Axe switch using standard interfaces and product opportunity evaluation.

IBM has signaled its intention of becoming a major player in European telecommunications for some time, lending its support to moves toward deregulation and reorganizing business units to meet the challenge.

"They have to find some way for increasing revenue," commented Martin Hingley, senior consultant at London-based market research firm International Data Corp. Europa, "and one of the obvious ways is in telecommunications."

In June, IBM announced the formation of a new organization — Integrated Services Switching Systems — for developing and manufacturing voice- and data-switching systems in Europe. One of the new unit's main tasks will be to adapt IBM's Rolm Corp. switching equipment to meet the standard requirements of Europe's powerful telecommunications authorities, the PTTs.

Ericsson recently improved its position in the French telecommunications market when a consortium it is leading won a bid for the Compagnie General des Constructions Telephoniques, one of France's two major switch suppliers.

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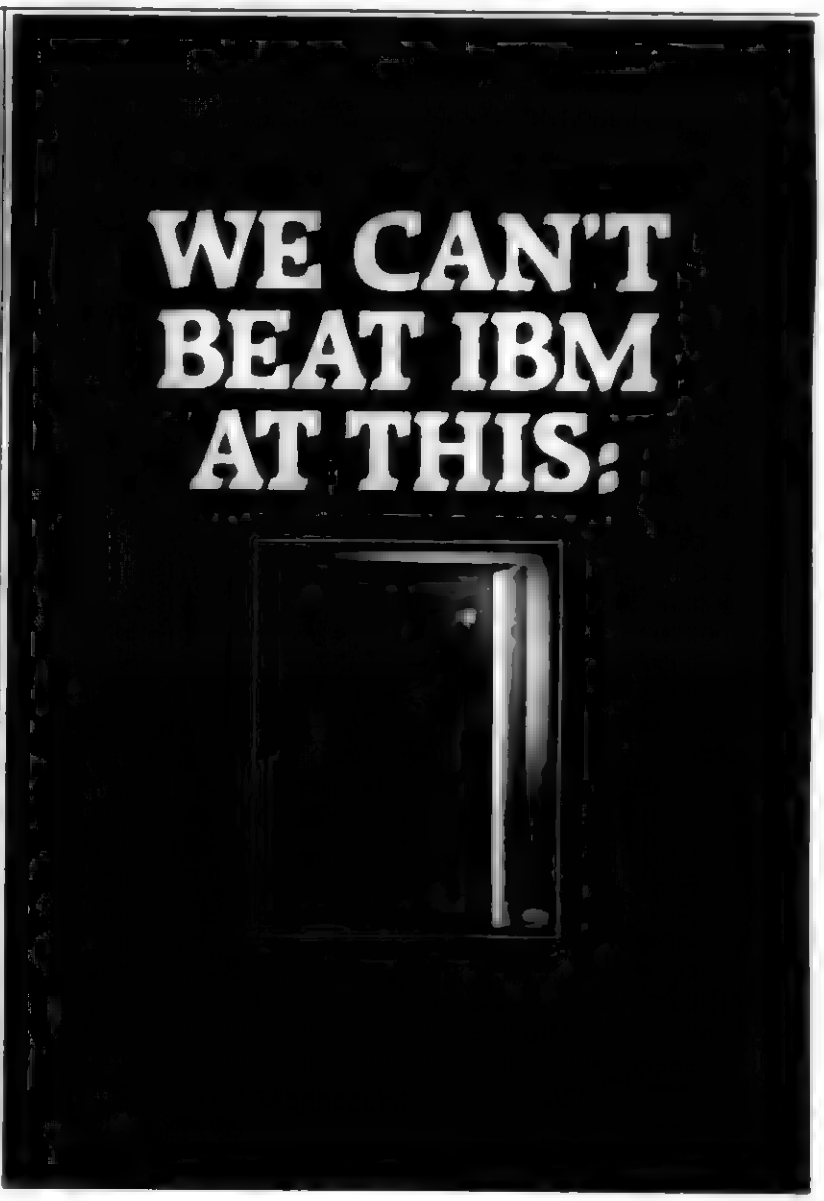
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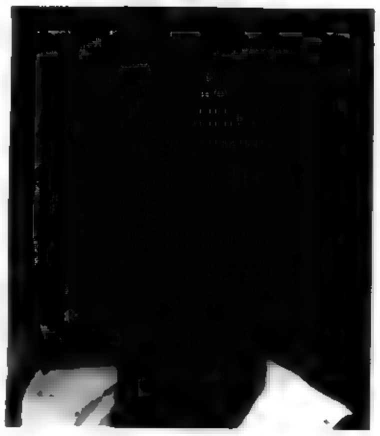

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Bridge

CONTINUED FROM PAGE 61

curity profiles, access controls, data encryption and audit-trail information for controlling and monitoring — in addition to analyzing — sensitive and proprietary data.

DES standard used

All TCP/IP sessions are encrypted using the Data Encryption Standard (DES), an encryption algorithm certified by the National Bureau of Standards.

In addition, administrative and audit trail information transferred to and from the Secure NCS/AT is encrypted under a public key-encryption system.

Combining public keys and DES ensures data security without the vulnerability of a single read-only memory-based networkwide key, Russell claimed.

Access control levels

BSNS products can operate in both secure and open modes under the control of the network manager. There are three levels of access control: network access — when and via which ports a user can access the network; security access — individual access level and user-group partitions; and resource acccess — access to a given resource.

The Secure NCS/AT security audit trail records log-in, access-control violations and key-management activity, Bridge said.

Fully compatible with Bridge's TCP/IP and PC network products, the Secure CS/50 and NCS/AT offer a range of services, including logical names, named command sequences for macros, speed- and flow-control matching and a context-sensitive Help facility.

Motorola-based

BSNS products use a multiple Motorola, Inc. 68000 architecture, an Intel Corp. 82596 LAN coprocessor and 512K bytes of dynamic random-access memory per CPU. The Secure CS/50 offers up to 16 simultaneous open sessions per server and eight per physical port, as well as data rates of up to 19.2K bit/sec. It costs $2,195.

The Secure NCS/AT is based on PC AT-compatible hardware, stores up to 2,048 logical names and configuration information to the port level for each attached server.

It costs $17,900.

An NCS/AT upgrade kit is available for $6,250.

Datapoint

CONTINUED FROM PAGE 61

tached Resource Computer (ARC) local-area network (LAN) users today must go through IBM 3270 emulation into Vista-Gate onto a host running Profs, he added.

Vista-Gate enhances Datapoint's connectivity capabilities to provide concurrent support of any combination of a number of IBM services over the IBM Synchronous Data Link Control (SDLC) or CCITT X.25 data link, Datapoint said.

Those services include IBM 3278 display station emulation, 3287 printer emulation, 3777 Remote Job Entry, Document Interchange Architecture and LU6.2.

These connectivity capabilities are available as network resources on the ARC LAN. Vista-Gate provides the user with fully functional access from either a Datapoint multifunction workstation or an industry-standard personal computer supported by Datapoint's Starbuilder PC integration system.

ARC users will be able to continue using existing mainframe-oriented applications and information access while simultaneously evolving toward fully distributed, advanced, peer-to-peer architectures, Datapoint claimed.

Using Vista-Gate, the vendor said, customers will have access to the following features:

- Sharing communications hardware and software over the network.
- Connectivity flexibility through support of switched and leased SDLC lines and X.25 packet-switched data networks for more communications options and potential savings.
- A function-independent, standard user interface said to make access to the new communications capabilities transparent to the user and available at a single keystroke.

Access to multiple sessions

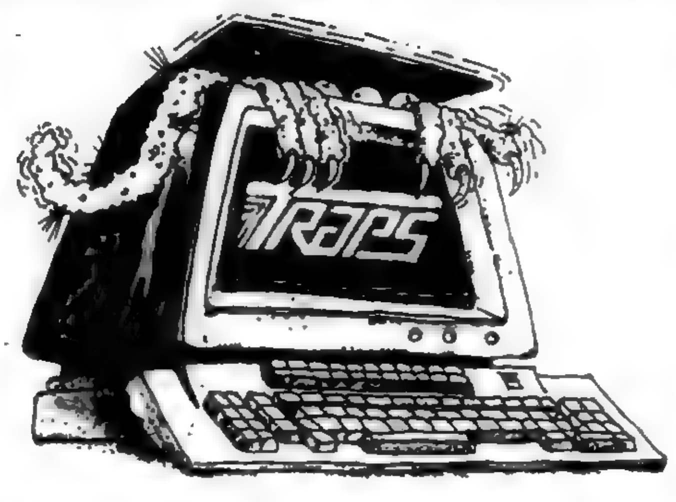
By utilizing Vista-View, Datapoint's multitasking, multiwindowing interface, several users may each run up to eight sessions from a single workstation. Each user will have simultaneous access to multiple 3270, 3770 and IBM host Distributed Office Support System/370 sessions, Datapoint claimed.

In its initial release, Vista-Gate will support both SDLC (leased-line, manual-dial, switched, CCITT V.25 bis automatic dial) and X.25 public and private packet-switched networks.

Typical configurations and pricing, including hardware and software, are as follows: $5,495 for a 16-user SNA/SDLC 3270 and 3770 system; $6,245 for a 16-user SNA/X.25 3270 system; and $3,245 for an eight-user X.25 system.

These prices include an intelligent communications adapter, a high-speed Datapoint Resource Interface Module, a Vista-Gate-to-modem cable and the basic server software.

The communications server upgrade kit does not include the required 640K-byte personal computer with 1.2M-byte diskette drive or the workstation.



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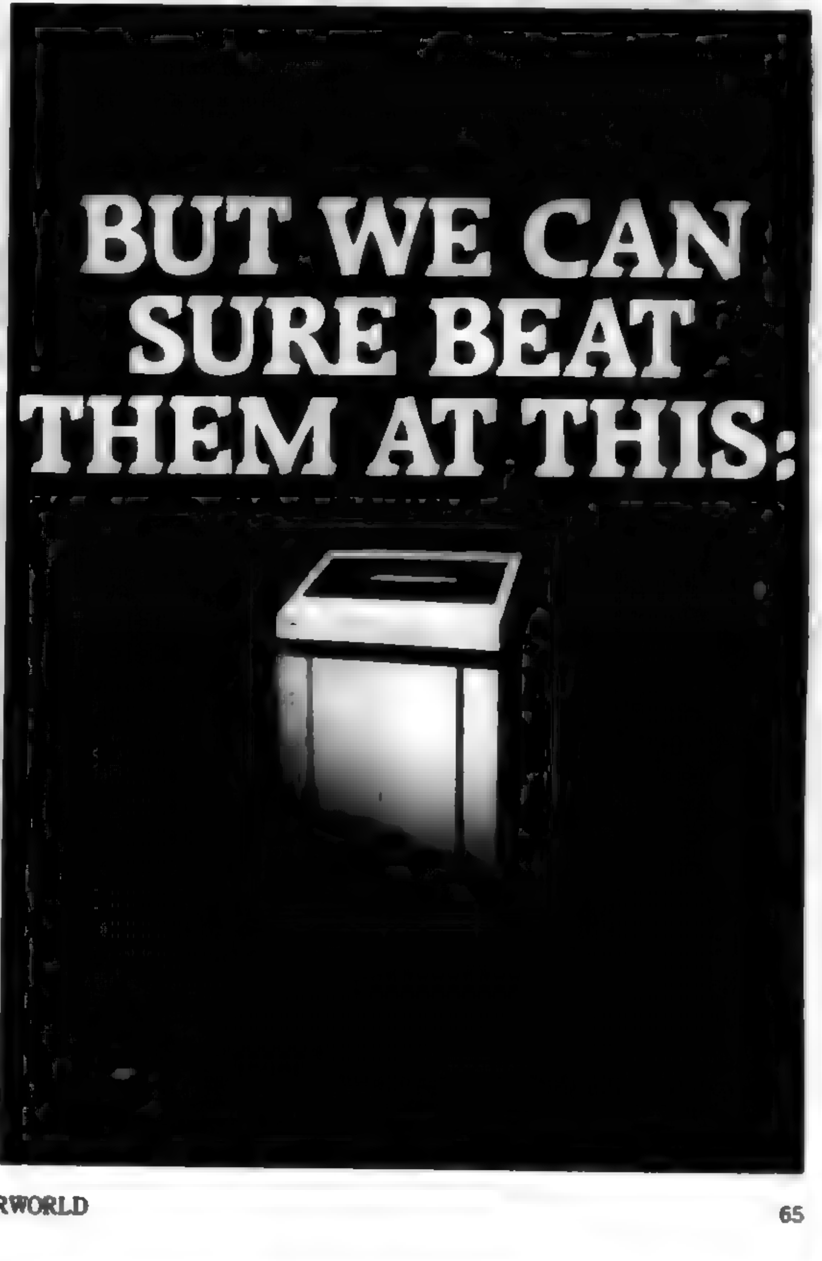

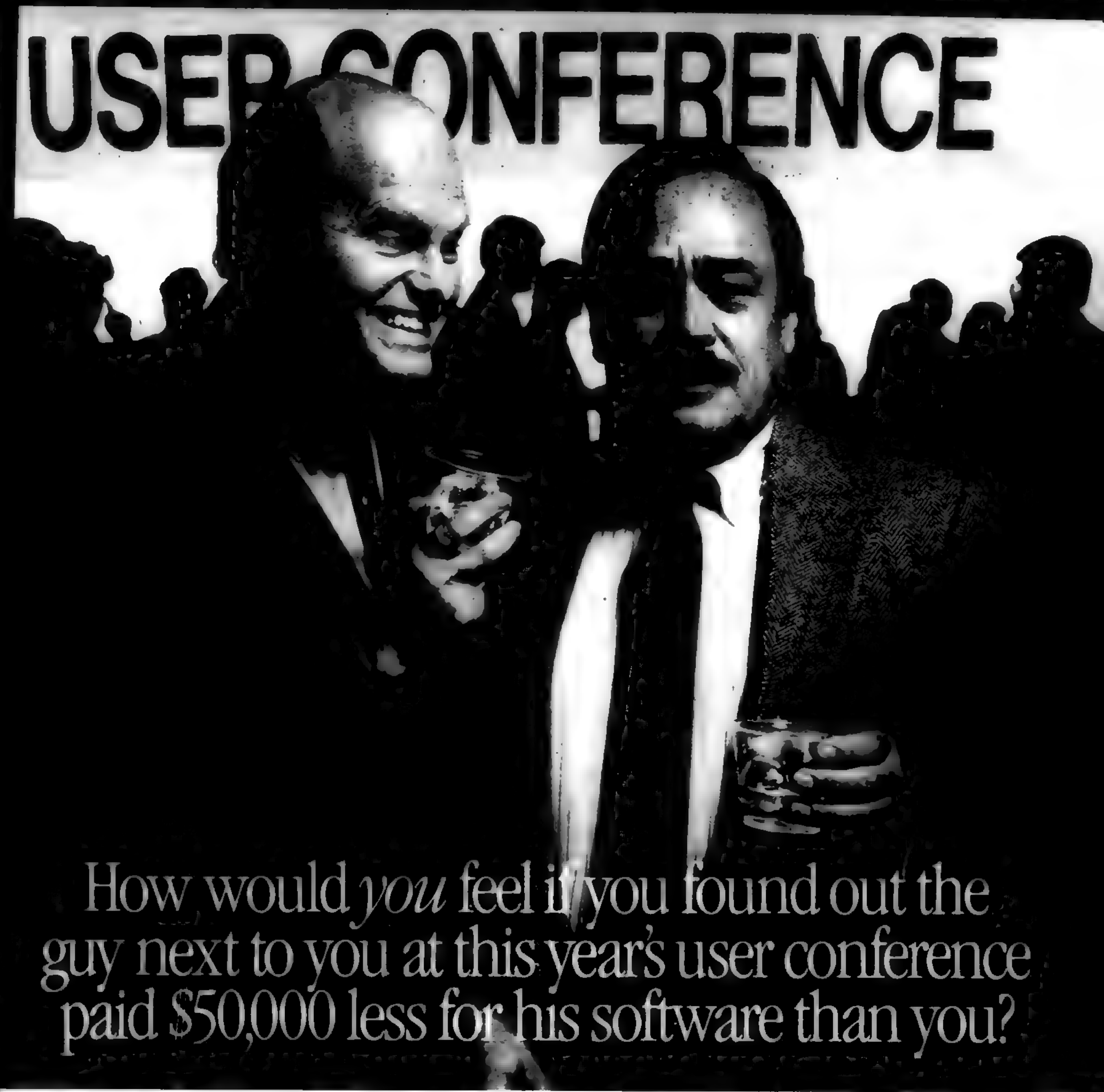

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Gateway tips

CONTINUED FROM PAGE 61

might need, because they are also logical units and will be counted just as are terminal sessions..

- **Number of sessions assigned to users.** There are two basic approaches to this: contention and assignment. In a contention-based system, there is a pool of sessions available on a first come, first served basis. In an assignment system, sessions are dedicated to specific users. The latter is important for printers and terminals that will run production jobs. Some products support both approaches.
- **Predicted growth and use rate of the mainframe network.** Many personal computer-based shops, even those that perform a large amount of mainframe work via terminal emulation, typically call someone and ask, "Can you run a line to this desk for us to hook up?" You must be better informed than that. You need to decide how flexible your environment is going to be and what your margin of error is.

> MANY PERSONAL COMPUTER-based shops, even those that perform a large amount of mainframe work via terminal emulation, typically call someone and ask, "Can you run a line to this desk for us to hook up?" You must be better informed than that.

- **Estimated cost of additional users.** Say you are attaching the network to a cluster controller that is approaching maximum capacity. How easy will it be to add another controller? Are there lines to run back to the host? Will there be ports available when you get there? These are questions you should ask.
- **User expertise vs. the level of local support.** A related issue is how much user support the gateway provides. Even in the case of gateways that provide good information at the workstation, users need to be educated to interpret screen messages and also need a knowledgeable lead operator on call for specific questions.
- **Administration utilities.** How much does the system tell you about what is going on? Can you see exactly which logical units are in use? Can you see the quality of the lines and the location of active sessions? The absence of this kind of data, which is essential for diagnostics and monitoring, can be good reason to avoid an otherwise excellent product.
- **Using a dedicated machine as a communications server.** Some gateways require the use of a dedicated machine, which avoids potential bottleneck problems (especially if that machine is a garden-variety PC). But be careful. Broadcasts that lock up workstations can do the same to a communications server, unless the machine is set to reject such broadcasts.
- **Gateway support for multiple bridged networks.** You should ensure that users on one network can establish sessions on a host connected to a gateway on another network. Otherwise you will have to put a gateway in every LAN.
- **Cost considerations of providing backup hardware and lines.** If you're using an IBM Synchronous Data Link Control-based gateway, you have a single point of very high vulnerability. It is critical to know how good the vendor's support will be. Alternate strategies include using a redundant piece of hardware for backup, a second line or a standby dial-up connection. One or more of these is a good investment.
- **Test and test and then test again.** Different factors come into play with each application. Consider the combination of products and combination of keystrokes that will be involved. It can be fatal if applications want the same keystroke the gateway needs for some control function and you can't remap.

Adrian is manager of end-user computing at Shearson Lehman Brothers, Inc. and chairman of the NYPC Micro to Mainframe Special Interest Group.

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T-2 Designing Networks with Digital and other Vendor Architectures
Leader: Jim Herman, director, Telecommunications Consulting Group, BBN Communications Inc.

This seminar will take a practical look at how to design and upgrade modern, wide-area distibuted data networks. You'll learn how to assess specific requirements and choose the right architectures to design configurations that meet those needs. Discussion includes the evaluation of various VAX products as well as guidance on how to plan for change. **Who should attend:** An important resource for DP and data network managers, planners, analysts and others who evaluate, purchase or use communications networks.

T-3 Managing Mixed Vendor and Local Networks
Leader: Dr. Kenneth Thurber, president, Architecture Technology Corp.

This session will provide a thorough study of the issues involved in managing mixed vendor and local networks, stressing the function characteristics and capabilities of various designs and gateway technologies. Discussion includes LAN-based systems, Ethernet and token-ring gateways and LAN-to-LAN gateways. You'll learn how to evaluate and implement various technologies and products including those expected in the future. **Who should attend:** Especially useful for DP managers systems analysts, marketing managers and others who need to know how to manage mixed vendor local networks.

T-4 Comparing All-In-1 and other Office Automation Architectures
Leader: Amy Wohl, president, Wohl Associates

Examining the status of DEC's All-In-1 in today's office environment, this seminar discusses current applications, as well as those likely to evolve in the future. A comparison of All-In-1 with competing architectures, such as those offered by IBM, includes a look at how it fares in an ever-changing market. **Who should attend:** A good choice for professionals who currently use All-In-1 and for those who are considering new architectures for their communications network.

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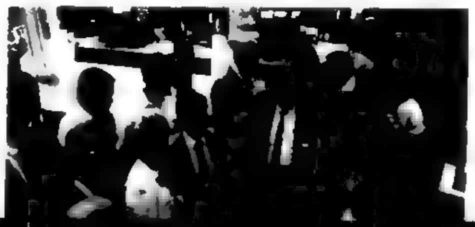
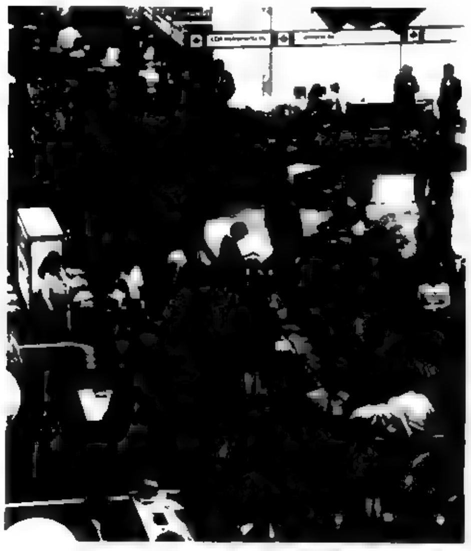
The WCC is produced by The Interface Group, Inc., the same company that sponsors COMDEX, the world's largest computer show, and other world-renowned trade events serving a variety of industries. Our 16-year record of success and innovation is your assurance that The WCC



services and accessories. And an in-depth conference of ideas, techniques and strategies on the most important applications, technology and management issues.



WHO WILL EXHIBIT?

The WCC exhibit floor will bring together—at one place and at one time—all the computer products and services required by end-user organizations. Hundreds of companies representing the international computer industry—from established technology giants to the start-ups and innovators—will pack Chicago's McCormick Place with exhibits featuring:

Computer Systems (minis, micros, mainframes)

Fault-Tolerant Computer Systems

Applications and System Software

Services (data processing, data entry, security, leasing, data storage, maintenance, etc.)

Accessories (furniture, cables, etc.)

Supplies (ribbons, paper, forms, photographic, etc.)

Consulting Services (software development, systems design, networking, etc.)

Education and Training (user, programmer, operations, etc.)

...and a host of other products and services relevant to comprehensive computing.

WHO WILL ATTEND?

The WCC offers value and solutions to MIS/DP executives and professionals responsible for their organizations' computer systems.

They represent the entire spectrum of international computer-intensive organizations; manufacturing to finance, transportation to government, energy resources to scientific research, communications to education. And they will come to The WCC seeking solutions in every area of computing, including:

End-User Computing

Connectivity

Cooperative Processing

CONFERENCE VALUABLE THAN OTHE COMPUTER INDUSTRY CONFERENCES?

Again, it's all in the focus!

Every WCC conference session directly targets the issues and opportunities facing MIS/DP executives and professionals in end-user organizations.

The industry's leading innovators, consultants, academicians and users will present ideas, insights, alternatives and solutions that attendees can use immediately to design, implement and manage their systems more effectively.

Among many topic areas planned for The WCC conference are:

Strategic application of computing resources to meet organizational goals.

Systems connectivity through hierarchical integration of PCs, minis and mainframes.

Work group productivity—harnessing the latest integrated technologies.

Architectural alternatives for application-specific system solutions.

Computer tools for software development and maintenance.

Optimization of business resources in large-scale applications environments.

will deliver the most value possible to attendees and exhibitors alike. Also, we are working with research professionals at the prestigious International Data Corporation (IDC) to ensure that The WCC accurately reflects the needs of data professionals worldwide.

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The first WCC will be held concurrently with INTERFACE '88, the largest international event serving the communications/networking industry. As an exhibitor at The WCC your booth traffic will be enhanced by the thousands of communications executives attending INTERFACE '88.

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BIT BLAST

Televideo, Micom strike controller OEM deal

Micom Systems, Inc. in Boxboro, Mass., has announced a multiyear OEM agreement with **Televideo Systems, Inc.** in Sunnyvale, Calif., for the purchase of Micom's NP600 Ethernet Controller, which also supports Transmission Control Protocol/Internet Protocol (TCP/IP).

The agreement is valued at approximately $5 million. Installed in Televideo's Telestar/386 workstations, the controller board will have a driver that communicates directly with the AT&T Unix System V, Release 3 operating system resident in Telestar.

Apollo Computer, Inc. in Chelmsford, Mass., and **Ridge Computers** in Santa Clara, Calif., have entered into a joint marketing agreement designed to offer Apollo workstations and Ridge reduced instruction set computing (RISC)-based superminicomputers as an integrated networking computing environment for technical professionals.

The companies' agreement includes cooperative advertising, corporate technical support and trade show participation as well as other marketing and promotional activities.

Apollo and Ridge will target companies requiring high-performance graphics, networking and computational capabilities in fields such as electronic design automation, mechanical computer-aided design and other engineering and scientific markets.

Utilizing Apollo's Network Computing System, a set of networking products for distributed computing, the firms will also work with third-party software vendors to tailor their applications to utilize Ridge superminis in a networked environment.

Network Research Corp. in Oxnard, Calif., has added support for **Sun Microsystems, Inc.'s** Network File Server (NFS) protocols to its Fusion Network Software on Digital Equipment Corp. VAX/VMS systems. This will reportedly enable VAXs to act as transparent servers for other NFS-supported systems. Users of these systems will be able to access and manipulate files stored on VAX/VMS computers with the Fusion NFS-based server while working on their own systems.

Network Research's NFS specification is based on Sun's Remote Procedure Call Source code. The Fusion NFS option was implemented using Network Research's Program Development System libraries on VMS, said to enable users to develop their own networking applications.

The underlying transport mechanism is Network Research's Fusion TCP/IP protocol package for VMS.

The Fusion NFS option will be available early in the fourth quarter for the VAX 11/700 and VAX 8000 families, Microvax II and 2000 and Vaxstation 2000 systems running the VMS 4 series operating system.

Pricing starts at $1,800.

Quadram Corp. has signed a licensing agreement with **Adobe Systems, Inc.** in Mountain View, Calif., that allows the Norcross, Ga.-based vendor to use Adobe's Postscript Interpreter with its Quadlaser printer. Adobe will provide Quadram with its Postscript controller board techology; Quadram will build the boards. The Quadlaser Postscript printer will cost $3,995. Current users can upgrade for $1,895.

The Quadlaser I has been reduced in price by $300. Both the new printer and the upgrade board are scheduled to ship in November.

Quadram also said it plans to pursue development of a Postscript controller that will include all printer emulation modes currently available with the Quadlaser I.

Excelan, Inc. in San Jose, Calif., and **Kinetics, Inc.** in Walnut Creek, Calif., announced the closing of their merger. Kinetics is now a wholly owned subsidiary of Excelan.

In accordance with the merger agreement, Excelan has issued 234,000 shares of common stock in exchange for all Kinetics shares outstanding. This brings Excelan's total outstanding shares to 8,350,632.

In addition, Excelan has granted options to purchase an aggregate of 140,963 shares of Excelan stock in lieu of outstanding Kinetics options to purchase 47,602 shares of Kinetics stock.

Access Data Products, Inc., a systems integrator based in Mount Vernon, N.Y., has announced an electronic bulletin board service dedicated to connectivity and networking issues.

Targeting MIS professionals, the bulletin board will be active 24 hours a day and will initially have two dedicated phone lines.

A third line will be installed before the end of the month, Access Data said.

There is no charge for using the board, which users will find to be organized by conferences when they log on.

A menu of conference choices will include Editorial (password-protected), Novell, Banyan, Other LAN Operating System, Arcnet, Pronet, Other LAN hardware and X.25.

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— Phil Thomas
Thomas Business Systems

Phil Thomas is President of Thomas Business Systems of Boca Raton, Florida. Thomas Business Systems buys, sells and leases new and used IBM, DEC and Data General equipment. They've been doing so for 10 years.

In that time, Phil has used many methods of getting his message across to buyers and sellers. He's advertised in several publications off and on. But for 10 years, he has advertised regularly (an average of once every two weeks) in *Computerworld's BUY-SELL-SWAP* section.

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NEW PRODUCTS

Local-area network hardware

A series of disk subsystems designed for use with Novell, Inc. networks has been announced by **Advanced Digital Information Corp.**

The Series 700 subsystems are small computer systems interface-based, allowing daisy-chaining of multiple units. They also utilize the run-length-limited encoding method. Average access time is said to be 28 msec.

Models are available in disk storage capacities ranging from 109M to 488M bytes. Prices range from $4,000 to $12,000.

Advanced Digital, P.O. Box 2996, 14737 N.E. 87th St., Redmond, Wash. 98073.

Local-area network software

Two menu- and window-driven communications programs for IBM Personal Computers and compatibles have been announced by **Kortek, Inc.**

Freeway provides control of more than 34 communications settings. Terminal emulations available include teletype and Digital Equipment Corp. VT100 and VT52. ASCII Kermit, Freeway and Freeway Server protocols are also supported. Data transfer rates range from 75K to 115.2K bit/sec. Features include pop-up command menus, phone books, on-line Help and a page editor.

Freeway Advanced adds a script facility, automatic answer, uploading and downloading of files and additional command parameters to the basic Freeway features.

Freeway costs $24.95. Freeway Advanced costs $89.95.

Kortek, 505 Hamilton Ave., Palo Alto, Calif. 94301.

Network management

A network management system, said to establish and maintain multiple sessions across mainframes, minicomputers and microcomputers running various jobs using terminal protocols, has been announced by **Century Analysis, Inc.**

M-Link enables multiple terminal sessions to be active simultaneously. It supports application nodes such as NCR Corp. 8000 VRX, NCR 9800 VRX/E, NCR Tower Unix, and Digital Equipment Corp. VAX and University of California at Berkeley Unix 4.2, application end-points such as IBM Systems Network Architecture, CCITT X.25 and Transmission Control Protocol/Internet Protocol hosts and intelligent workstations.

M-Link is priced between $5,000 and $10,000 per application node.

Century Analysis, 114 Center Ave., Pacheco, Calif. 94553.

Able Computer has added the **Resource Manager** centralized network management system to its Attach networking systems.

With the Resource Manager, Attach is said to provide port contention, dynamic load balancing and multisessions as well as a queueing function that allows users to wait for a resource.

Other functions include security, the ability to define Attach network parameters and provision of a network audit trail.

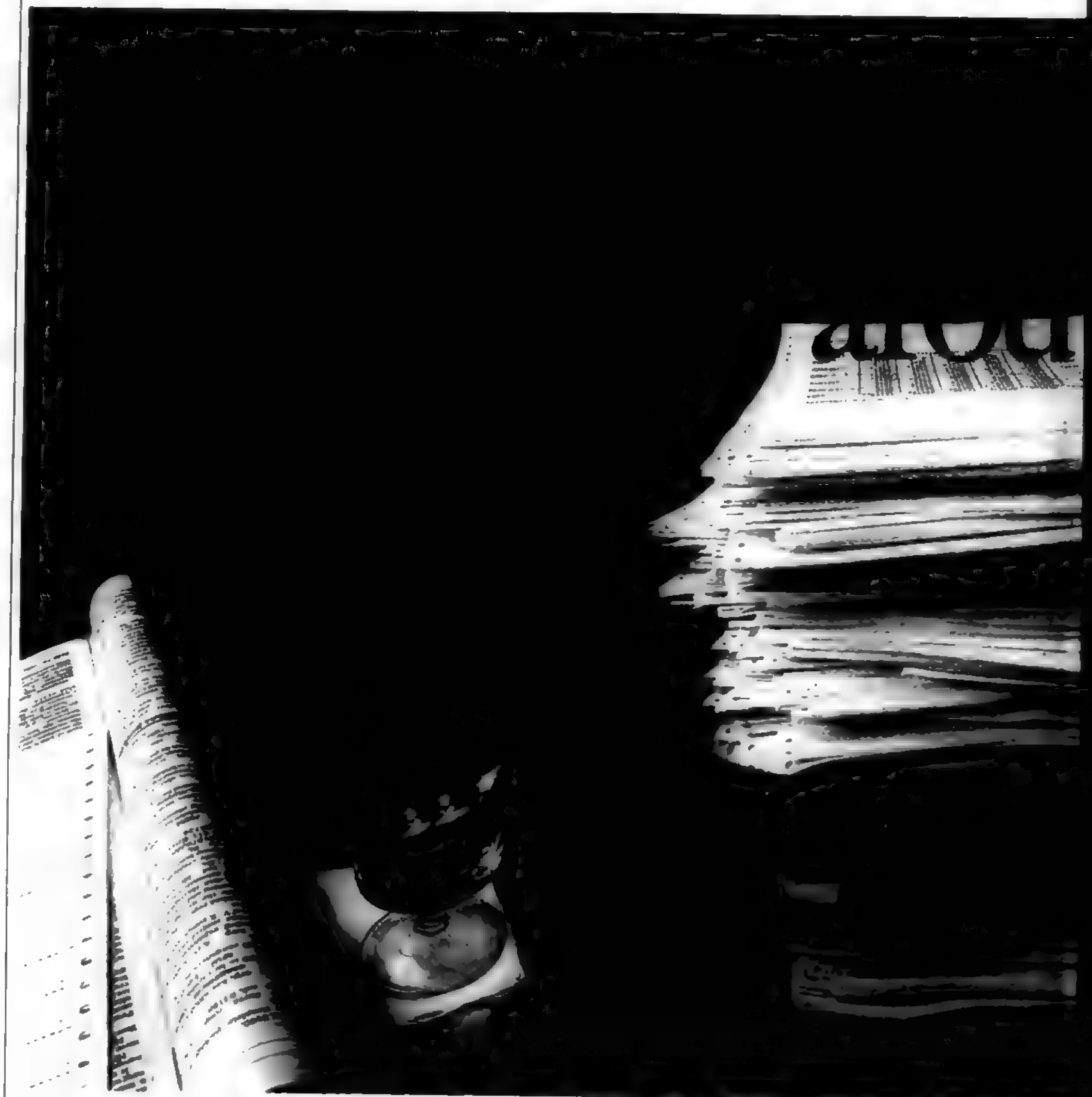
A baseline Attach system with the Resource Manager, 64 server ports and two 128-port front-end processors costs $18,000. Current Attach users can obtain the Resource Manager for $1,500.

Able Computer, 3080 Airway Ave., Costa Mesa, Calif. 92626.

Customer-premise equipment

A card that interfaces and multiplexes data from an IBM 3174 or 3274 controller to a maximum of 16 IBM 3270 Category A peripherals has been released by **Fibronics International, Inc.** for use in its Unimux 832 chassis.

The **CC83242 IBM Channel Card** has a 50-pin RJ-21 receptacle to connect to an expander panel or telephone cables. The expander panel provides 16



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dual-purpose or RJ-11 connectors that can connect to a controller or peripherals.

Two Unimux 832 chassis fully configured with CC83242 cards can interface, multiplex and remote 128 IBM peripherals from four independent controllers up to 2.1 km. Diagnostic features monitor data on all 128 ports. Built-in baluns provide electrical port isolation.

The card costs $725.

Fibronics, Communications Way, Independence Park, Hyannis, Mass. 02601.

Lee Data Corp. has announced a **Smart Controller Option** for its Series 300 and 400 controller lines. It is said to allow IBM 3270 terminal users to run various office automation tasks at the controller level, off-line from the host processor.

The Unix-based multiuser system allows six to 12 Lee Data terminal users to share applications concurrently, exchange electronic messages and access peripherals. Standard features include an Intel Corp. 80286-based processor, a 1.2M-byte floppy disk drive, four expansion slots for additional memory and serial I/O board and AT&T Unix System V.2 Unix software.

The Smart Controller Option is priced at $10,995.

Lee Data, 7075 Flying Cloud Drive, Minneapolis, Minn. 55344.

Links

A software package for linking Digital Equipment Corp. VAX computers with VMS operating systems to Arcnet local-area networks has been introduced by **C&C/Comendec Ltd.**

The **Q-ARC-CX** software is offered at two levels. The basic CX device driver package is concerned with low-level control of the Q-ARC-01 hardware. The Q-ARC-CX/ACP contains the CX driver.

Single copies of the Q-ARC-CX device driver start at $750 for the DEC Microvax II version. A copy of Q-ARC-CX/ACP software starts at $1,100 for the Microvax II.

C&C/Comendec, P.O. Box 280, 708 Mandrake Drive, Batavia, Ill. 60510.

Cambridge Computer Corp. has announced versions of its micro-to-Honeywell, Inc. mainframe software products for the IBM Personal System/2 Models 50, 60 and 80.

PC77/78, which emulates the Honeywell VIP7700, VIP7800 and HDS series of synchronous terminals and provides for file-transfer capabilities, uses the PS/2 Multiprotocol Adapter for synchronous communications to the host. The file transfer software has been enhanced to support all host file formats.

PC73/78, which emulates the Honeywell VIP7200, VIP7300 and VIP7800 series of asynchronous terminals, has been enhanced to utilize any of the eight communication ports available for the PS/2. Features include Kermit and Xmodem file transfer capabilities, script processing, print reduction and color-attribute mapping.

PC77/78 costs $350. PC73/78 costs $295.

Cambridge Computer, 80 Mount Sanford Road, Mount Carmel, Conn. 06518.

Pacer Software, Inc. has announced that its **PClink** software package now provides Apple Computer, Inc. Macintosh- and IBM Personal Computer-to-Digital Equipment Corp. VAX integration over Ethernet.

PClink includes features for moving data between the DOS and Macintosh environments. It provides terminal emulation of DEC's VT100, VT200 and VT241; virtual disks; bidirectional file transfer of ASCII, binary and Macbinary files at rates up to and above 800K bit/sec.; remote printer access; and a command-file feature that allows users to construct customized communication applications.

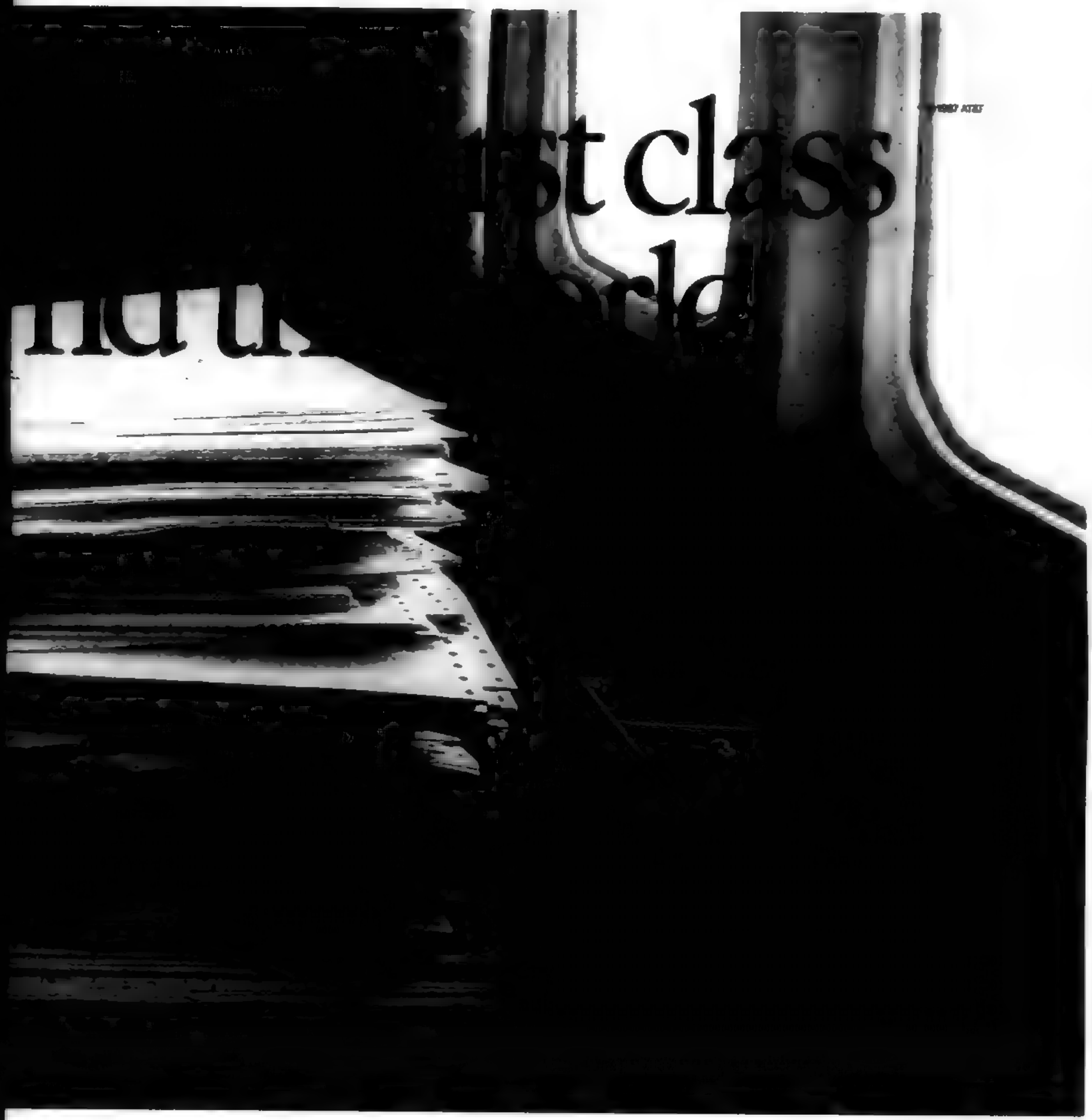
PClink pricing is server-based. It starts at $2,000 per VAX.

Pacer, Suite 40279, 11 Herschel Ave., La Jolla, Calif. 92037.

A direct channel-attach unit linking Tandem and IBM systems has been announced by **Tandem Computers, Inc.**

The subsystem, called **Snax**

Continued on page 74



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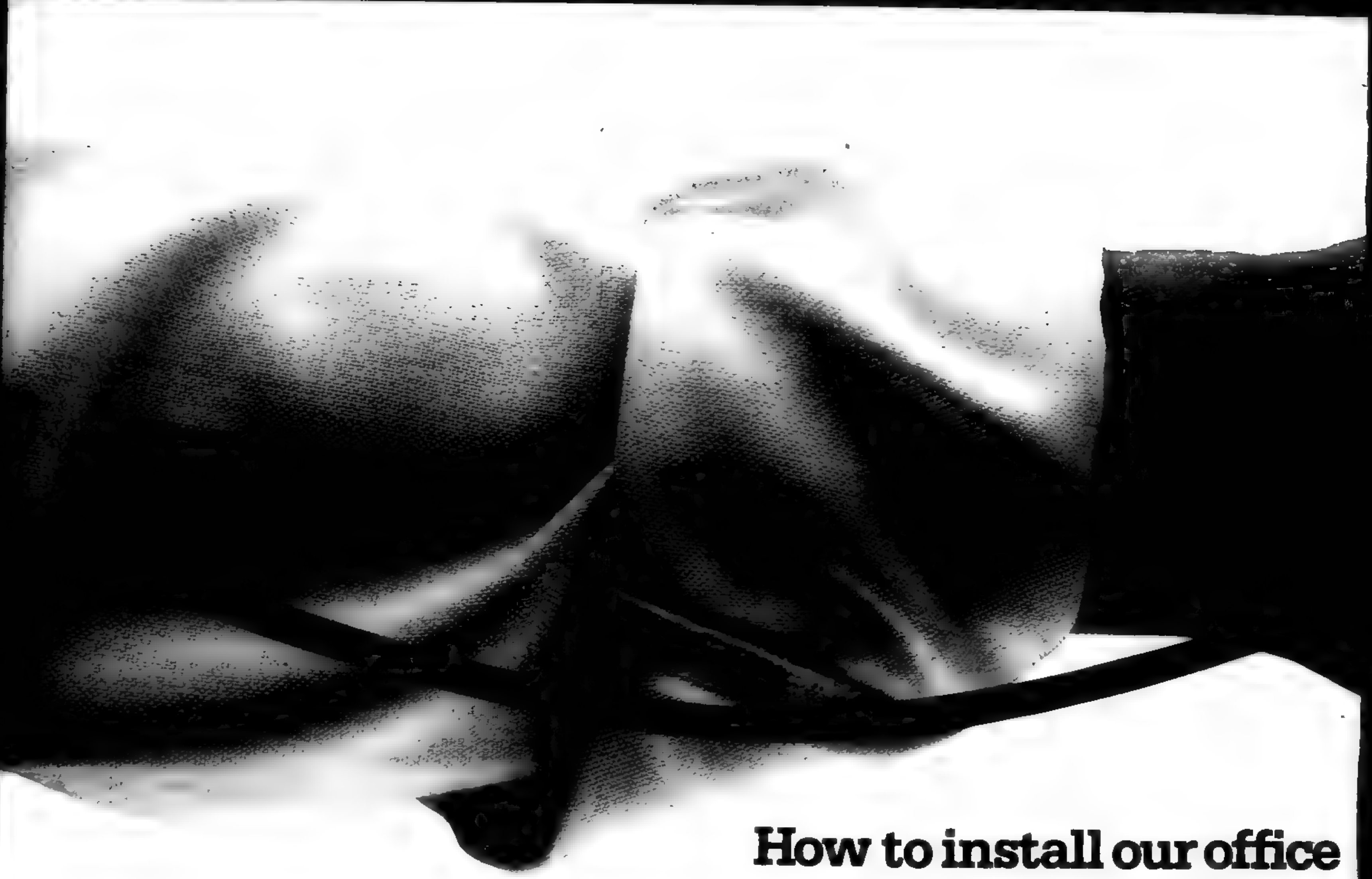

How to install our office

How to expand our office

The Hewlett-Packard StarLAN office networking system works along the same lines as your existing phone system.

So where the phones go, your PCs can go.

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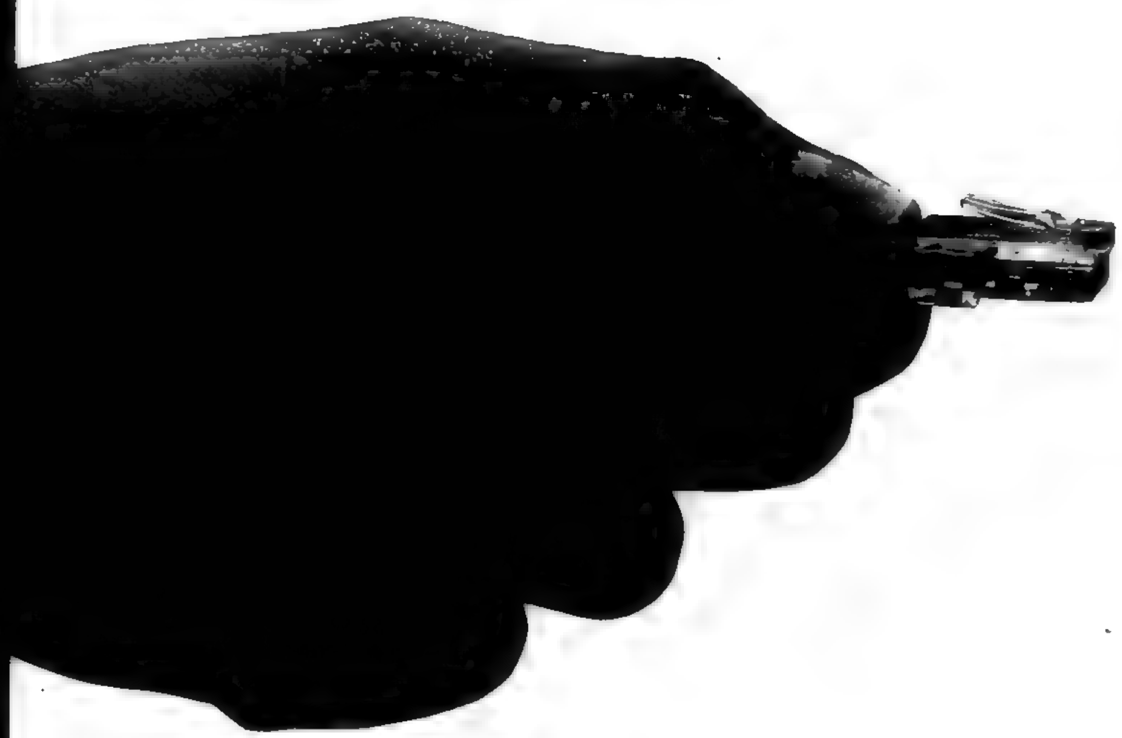
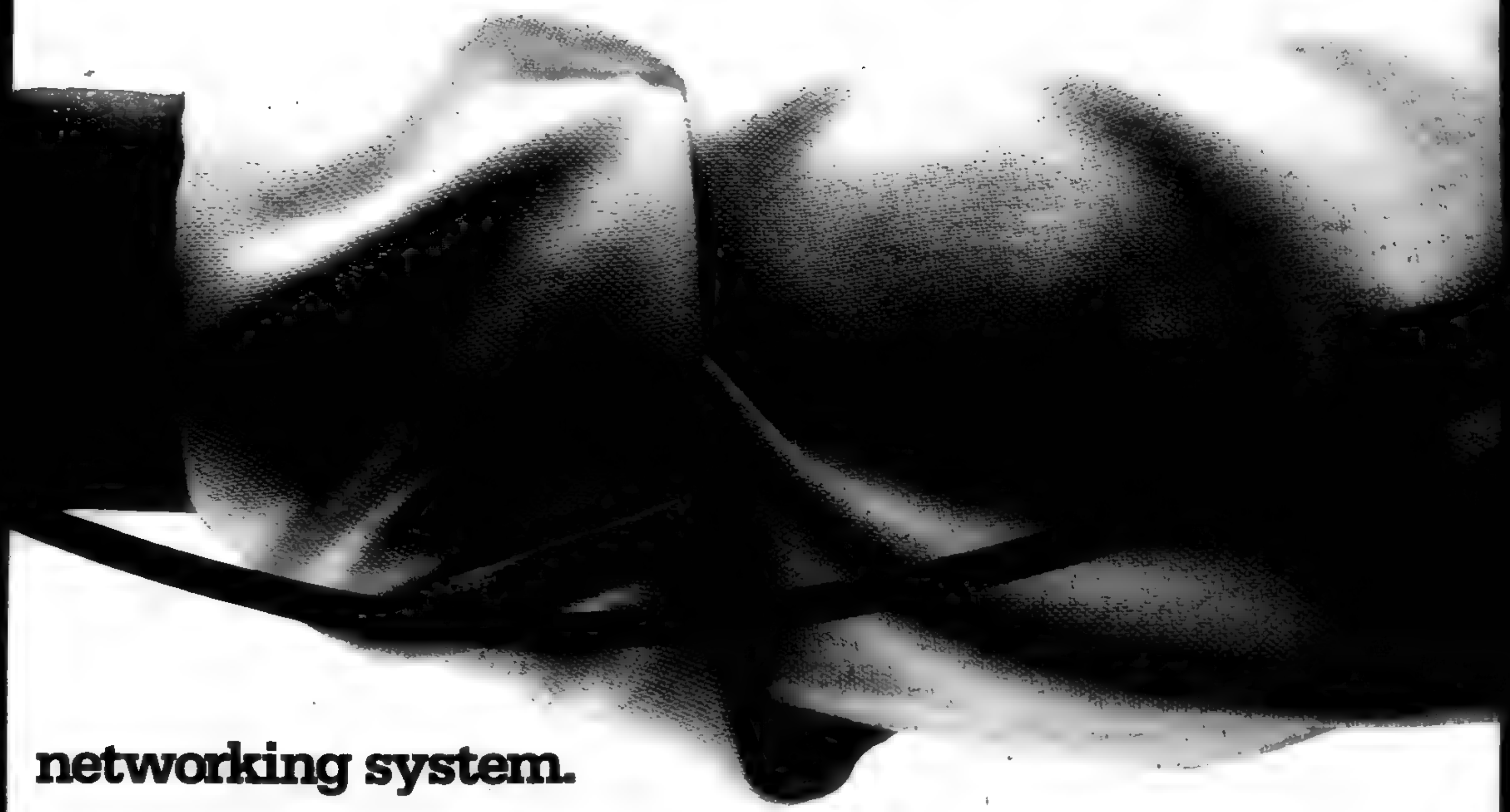
"What if..."



networking system.



networking system.

As always, we asked a lot of "What if..." questions before we came up with HP StarLAN as part of Hewlett-Packard's total office systems solution.

To plug into our networking system, call 1 800 752-0900, Dept. 283B.

HEWLETT PACKARD

Continued from page 71

link, was designed for use in the IBM Systems Network Architecture environment. It serves as a communication path between Snax, Tandem's SNA access software and IBM's VTAM.

Snaxlink replaces multiple communications lines with a high-speed fiber-optic link attached to the I/O channel of an IBM or compatible system. Channel attachment allows full-duplex data transfer up to 1M bit/sec.

Snaxlink costs $49,550 for one unit and $79,676 for two. The basic monthly maintenance charge is $88 for one unit and $176 for two. The monthly software license fee is $125 per unit.

Tandem, 19333 Vallco Pkwy., Cupertino, Calif. 95014.

An add-on program for Lotus Development Corp.'s 1-2-3 and Symphony said to link IBM Personal Computers to mainframe computers has been announced by **Intex Solutions, Inc.**

The memory-resident program, called **4-5-6 Link**, captures mainframe data into a Lotus spreadsheet. When 4-5-6 Link communicates with the mainframe, the personal computer emulates an IBM 3278 terminal.

Users can control the way the data is broken up and formatted into 1-2-3, and Link can format numbers as numerics and text as labels during transfer so data does not need to be parsed.

4-5-6 Link requires a physical connection to an IBM mainframe and a Digital Communications Associates, Inc. Irma board or compatible. It costs $199.

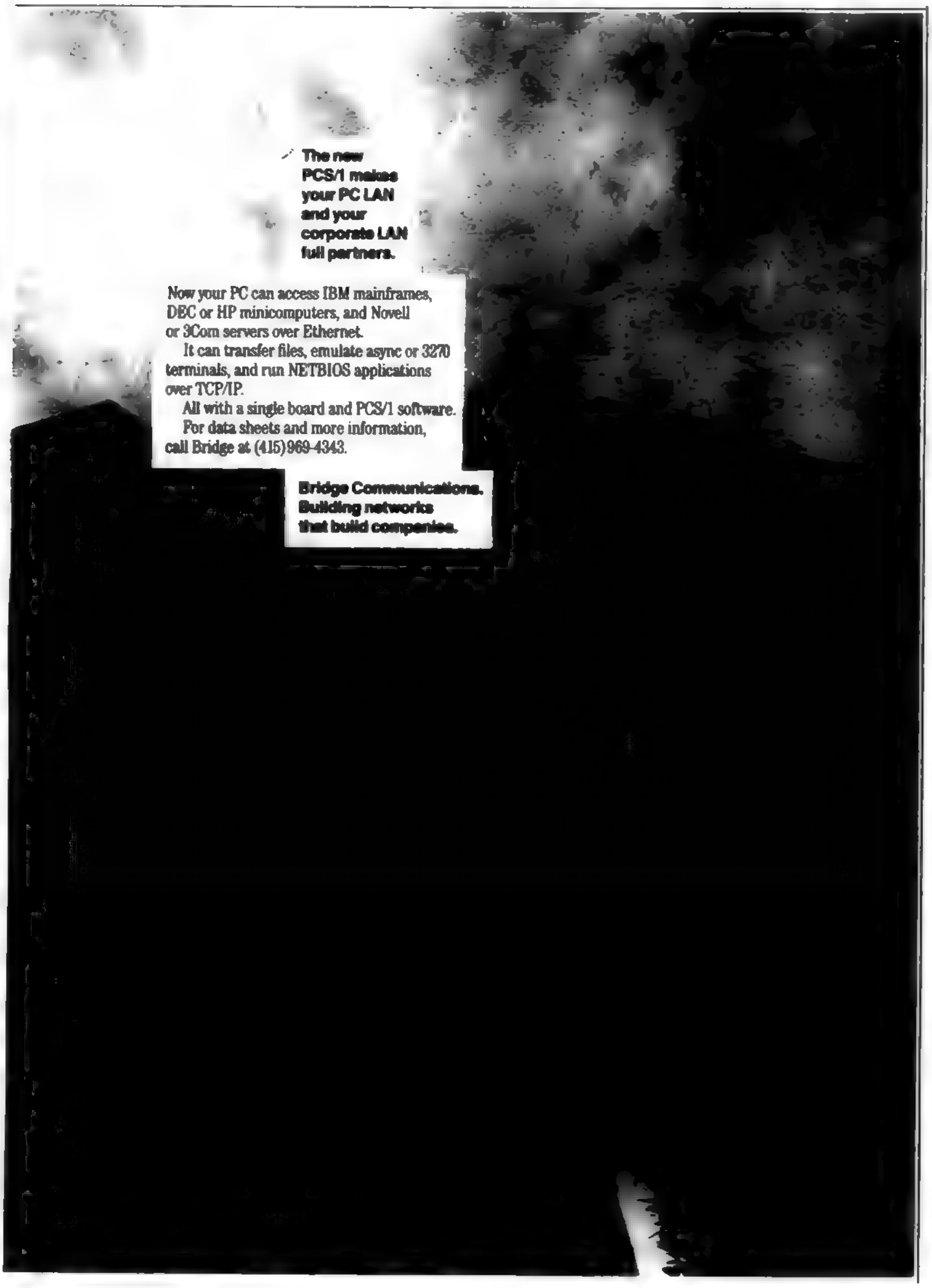
Intex Solutions, 568 Washington St., Wellesley, Mass. 02181.

A software enhancement to the **Gammafax** communications product that will allow personal computer users to send Autodesk, Inc.'s Autocad documents via telephone lines to any Group III facsimile machine has been introduced by **Gammalink.**

The Gammafax package consists of a printed circuit board, menu-driven communications software on two diskettes for establishing a direct PC-to-Fax link and a 9.6K bit/sec. modem.

Gammafax with the Autocad interface costs $995.

Gammalink, 2452 Embarcadero Way, Palo Alto, Calif. 94303.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Security devices

A **Call-Back Security Controller** add-on option for **Microcom's** High Density Modem System (HDMS), designed to prevent unauthorized access to a host, has been announced by the vendor.

The self-contained board plugs into a standard HDMS chassis. It provides three types of callback security including fixed callback, variable callback and pass-through access. In all three modes a threshold alarm detects repeated attempts to access the system with invalid ID numbers or passwords.

The controller can handle a data base of 1,000 user IDs and supervise up to 192 HDMS modems. In addition, it outputs a usage report that provides a one-line audit trail of each call.

The HDMS Call-Back Security Controller is priced at $4,499.

Microcom, 1400 Providence Highway, Norwood, Mass. 02062.

A biometric authentication system that acquires and analyzes fingerprint data to prevent unauthorized access to computer systems has been announced by **Thumbscan, Inc.**

The **Thumbscan** system consists of a fingerprint scanning device connected to the user workstation and software installed in the host computer. During logon, the host software scans the user's thumb or finger, then digitizes and encrypts the fingerprint. Enrollment is provided within five minutes and authentication within five seconds.

The Thumbscan system interfaces with IBM PC-DOS and mainframe environments, Digital Equipment Corp. VAX and certain access-control systems. The security device costs $995, mainframe software costs $9,500 and minicomputer software costs $5,500.

Thumbscan, Suite 800, Two Mid-America Plaza, Oakbrook Terrace, Ill. 60181.

Modems/Multiplexers

Universal Data Systems has announced the **Model 9600** Trellis A/B microprocessor-designed data modem and the **Model SW56** Terminal Interface Unit.

The Model 9600 modem is said to operate synchronously over four-wire private lines or the dial-up Public Switched Telephone Network at 9.6K and 4.8K bit/sec.

The Model SW56 Terminal Interface Unit is a combination Data Service Unit/Channel Service Unit with an integral automatic dialer. It provides full-duplex serial, synchronous data communications at 56K bit/sec.

The Model 9600 Trellis A/B costs $1,995. The Model SW56 Terminal Interface Unit costs $1,595.

Universal Data Systems, 5000 Bradford Drive, Huntsville, Ala. 35805.

A modem designed for point-to-point or multipoint use has been introduced by **Anderson Jacobson, Inc.**

The **AJ 9601-STF** meets CCITT V.29 specification and provides full-duplex, synchronous operation over four-wire, unconditioned leased lines. It offers fast-poll capability and a downline loading

Continued on page 79

For 25 years, our networks have prevented gray hair, cured ulcers and lowered blood pressure. Oh yes, and improved communications.

As a communications manager, you want a networking company that can eliminate your communications problems. And the stress that goes along with them.

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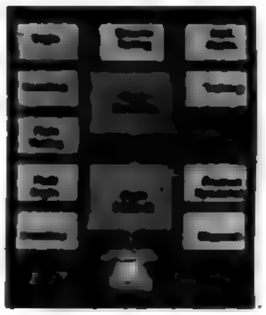

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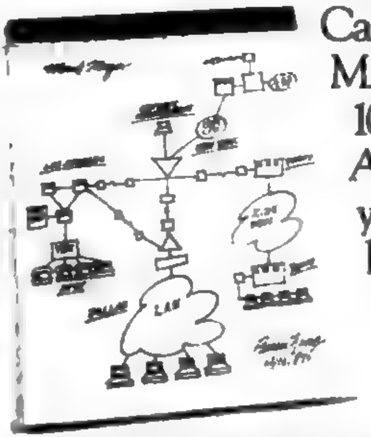

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More transactions per MIP than the competition. A true production-power, database management system, IDMS/R 10.2 combines the latest advances in relational database technology with the power to exploit mainframe architecture and operating system software.

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Cullinet's Computer-Aided Software Engineering (CASE) tools include IDMS/ARCHITECT,™ an easy-to-use, graphics-oriented, PC-based software tool that not only supports systems analysis but also automates the design, specification and physical implementation of databases and applications.

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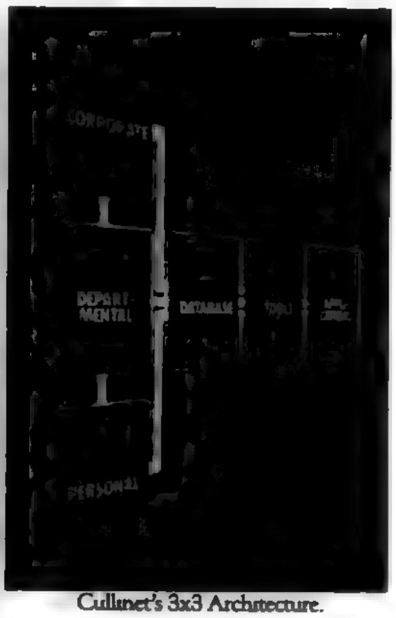

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Continued from page 74

feature that allows remote modems to be configured, the vendor said.

Features include an automatic adaptive equalizer; recalling factory option settings; selecting point-to-point or multipoint operation; setting the carrier-detect level; and standard diagnostic tests.

The modem costs $1,695.

Anderson Jacobson, 521 Charcot Ave., San Jose, Calif. 95131.

The **4600/PC** family of internal IBM Personal Computer-compatible variable-speed modems has been announced by **Case Communications, Inc.**

The 4600/PC modems meet the CCITT V.22bis standard for data transmission over leased and dial-up telephone lines. They are also compatible with the Hayes Microcomputer Products, Inc. PC AT command set.

The 4624/PC modem transmits data at 2,400 bit/sec. and can operate in full- or half-duplex mode. The 4648/PC operates at 4.8K bit/sec. and the 4696/PC modem operates to 19.2K bit/sec. over dial-up lines.

Prices for the 4624/PC, 4648/PC and 4696/PC are $699, $799 and $1,749, respectively.

Case Communications, 7200 Riverwood Drive, Columbia, Md. 21046.

Benchmark tests for evaluating and comparing nonstandard asynchronous 9.6K bit/sec. modems have been developed by **Racal-Vadic**.

"The 9,600 bps Asymmetrical Modem Benchmark Report" is available from Racal-Vadic and discusses the methodology and results used to test three modems: Microcom, Inc.'s AX9624C, Racal's 9600VP and Telebit Corp.'s Trailblazer.

The report discusses how to properly evaluate the modems, revealing the strengths and weaknesses of competing technologies under real-world conditions. Included is a tutorial covering 9.6K bit/sec. standards, error control, buffer management, link protocol and data compression.

Qualified individuals interested in verifying the test results can use Racal-Vadic facilities.

Racal-Vadic, 1525 McCarthy Blvd., Milpitas, Calif. 95035.

A fiber-optic, modular, time-division multiplexer, designed to transmit different signal formats onto a single fiber-optic link, has been introduced by **Astrocom Corp.**

The **Megapath Series 5000 Multiplexer** provides 14M or 28M bytes of information multiplexing transmissions from IBM controllers, synchronous, asynchronous or T1 sources.

When fully equipped, the multiplexer can support up to 128 IBM connections, 72 RS-232, eight T1 channels, 16 V.35 channels or any combination of these, according to the vendor.

It has a typical transmission distance of 3 to 4 kilometers and can accommodate up to four I/O modules.

The multiplexer supports fiber-optic cable sizes of 50/125, 62.6/125, 85/125 and 100/140 microns.

A typical unit, which supports 64 IBM terminals, costs $4,950.

Astrocom, 120 West Plato Blvd., St. Paul, Minn. 55107.

A combination statistical multiplexer, switching multiplexer and private branch exchange has been introduced by **Datatel, Inc.**

The **DCP5032** is available in eight- and 16-channel models.

It features console control, front-panel control, downline loading, flow control, automatic speed recognition, camp-on, built-in diagnostics and a separate printer port.

As a statistical multiplexer, it concentrates up to eight or 16 asynchronous inputs over a single output link.

Inputs may be dial-up or dedicated, operating at speeds from 50 to 19.2K bit/sec.

The DCP5032 costs $2,650 for the eight-channel model and $3,650 for the 16-channel model.

Datatel, Cherry Hill Industrial Center, Pine Oak and Springdale Roads, Cherry Hill, N.J. 08003.

Split-channel operation on rack-mount cards has been announced by **Gandalf Data, Inc.** for its LDM family of stand-alone medium-distance modems.

The split-channel option allows two-channel operation per modem in rack-mount form. The cards are available with split-channel operation capabilitiy in dual-card configuration or single-channel cards with retrofit capability.

The modems operate full duplex over four-wire voice grade leased-line circuits at speeds of 9.6K bit/sec. or 4.8K bit/sec., depending on the card. Up to seven dual rack-mount cards can be accommodated in the standard Gandalf LDS 3000 chassis.

Prices range from $995 to $1,095 for the dual rack-mount cards.

Gandalf Data, 1020 S. Noel, Wheeling, Ill. 60090.

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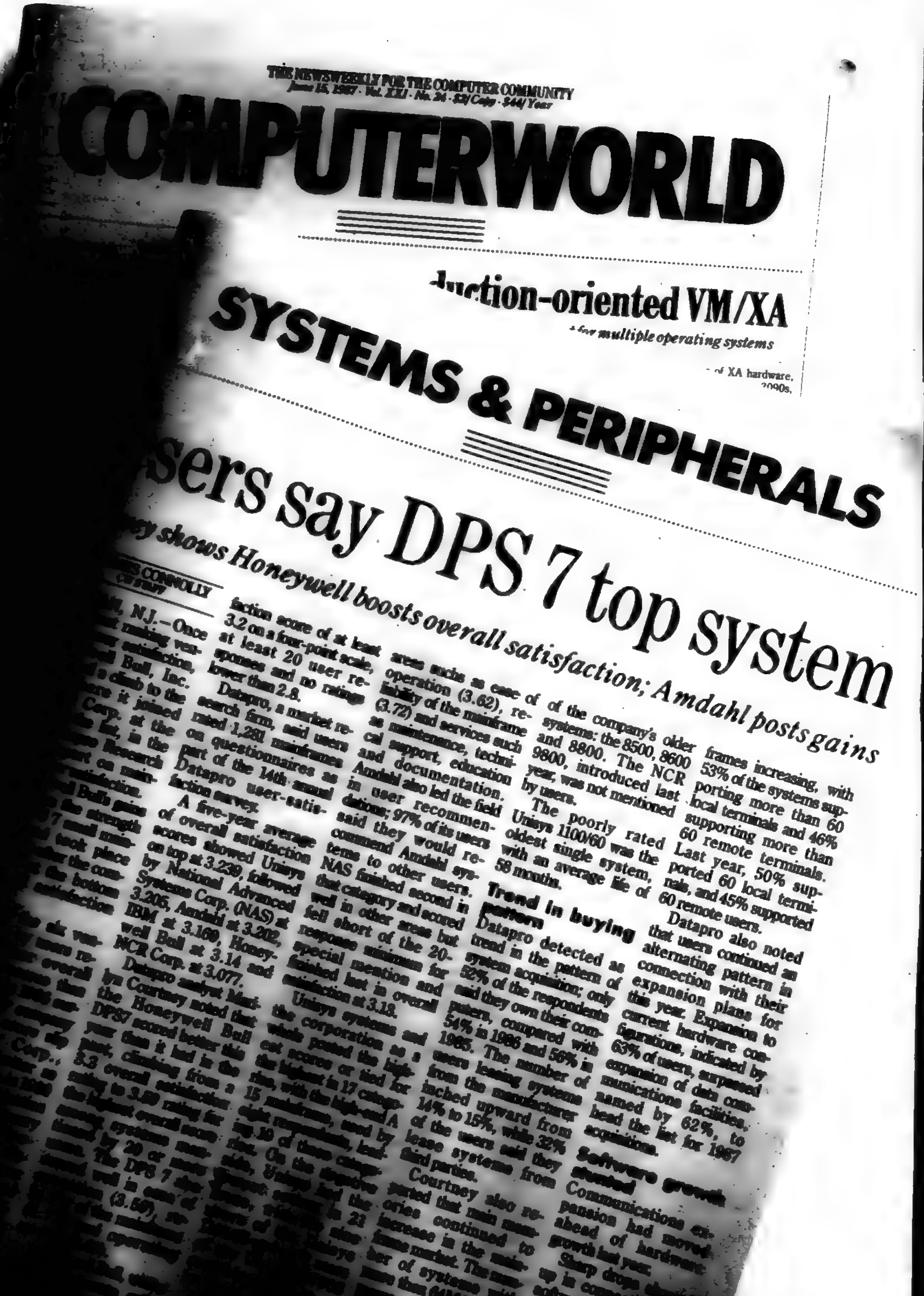

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COMPUTERWORLD

…uction-oriented VM/XA

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…of XA hardware, …3090s,

SYSTEMS & PERIPHERALS

…sers say DPS 7 top system

…ey shows Honeywell boosts overall satisfaction; Amdahl posts gains

…ES CONNOLLY
…CW STAFF

…, N.J. — Once … ranking ven… satisfaction, … Bull, Inc. … a climb to the … ere it joined … Corp. at the … list, in the … Research … on main… satisfaction. … Bull's gains … strength … 7 and main… took place … the com… the bottom … satisfaction

faction score of at least 3.2 on a four-point scale, at least 20 user responses and no ratings lower than 2.8.

Datapro, a market research firm, said users rated 1,281 mainframes on questionnaires as part of the 14th annual Datapro user-satisfaction survey.

A five-year average of overall satisfaction scores showed Unisys on top at 3.239, followed by National Advanced Systems Corp. (NAS) at 3.205, Amdahl at 3.202, IBM at 3.169, Honeywell Bull at 3.14 and NCR Corp. at 3.077.

Datapro analyst Mark Courtney noted that the Honeywell Bull DPS7 scored better this year than it had in the past, climbing from a 3.3 overall satisfaction rating to [illegible]

areas such as ease of operation (3.62), reliability of the mainframe (3.72) and services such as maintenance, technical support, education and documentation.

Amdahl also led the field in user recommendations; 97% of its users said they would recommend Amdahl systems to other users. NAS finished second in that category and scored well in other areas but fell short of the 20-response minimum for special mention and finished last in overall satisfaction at 3.18.

Unisys systems and the corporation as a whole posted the highest scores or tied for the highest in 17 categories, with the high-end A 15 mainframe, used by eight respondents, leading 10 of these categories. On the downside, Unisys had the [illegible]

of the company's older systems: the 8500, 8600 and 8800. The NCR 9800, introduced last year, was not mentioned by users.

The poorly rated Unisys 1100/60 was the oldest single system, with an average life of 58 months.

Trend in buying pattern

Datapro detected a trend in the pattern of system acquisition; only 52% of the respondents said they own their computers, compared with 54% in 1986 and 56% in 1985. The number of users leasing systems from the manufacturer inched upward from 14% to 15%, while 32% of the users said they lease systems from third parties.

Courtney also reported that main memories continued to increase in the mainframe market. The number of systems with more than 64M bytes of memory rose from [illegible]

frames increasing, with 53% of the systems supporting more than 60 local terminals and 46% supporting more than 60 remote terminals. Last year, 50% supported 60 local terminals, and 45% supported 60 remote users.

Datapro also noted that users continued an alternating pattern in connection with their expansion plans for this year. Expansion to current hardware configurations, indicated by 63% of users, surpassed expansion of data communications facilities, named by 62%, to head the list for 1987 acquisitions.

Software growth stunted

Communications expansion had moved ahead of hardware growth last year.

Sharp drops showed up in connection … software needs … quisition…

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Nothing beats word of mouth advertising. And the word being spoken by users of Honeywell Bull systems is "satisfaction."

In a recent Datapro Research Corp. report, Honeywell Bull scored highest in overall user satisfaction.

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And users gave our DPS 7 mid-range computer high marks for its ease of operation and reliability. They also praised its operating system, GCOS 7, that allows it to perform a wide range of functions, such as high-volume transaction processing, office applications, sophisticated networking and communications, and program development. In short, they rated the DPS 7 the best system available.

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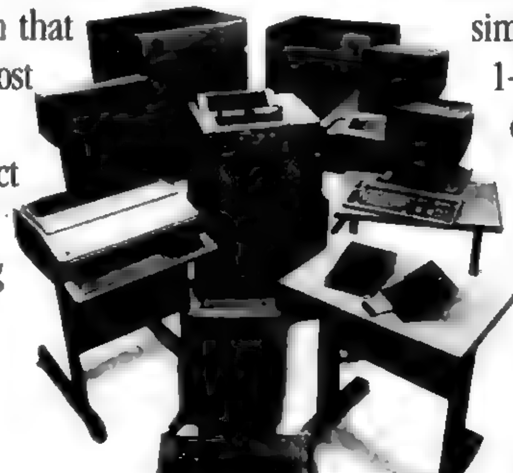

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HARD TALK

James Connolly

Competition heats up

Now, things get serious. The rivalry between IBM and DEC is intensifying daily — and will continue to flare.

While users will see IBM and DEC knock heads in bids pitting IBM 3090 mainframes and 4381 intermediate systems against DEC's VAX 8000 family, the real heat will be at the departmental level and in networking and software.

The networking and software arguments are not new: Both vendors stake claims to ease of use, compatibility and connectivity titles. Those claims are almost impossible to quantify, except through years of experience by users.

But there is something new in the DEC and IBM claims regarding departmental systems. Two companies that insist they do not publicly comment on competitors are spending a lot of time doing just that.

IBM's 9370 came up for discussion a half-dozen times in a press conference two weeks ago. But it was a DEC — not an IBM — show. Meanwhile, IBM may match *USA Today*'s circulation with brochures compar-

Continued on page 86

DEC's service network grows

BY JEAN S. BOZMAN
CW STAFF

COLORADO SPRINGS — Digital Equipment Corp. has fashioned what it says is a state-of-the-art remote-maintenance network that extends around the world and is anchored in a building at the base of the Rocky Mountains.

Inside the sand-colored Customer Support Center (CSC), which has a view of nearby Pike's Peak, 130 hardware specialists and 300 software specialists collectively field 3,500 calls a day from customers throughout the U.S. A customer's call to an 800 number gets him on-line with one of DEC's Colorado specialists, but often the problem ends up being resolved via an electronic connection with another DEC facility in the U.S. or abroad.

DEC's diagnostic capability resides in the 14 CSCs that it maintains around the world, including sites in France, England, Japan, Australia and Canada. There are three centers in the U.S., including the 350,000-sq-ft Colorado facility, which maintains the largest library of product specifications within DEC. A center in Atlanta, staffed by 220 specialists, handles most office systems-related questions, including those regarding DEC's All-In-1. A third center in Westboro, Mass., fields difficult VAX-related questions.

A series of software products, each with expert system features, allows the Colorado specialists to pinpoint failing hardware via a phone connection with a customer's machine.

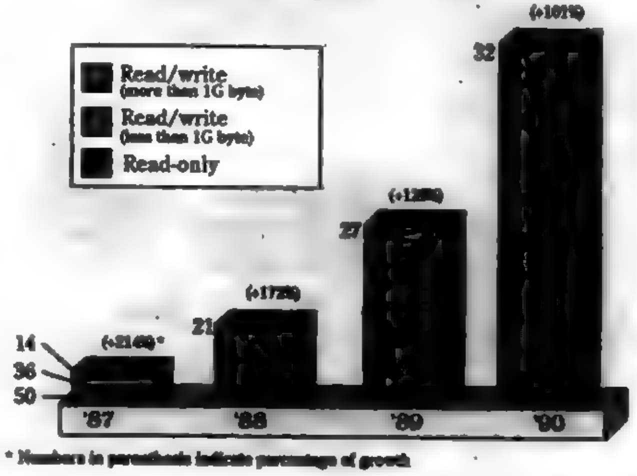
DEC is not alone in this remote-diagnostics capability. IBM, AT&T and other major vendors provide remote diagnostics, although each takes a different approach. One thing that sets DEC's maintenance software apart is that it can predict which hardware faults may become critical and take the affected units off-line before they crash, according to Dave Lindsey manager for the Netsupport

Continued on page 90

Data View

Optical disk drive market expands

Worldwide unit shipments in thousands



* Numbers in parentheses indicate percentage of growth

INFORMATION PROVIDED BY DISK/TREND INC.
CW CHART

Beehive adds terminals

IBM 3190 compatibles boast 3K-byte memory

BY STANLEY GIBSON
CW STAFF

SALT LAKE CITY — Beehive International recently introduced three terminals, the 191D, 192D and 192F, that are plug-compatible with IBM 3191 and 3192 models announced earlier this year.

The terminals include a record/playback/pause feature that contains 3K bytes of nonvolatile memory, approximately twice that offered by IBM, ac-

Continued on page 84

Vaxstation toasted, but . . .

BY JAMES CONNOLLY
CW STAFF

Digital Equipment Corp. bolstered its claim to one of the lead positions in the bitterly fought workstation game with the recent introduction of its most powerful Vaxstation systems.

Analysts interviewed after DEC announced its Microvax-based Vaxstation 3200 and 3500 agreed that DEC at least narrowed any performance gap that existed between earlier Vaxstations and workstations made by Sun Microsystems, Inc. and Apollo Computer, Inc.

While those analysts generally declined to endorse any of the three vendors as the price/performance leader, they said DEC's offering of 3-million-instruction-per-second (MIPS) Vaxstations makes those DEC machines competitive with Sun and Apollo's 4-MIPS systems.

DEC is making steady progress in the workstation field —

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Inside

- EMC uncages Falcon subsystems for HP 3000s. Page 84.
- California Peripherals puts intelligent formatters in tape-cartridge drives. Page 86.
- Talaris Systems unwraps laser print station. Page 92.

▶ IBM 3270 and System/34/36/38 Users: [illegible]

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EMC ups subsystems' capacity

BY STANLEY GIBSON
CW STAFF

HOPKINTON, Mass. — EMC Corp. recently introduced two disk drive subsystems, the Falcon 5000 and Falcon 8000, providing up to 1.25G bytes of storage for Hewlett-Packard Co. HP 3000 computers.

The Falcon 5000 provides 625M bytes of storage, and the Falcon 8000 offers 1.25G bytes of storage. Using three Falcon 8000 subassemblies, users can reportedly configure up to 3.75G bytes of disk storage in a single cabinet. Other Falcon products, the Falcon 1 and the Falcon 2, store 406M and 812M bytes, respectively. All Falcon series disk drives include 4M bytes of cache, according to EMC.

"A number of our 812M-byte [machine] customers expressed a need for even greater mass-storage capacity per drive. Now, EMC has brought disk densities normally associated with large mainframes to HP 3000 users," EMC senior product manager Joseph Gately said in a prepared statement.

The subsystems are 100% compatible with HP's MPE operating system and HP diagnostic procedures, according to the vendor.

Seek time of 15 msec

EMC reported that the average seek time for the new disks is 15 msec and that the average data-transfer rate is 2.46M byte/sec.

The Falcon 5000 and Falcon 8000 subassemblies each contain a NEC Corp. disk drive and an EMC controller. The controllers used on the new drives are the same as those sold with the Falcon 1 and Falcon 2.

The Falcon 5000 and 8000 subsystems are being shipped, EMC said. The Falcon 5000 is priced at $19,500, and the Falcon 8000 costs $33,500.

Encore adds I/O products

MARLBORO, Mass. — Encore Computer Corp. has announced an I/O subsystem designed to improve I/O performance by 50% to 100% and to more than double the on-line storage capacity on its Multimax family of parallel processors.

The company introduced the FDDN disk drive with a capacity of 655M bytes and a price of $22,500. Encore also announced the LDC disk controller, which supports up to four drives and features overlapped seeks between drives on a controller and overlapped operations between controllers on a channel.

Encore officials said the FDDN drive provides a 17% reduction in cost per megabyte when compared with Encore's earlier drives.

Beehive

FROM PAGE 83

cording to Dick Hodge, Beehive's marketing vice-president. The memory can be dynamically allocated to 24 programmable function keys, the same as on comparable IBM terminals, Hodge said.

The features allow users to shorten logon procedures and change the terminal's configuration with a single keystroke, he explained.

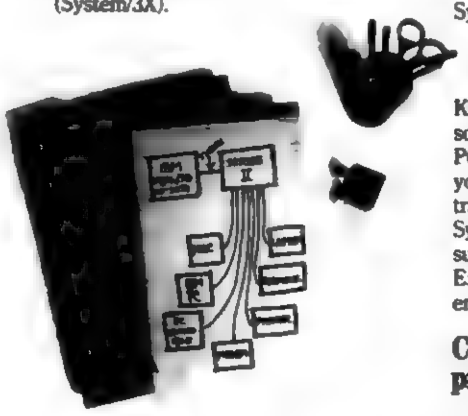
The 192F, which Beehive calls its flagship product, is a color terminal that has a 132-col. display, as does the IBM 3192F announced in June.

Beehive distributes only through value-added resellers, OEMs and systems integrators.

The 191D carries a suggested retail price of $1,350; the 192D is listed at $1,580; and the 192F has a suggested retail price of $2,012. Each suggested price includes a three-year warranty. The terminals are available now, according to Beehive.

See how your IBM 34/36/38 can support more of the peripherals you want, with the right support from KMW.

Take full advantage of your IBM 34/36/38 by linking it to your peripheral devices. KMW's Series II Twinax and Series III Twinax protocol converters provide a reliable, inexpensive method for connecting a variety of micros, terminals and printers to an IBM System 34/36/38 (System/3X).



The multi-port Series II Twinax provides a cost-effective method to connect up to seven asynchronous devices to your System/3X. The single-port Series III Twinax gives you the same proven features as the Series II, without paying for more ports than you may need. Both allow local connection or remote connection via dial-up modems.

Communicate with a wide range of microcomputers and terminals, including Macintosh.

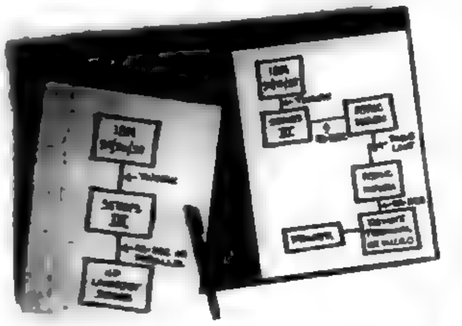
Apple Macintosh. IBM PC and compatibles. Laptops. ASCII terminals. All of these can be connected to your System/3X with a KMW protocol converter, and they will appear to the host as 5251/5291 terminals.

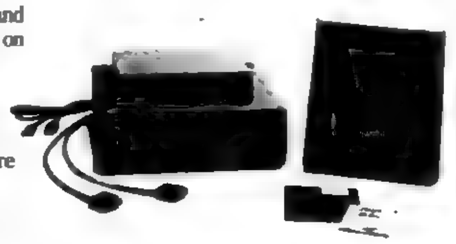
Files can be transferred by using KMW's free terminal emulation software on your PC or Macintosh and PC Support 36/38 or ETU software on your System/3X. This powerful file transfer feature allows you to use System/3X data in popular packages such as Lotus 1-2-3 and Microsoft Excel. Plus, an error-checking feature ensures flawless file transfer.

Connect to just about any printer you want.

Printers attached to the Series II or Series III appear to the System/3X as IBM 5225 or 5256 printers. Most popular printers are supported, including many from Epson, Xerox and C.Itoh. Additionally, the 5219 emulation feature of the Series III supports a variety of printers, including Hewlett-Packard LaserJet.

For maximum productivity, the printer pass-through feature allows you to send one set of data to your printer while you work on a different set of data on your terminal or micro.





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California Peripherals readies half-height drives

TORRANCE, Calif. — California Peripherals Corp. recently announced half-height 125M- and 150M-byte ¼-in. tape cartridge drives that include intelligent formatters.

Customers may adapt the CP-125E or the CP-150E tape drives to the QIC-02, QIC-36 or small computer systems interface (SCSI) standards, according to Howard Wing, vice-president of marketing and sales. The drives include a head mechanism that can adjust to compensate for irregularities in the data track on the tape.

The drives were designed by California Peripherals and manufactured by The Nakamichi Corp. in Tokyo.

California Peripherals was founded in September 1986 by President Yoshi Noguchi and Wing, who both formerly worked for Storage Technology Corp. California Peripherals sells its products, which include IBM 3480-type tape cartridge drives, to OEMs.

Shipping in March

The company will reportedly ship CP-125E and CP-150E units for evaluation in November and will ship volume quantities in March. Prices in OEM quantities range from $475 to $525 per unit, depending on the interface selected.

California Peripherals also announced the CP-150, which supports the QIC-150 recording format.

Priced at $390 per unit for OEM volumes, the device is scheduled to be produced in volume in November.

Competition

FROM PAGE 83

ing the 9370 with DEC systems. In addition to the oneupsmanship and public preening, there is a key benefit for users in DEC vs. IBM. That is a flood of better products.

The pressure was on DEC to put some horsepower in its third-generation Microvax systems. The Microvax II, which reportedly responded like a tortoise when saddled with more than 20 active users, became a focus for competitors the way IBM's System/36 had been targeted by DEC.

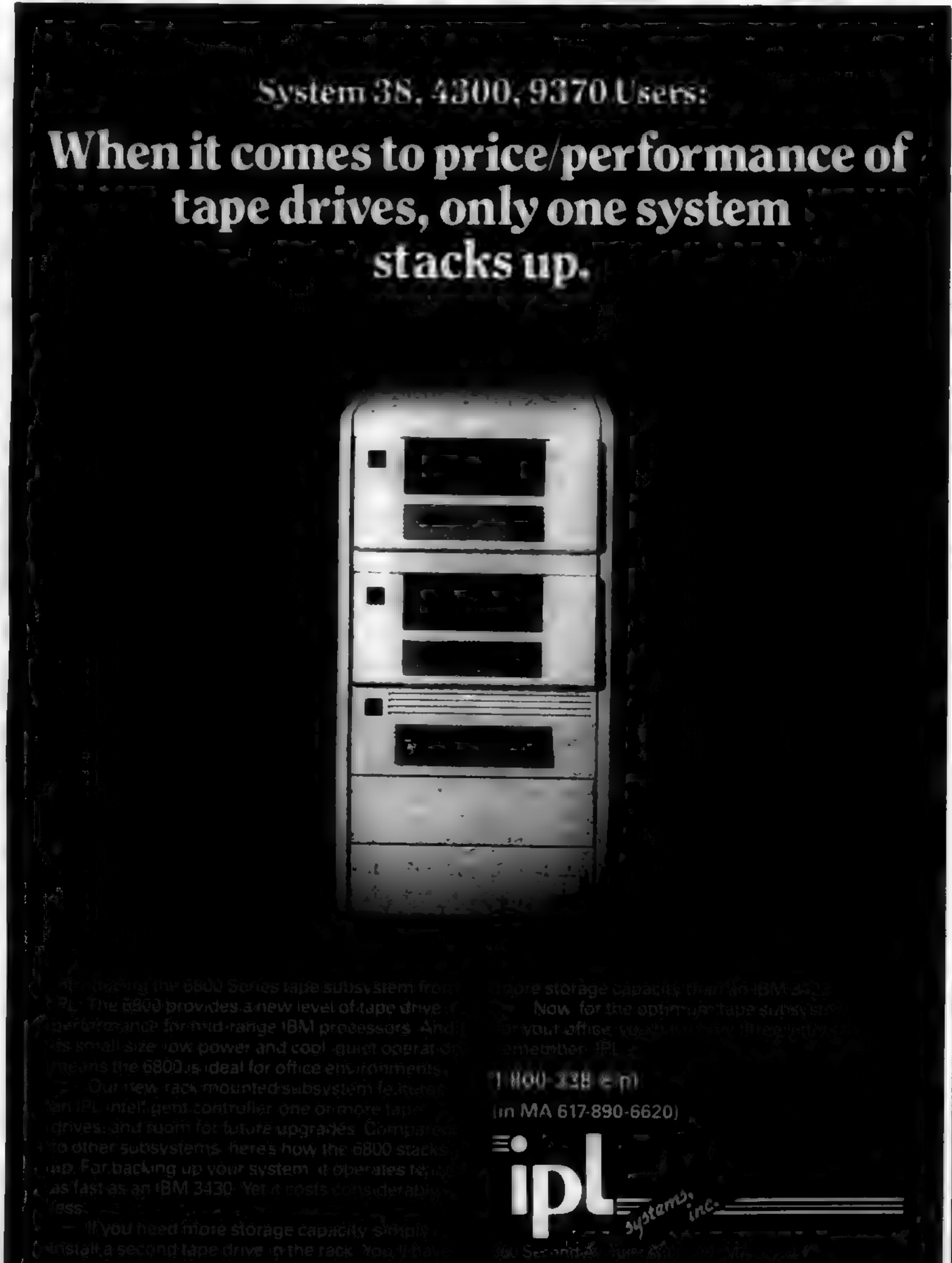
The Microvax 3500 and 3600 have addressed the performance complaints by tripling the power of the Microvax II. The new Microvaxes will be DEC's low-end platform for quite a while. It is only a matter of time before DEC moves the technology downward to replace the less expensive Microvax 2000 and Microvax II.

Meanwhile, don't be surprised if IBM cuts prices or otherwise improves price/performance figures for the 9370 family. Now that DEC has played its hand, IBM sees the parameters in which to work if it cuts prices or provides a performance kick.

In addition, IBM has its System/36 and 38 follow-on product in the wings for second-half 1988 delivery. Some view that product, code-named Silverlake, as the true VAX-killer. Its debut will likely launch a new wave of counterthrusts.

The bottom line is that lower mid-range systems now provide more power at less cost than ever. And those price/performance figures can only get better as the years pass.

Connolly is *Computerworld's* senior editor, systems & peripherals.



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Vaxstation

CONTINUED FROM PAGE 83

in which DEC President Ken Olsen acknowledged his company got a late start — but still must overcome several barriers, the analysts said.

The DEC workstation group's principal shortcoming is in the area of three-dimensional graphics, according to Vicki Brown, an analyst with Framingham, Mass., market research firm International Data Corp. (IDC), and Charles Foundyller, president of Cambridge, Mass., market research group Daratech, Inc. Both said they expect DEC to address the need for high-performance graphics.

Analyst Craig Symons of the Gartner Group, Inc., a market research firm in Stamford, Conn., added that DEC, which has promoted use of its minicomputer-oriented VMS on the Vaxstation, "still has to wake up and recognize that Unix is the de facto standard in the workstation market."

Meanwhile, Symons said the most recent Vaxstation introductions are one more step in a "well-thought-out strategy by DEC to dominate the workstation market."

Symons said the first step was to cut prices, which DEC did on its Vaxstation 2000 products in June. "The second step was to get the performance, and, basically, with the Vaxstation 3600 series, they cut the performance gap," he added.

Mixed news for competition

Symons also noted that DEC's announcement contained both good and bad news for Apollo and Sun. He said Sun is left to explain why it scored poorly — being outscored by Vaxstations that cost 60% as much as its Sun-3/260 on a suite of 58 benchmarks. But he added that Apollo's DN4000 "looked like a rather nice machine," even in the DEC tests.

Meanwhile, IDC's Brown reported that users evaluating DEC, Sun and Apollo machines with their own applications are likely to find all three providing about the same price/performance levels.

Daratech's Foundyller also said that the Vaxstation 3200 and 3500 appear to offer performance comparable to that of the Sun-3/260 and Apollo DN4000, which are based on Motorola, Inc. 68020 microprocessors and had previously made Microvax-based workstations "look pretty poor."

Foundyller called the most recent DEC announcements good news for DEC users and said that users who had standardized on the VAX family had been vindicated. He said the new Vaxstations will help DEC protect its user base from incursions by Sun and Apollo, although he speculated that DEC is unlikely to use the new systems to steal existing Sun and Apollo customers.

But Foundyller also raised questions about the benchmarks released by DEC and its competitors. "I found it interesting that the consultants and users who DEC said ran the tests didn't come forward," he noted.

Foundyller called for an independent means of measuring workstation performance. He complained that "performance posturing" is common in the computer industry and suggested that a body such as IEEE set up a benchmarking procedure.

"It's high time we had less hype and hot air and more facts," he said.

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Unisys announces the birth of the Smallframe.

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But each starts you running true mainframe applications economically and quickly. Plus, Smallframes use the same operating system as our biggest A Series mainframe—and every machine in between—without any software conversion. (That's what we meant by "frame." As in main*frame*.)

What potential!

With the newborn A1, the smallest of the Smallframes, Unisys now gives you a clear, continuous growth path of more than 100 times in computing power.

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The A1, A4 & A6 are the youngest and smallest members of the respected Unisys family of A Series mainframes. The series includes machines that run major banks, governments, schools, hospitals and businesses all over the world. An independent survey of mainframe owners found Unisys systems scored the highest five year average in overall satisfaction.*

While Smallframes are about the size and price of minis, the top of the A Series isn't a set of minicomputers playing together. It's the A15, one of the largest and most powerful true mainframes money can buy.

Between the A15 and the A1, there are 12 other models.

**Computerworld*, June 15, 1987, survey by Datapro Research Corporation.

All compatible over the line—and over time. Software written for any model or generation over the last 17 years is compatible with any current A Series model.

Since all three are built for the same size cabinet, the A1 itself is field upgradeable to A4 and A6 levels—a better than 3 times increase in computing power.

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But what about the rest of the A Series? From the moment of conception, every computer in the family is designed to be easy to get along with and cost very little to run.

That means reasonable purchase price. Low operating costs. Low training costs. Even low software development costs, thanks to the powerful A Series operating system and LINC—the well-known fourth generation language from Unisys that can cut programming time by a factor of ten or more.

Grandpa's eyes.

All in all, the best thing about the Smallframe is that it sees the world the same way the powerful A15 and the whole A Series does. You might even call it a "chip off the ol' box." It's got the same operating system. Same interfaces. And it will even communicate with IBM machines.

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DEC service

CONTINUED FROM PAGE 83

service within DEC's Field Networks Services Group. The predictive software was developed in a CSC laboratory.

Now, DEC may be prepared to sell some of its preventive maintenance software expertise, industry experts say. Francis Dzubeck, president of Communications Network Architects, Inc., says DEC may soon announce the availability of some of its internally used preventive maintenance routines for sale to users.

DEC's Customer Support Center *sits at the base of the Rocky Mountains.*

Many users do not realize the operating system in their DEC machine is cataloging all system errors and that patterns in the errors can pinpoint the cause of a system failure, says Ronald Ochoa, an engineer in DEC's Customer Integrated Systems Group.

At the Colorado center, DEC software engineers rely on several tools to unlock the patterns of the cataloged errors stored under VMS and other DEC operating systems. To examine an ailing VAX system, the Colorado specialists, each wearing a telephone headset, summon a kit bag of software tools. Most problems are resolved in 45 minutes or less — a record comparable to that of IBM's call-in service, according to several analysts. In DEC's customer base, 60% of the problems are associated with software and 40% with hardware failures.

Now, variants or parts of these maintenance programs may become available to users. The software used by the Colorado center includes the following:

- The Storage and Retrieval System (Stars), which is a compendium of 70 technical data bases including 20,000 technical facts on DEC hardware and software. Stars was developed as a single gateway to thousands of possible causes of system errors. "The idea is that no one can know everything," says DEC's Jeff Robbins, who designed Stars. "We designed Stars so that a specialist could have access to the shared experience of all our field service specialists."
- The Summary and Retrieval Module (Spear), which resides in the customer's system and allows CSC specialists to look at the error record stored in the customer's machine. "Spear allows us to connect to the system and to retrieve only the errors related to that system," Ochoa says. Customers may buy a basic version of Spear, but an extended version with built-in analytic tools is used at the center here.
- Vaxsim, which allows engineers to visualize the problem on a node-by-node basis. The Vaxsim program presents a screen of boxes, each representing a logical subsystem, such as a disk drive, printer or CPU. The display shows the number of errors logged for each device and the safe, or threshold, level of errors.

Voice interfaces interplay

Advanced interfaces in the DEC diagnostic tools play a key role in the CSC's operation. Many tools make intensive use of color to indicate the levels of failure. A Dectalk synthetic voice interface alerts the three network managers of the CSC's own Ethernet/Decnet network to impending or existing system breakdowns. The voice interface, known as Diana, calls a network manager on a beeper and identifies system faults through coded numbers on the beeper's display.

A subset of Stars can be used with DEC's Digital Software Information Network and is being readied for user applications, says Robbins, who works in the center's Advanced Projects Development Group. He explains that the CSC will retain the full repository of 20,000 technical articles on all supported DEC products. Users will benefit from dial-up retrieval of the central DEC data base.

Stars is one of several sources of expert system assistance for users, according to Robbins. "We're taking some of the artificial intelligence out of Spear and putting it into Vaxsim," he says. "That way, a customer can read us numbers, and we won't always have to connect to his system to see what's wrong."

DEC may want its customers to preprocess some of their own maintenance problems, Dzubeck suggests. That would not be far different from IBM's own Customer Service Amendment, which gives customers discounts for doing on-site maintenance themselves.

DEC has been working to reduce the time it takes to get problems resolved and to increase the number of jobs handled by any given specialist. The push comes from the fact that DEC's maintenance operation is run as a profit-and-loss business, Lindsey says, noting that maintenance provides 20% to 30% of revenue.

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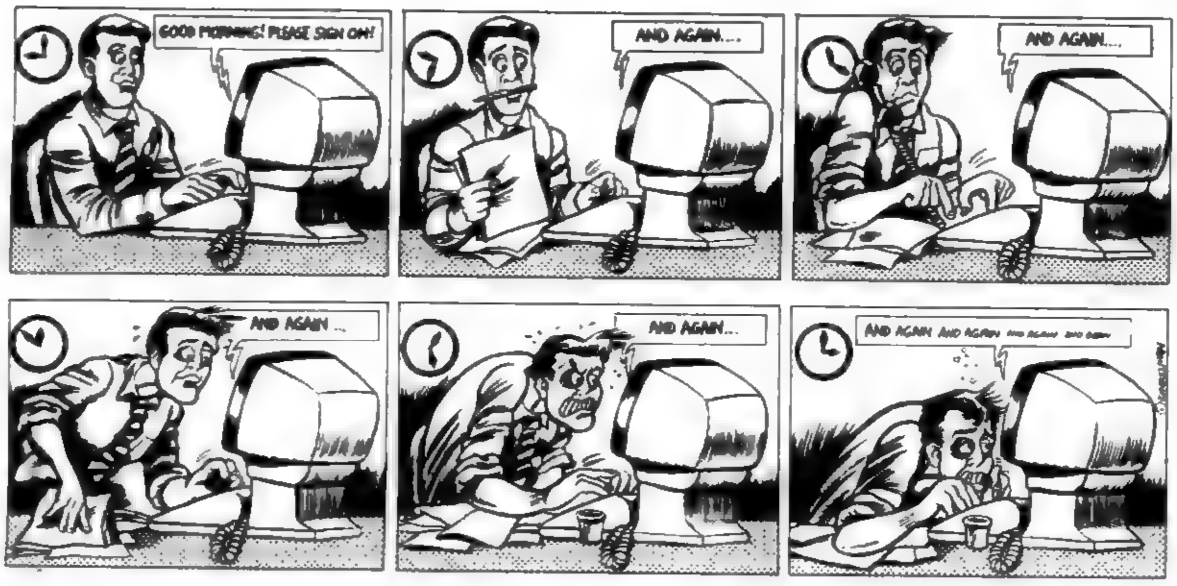
to VTAM applications all day long?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NEW PRODUCTS

Processors

A custom VMEbus memory board called the **PME CRR-2** has been introduced by **Plessey Microsystems.**

The board is said to provide six 32-pin sockets to accommodate static random-access memory, erasable programmable read-only memory (EPROM), enhanced EPROM, PROM and ROM devices.

The CRR-2 is divided into four banks of four devices each, with each bank separately configurable to contain 28- or 32-pin JEDEC-standard devices. According to a company spokesman, this provides storage capacities from 128K to 16M bytes.

The CRR-2 is priced at $700, complete with battery and ready for installation of memory devices.

Plessey Microsystems, One Blue Hill Plaza, Pearl River, N.Y. 10965.

A memory board, available in either 4M- or 8M-byte capacities and said to emulate multiple Data General Corp. 8708 memories for use in that firm's 32-bit MV/6000 and MV/8000 processors, has been announced by **System Controllers and Interface Products.**

The **MV680** memory features low power consumption by utilizing F logic and by providing either 4M or 8M bytes on one board.

The starting memory address is selectable in 1M-byte boundaries via a four-position board-edge switch.

Other features are a board de-select switch, which removes the memory from the system, and LEDs, which indicate memory power on and memory selected.

The 4M-byte MV680 costs $2,750, and the 8M-byte MV680 costs $5,850.

System Controllers and Interface Products, 449 S. Beverly Drive, Beverly Hills, Calif. 90212.

Data storage

A quarter-in. tape cartridge duplication system said to copy up to four cartridges at the same time from a single master on a hard disk has been announced by **Mountain Computer, Inc.**

According to the vendor, the **Imagecopier System** can duplicate tapes regardless of the host operating system. It is available in QIC-24 and QIC-11 formats. Typical throughput for a 60M-byte cartridge is said to be about 12 min.

The system keeps a count of each tape copy made and features a read-after-write verification procedure.

The user can request a byte-by-byte comparison between the master tape and duplicate tape.

The system costs $40,000.

Mountain Computer, 360 El Pueblo Road, Scotts Valley, Calif. 95066.

A disk controller designed for interfacing up to four ST506/412 Winchester disk drives to Digital Equipment Corp.'s Microvax, MicroPDP-11 and LSI-11 computers has been announced by **Distributed Logic Corp.**

The **DQ616** controller is contained on a single dual-height board. It is said to be fully compatible with DEC's Mass Storage Control Protocol driver contained in the MicroVMS, RT-11, RSX-11M+ and Ultrix operating systems.

Features include an on-board formatter, an 8K-byte buffer and a command-queue buffer. It supports overlapped seeks for up to four ST506/ST412 or DEC RD51 and RD52 drives. It supports 16-, 18- and 22-bit Q-bus addressing and both block and nonblock mode memory.

The DQ616 costs $1,150.

Distributed Logic, P.O. Box 6270, 1555 S. Sinclair St., Anaheim, Calif. 92806.

Terminals

A family of workstations said to be compatible with the IBM 3196 and 3197 display stations.

The Lynk Corp.'s *Lynkstation/196.*

Model D has been announced by **The Lynk Corp.**

The **Lynkstation/196** family emulates the 3196 and IBM 5291 and 5292 display stations.

Features include a 15-in. green or amber screen, a choice of 83-, 102- or 122-key keyboards, menu-driven configuration and setup and compatibility with the IBM System/34, 36 and 38 processors and the IBM 5294 Remote Control Unit.

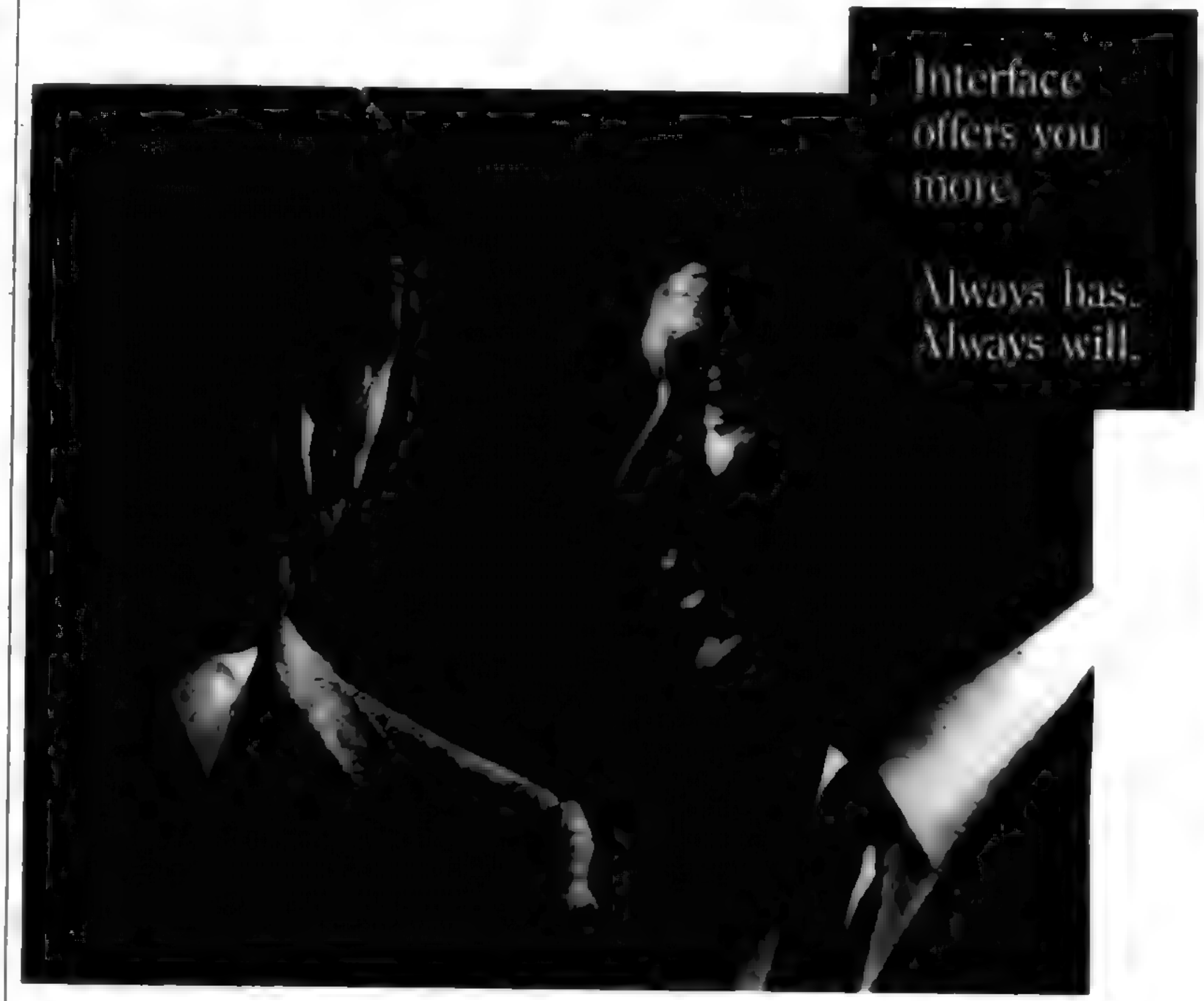
The Lynkstation/196E can be configured to run concurrent dual sessions or to drive ASCII printers as system-addressable printers.

The Lynkstation/196 costs $1,250. The Lynkstation/196E costs $1,550.

Lynk, 101 Queens Drive, King of Prussia, Pa. 19406.

Stereographics Corp. has introduced the **Z-Screen** liquid crystal modulator, an

Continued on page 92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Continued from page 91

enhancement to its camera and graphics systems that enables stereoscopic three-dimensional images to be viewed using polarizing glasses.

Stereographics systems provide an unambiguous display of foreground and background objects along the Z axis.

The Z-Screen modulator, which is fitted over the front of the monitor, encodes the left and right viewpoint images.

Polarizing glasses worn by the viewer pass the appropriate image to each eye, creating the stereo 3-D effect.

The Z-Screen is available in sizes up to 19-in. diagonal.

Prices start at $5,900.

Stereographics, P.O. Box 2309, San Rafael, Calif. 94912.

Printers/Plotters

Two flexible-membrane ASCII-encoded keyboards designed for use in harsh environments have been announced by **Cardinal Technologies, Inc.**

The **KB670** is a 58-key typewriter-format keyboad with two user-definable key-switch closures. It is fully encoded with the 128-char. ASCII alphanumeric character set.

The **KB675** adds a 16-key calculator-format numeric keyboard to the typewriter keyboard.

The KB670 costs $199, and the KB675 costs $239.

Cardinal Technologies, New Holland Ave., Lancaster, Pa. 17604.

A 15 page/min laser print station has been announced by **Talaris Systems, Inc.**

The **1590 Printstation** features a controller, called the Talaris 1590 Printstation Control System, with two processors. One processor does raster image processing, and one manages I/O and interprets commands. The print station offers from 3M to 5.5M bytes and uses the vendor's Extended Commands Language.

Other features of the print station include a small computer systems interface, 40 fonts stored in read-only memory, two 250-sheet paper trays and a 500-sheet facedown output tray.

The 1590 Printstation costs $8,490.

Talaris Systems, P.O. Box 261580, 6059 Cornerstone Court W., San Diego, Calif. 92126.

Power equipment

A 1,000VA compact uninterruptible power supply (UPS) system has been introduced by **Isoreg Corp.**

The **FRO Series Continuous Online UPS** is said to protect against voltage spikes, surges and sags, brownouts and blackouts. It incorporates a static bypass circuit that transfers the load to utility power in case of a momentary overload beyond the UPS's rating. The UPS can supply power for 12 to 30 min during a utility power outage.

The 1,000VA UPS for operation at 120V and 60Hz costs $2,450. A 50Hz, 220V version costs $2,572.

Isoreg, P.O. Box 486, 410 Great Road, Littleton, Mass. 01460.

Auxiliary equipment

A unit designed to provide access for channel monitors or logic analyzers to multiple mainframe I/O channels has been introduced by **Technology 80, Inc.**

The **Model 2020 Channeltap**, is said to provide access to any of up to four channels, without the user having to swap the monitoring device from channel to channel or bring down the host mainframe system prior to connecting the monitor.

Up to five Channeltaps may be daisy chained together, providing a monitor with access to any of up to 20 channels. The Channeltap connects to mainframe I/O channels using regular channel tag and bus cables.

According to the vendor, the Channeltap is totally passive.

The Model 2020 Channeltap is priced at $4,000.

Technology 80, 658 Mendelssohn Ave. N., Minneapolis, Minn. 55427.

Input devices

An enhanced version of the **Model 2100** series hand-held fixed-beam laser diode scanner has been announced by **Photographic Sciences Corp.**

Model 2100 *laser diode scanner.*

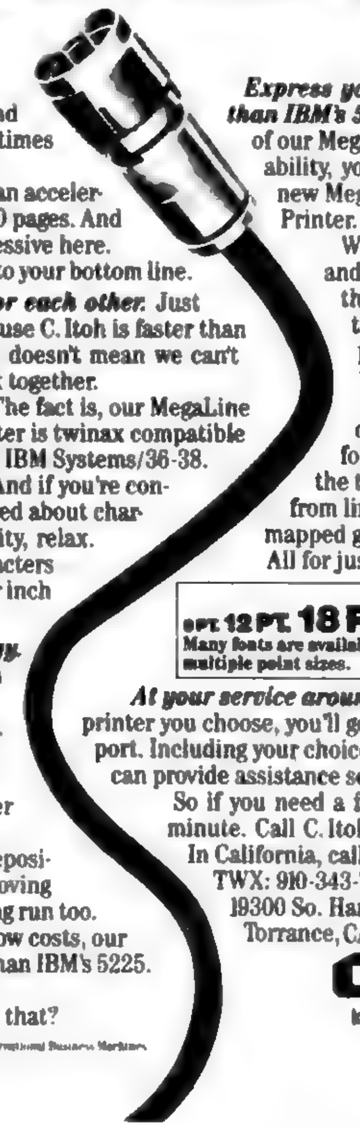
The 2100 series features integrated decoding. According to the vendor, it will read Code 39, the full ASCII character set, Codabar, the Universal Product Code and other codes. Models with the elliptical beam are said to be suited to read dot matrix bar codes.

Enhancements include lower power consumption, the ability to interface with most data collection devices and a user-friendly configuration.

The Series 2100 hand-held scanner is priced at $395.

Photographics Sciences, P.O. Box 338, 770 Basket Road, Webster, N.Y. 14580.

It only takes a minute to prove we're four times faster than IBM.



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Characters/Line	136-198	136-198
Lines/Page	[illegible]	[illegible]
Twinax	Yes	Yes
Printer Type	Impact	Non-Impact
[illegible]	5225	5225

The fact is, our MegaLine printer is twinax compatible with IBM Systems/36-38.

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IN DEPTH

How companies plan

A survey of 17 companies reveals a variety of planning methods but a common theme: Executives do not naturally realize the value of information systems

BY LEILANI ALLEN

What are MIS managers really doing about strategic planning when confronted with new technologies and rapidly changing business requirements? To answer this question, I conducted a survey to discern if and how MIS is developing and promoting methodologies for strategic planning. I was interested in hearing, as one public figure recently stated, "the good, the bad and the ugly." And I did.

One striking finding of the survey is that it is not, by and large, the so-called "information-driven" industries (banking, financial services, high technology, insurance) that use the most innovative approaches to information management.

Instead, many of the most interesting practices are found in the retail and transportation firms. The key determinant in good MIS planning and management seems to be the ability of corporate executives to recognize (or the MIS executive to sell) the value of information and information systems to the corporation's bottom line. The bad news is that this idea does not naturally occur to executives in "information-driven" industries; the good news is that it can occur at any firm.

Another surprising finding is the degree to which MIS executives see themselves as business people first, MIS professionals second. Popular mythology — and a good deal of the current DP literature — still depicts MIS managers as hopeless "technobigots," more enthralled with systems than with organizational or management issues.

This is an absolutely false characterization of the respondents in this survey, although they do vary in the extent to which they have convinced their fellow executives of their business roles. If these results are typical, it means far more MIS executives are willing to be business managers than the businesses themselves will acknowledge or accept.

Another key finding is that a movement is definitely under way to distribute MIS resources into user areas — not computing resources but people resources. The monolithic DP empire may be crumbling, but one cannot look at hardware or facilities to assess this change.

Rather, decentralization is achieved by assigning MIS staff to user areas, permanently or temporarily. This means MIS personnel may ultimately be more likely to report to a regular business manager than to another MIS professional.

This has profound implications on the ways we recruit, train and promote people in the profession.

For years the MIS staff member viewed himself as MIS, first and foremost. His loyalty and commitment were to the profession; his self-esteem was derived from the opinions of his colleagues. Now we take this person and send him to a user area where standards of performance and colleague evaluations are much different. A new self-image and a new identity have to be created to help motivate the decentralized staff.

The respondents

Seventeen executives from the San Francisco Bay area participated in the survey. Because the respondents were assured of complete confidentiality, this report does not identify an executive or company by name. Some corporate information has been kept deliberately vague, and technology strategies are discussed only for the group as a whole to safeguard potentially competitive information from disclosure.

The respondents are, by and large, senior MIS professionals of more than 20 years experience. With one exception, they are all male. Most are directors or vice-presidents of MIS or the equivalent. None sport the title "chief information officer," although some clearly function in that role. The majority report to a senior executive in finance or administration, although several have direct and routine contact with the president or chief executive officer.

All of the respondents have at least an associate's degree; half have baccalaureates. There is an almost even split between individuals with technical degrees

P. CHARLES LADOUCEUR

Allen is a senior consultant with Amdahl Corp. in Sunnyvale, Calif. This article is excerpted from her longer report, "Strategic Planning for Information Systems," published by Knowledge Consortium in Oakland, Calif.

- **Do firms want you to be a business person?**
- **Innovators vs. traditionalists**
- **MIS is ready, willing and able to help plan**

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and those with business or liberal arts backgrounds. The vast majority have risen through the applications development hierarchy, and almost all have frequently changed firms and industries in the course of their careers. There appears to be a slight positive association between company tenure and/or knowledge of the industry with credibility at the executive level.

The executives fit a fairly typical profile of senior MIS management. The results of the survey are, thus, particularly interesting because they challenge a great many popular concepts and theories about MIS executives and the role of MIS in business.

No single planning methodology is used by a large number of participants, and even standard methodologies are being customized and tailored to the situation. Almost all of the executives surveyed use their own eclectic blend of formal training and on-the-job experience, developed by trial-and-error methods during the years, to come up with a reliable planning method.

Probably the most positive finding of the survey is the fact that users are ready, willing and able to assume greater responsibility in the area of information management, provided MIS creates the appropriate mechanisms for them. Users will then serve on steering committees, provide better systems specifications, sponsor development projects and even adopt MIS staffs as employees in their own organizations.

Innovators, traditionalists

On the basis of comments made in the interviews, the MIS departments surveyed appear to fall into two broad categories, which I term "innovators" and "traditionalists." By innovators, I refer to companies that have made significant strides in integrating MIS and business planning by means of innovative organizational structures or planning methodology.

Traditionalist firms are those in which MIS remains relatively isolated from the business and is largely concerned with operational issues.

There are no value judgments attached to either label. Both sets of departments are performing their functions to their full capability and in response to their corporate environments. The study finds an almost even split between the two.

The innovators have at least experimented with new or different methodologies or organizational arrangements that help them respond to the key management challenges of increasing organizational productivity and profitability and integrating MIS with the business. Although the solutions vary, MIS innovators tend to share the following characteristics:

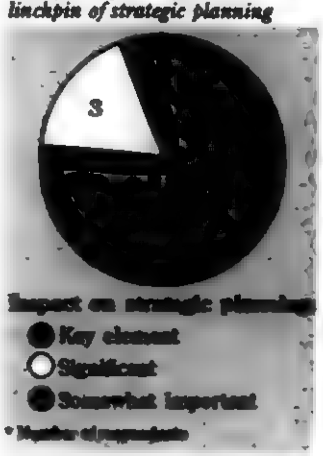
- Success in integrating MIS and user activities, especially by the distribution of MIS personnel resources into user areas.
- Creativity in establishing mechanisms for executive involvement in MIS decision making.
- An understanding of and appreciation for the critical success factors of the enterprise.
- An organizing principle to guide planning and management.
- Commitment to user sponsorship of MIS projects.
- A willingness to involve vendors in the planning process as soon as the strategic direction is established.

The traditionalists run MIS functions that are still largely

Continued on page 101

Mainframes still No. 1

Sixteen out of 17 companies surveyed say mainframes are the linchpin of strategic planning



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MIS takes on the role of innovator

The corporations I surveyed for my research on strategic planning fell into two broad categories: innovators and traditionalists.

The following case study highlights an innovator, a company that has made significant strides in integrating MIS and business planning by means of innovative organizational structures or planning methodologies.

Corporate profile. This large savings and loan firm started as a small regional company in the 1920s. The firm achieved major status in the late 1960s because of a merger.

Currently among the ten largest savings and loan institutions in the nation, it routinely outperforms its competitors in return on assets.

The savings and loan firm currently has assets of $12.7 billion, and the firm's financial condition is "outstanding," according to the firm's interviewed MIS executive.

Run like a business, with the focus on the profit and loss statement and the margin, the company is something of a maverick in its industry.

The corporation is financially driven, with specific objectives set for a one-year budget cycle, a five-year capital growth plan and a 10-year growth program. Planning is done by each operating division, with capital expenditure requests built from the bottom up. Plans are then discussed in an annual meeting of the executive planning committee. The plans are very detailed and, so far, have been very accurate.

MIS profile. Management Information Services is centralized, with 100 MIS employees accounting for 4.9% of the total work force of 2,200.

The senior vice-president of information systems reports directly to the chairman. The departments of applications development, operations, communications (voice and data) and administration — which includes quality assurance, technical services, documentation and finance — all report to the senior vice-president of information systems.

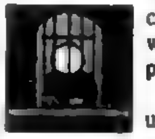
For many years, the MIS department operated very much as a service bureau. Since 1984, however, there has been an attempt to turn this practice around and bring new people on board. Consultants were hired to suggest changes, but they could not sell management on how to implement the plan.

At that time, a new senior vice-president for MIS was brought in to report directly to the chairman of the board. This individual incorporated the firm's no-nonsense business philosophy within MIS.

The objective is to run a lean, efficient department and implement a planning methodology that allows projects to be evaluated on a business basis. MIS does not have a charter because this degree of formality would conflict with company culture. Instead, the executive has personal objectives and a mission to "take advantage of technology to maintain the firm's position in the financial community."

Planning methodology. MIS strategic planning is driven by the following three factors:

- A corporate environment that stresses the need for short- and long-term objectives against which the performance of all departments can be measured.
- The technology explosion, which requires a long-range perspective.
- The personal experience and background of the MIS executive.



MIS planning uses the same time frames as the corporation. Prior to the budgeting process, the MIS executive has a planning meeting with each user department. They discuss progress on the current year's MIS implementation plan and projects for the coming year.

The planning effort is supervised by a planning coordinator who reports to the MIS executive. Both use a customized, proprietary mathematical computer model to analyze every major planning decision.

The key benefit of strategic MIS-planning is being able to assess each new product or service based on its impact on planned capacity, service levels and financial objectives. To that end, each major project, such as automated teller machines, is put into the model to calculate its impact on system capacity and financial objectives.

"Without a strategic plan for MIS, you can't gauge the effect of projects on business objectives," the MIS executive asserts. "You just can't make sound business judgments."

This plan is then presented to the executive planning committee. The committee also receives quarterly updates that compare the plan with actual figures. Moreover, an operational analysis group monitors the effect of the business plan on operations.

In addition to users and executives, vendor involvement in MIS planning is fairly substantial. Once MIS plans have been created, the major hardware and telecommunications vendors are called in to discuss new products and services.

Occasionally, vendor consultants are used for supplementary planning and to ensure MIS's direction is in keeping with market concerns. MIS, like the firm itself, does not intend to be on the leading edge. Rather, MIS waits to see that an idea works, adopts it and then improves on it.

This practice is reflected in MIS's strategies. For example, there is no data base architecture, primarily because the business's focus is on marketing and selling traditional savings instruments. Several data bases do exist, but the prevailing philosophy is that hardware will evolve in the direction of data base machines. Therefore, the thrust is toward development of standard applications.

To assist in this, the department uses a commercial life cycle development methodology. This includes a project control process to measure the results of the life cycle against the schedule.

Evaluation. Of all the firms surveyed, this savings and loan has the most formal and quantitative methodology for strategic planning.

The dynamic executive is considered a full-fledged member of the executive team, and a real attempt is made to integrate users' business plans with MIS plans. The executive only wishes he had additional planning specialists to allow him to do an even more thorough job of strategic planning.

This corporate culture emphasizes teamwork and fiscal accountability. This stance not only makes it easier to obtain information but also demonstrates the logic for planning.

One other key element for success appears to be the separation of the planning and budgetary cycles, which allows MIS to obtain planning data far enough in advance to prepare its own financial estimates.

Not all firms have as tightly knit and purposeful an organization that can allow such rigorous planning. However, this firm serves as an example of what possibilities exist for strategic planning for MIS resources.

LEILANI ALLEN

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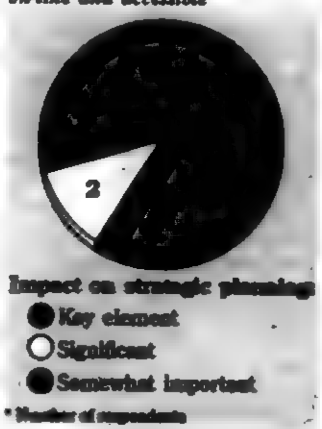
Planning

FROM PAGE 99

isolated from the business, especially from the business planning process. Computing resources as well as MIS personnel are centralized. MIS (and the MIS executive) have relatively low credibility in the firm, and information is not regarded as a resource. The MIS executive spends most of his time with technical issues or in operational fire fighting.

Appetite for DASD

Direct-access storage devices rated crucial to keeping information on-line and accessible



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The study confirms the old adage that MIS cannot do strategic planning unless the business itself does strategic planning. Very often, MIS executives have to wait for personnel changes in the management suite before the corporation is willing to take a longer term perspective on business operations. However, even without top management's leadership, MIS can do a fairly decent job of tactical planning if it can implement some of the following key organizational building blocks:

- Establishment of a formal mechanism, such as a steering committee, to involve user management in MIS planning and serve as a channel of communication.
- Implementation of a user ownership policy for MIS projects, supported by a rigorous system-development methodology that provides strong incentives for accurate requirements specifications.
- Creation of an active program to educate MIS managers and staff about the business.
- Building political alliances with key user executives.

Strategy puzzle pieces

In this section, respondents were asked the extent to which the following technologies or strategies figure in their MIS plans.

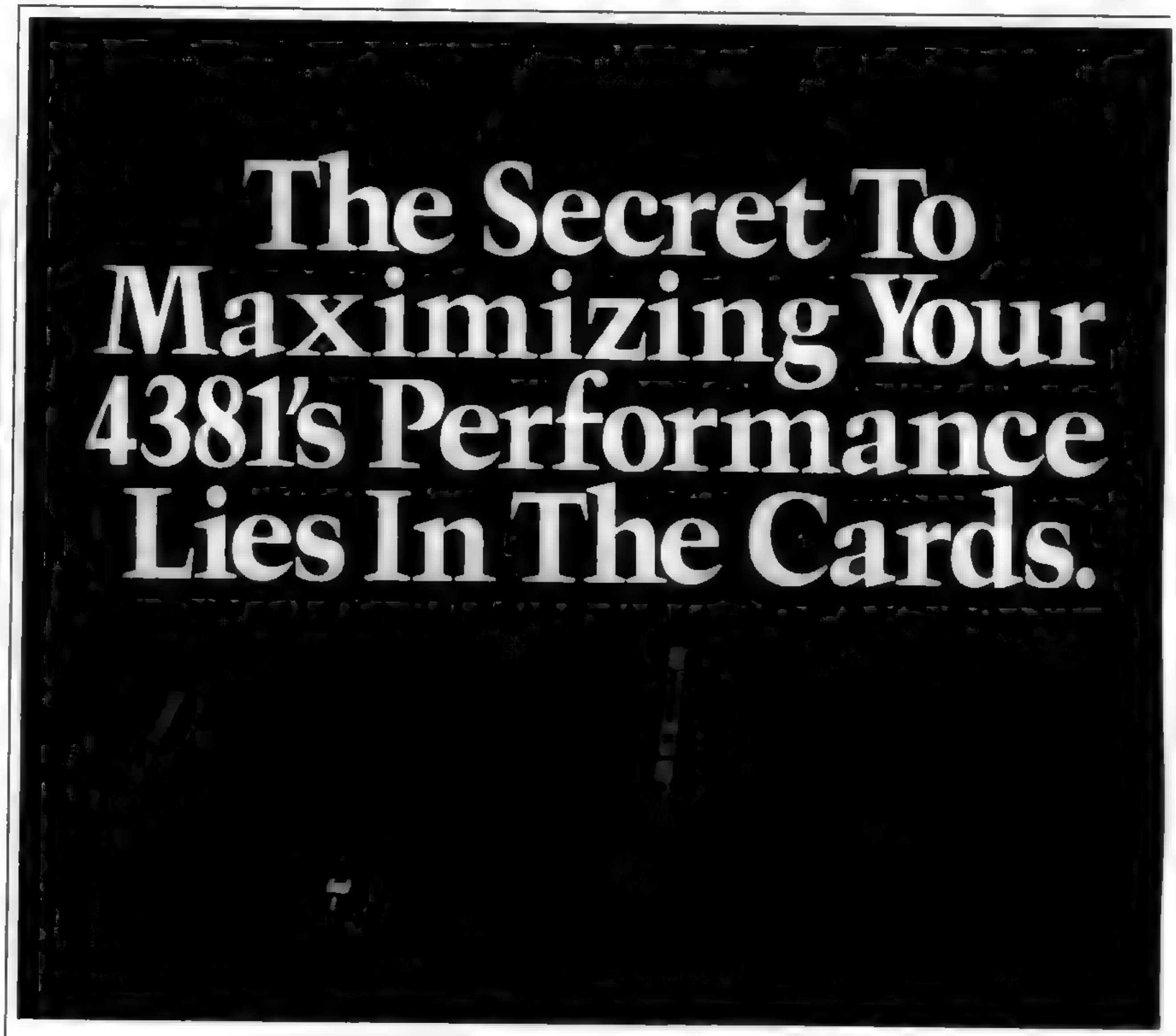
- The key planning concerns of MIS executives revolve around centralized hardware and software resources, followed closely by the network.
- Whereas end-user computing and information centers have become an accepted reality, office automation is not viewed as a strategic issue.
- MIS executives are interested in new technologies such as expert systems and integrated voice/data networks. However, they are also concerned about their cost justification.
- It is unlikely that MIS executives will use technology, such as telecommuting, videoconferencing, laptop computing or executive computing, to change the ways people work.

Most of the firms in the survey are strong on operational controls, such as security and disaster planning, and the majority have already implemented some form of office automation and end-user computing facility.

Some information technologies or strategies — such as telecommuting, executive use of computers, video- and teleconferencing — are being soundly rejected by the majority of respondents. Of interest is the fact that rejection comes not on technical grounds but because such efforts would conflict with the corporate culture.

Thus, most of the firms intend to maintain a traditional, central-site, mainframe focus while selectively implementing those technologies and strategies that generate strong economic value or user support. There is virtually no interest in technology for technology's sake, which, again, runs counter

Continued on page 103



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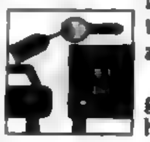
When MIS keeps to its own business

The following case studies highlight the planning habits of two traditionalist firms — companies in which MIS remains relatively isolated from the business and is largely concerned with operational issues.

Corporate profile. Founded almost 40 years ago, this company is one of the largest general leasing firms in the country. With annual revenue of $380 million, it is in good financial condition and is expanding its operations, although the new tax laws may have an adverse effect on its strategy.



The company is structured into five independent firms, each of which handles different aspects of the leasing market, ranging from trucks, cars and airplanes to office and testing equipment. The headquarters' functions include finance, law, public relations, mergers and acquisitions and information systems.

The key factor driving the firm's success is its ability to manage money effectively, since it must borrow huge sums to fund its capital acquisitions. Strategic planning, in the sense of determining an overall direction for the businesses, defining market niches, establishing penetration levels and identifying tools and techniques to leverage these objectives, is not done. Instead, each profit center creates its own three-year plan that focuses primarily on financial targets. These plans are discussed informally within the senior executive group and subsequently distributed to the appropriate managers.

MIS profile. Information services is run by a vice-president, who reports to the chief financial officer, who, in turn, reports to the president. The corporate group has 35 employees out of a total headquarters staff of 600. Each profit center has its own MIS manager, with a dotted-line relationship to the corporate vice-president. Out of an employee population of 1,200, there are 90 additional MIS employees in the operating units.

MIS views itself as a service organization to the corporation but has no formal charter. The profit centers are very independent in their implementation of technology, and there is no overall strategic direction for information systems. Development is handled at each profit center; the corporate data center operates the hardware and the network. Consequently, its key focus is the preparation of a capacity plan.

Planning methodology. Corporate MIS and the regional MIS managers do their planning simultaneously. The three-year business plans yield one-year budgets; the MIS groups then derive their own budgets. The corporate data center has no access to details such as new locations, new businesses and acqusitions that support the plans. Instead, the comptroller generates reports on historical usage trends that are then forwarded to the MIS managers at the profit center.

"The business recognizes the value of information systems, but, in general, MIS does not recognize the business process. We're too busy running our day-to-day businesses," the MIS executive says.

Planning has little visibility within the corporation or MIS. At a monthly meeting, regional MIS managers discuss such factors as the directions of hardware and software, division of responsibilities and other tactical concerns. However, these discussions are basically reactive, not strategic. There is no overall plan on where to invest MIS dollars. Furthermore, executive and user involvement in MIS planning is virtually nonexistent.

Evaluation. The MIS executive in this situation must overcome fundamental cultural (and probably ego) barriers to do any kind of planning. He sees great potential for the effect of information systems on the bottom line, including electronic interfaces with vendors and customers.

However, it has been difficult to communicate this potential to the profit center executives. The current thrust is to demonstrate MIS's value by implementing small systems at a small cost. However, this approach needs to be supplemented with a conscientious, if informal, program for educating the business executives on strategic possibilities.

In the meantime, the immediate issue is to come up with a better method of estimating system capacity.

One approach would be to run close to the capacity line but apply some kind of financial penalties, such as one-time budget surcharges if the machines have to be upgraded quickly because of inaccurate forecasts.

■

Corporate profile. The second financial holding corporation subsidiary has been in business for almost 100 years and currently holds more than $5 million in assets. The corporation has always posted a healthy profit margin and has grown substantially in the last three years. It has aggressively increased its loan portfolio and continues on a high-growth curve.

Planning is exclusively tactical and reactive in nature, with time frames of one year or less. For the last 20 years, planning has been done by the president and a core committee of three senior executives. The full executive committee of seven approves the plan, which consists largely of financial objectives to be met in key areas of operation.

MIS profile. Information services is viewed as a support organization, headed by a vice-president who is three levels removed from the president. There are only 32 MIS employees out of a total work force of 1,500. Despite the small size, there are seven different departments that report to the information services vice-president — operational group support, applications programming, systems programming, systems analysis, data communications, data entry and word processing.

Growth and change in the MIS area have been explosive in the last three years. It started out with one minicomputer and 24 terminals that handled fewer than 40,000 transactions per month and grew to a hardware environment that includes a large mainframe, two minicomputers, more than 100 PCs and supermicros, 400 on-line terminals and local- and wide-area networks. More than 600 programs have been developed in that time.

The MIS executive managed this transition according to a detailed plan presented to senior management. It outlined the goals and objectives of the function and defined the critical success factors. It included a critical path analysis of the projects, appropriately grouped and prioritized. These priorities were based on the potential financial return of the corporation, especially in the area of income generation.

Planning methodology. The initial plan was highly successful in getting things moving. However, MIS is greatly handicapped in its ability to plan strategically. The highly vertical and compartmentalized structure of the holding company does not allow staff to be moved. Thus, MIS remains a separate and distinct organization. Moreover, it is viewed as strictly a service organization with no budget of its own — even the computer equipment is owned by a subsidiary within the corporation. By contrast, user involvement in the applications planning process is quite high.

All applications were designed using the KISS ("keep it simple, stupid") method, with an emphasis on creating systems that people can really use. Everything was designed in modules with a critical path identified. Periodic meetings among the MIS managers examine resource requirements, work schedules and, if necessary, project reorientation.

These managers also help the executive develop a three-year, high-level technology plan, based largely on an analysis of the trade press, consultations with peers and vendor presentations.

Although vendors are viewed as good sources of information, they are not directly involved in the planning process.

Evaluation. The information systems vice-president makes an effort to look at things as his peer executives do — primarily from a financial perspective.

However, there is no mechanism for actively soliciting input from executives on information systems and technology. What input there is is informal and sporadic. Thus, the decision is made first, and the planning follows — the classic definition of "reactive mode."

With such a small staff and a large span of control, the executive becomes involved in almost all operational issues. The executive expressed a desire for a steering committee to set priorities and back up these priorities with resources.

The larger problem with which MIS must contend is the fact that the corporation has not yet recognized the value of information and information systems in its own growth and profitability. Every effort should be made to enlist user managers in helping to quantify this relationship, and this information should be routinely shared with senior management.

Handled with sufficient finesse to keep the analysis from appearing self-serving, such public relations should help bring MIS in from the cold.

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Planning

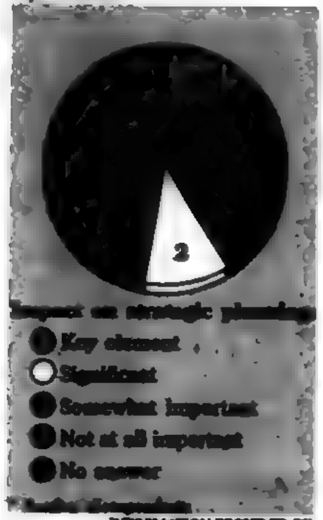
FROM PAGE 101

to the popular image of the MIS professional.

Central-site mainframes. The respondents are overwhelmingly concerned about the need to select appropriate central-site mainframes. Sixteen out of 17 surveyed say they feel it is either the key element or that it plays a significant role in their strategic plans.

Information centers: A mixed bag

Nine firms have made a major commitment; eight others blame information center users for generating superfluous information



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The single exception is one respondent who says the mainframe issue had been satisfactorily resolved and that software is a more pressing issue. Almost all companies say they feel the sheer impact mainframe processing has on the user community makes it a critical issue.

Others speak of the economies of scale associated with centralized processing as well as the ability to regulate, control and standardize service to end users.

Departmental minicomputers. Only five of the respondents say that using departmental minis is either significant or key to their business success, and 12 rate it as having only some or no importance.

Given the heavy mainframe orientation of the firms surveyed, this result was expected. One respondent says PCs will grow to take the place of minicomputers; another says the same functionality can be achieved via software views on the mainframe.

However, most respondents recognize the need to make exceptions to a centralized architecture. Process control, loan processing and automated teller machine processing are some of the applications being handled on minicomputers. Advocates of minicomputers feel they make better economic sense than personal computers or allow a better distribution of information in the firm.

DASD. Again, given the centralized orientation of the firms that responded, the concern for direct-access storage devices (DASD) parallels that for mainframes. Twelve respondents feel DASD is either a key element or plays a significant role in their business strategy.

All respondents agree with one executive's view of the "unending appetite for data" and note the growing pressure from users to keep massive amounts of information on-line and accessible. Another respondent says he sees DASD as the "key building block to the movement of data."

PCs. Thirteen of 17 respondents say PCs play an important or critical role as an information delivery mechanism. Several financial institutions have woven PCs into their basic operations; most participants say they provide essential information to the business. Some respondents also note that the key MIS planning issue is not whether PCs are useful but rather how to network them together and/or integrate them into an overall information architecture.

Only one respondent negates the use of PCs as a processing mode, maintaining that all information would always be accessed through the mainframe. The three organizations that place only a small degree of importance on PCs in strategic planning feel the focus has really

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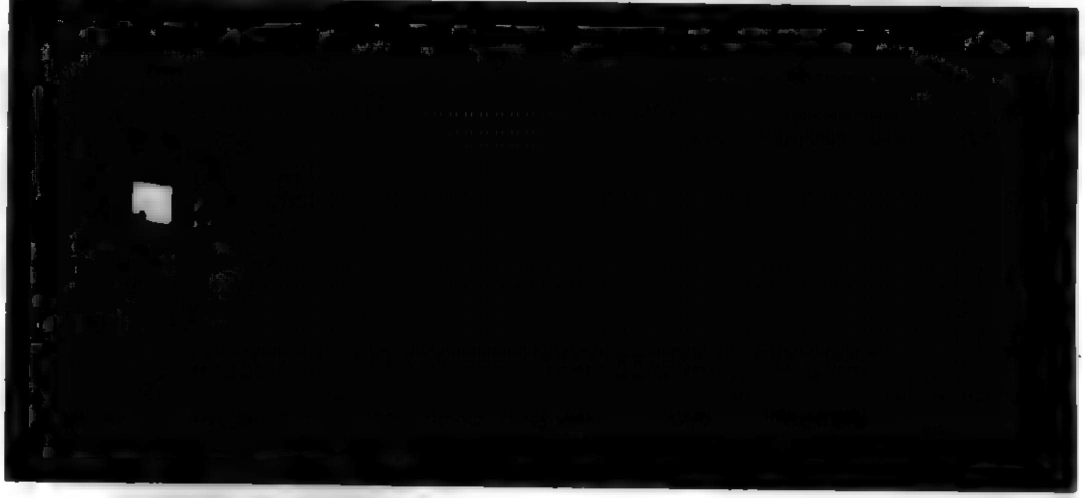

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shifted to PC software or that justification and planning for PCs has moved into the user areas and is no longer an MIS issue.

End-user computing and the information center. Most of the survey respondents identify these two subjects so closely that they are treated as one and the same.

Nine firms say they are making a major commitment to end-user computing, having installed inquiry facilities or provided PC software to assist in reporting and analysis. They view end-user computing as an opportunity to make users self-sufficient in their reporting or to ensure that MIS stays fully cognizant of the business's needs.

Security and disaster recovery gain attention

Most surveyed have security and disaster recovery plans in place; the four that do not cite corporate culture or budgets as obstacles

* Number of respondents

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CW CHART

Two of these respondents view the information center in particular as a mechanism to bring about cultural change what one calls "peer bonding."

The eight firms that do not see end-user computing in their plans cite lack of middle- and senior-management awareness of its benefits or concern that users will generate trivial or superfluous information.

Security and disaster recovery. Although these may be viewed as distinct areas, all but one respondent treat the two issues as a single subject. Twelve of the firms are well-along in this area, with at least one having a hot site as backup. Another firm notes that its users are active participants in the annual update defining critical data.

For the participants, the motivation to establish security and disaster recovery came from many sources: In one case, it was required by the auditors; in another, the MIS executive took personal initiative for the program. In yet another, a disaster precipitated management's attention.

In creating such a program, respondents stress the need to take a corporate viewpoint to allow the various operating units to respond consistently in the event of an emergency.

The four firms that had not addressed this issue cite lack of management awareness, a corporate culture that did not value such planning or difficulties in financially justifying the effort.

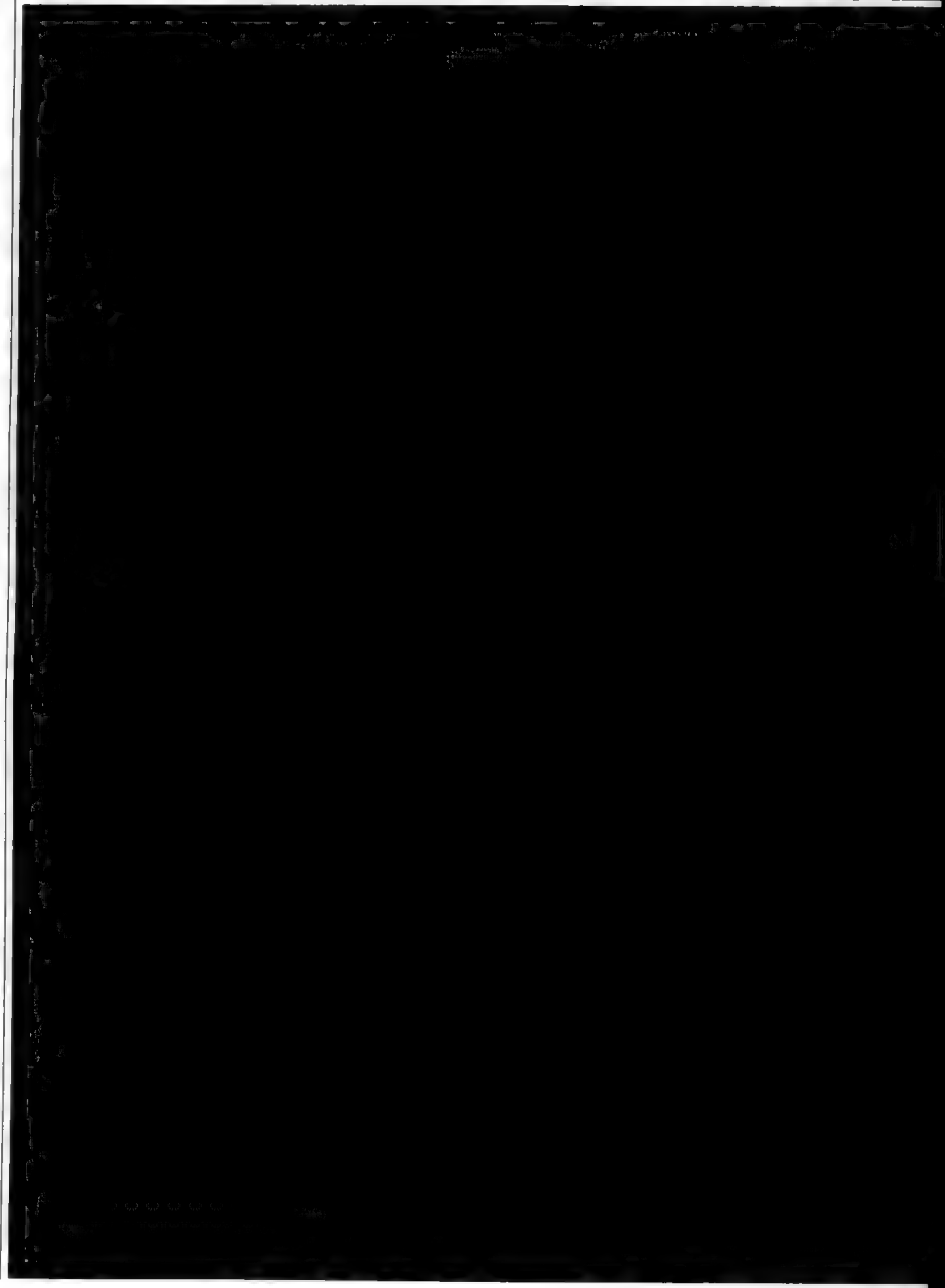
Office automation. Interestingly, respondents had the most difficult time defining office automation, stating that, frankly, they did not know what it encompassed. Most view it as providing word processing and electronic mail on the PC or mainframe.

In that context, 11 respondents say they feel it is either a key element or plays a significant role. They see an office automation strategy as being beneficial in standardizing data and reports throughout the company. One respondent says he sees it as a value-added resource and productivity aid.

Still, most respondents report they cannot see office automation as a strategy by itself but rather as part of an overall automation strategy.

DBMS. Of the 17 respondents, 12 firms rank using data base management systems highly, saying it is key or significant to their company strategy.

Most respondents say they use mainframe DBMS as their key information facility, but many express the need to improve on traditional systems and implement fully relational systems. At least one participant



says he intends to rewrite the firm's traditional DBMS; another wants to take greater advantage of fourth-generation tools. There is also a distinct need to find a DBMS that can perform well, especially in multivendor or multihardware environments.

Many organizations say they want to provide management with more integrated information from the corporate data bases.

CAD/CAM. Computer-aided design and manufacturing (CAD/CAM) is key or significant to only two of 17 respondents.

By and large, CAD/CAM applies only to the manufacturing firms in the study, although one retailer uses it for store planning and construction. Even manufacturers show little interest in the technology. For those firms that do use CAD/CAM, it is handled either by the engineering department or it is not integrated in the MIS architecture.

LANs. No one surveyed views local-area networks as a critical issue; they either have them or they don't. The 10 firms that do not have one feel the technology is insufficiently developed or that the benefits are still debatable. Another feels it is more important to find ways of connecting intelligent PCs with the mainframe.

Even the six firms that include LANs in their plans see them primarily as filling specific niches, on the shop floor, for instance, or strictly in support of office automation. Two firms note that their new buildings have been wired for LANs and that they will take advantage of the technology, although, once again, it is not a particularly pressing issue.

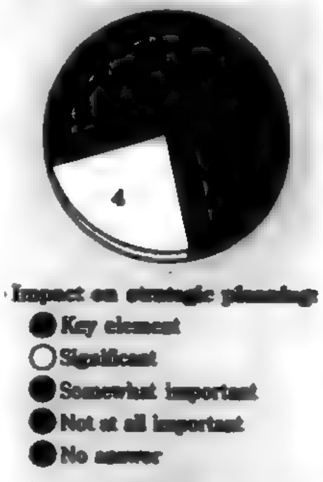
Not all bad news

Five months have elapsed since the interviews were conducted. Of the 17 companies in our survey, one was bought out by another firm, and two were subjects of hostile takeovers and had to sell off assets to fight the bids.

Not all the news is bad, however. Another organization was the victom of a strike by its unionized workers, and many MIS staff members were assigned temporary duty in the user work areas. Most of the MIS managers view this as a positive experience, allowing the staff to gain a greater sensitivity to users' needs and the pressures they face.

DBMS gets limited mandate

Twelve firms rank DBMS high in their plans, although they want improvements on their key information facility



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What these events really demonstrate is that business executives face enormous pressures to survive the 1980s and that all plans must be flexible enough to respond to distinct swings in economic fortunes. The best survival strategy is to take the long view, consider the largest number of possible business scenarios and join the rest of the executive team in quickly responding to change.

Often we are too overwhelmed by the steady pace of change as well as the volatile nature of information needs to spend energy in planning. But an organizing principle and a business-based planning methodology allow us to respond to changes. The better we know the business, the better MIS will be able to contribute to corporate welfare.

Now is the time for MIS executives to consider the example set by the innovators and create a means of integrating their decision making and operations with the user departments. ●

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TAKING CHARGE

David Ludlum

MIS needs leadership

What do MIS organizations and the Constitutional Convention in Philadelphia 200 years ago have in common? Both represent fertile fields for demonstrating and reaping the rewards of leadership.

MIS professionals aiming for a management role and managers seeking to climb the executive ladder know it's important for them to temper their technical knowledge with business acumen.

But effective management calls for knowledge well beyond understanding how a particular business works. It calls for leadership — the ability to inspire others to share one's goals.

Supervisors who rise above mere management to leadership are the ones who can recognize their subordinates' needs and interests and attune those to their own goals.

The results of *Computerworld*'s survey of job satisfaction published last week underline the need for this sort of leadership ability within MIS organizations.

In discussing their satisfaction, or lack of it, with their jobs, the MIS professionals and managers who responded repeatedly pointed out their need to be recognized as individuals while at work.

Among 15 factors rated for their importance to job satisfac-

Continued on page 116

He keeps close to staff

Drexel's Castellano invests in relationships

BY ALAN ALPER
CW STAFF

NEW YORK — If Joseph Castellano wasn't an MIS honcho at one of the fastest growing investment banks on Wall Street, he wouldn't know what to do with himself.

"I know one thing: I'm committed to this business," says the recently appointed managing director of MIS at Drexel Burnham Lambert, Inc. "I know I wouldn't like to run a marina in Florida."

Since graduating from Rutgers University in 1965 with a liberal arts degree, Castellano has spent most of his time living and breathing data processing.

He says he joined Drexel because of its reputation as a good place to work, the challenge of managing the DP needs of a fast-growing but maturing company and the opportunity to broaden his understanding of the data processing field, which he calls his love and lifeblood. "At 65, I'd like to still live in New York, have a winter home in a warm climate, but still be involved in data processing," he says.

Climbing the ladder

Castellano first worked as a systems programmer, then managed development projects and helped run business units for Merrill Lynch & Co. His 12 years there were rewarded with a promotion to MIS chief in 1981. His Merrill Lynch career culminated in 1984 when he assumed the presidency of Information Market Network, known as Imnet, the firm's financial information service joint venture with IBM that was disbanded earlier this year.

Castellano's modus vivendi has been to build close relationships with peers and subordinates, colleagues say. To some observers, he embodies the blend of technological prowess and business acumen required to make it as an MIS executive in the fast-paced world of Wall Street, characteristics he attributes to his years at Merrill Lynch.

"Joe is viewed on Wall Street as the MIS executive par excellence," says Jerry Higgins, a senior vice-president at Shearson Lehman Brothers, Inc. who worked for Castellano at Imnet. "People look up to him here."

The 43-year-old Castellano, tough-talking yet low-key and understated, is now marshaling his resources to manage the MIS operations of Wall Street's most profitable firm.

He has big shoes to fill. He inherited Drexel's MIS reins in August from William Tuite, who

Continued on page 112

PROFILE

Joseph Castellano

Position: *Managing director of MIS, Drexel Burnham Lambert, Inc.*

Mission: *To tighten controls, eliminate redundancies and increase productivity in DP while maintaining an entrepreneurial spirit at the fast-growing securities firm.*

TELECOM VS. MIS

MIS, telecom joust for corporate influence

BY ELISABETH HORWITT
CW STAFF

Telecommunications managers can be classified either as dodos, pelicans or eagles, according to John Walsh, managing director of New York research company Integrated Strategies Group.

"The dodos concentrate on accounting, capacity planning and fine tuning: Squeezing every megabit per second out of bandwidth. The pelicans are trying to rethink their roles, and the eagles are already looking at the competitive role to be played by networks," Walsh says.

As more and more corporations merge MIS and telecommunications operations, telecom managers' ability and readiness to redefine their jobs is determining whether they participate in the new regime as partners or as subordinates. It may even determine whether they have a job at all. While telecom managers have their success stories, many have been eclipsed as MIS has been put in charge of efforts to harness technology to business needs.

Ironically, it is Fortune 500 companies' increasing emphasis on telecommunications as a strategic tool that is threatening to do away with the autonomy of telecommunications departments. Leased lines have become lifelines between remote sites and corporate data centers as well as between businesses and customers.

Furthermore, at the same time buying decisions have become more crucial, they have also become more difficult: Divestiture has done away with the one-stop telecommunications vendor, and the promise — or threat — of Integrated Services Digital Network has left a lot of people bewildered as to what technologies and protocols will still be around in the next few years.

KEVIN POPE

Searching for the right combination of business and technical savvy to navigate these treacherous waters, corporate management has more often than not put MIS at the helm, with telecommunications in a subordinate role. The International Communications Association, a major user organization, recently surveyed more than 640 telecommunications professionals, asking to whom their departments reported. For 69% of respondents, the answer was DP/MIS (see chart page 110).

"Telecommunications tends to take a 'Systems Analy-

Continued on page 110

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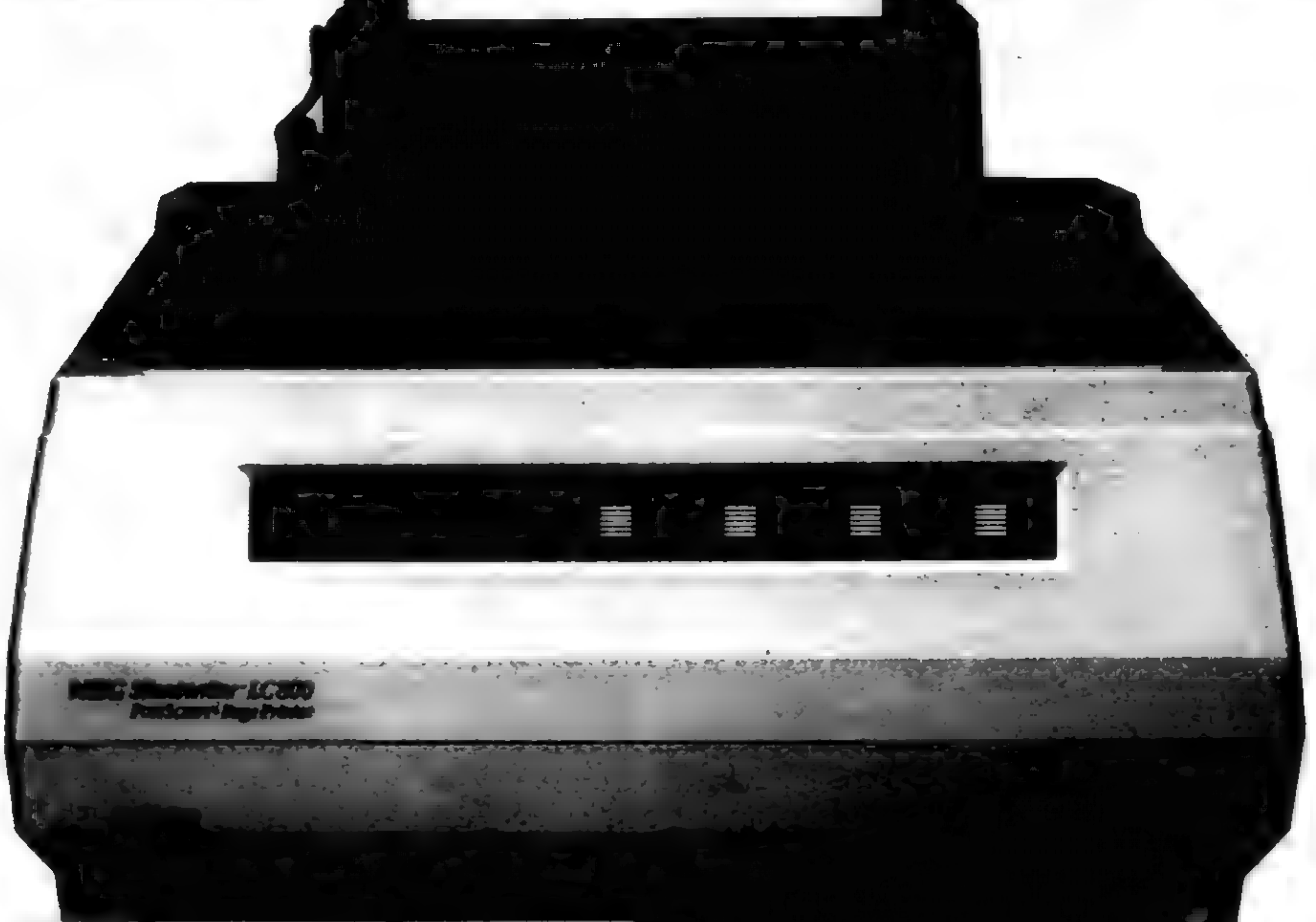

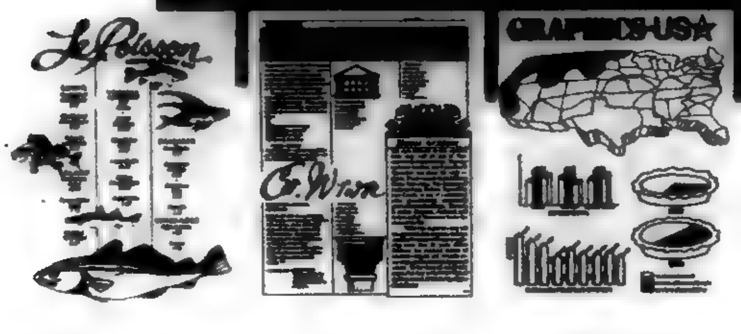

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MIS, telecom

FROM PAGE 107

sis 101' tack, figuring out what users require from a technical standpoint, where Information Systems looks at a product in terms of business value," says Tom Davenport, director of research at Cambridge, Mass.-based Index Group, Inc., which specializes in management-related issues of technology implementation in Fortune 500 firms.

Based on his experience, Davenport is pessimistic about how easily traditional telecom staffs can become active participants in corporate strategy-setting sessions — even when they are given the chance. "So far, we are finding that even in organizations which have supposedly combined MIS and telecom departments, there is not much synergy. A national war has been transformed to a civil war with lots of finger-pointing between operating system and networking people. To have successful mergers, you need changes in personnel, not just having everyone report to one person."

This has proven the case for at least one Fortune 500 corporation, according to a vice-president there, who prefers not to be identified. "The transition to today's organization was not pleasant," recalls the executive, who says he is "on the DP side but [is] responsible for telecom."

As top management became actively involved in the concept of information delivery as a strategic resource, a management upheaval resulted, polarizing sides over the issue of whether to leave telecom autonomous or give MIS control, he explains. "They shot for too much, and the compromise we eventually reached, to merge them into MIS, brought casualties."

Travelers' Waltrip

The ensuing conflicts resulted partly from personalities, partly from some telecom managers' refusals to change their traditional job descriptions and managerial styles, the vice-president indicates.

"Telecom managers have to face the need to become MIS managers. We had no problem with the managers higher up, but when it came to implementation, telecom managers refused to reveal their mystique." While MIS is generally service-driven, responsible for maintaining acceptable response-time levels worldwide, telecom tended to be demand-driven, concerned with responding to specific user needs, he explains.

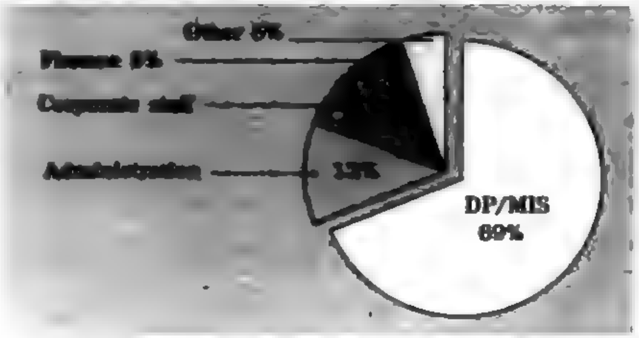
Rebuilding

When the smoke of battle cleared, the company had lost a number of telecom managers, who felt it was "degrading" to be part of MIS, the vice-president says. The work force was rebuilt with an emphasis on "people who didn't have a strong inclination to voice or data," many of whom were data-oriented but willing to learn voice skills, he adds. The vice-president, whose background includes 15 years in data communications and DP, now oversees telecommunications and computing services.

His company appears to have paid a heavy price in personnel to attain its ideal of an integrated information services department. Some companies face another type of problem — how to further their communications strategies without being stymied by dodos who want to continue doing things the old way.

Telecom departments' reporting relationships

Most answer to MIS, based on a survey of more than 640 telecommunications professionals in 124 companies



INFORMATION PROVIDED BY THE INTERNATIONAL COMMUNICATIONS ASSOCIATION
CW CHART

James E. Jewett, cofounder of the Nashville-based Telco Research Corp., says an airline executive recently complained to him that "telecom managers come up with tailored, complex solutions when I want fast, less complex, sometimes more expensive solutions that are less dependent on the telecommunications department. Telecommunications people are committed to the leading edge, which is less important to us than keeping in touch with users' needs."

While the traditional telecommunications manager may "come up with an exact solution to the wrong problem instead of an approximate solution to the right problem," the "value-added manager seeks line responsibility where value is created; operates telecommunications like a business; supports the company's strategic goals and makes telecommunications a competitive weapon," Jewett advises.

The industry does have its success stories, particularly among Fortune 500 companies that sensed the need to integrate telecom and DP long before divestiture of AT&T, according to Trav Waltrip, a vice-president of data processing at Travelers Insurance Co. with 35 years of telecommunications under his belt. Waltrip heads Travelers' telecommunications department, which reports, along with the DP department, to one information processing executive.

'Close relations'

"My boss can be considered to have responsibility for information technology; telecom, computer science — the glass house with the host and [direct-access storage device] — and application development," he says. Waltrip shares facilities with the five other DP vice-presidents and meets with them weekly to discuss tactics and strategy. "We have to be close relations," he says.

Far from being relegated to cabling and telephone jacks, the telecom department "is responsible for host-to-terminal connections from the host channel on," Waltrip claims. IBM communications systems such as VTAM and Network Control Program do not belong to DP, he emphasizes.

Stan Welland, manager of corporate telecom for General Electric Co., agrees that opportunities f~~ savvy telecom managers have been opening up recently in large corporations. "I've only been here two years, but my job didn't exist before that at the corporate level. I've had to create and fill it," he says.

Six years ago, Welland was manager of strategic technology at Merrill Lynch & Co. — a job that was 50% telecom, he says. He became a prime mover in the Teleport project, which involved installing a fiber-optic link between the financial service giant's New York offices and sites in New Jersey. "In 1981, the major issue was, Is fiber viable?" Welland recalls. Since then, the company has gone from keeping the link for internal use only to becoming a legitimate common carrier, reselling bandwidth to other firms as an inexpensive way to bypass the local telephone company.

GE's Welland

Conflicts between MIS and telecom come up all the time at Welland's present job, he admits. "Today, we are distributed around the nation, and the wires that allow support of host-to-terminal connections across multiple sites have a major impact on MIS. If the lines go down, there is a lot of finger-pointing. That's why MIS and telecom have to work together: If there is a problem, the user always pays."

Lessons from universities

Corporate telecommunications managers might take a lesson from their colleagues in academia on how to work out a productive relationship of equals with MIS.

Major users of the local telephone loop, universities have become adept at bargaining with the local telephone company for price breaks and new services. Recently, many have gone private, forcing their telecommunications managers to learn how to be both their own telephone company and a business, since such services are often resold to students.

"Telecom departments have to really sit down with MIS and say, 'We don't want to take over; we're in the transport business. Whatever you put on the end of the cable is fine as long as it's compatible; we can provide the economies,' " states Mal Reader, a communication manager at the University of Calgary in Alberta, Canada.

Reader advises managers not to wait for DP to come to you and say, "Here are 300 terminals, connect them," but instead to become proactive participants in their organizations' strategic planning processes. "You need to become a funnel for plans," he says. A receptive, nonthreatening telecom manager can also become a primary contact for users who "want to talk to one person, not eight, when there's a problem."

Self-education is a prerequisite for dealing with MIS and the user community, however. "Keep up with the technology so that you can say to users, 'You're buying yesterday's news,' " Reader says. "If they tell you, 'We need a 4M bit/sec. LAN,' you can say, 'It'll cost X — do you really need it?' " Telecommunications managers also need to keep track of current equipment installations so they know what can be reused, he says.

A lot of "data people" are joining the Association of College and University Telecommunications Administrators (ACUTA), says Reader, who was the program chairman for the recent ACUTA conference in Minneapolis. "They want to learn how to provide service and support. They are used to contracting out to IBM. Now a lot of what they provide is not going through the mainframe."

Ruth Michaelecki, director of telecommunications at the University of Nebraska at Lincoln, seconds Reader's advice.

Recently, Michaelecki played a key role in getting AT&T to deliver digital 56K bit/sec. connections to the university. This was a crucial element of the university's participation in a project funded by the National Science Foundation to link researchers and computing resources in 11 Midwestern academic institutions. "The computing center director could have implemented the network, but he didn't have the time or knowledge of LATA rules," Michaelecki said.

This fall, the university will provide direct wiring between students' terminals and the university's computing facilities. Michaelecki's group has negotiated with a cable television company to provide free installation of the twisted-pair wiring that will support these services while it installs its coaxial cable.

"Those universities that have combined telecom and DP and put telecom at a low level so they report to DP have made a mistake, I think," Michaelecki says. "This is an old trend that is being reversed in areas where telecom managers have taken an agressive stance to educate themselves. When the reporting levels are equal, telecom and MIS make a good team that adds value to the university."

ELISABETH HORWITT

For excellence, author says, get closer to the customer

BY GLENN RIFKIN
CW STAFF

Nancy K. Austin

The MIS executive must be a maverick in order to have an impact on strategy and turn around negative perceptions of the profession. This is the prescription set forth by Nancy Austin, a Capitola, Calif.-based management consultant and coauthor with Tom Peters of the best-selling *A Passion for Excellence.*

"With the unbelievable amounts of information being generated in corporations, managers tend to be overwhelmed with priority items, and they can't act on them all," Austin says. "The MIS professional today can enlighten and facilitate action. This is the opposite of how MIS has been perceived in the past."

Austin, in Boston last week to address an executive seminar at Decworld, pointed out in an interview that one way for an MIS manager to act as a maverick is to initiate and follow through on direct customer contact, both within and outside the company.

"If the MIS executive gets out of the office and goes face to face with customers, he not only finds out what those customers need but can bring back information that has a direct impact on corporate strategy," Austin stated. "It may seem radical, but it is simply another way for management to authorize people to think."

Changing attitudes

According to Austin, MIS has long been perceived as an obstacle to productive action — rather than a facilitator of it. "They were a disrespected bunch who gummed up the works," she pointed out. "The only way to reverse that is to for them to get out to meet the users. Then MIS can tailor its service in a way that can't be beaten."

Austin does not believe that type of thinking is restricted to a new generation of MBA-toting MIS professionals. Longtime MIS professionals are just as well equipped to try new and radical approaches to their jobs.

"They haven't thought of themselves as leaders. In fact, when the subject comes up in seminars about bureaucracy getting in the way of productivity, MIS people identify with the frustrated masses, not with the bureaucracy," Austin declared. "They are only recently beginning to rethink how important they are to the firm."

While a first-time customer visit might be "terrifying," Austin insists that the real-life feedback is essential for MIS to prove its value to management. Of course, top-level management must show some interest in such a venture, and Austin pointed out that ironically, it is companies going through tough times that may be most receptive to this kind of thinking.

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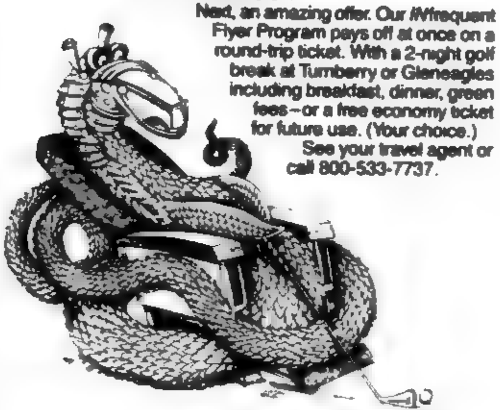

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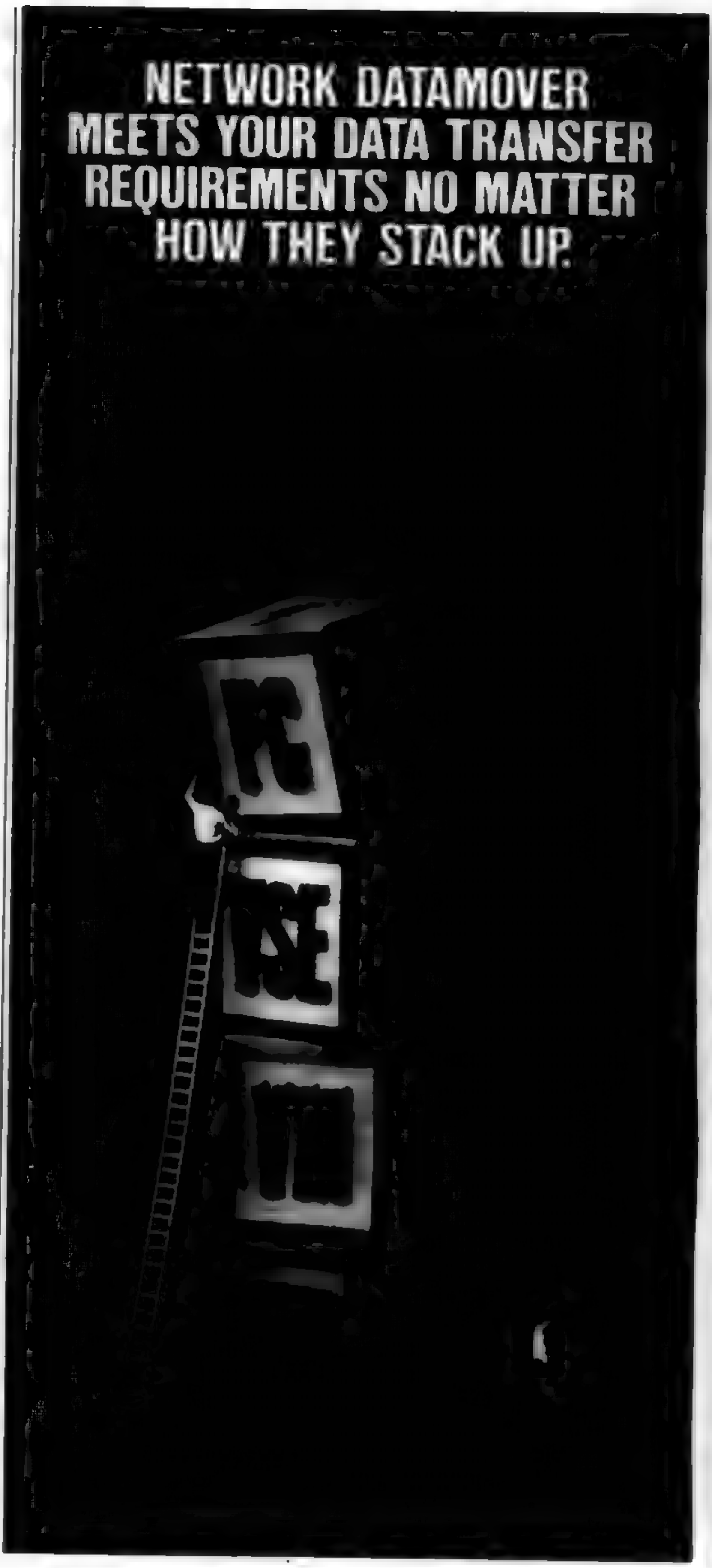
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Close to staff

FROM PAGE 107

in his 26 years became something of an institution at the $4 billion firm.

Tuite built an MIS infrastructure from scratch, grafting layer upon layer to accommodate Drexel's growth, which has almost doubled annually in the last few years — thanks in part to the prodigious corporate merger activity financed by Drexel junk bonds.

From his corner office on the 24th floor of 60 Broad St. — overlooking the East River in the hub of New York's financial district — Castellano presides over some 1,000 employees of the Information Systems Division (ISD). He oversees all DP operations, office automation and communications at Drexel's 50 offices worldwide.

The ABCs

Castellano's experience as a systems programmer and engineer has familiarized him with the basics of MIS. He began his career as a systems programmer for Public Service Electric & Gas Co. in Newark, N.J., and later joined RCA Corp. as a systems engineer when it was still in the computer business. He came to Wall Street in 1968 to develop back-office applications for Francis I. DuPont, a leading financial services firm that is now defunct.

Castellano says that early in his career he viewed each of his positions as an individual job, not a stepping stone in a career. After 10 years in the industry, however, he wanted more. "I realized that I could do more," he recalls. "I began to measure myself against what others in the industry were doing. I said, 'Let's see who's doing what; maybe I can do it.' "

He joined Merrill Lynch in 1972, running an application development unit, and entered management in 1975 as assistant to the executive vice-president of services, doing planning and budgeting. He rejoined corporate systems in 1978, heading a department that supported financial systems, then was promoted to group manager of planning for corporate systems. In 1981, he was named corporate systems division manager with responsibility for all computing operations.

In moving to Imnet, Castellano faced an uphill battle. Merrill Lynch's participation alienated its rival financial services companies, and Imnet sought to pioneer a system accessed by personal computers amid constant price erosion and technological change. While IBM and Merrill Lynch had the resources to make the venture fly, the two companies argued over strategic and technological direction, which led to Imnet's permanent grounding on New Year's Eve last year.

Not averse to risk, Castellano says he recognized the potential hazards of Imnet but felt the challenges of starting up a company were too great to ignore. "It was a very interesting experience, like a roller coaster ride," he says.

Bad news bearer

Castellano remembers last Christmas Eve, when he was told of the decision to abort Imnet. He spent a gut-wrenching week negotiating with Imnet's parents and devising a way to tell employees of their fates. On New Year's Eve he called the troops together for one last time, expecting the worst.

"He got applause and a standing ovation," recalls Shearson's Higgins. "Joe had always been exceedingly honest, and the 250 people at Imnet sensed it. He had negotiated a nice severance package and outplacement service for his people, and everyone was happy."

Castellano says he always tried to stay close to his Imnet employees, calling meetings with the entire company every six weeks to provide progess reports. Keeping his employees in-

JOHN CHIASSON/GAMMA LIAISON

Castellano *in his Manhattan office*

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formed helped build a rapport with them.

"When you build close relationships with people, you can get away with an awful lot," he says, reflecting on the response to the firm's closure.

At Drexel, ISD is doing an adequate job delivering information services to 10,000 employees, but some management pieces are missing, Castellano maintains. Drexel, a privately held, century-old firm, has traditionally operated in a freewheeling style, suitable to the frenetic pace of the investment banking business. Now, the company is adopting a more structured approach to conducting business, affecting the way it manages data processing.

"My job is to keep the entrepreneurial spirit and begin to manage data processsing as an entity that has 1,000 employees and has a large budget," he says. "My job is managing that transition from the rapid growth to a more mature environment where there will be pockets of rapid growth."

ISD employees view Castellano's arrival as the initial salvo in a campaign to manage the division by profit and loss. "In the past, the business was run as a service," says an ISD vice-president who requested anonymity. "People raised their hands for help on projects, and we hired programmers to make it happen."

Castellano views his primary challenges as eliminating redundancies and increasing productivity within the DP development staff. Drexel's traditional free-spirited approach to DP allowed a number of systems — particularly Digital Equipment Corp. VAXs and PC networks — to operate outside of MIS control. Castellano believes that critical systems functions must come under central control.

"That doesn't mean that occasionally, because business requires it, we can't loosen control and let people go out on their own," he says. "Eventually, things that run our day-to-day business have to run with regularity, and communications network and core systems that run the business should be under our control."

Making friends

Castellano says he hopes to gain influence over systems outside ISD's current sphere by making ISD more accessible to departments doing things on their own. "You get more by reaching out a hand to people and offering help than by making demands," he says. "The more you help, the more they will ask you to do."

When it comes to increasing productivity, Castellano sounds like a football coach on game day. Hard work, enthusiasm and esprit de corps will make the division more productive than any programming methodology, he claims. "There's tools and techniques, fourth-generation languages, data base managers: Yeah, we'll use that stuff, but that's not going to make the difference," he contends. "It's the people and how hard they work and what their attitude is and how well I can motivate them to do unusual things."

Castellano also believes in creating an ISD culture embodying a commitment to a quality process for developing systems, managing change and people and education.

He also expects to help improve productivity by modernizing ISD's existing computing architecture, data base structure and communications network. He likens Drexel's situation to a boomtown spreading over the horizon that has not built a proper infrastructure. "We need to get out ahead of the boom and put those facilities in place, because in the long run, those things will have a leveraging productivity effect," he says.

As the centerpiece of its modernization drive, the firm is relocating its primary data center to a new building in Weehawken, N.J., which Castellano expects to move into in April 1989.

A lot of little things

Its strategy also calls for evaluating existing technologies, such as IBM's data base mangement system, DB2, and finding ways to integrate them within the computing environment. "I always tell people that data processing is four-yards-and-a-cloud-of-dust business," Castellano says. "Once in a while you throw a long pass and someone catches it and you get lucky, but the business of running a DP organization is the process of doing a lot of little things correctly. Systems business is systematic, regular."

Castellano is getting good reviews for his willingness to listen and learn. "He's established an open door policy," the anonymous ISD vice-president says.

As he sees things now, Castellano emphasizes that, in contrast to that of retail-oriented Merrill Lynch, Drexel's architecture must suit its position as a leading institution-oriented investment banking and securities trading business.

"Drexel Burnham has a committment to technology, but not for technology's sake," he adds. "It doesn't have a burning desire to be a technology leader. It is driven by the quality of its people and their innovativeness in coming up with new methods of investments. Techoology supports it."

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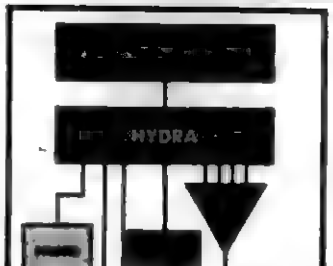

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Continued from page 109

4000 N.E. 41st St., Seattle, Wash. 98105.

Third Party Maintenance. San Francisco, Oct. 5-6 — Contact: Carol Every, Frost & Sullivan, Inc., 106 Fulton St., New York, N.Y. 10038.

Strategic Issues in Managing Information Technology. Boston, Oct. 5-7 — Contact: Decision Support Technology, Inc., Conference Registration Office, 51 Church St., Boston, Mass. 02116.

Comten Users' Exchange Fall Conference. Seattle, Oct. 5-9 — Contact: Dave Beran, CUE Coordinator, NCR Comten, 2700 Snelling Ave. N., St. Paul, Minn. 55113.

Third Annual PDOS Interest Group Conference. Boston, Oct. 5-9 — Contact: Connie T. Roberts, Eyring Research Institute, Inc., 1455 W. 820 St. N., Provo, Utah 84601.

Feedback '87, 12th Annual DSSD User's Conference. Kansas City, Mo., Oct. 6-8 — Contact: Data Systems Structured Development, Ken Orr & Associates, Inc., 1725 Gage Blvd., Topeka, Kan. 66604.

AVIOS '87 Conference. Alexandria, Va., Oct. 6-8 — Contact: Leon Lerman, American Voice Input/Output Society, P.O. Box 60940, Palo Alto, Calif. 94036.

Fall Meeting of the Life Insurance Systems Association. Indianapolis, Oct. 6-9 — Contact: Valerie K. Tamblyn, Life Insurance Systems Association, Indianapolis Life Insurance, P.O. Box 1230, Indianapolis, Ind. 46206.

Banyan User Group Meeting. Newport, R.I., Oct. 7-9 — Contact: Banyan Systems, Inc., 115 Flanders Road, Westboro, Mass. 01581.

Electronic Messaging '87. San Francisco, Oct. 6-9 — Contact: Electronic Mail Association, Suite 300, 1919 Pennsylvania Ave. N.W., Washington, D.C. 20006.

Fourth Annual Computer Graphics Workshop. Cambridge, Mass., Oct. 8-9 — Contact: Judy DesHarnais, Usenix Conference Office, P.O. Box 385, 16961 Pacific Coast Highway, Sunset Beach, Calif. 90742.

Ami Expo. New York, Oct. 10-12 — Contact: Ami Expo Headquarters, Suite 301, 211 E. 43rd St., New York, N.Y. 10017.

OCT. 11-17

Software Publishers Association's Third Annual Conference: Exploring New Frontiers in Software. Cambridge, Mass., Oct. 11-14 — Contact: SPA, Suite 901, 1101 Connecticut Ave. N.W., Washington, D.C. 20036.

Society for Information Management's 19th Annual Conference. Seattle, Oct. 11-15 — Contact: Kathleen Niles, SIM Headquarters, Suite 600, 111 E. Wacker Drive, Chicago, Ill. 60601.

Smart Card Applications and Technologies Conference. Atlantic City, Oct. 12-14 — Contact: The Information Exchange, Suite B, 15269 Mimosa, Dumfries, Va. 22026.

USE, Inc. Fall Conference (for Unisys Corp. Series 1100 users). Montreal, Oct. 12-16 — Contact: USE, Inc., Box 461, Bladensburg, Md. 20710.

Systems for Manufacturing Excellence '87. Long Beach, Calif., Oct. 12-16 — Contact: Society of Manufacturing Engineers, P.O. Box 930, One SME Drive, Dearborn, Mich. 48121.

Vax Users Show, Exposition and Conference. Dallas, Oct. 13-14 — Contact: The Producers, 360 Merrimack St., Lawrence, Mass. 01843.

Scan-Tech 87. Kansas City, Mo., Oct. 13-15 — Contact: Automatic Identification Manufacturers, Inc., 1326 Freeport Road, Pittsburgh, Pa. 15238.

Chem Com '87. New Orleans, Oct. 13-16 — Contact: Devon Buckler, The Synthetic Organic Chemical Manufacturers Association, Suite 300, 1330 Connecticut Ave. N.W., Washington, D.C. 20036.

System 3X Users Exposition and Conference. Atlanta, Oct. 14-15 — Contact: Systems 3X Users Show, The Producers, 360 Merrimack St., Lawrence, Mass. 01843.

Second National Conference on Building and Operating Defect-Free Software. San Francisco, Oct. 14-16 — Contact: Quality Assurance Institute, 9222 Bay Point Drive, Orlando, Fla. 32819.

Fifth Biennial IEEE Careers Conference: The Engineer's Life and Career in Today's World. San Diego, Oct. 14-16 — Contact: William R. Anderson, Institute of Electrical and Electronics Engineers, Suite 608, 1111 19th St. N.W., Washington, D.C. 20036.

Solutions for Today: TOP and GOSIP Profiles. Washington, D.C., Oct. 15-16 — Contact: Technical Activities Division, Society of Manufacturing Engineers, P.O. Box 930, One SME Drive, Dearborn, Mich. 48121.

Northeast Computer Faire. Boston, Oct. 15-17 — Contact: The Interface Group, Inc., 300 First Ave., Needham, Mass. 02194.

OCT. 18-24

Eastern Prime Users Group Conference. Philadelphia, Oct. 18-21 — Contact: Michael Muraca, c/o Eastern Prime Users Group, P.O. Box 3231, Boston, Mass. 02101.

International Data Corp. Fall Executive Conference — Systems Integration: The Business Challenge. Scottsdale, Ariz., Oct. 18-21 — Contact: IDC, 5 Speen St., Framingham, Mass. 01701.

Fourth Annual Nomad Users Conference. New Orleans, Oct. 18-22 — Contact: Must Software International, 187 Danbury Road, Wilton, Conn. 06897.

International Tandem Users' Group 1987 Fall Conference. New Orleans, Oct. 18-22 — Contact: ITUG, Suite 600, 111 E. Wacker Drive, Chicago, Ill. 60601.

Financial Times Annual Electronic Financial Services Conference. London, Oct. 19-20 — Contact: International Business Conferences and Seminars, Minster House, Arthur St., London, England EC4R 9AX.

Hammer Forum 87 — Strategic Information Systems: The Technological Dimension. Cambridge, Mass., Oct. 19-21 — Contact: Hammer Forum 87, 5 Cambridge Center, Cambridge, Mass. 02142.

Techconnect, The Wang Compatible Trade Show. Boston, Oct. 19-21 — Contact: Sandy Hoffman, Data Base Publications, Suite 385, 8310 Capital of Texas Highway, Austin, Texas 78731.

American Production and Inventory Control Society's 30th Annual Technical Exhibit. St. Louis, Oct. 19-22 — Contact: Stephanie Becker, APICS Technical Exhibit, P.O. Box 11480, Alexandria, Va. 22312.

CASExpo, The National Computer Aided Software Engineering Conference and Exposition. Washington, D.C., Oct. 19-22 — Contact: Hank Bowman, CASExpo, 3025-I S. George Mason Drive, Falls Church, Va. 22041.

14th Annual Conference of the North American Data General Users Group. Las Vegas, Oct. 19-22 — Contact: NADGUG, MS C-228, 4400 Computer Drive, Westboro, Mass. 01580.

The Third Annual Expert Systems in Government Conference. Washington, D.C., Oct. 19-23 — Contact: The Computer Society of the Institute of Electrical and Electronics Engineers, 1730 Massachusetts Ave. N.W., Washington, D.C. 20036.

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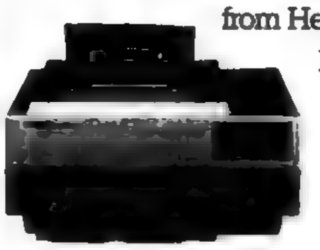

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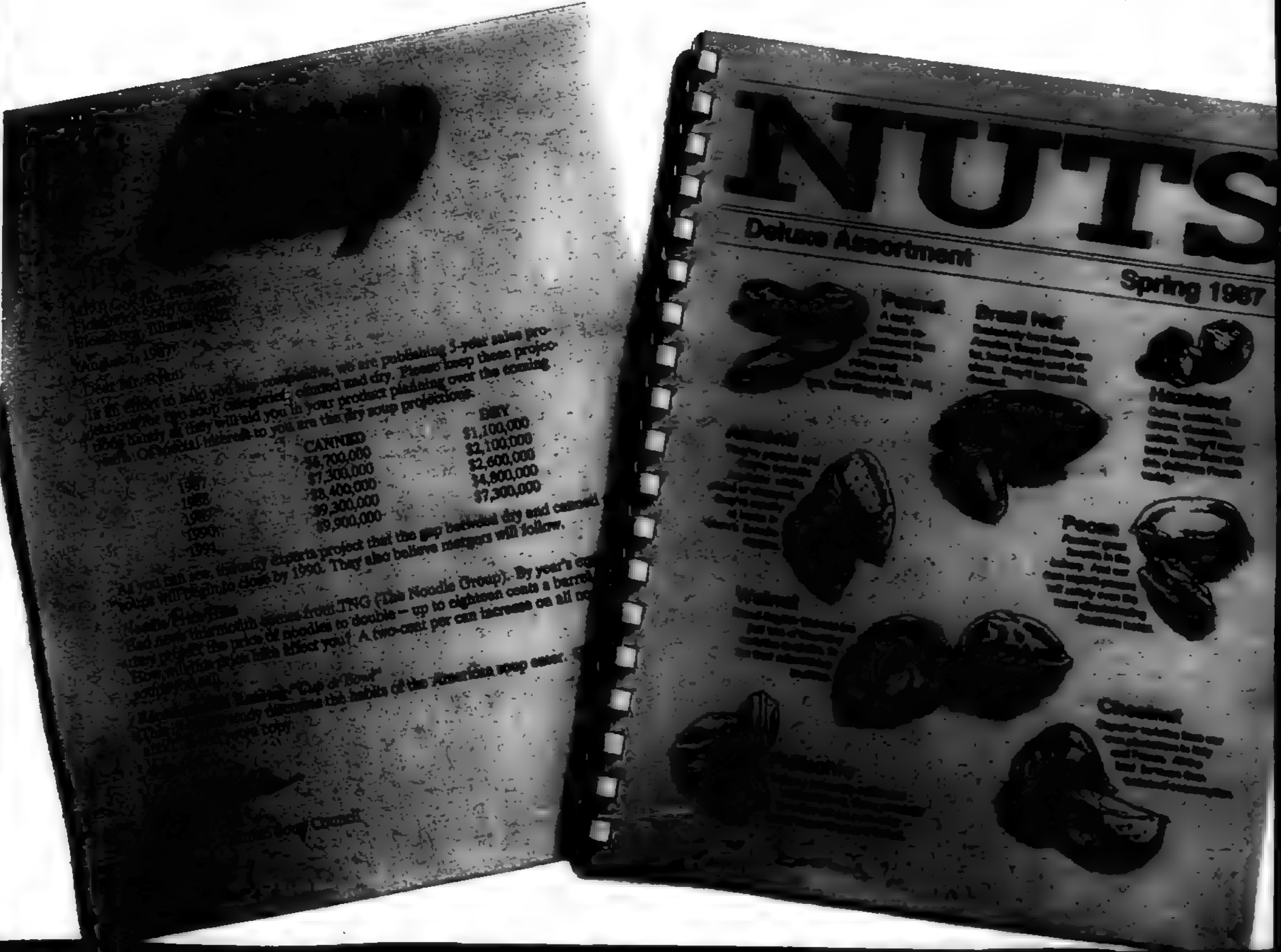

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LOCAL HAPPENINGS

NORTHEAST

Newton, Mass., Oct. 14. Society for Information Management, Boston Chapter. Monthly meeting. Newton Marriott. Contact: SIM, P.O. Box 116, Newton Lower Falls, Mass. 02162.

Boston, Oct. 16. Society for the Management of Professional Computing. Monthly meeting. Anthony's Pier 4 Restaurant. 11:30 a.m. Contact: SMPC, 715 Boylston St., Boston, Mass. 02116.

New York, Oct. 14. Data Processing Management Association (DPMA) Financial Industries Chapter. Principles of Project Management, with Thomas E. Conlon of Sherwood Securities Corp. Harry's of the American Exchange, 113 Greenwich St. 6:30 p.m. Contact: Dick Lefkon, DPMA, P.O. Box 894, Wall Street Station, New York, N.Y. 10005.

New York, Oct. 14. Association for Women in Computing, New York Chapter. Annual Fall Reception. Contact: AWC, P.O. Box 2293, Grand Central Station, New York, N.Y., 10163.

Harrisburg, Pa., Oct. 14. Association for Systems Management (ASM), Central Pennsylvania Chapter. Tour of Harrisburg DP center. City Hall. 7 p.m. Contact: Mark Anderson, 809 Acri Road, Mechanicsburg, Pa. 17055.

SOUTHEAST

Columbia, S.C., Oct. 1. ASM, Midlands Chapter. Student Night. Quality Inn, Interstate 20 and Broad River Road. 5 p.m. Contact: George P. Haybee, 118 Park Ave. S.E., Aiken, S.C. 29801.

Chamblee, Ga., Oct. 13. ASM, Atlanta Chapter. Robotics: Today and Tomorrow, with Les Ottinger of Advanced Manufacturing Systems, Inc. Holiday Inn Chamblee-Dunwoody, 4386 Chamblee-Dunwoody Road. Contact: Jane Roberts, HBO & Co., 1 Ravinia Drive, Atlanta, Ga. [illegible]

Charlotte, N.C., Oct. 15. ASM, Queen City Chapter. Productivity in Systems Development, with Olin Broadway of Broadway & Seymour. Comeco Steak House, 5100 E. Independence Blvd. 6 p.m. Contact: Robert Yearwood, Metro Information Services, Suite 140, 7 Parkway Plaza, Charlotte, N.C. 28217.

MIDWEST

Cleveland, Sept. 30. DPMA, Cleveland Chapter. Feagler's View of the World, with Dick Feagler. Harley House Hotel, Rockside Road and I-77. 6:30 p.m. Contact: DPMA, P.O. 6772, Cleveland, Ohio 44101.

Lafayette, Ind., Oct. 8. DPMA, Sagamore Chapter. Career Planning for a Lifetime, with Terry Phillips. Judith Panter Catering, 101 Plaza Lane. 5:30 p.m. Contact: Joan Vaughan, MIS department, Aluminum Co. of America, Box 7500, Lafayette, Ind. 47902.

Toledo, Ohio, Oct. 14. ASM, Toledo Chapter. Selling Ideas and Change to Management, with Ken J. Shoe of Executive Support Systems. Heatherdowns Country Club. 5:30 p.m. Contact: Dale R. Briggs, Computer Services, Marathon Oil Co., 539 S. Main St., Findlay, Ohio 45840.

WEST

Sacramento, Calif., Sept. 24. ASM, Sacramento Chapter. Growth of High Tech in the Sacramento Area, with Assemblyman Tim Leslie (R-Carmichael). Clarion Hotel, 16th and H Streets 6 p.m. Contact: Mike Blank, P.O. Box 13035, Sacramento, Calif. 95854.

Walnut Creek, Calif., Oct. 21. ASM, East Bay Chapter. Monthly meeting. Contact: ASM, 32 Robert Road, Orinda, Calif. 94563.

El Paso, Texas, Oct. 22. DPMA, El Paso Chapter. Disaster Recovery (Bosses Night). International Club, Mbank Tower. 5:30 p.m. Contact: Steve Tarro, Las Cruces, N.M.

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Leadership

CONTINUED FROM PAGE 107

tion, the one with the highest rating — topping concern with salary — was variety of responsibilities. The message is that MIS jocks will be particularly responsive to managers who recognize and satisfy this natural urge for variety.

Third on the list, following salary, was opportunity for advancement. Buttressing this response was the finding that only 12% of those surveyed expect to be in the same job in three years.

This concern with career advancement is one that progressive managers are increasingly recognizing and addressing through formal career development plans, such as the one recently implemented for DP workers at Pacific Bell.

Following the ubiquitous concern with work load, and rounding out the five satisfaction factors that survey respondents rated somewhere between important and very important, was nonmonetary recognition.

"A pat on the back is better than a raise for some people," one MIS director said, reflecting the yearning of many workers for explicit, personal recognition. Another respondent, a systems analyst at a hospital, said one thing he likes about his job is the knowledge that he is enhancing medical services. Workers' craving for this sense of purpose is another need that leaders can recognize and team with their own goals.

While the leadership of the founding fathers at the Constitutional Convention has been getting a lot of attention lately, MIS managers can look closer to home for examples, too. In Boston last week, one example could be found in Digital Equipment Corp.'s gargantuan Decworld.

Sensitivity to employees' needs seems to have played a significant role in the success of DEC founder Kenneth H. Olsen, to judge by the commencement address he delivered at MIT earlier this year. "I would also suggest that one of the most satisfying things is to help others to be creative, to take responsibility, to be challenged in their jobs," Olsen said.

He added that when he retires, he hopes colleagues will remember him as someone who challenged them, spurred their creativity and encouraged them to enjoy their work. MIS managers could do worse than emulating Olsen's attitude, and a lot worse than his organization has done lately.

Ludlum is *Computerworld's* senior editor, management.

COMPUTER INDUSTRY

INDUSTRY INSIGHT

Clinton Wilder

A maverick remembered

Because of the intangible nature of its products, the software and services industry has always been more volatile than most. For its customers, investors and participants, it is often difficult to get a clear picture of precisely what is happening amidst all the buzzwords. Thus, a well-informed, truly independent observer of the industry can help us all sort things out.

Nine days ago, the industry lost one of its most independent, straight-shooting observers. Tom Lawton's death at the much-too-young age of 52 deprives the industry of a unique maverick, one who liked nothing better than cutting through hype to get at the truth behind a merger, a technology trend or a major executive change.

Lawton had published the monthly "Computer Services Report" newsletter from his Belmont, Mass., home since 1981. Tracking financial performances, key industry news events and interesting rumors, the red-bordered newsletter developed a strong following among many chief executives and other software movers and shakers.

Lawton's style, both in his writing and in person, was unmistakable. He left many a CEO stammering to answer a pointed question at an ADAPSO session or irate after reading a biting Lawton quote in *Computerworld* or another trade publication. Yet I suspect those CEOs are among those who will miss him the most.

Tom was particularly cynical about the merger mania sweeping the industry in recent years. While some companies and deal makers never met an acquisition they didn't like, Tom openly questioned the wisdom of many mergers for users and investors alike. He wasn't always right, but he always reminded everyone that you need a lot more to make an acquisition truly work than a lucrative stock swap and a smiling handshake.

He spoke from personal ex-

Continued on page 118

Televideo leaves 'em at altar

Zentec latest to be stood up by picky suitor that needs a partner to grow

BY JULIE PITTA
CW STAFF

SUNNYVALE, Calif. — Looking to resuscitate its flagging sales, Televideo Systems, Inc. has spent the last two years looking for a suitable acquisition. But Televideo has been a fickle suitor, courting a number of partners only to back out before any relationship could be solidified.

After making its name in the VDT market, Televideo has recently flirted with the market for low-end systems — with mixed results at best.

It made a disastrous foray into the retail IBM Personal Computer-compatible market, tried an unsuccessful attempt to privately label its microcomputers to OEMs and, most recently, launched an entry among Intel Corp. 80386-based Unix workstations.

K. Philip Hwang

"The engineering workstation is a good extension of their technology," said Michael Murphy, editor of the "California Technology Stock Letter." "But it's hard for a company the size of Televideo to maintain their current sales levels, and even add a little momentum, with a single product. It will probably be enough to keep their sales from falling any further, but they need an acquisition to grow."

Santa Clara, Calif.-based terminal manufacturer Zentec Corp. found itself the most recent victim of Televideo's inconstant affections. After signing a letter of intent last month, Televideo and Zentec severed their negotiations, both sides saying

Continued on page 124

MCC tries conductor research

BY JAMES A. MARTIN
CW STAFF

AUSTIN, Texas — Microelectronics and Computer Technology Corp. (MCC) recently announced the creation of a program focusing on the development of a variety of applications using high-temperature superconductors.

The superconductor program marks the first time the MCC research consortium has opened its programs to companies that are not current members of MCC. Shareholders and outside concerns will pay $100,000 to participate; nonshareholders will pay an additional $25,000 a year.

MCC's program will focus on bolstering American industry's efforts in developing applications around the advanced technology after superconductor materials are developed. The program announcement came shortly after Japan's Ministry of International Trade and Industry said it is seeking $22 million for superconductor research next year [CW, Sept. 7].

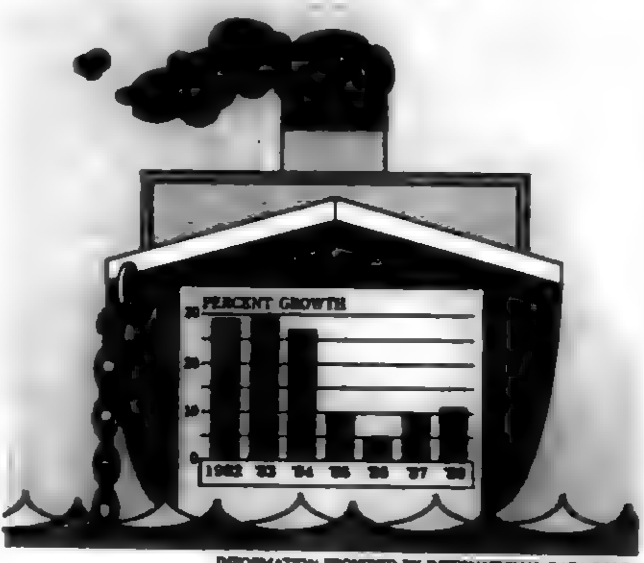
"MCC seems to be right on schedule, but there's not a moment to lose," said Sheridan Tatsuno, a semiconductor and superconductor research analyst

Continued on page 119

Data View

Industry growth on slow but steady course

Annual growth rate of worldwide computer shipment value for U.S.-based hardware vendors



INFORMATION PROVIDED BY INTERNATIONAL DATA CORP.
CW CHART: MITCHELL J. HAYES

National Semi earns $13M

BY JAMES A. MARTIN
CW STAFF

SANTA CLARA, Calif. — Continuing its profitable rebound, National Semiconductor Corp. last week announced net income for the first quarter 1988 of $13 million, or 10 cents per share, compared with a year-earlier loss of $1.4 million, or 4 cents per share. Revenue for the quarter was $517.6 million, compared with $501.1 million for the same period last year.

The net income included a $1.5 million extraordinary tax credit from operating loss carryforwards.

Beginning with the 1988 fiscal year, National Semi adopted a 52-week fiscal year in order to

Continued on page 119

Inside

- 3Com, Novell report strong earnings. Page 118.
- Asian countries lay groundwork for establishing ISDN compatibility. Page 119.

Japanese firms team up, standardize AT clone

BY LORI VALIGRA
IDG NEWS SERVICE

TOKYO — Fourteen Japanese computer and software companies announced last week that they are developing a set of common specifications from which to produce IBM Personal Computer AT-compatible computers in Japan.

The effort, spearheaded by Microsoft Japan and joined by Mitsubishi Electric Corp., Sanyo Electric Co., Sharp Corp. and others, is intended to produce an AT-compatible called the AX that can run both English-language software for the AT and some specially translated Japanese software.

Final specifications will reportedly be available before the end of the year.

According to Microsoft Japan spokesman Tetsu Etoh, the manufacturers realized that if each sought to make an AT compatible independently, the result would be a group of incompatible compatibles that would not be able to chip away at Japanese market leader NEC Corp.

NEC holds a 50% share of the Japanese personal computer market and an 80% share of the business portion of that market. Its PC-9800 business computer dominates the market, boasting more than one million installations.

Laptop looms

Mitsubishi said it plans to release a laptop version of the AX early next year. Etoh said it will likely compete with the Japanese laptop that IBM Japan Ltd. unveiled earlier this week.

The AX effort follows a similar cooperation by some of the same companies several years ago to produce home computers containing common read-only memory (ROM) software but retain slightly different hardware features to distinguish each manufacturer's product.

That effort, called MSX, was also started by Microsoft but has since been taken over by its former Japanese partner, ASCII Corp. The MSX effort was not as successful as initially hoped, partly because the ROM software made the system somewhat inflexible, industry analysts said.

3Com, Novell boast strong quarters

BY STEPHEN JONES
CW STAFF

SAN FRANCISCO — Stoking enthusiasm over its imminent merger with Bridge Communications, Inc., 3Com Corp. last week reported record quarterly revenue of $33.1 million and discussed upcoming strategies for the combined company with investors here.

While analysts said the gains are impressive, 3Com was unable to get a leg up on longtime rival Novell, Inc., which also reported strong quarterly results.

Santa Clara, Calif.-based 3Com said revenue jumped 66% for the quarter ended Aug. 31 when compared with the same period a year ago. 3Com's net income was estimated at 22 cents per share, up 57% from the 14 cents reported last year.

The approximated numbers were released early so 3Com officials could discuss the company's performance with analysts and investors at a series of receptions held across the country. Complete financial results are expected this week.

Provo, Utah-based Novell saw its sales soar 87% for the third quarter ended Aug. 1, from $26 million in 1986 to $48.7 million this year.

Net income rose from $2.8 million, or 11 cents per share, to $5.3 million, or 20 cents per share.

Richard Kimball, an analyst with Montgomery Securities in San Francisco, attributed 3Com's growth to accelerated orders throughout the quarter for such products as 3+, 3Com's network operating software. He said that customers have been very receptive to new products, including a version of 3+ for the Apple Computer, Inc. Macintosh.

Bill Krause, 3Com's president and chief executive officer, noted that the revenue gap between 3Com and Novell will be narrowed once the Bridge merger is complete. "With the combined company, we'll have the largest independent networking company," Krause said.

He estimated that the two companies have a total of 10,000 customers, with 28,000 servers and 36,000 networks installed worldwide.

Under the agreement, which is pending approval from the shareholders of each company at the end of this month, Bridge will become a subsidiary of 3Com. Krause said he will focus on external issues as chief executive and chairman, while Bridge President William Carrico will be responsible for day-to-day management as president and chief operating officer.

To build on the merged company's base, Carrico said 3Com will roll out 18 major products by next May, with 10 coming from 3Com and eight from Bridge.

Carrico also discussed a plan to prevent infighting between Bridge sales personnel and 3Com dealers who might end up competing for the same customer. The policy would provide compensation to any sales representative who passes a customer lead along to the proper individual.

"Nobody wants to get cut out of sales," Carrico said. "This is something that will help the dealers and direct salespeople feel good about the merger."

A maverick

CONTINUED FROM PAGE 117

perience, having been in charge of mergers and acquisitions at Computing and Software, Inc. and Keane, Inc. in the 1970s.

And he had worked on the user side as well, with programming and systems development stints at Westinghouse, what was then Sylvania and RCA in the early 1960s.

Tom's physical presence will be especially missed at the various ADAPSO meetings, where he was a fixture for many years.

A welcome part of the scene

Whether keeping vendor executives honest at a press conference or holding court with journalists over a Budweiser in the evening, Tom had been as much a part of the ADAPSO scene as John Imlay's stand-up comedy or Bernie Goldstein's memorable speeches.

Although Tom was known for his cynical exterior, he truly enjoyed the industry and the people in it. His year-end poems in the "Computer Services Report," in which he wove executives' names cleverly into lighthearted rhyming verse, were a testament to that.

Tom and his writing will be missed by a lot of software and services people for a lot of reasons. As a journalist writing for the MIS community, I will miss his ability to size up situations in which the vendors are not always serving their users' best interests.

If there was one thing a reporter could count on from Tom Lawton, it was a truly independent opinion delivered in a refreshing, down-to-earth style. In covering the ever-changing world of software and services, that will be hard to replace.

Wilder is *Computerworld's* senior editor, computer industry.

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Asian telecom reps meet, aim to ensure compatible ISDN standards

BY LORI VALIGRA
IDG NEWS SERVICE

TOKYO — Telecommunications representatives from several Asian countries met here recently to plan a cooperative effort to ensure compatibility among evolving integrated services digital networks (ISDN).

ISDN is regarded by these countries as critical to their economic and technological progress. The nations included Japan, South Korea, Malaysia and Singapore as well as Thailand.

South Korea, in particular, pegs telecommunications as a key stimulant to economic growth, noted Chang Kon Kim of Korea's Ministry of Communications' Telecommunications Policy Bureau. Kim said South Korea is in the initial phase of constructing an integrated digital network, which should be evolved into an ISDN by 1992.

From 1992 to 1996, the ISDN will be rolled out as a pilot experiment in major cities. It will then be commercialised and connected to existing networks developed between now and 1991. From 1997 to 2001, the ISDN will be expanded with more services.

Japan leads the way

Japan is perhaps the farthest along in its ISDN effort, having already concluded a trial, and is set to offer all-digital ISDN services next spring via a Nippon Telegraph & Telephone network. Japanese telecommunications groups have also said they plan to propose an ISDN standard to the International Telegraph and Telephone Consultative Committee late this year.

Malaysia also wants to add ISDN features to its telecommunications network, but the project will take at least five years, according to Mohamed A. B. Yusoff, director general of Japatan Telekom Malaysia.

Lim Sae Thye, divisional manager of Information Communication Network Development at the Telecommunication Authority of Singapore, said that while Singapore Telecom will continue to digitise its existing network, the long-term view is to offer all services from a future ISDN.

Singapore already held a pre-ISDN trial test using 320,000 digital switching lines from Fujitsu Ltd.

The extent of the Asian cooperation and the possible establishment of a committee for joint ISDN study will be voted on by participating countries in early October.

National Semi

CONTINUED FROM PAGE 117

have four equal quarters of 13 weeks. As a result, the first 1988 quarter was shorter than the same quarter a year earlier, although revenue and orders increased slightly.

National Semi's revenue and income were close to analysts' expectations. "It was a reasonably good quarter, especially since it coincided with the slower summer months," said Edward C. White Jr., a semiconductor analyst with E. F. Hutton & Co. in New York.

National Semi's performance "sets the stage for further growth down the line," White added. National Semi is expected to remain profitable, although the recent Fairchild Semiconductor Corp. acquisition will have a negative impact on its income during the next two quarters.

Fairchild agreed to be acquired by National for $122 million in stocks and warrants earlier this month [CW, Sept. 7]. The acquisition is expected to catapult National Semi into the No. 3 position in the U.S. semiconductor industry.

MCC

CONTINUED FROM PAGE 117

at Dataquest, Inc. in San Jose, Calif. "The Japanese seem to be behind us now, but that might be short-lived."

Research and development agreements are scheduled to be signed Oct. 15 between MCC and technology companies interested in joining the MCC superconductor program. MCC spokesman Bill Stotesbery said that a significant number of current MCC shareholders have expressed interest in the program, but he would not elaborate.

MCC shareholders include Advanced Micro Devices, Inc., Digital Equipment Corp., Hewlett-Packard Co., Control Data Corp. and National Semiconductor Corp.

Absent from the list is IBM, which is not an MCC shareholder and is not expected to join the program because of its own large-scale research efforts in superconductor technology.

Initial research is scheduled to begin in November.

The program is the first addition to MCC's stable of research areas, which include computer-aided design for very large-scale integration, software, semiconductor packaging and integration and advanced computer architectures.

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NICKELS & DIMES

American Software, Inc. announced revenue for the first quarter ended July 31 of $11.2 million, compared with $10 million in the previous year. Profits were $1.3 million, or 12 cents per share, compared with $1.7 million, or 16 cents per share, in the like quarter a year ago.

Intelogic Trace, Inc. announced net earnings of $3.1 million, or 21 cents per share, on revenue of $32.5 million for the fourth quarter ended July 25. This compares with net income of $4.4 million, or 26 cents per share, on revenue of $36.7 million reported in the previous year.

For the year, revenue was $134.5 million, compared with $155.8 million in the previous year. Profits were $8.6 million, or 54 cents per share, compared with $20 million, or $1.10 per share, in the comparable period a year ago.

MacNeal-Schwendler Corp. reported revenue for the second quarter ended July 31 of $16.3 million, compared with $12.7 million a year ago. Profits were $4.2 million, or 34 cents per share, compared with $3.3 million, or 27 cents per share, a year ago.

Concurrent Computer Corp. announced net income for the fourth quarter ended July 31 of $3.2 million, or 28 cents per share, compared with $1.1 million, or 10 cents per share, a year ago. Revenue was $68.6 million, compared with $55.8 million reported for the same period a year ago.

Net income for the year was $7.9 million, or 69 cents per share, compared with $6.1 million, or 58 cents per share, one year ago. Revenue for the year was $247.8 million, compared with $244.8 million reported in the previous year.

The Meridian Group announced pretax earnings of $11.2 million for the year ended May 31, a 24.3% increase over 1986 performance. Net earnings were off only 22%, to $5 million, despite a reported 93% increase in the company's tax provision, due largely to the repeal of the investment tax credit. Total fiscal 1987 revenue declined to $139.8 million from $141.7 million in 1986.

Corvus Systems, Inc. announced revenue for the past year of $36.1 million, compared with $42.1 million in the previous year. A net loss of $19.8 million, or 67 cents per share, was reported for the year, compared with a net loss of $32.4 million, or $1.15 per share, a year ago.

For the fourth quarter ended May 31, Corvus reported revenue of $7.3 million, compared with $11.4 million in the like quarter a year ago. Net loss was $10.5 million, or 36 cents per share, compared with a loss of $2.7 million, or 9 cents per share, for the like period last year.

Mohawk Data Sciences Corp. announced net income for the first quarter ended July 31 of $2 million, or 12 cents per share, compared with $1.8 million, or 11 cents per share, for the same period last year. Revenue was $20.5 million, compared with $24 million in the previous year.

System Industries, Inc. announced revenue for the year ended July 26 of $119.5 million, compared with $103.3 million a year ago. Profits were $5.2 million, or $1.12 per share, compared with $4.1 million, or 91 cents per share, in the previous year.

Televideo Systems, Inc. reported revenue for the third quarter ended July 31 of $19.1 million, compared with $25 million a year ago. The company reported a net loss of $2.5 million, or 6 cents per share, compared with a net loss of $689,000, or 2 cents per share, in the previous year.

Teknowledge, Inc. announced revenue for the year ended June 30 of $20.5 million, a 40% increase over the $14.6 million reported last year. The company reported a net loss of $2.8 million, or 39 cents per share, compared with net income of $669,000, or 13 cents per share, a year ago.

For the fourth quarter, revenue was $5 million, compared with $4.3 million a year ago. Net loss was $2.9 million, or 41 cents per share, compared with a net loss of $310,000, or 5 cents per share, in the like period a year ago.

Anacomp, Inc. announced revenue for the third quarter ended June 30 of $108.6 million, compared with $27.4 million in the previous year. Profits were $8.4 million, or 23 cents per share, compared with $404,000, or 1 cent per share, in the like period a year ago.

PDA Engineering announced revenue for the year ended June 30 of $21.7 million, compared with $17.4 million a year ago. Profits were $321,000, or 8 cents per share, compared with $1.4 million, or 36 cents per share, last year.

For the fourth quarter, revenue was $5.6 million, compared with $4.5 million a year ago. The company reported a net loss of $489,000, or 13 cents per share, compared with net income of $265,000, or 7 cents per share, reported in the previous year.

Encore Computer Corp. reported revenue for the third quarter ended July 25 of $3.6 million, a 165% increase over the

Continued on page 124

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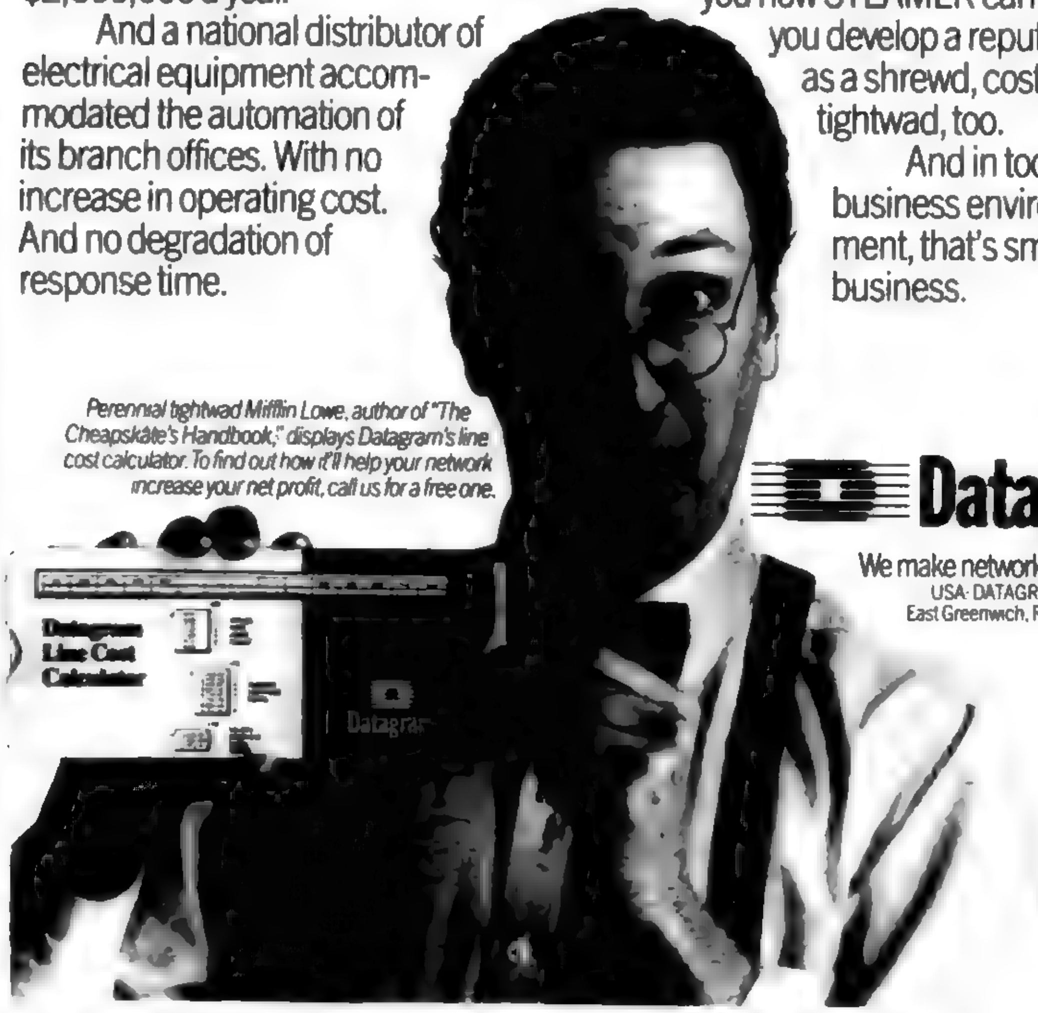

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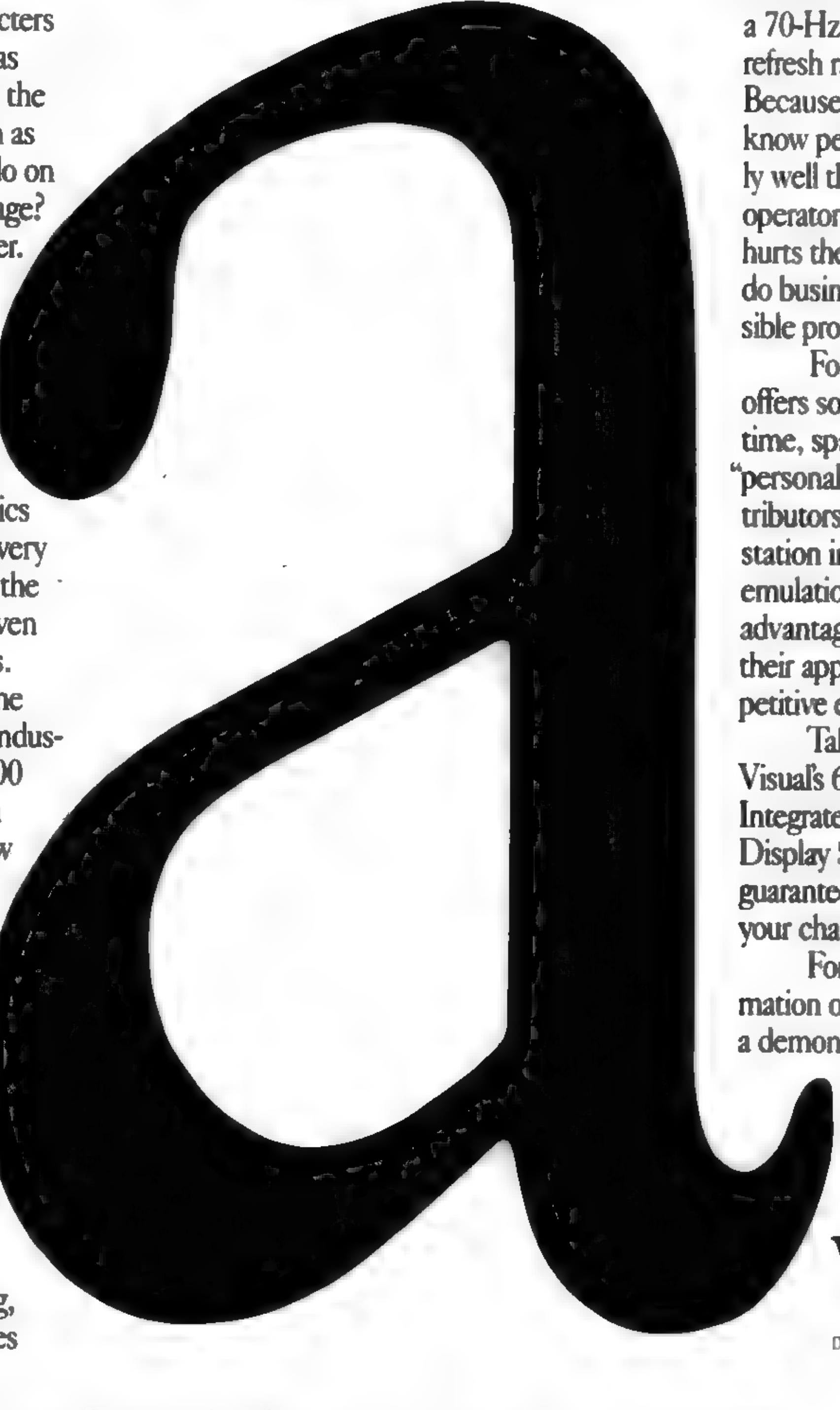

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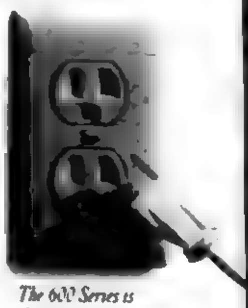

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Televideo

CONTINUED FROM PAGE 117

the marriage would not be in the best interest of their respective companies.

According to sources close to the negotiations, it was the issue of who would assume the chief executive's title — Televideo Chairman and Chief Executive Officer K. Phillip Hwang or Zentec President and CEO William D. Parker — that finally tore the prospective merger apart.

The merger with Zentec would have updated Televideo's VDT line as well as brought it a number of OEM accounts. Televideo, which sells most of its low-end systems and terminals through distributors, has been largely unsuccessful in penetrating the OEM market with either terminals or microcomputers, while two-thirds of Zentec's sales have been to OEMs.

"Zentec would have been neat if they could have pulled it off," Murphy said. "It certainly made sense from a product point of view and a distribution point of view, and it would have brought them management. Televideo needs management."

In a recent interview, Hwang attributed Televideo's inability to find a major acquisition to a lack of good candidates. Of Zentec, he said, "The idea was good, but there were some differences in management."

However, observers said that Hwang's hands-on management style has proven an obstacle to a corporate partnership and has resulted in a number of management defections. Hwang owns more than two-thirds of Televideo's common stock. "Phil Hwang needs to be persuaded to give up some control," Murphy said. "That's always been the problem."

Hwang dismissed any charges that Televideo has suffered from management departures. "Every company has management changes, but because we haven't done well for the last three or four years, people focus on them," he said.

Televideo's failed courtship of Zentec is not the first time Televideo followers have been disappointed. Last year, the firm signed a letter of intent to acquire Alpha Microsystems, Inc. in Irvine, Calif., a manufacturer of low-end systems sold primarily to value-added resellers.

Almost a month after the letter of intent was signed, Televideo pulled out of the deal. At the same time, the company's board of directors resigned and Televideo Chief Operating Officer Howard Oringer, an advocate of the acquisition, was demoted.

A corporate priority

Hwang insisted that finding a suitable acquisition is a priority for Televideo.

"There are some areas that we'd like to get into during the next year that we don't have in-house," he explained. "They would require acquisitions. But first, we need to define which businesses we want to focus on. We have terminals, but maybe we need to update our products through an acquisition. We're in the file server business, but we're not as competitive as, let's say, Novell, so maybe we need to acquire a network company."

Cash-rich Televideo — it has about $65 million in reserves — has been successful in making minor equity investments. Earlier this year, the company purchased a 51% stake in Delta Data Systems Corp., a manufacturer of Tempest-standard systems for the government market. Last year, it purchased a minority interest in Unix developer Microport Systems, Inc.

However, industry analysts agreed that those investments are not enough to revive sales. In its third quarter ended July 31, Televideo reported a $2.5 million loss on sales of $19.1 million, representing a steady decline in revenue.

"They have so much cash that they're going to be around for a long time," said Joel Hausman, industry analyst for Robertson, Colman and Stephens. "But they need to do something with that cash, and chances are it will be an acquisition that would give them different products and different distribution channels and be large enough to enable them to leverage their Far Eastern manufacturing ability."

Nickels

CONTINUED FROM PAGE 120

$1.3 million reported for the like period last year. The company reported a net loss of $2.5 million, or 11 cents per share, compared with a net loss of $2.6 million, or 12 cents per share, in the comparable period a year ago.

Network Systems Corp. announced net income for the second quarter ended June 30 of $4.9 million, or 17 cents per share, compared with $3.8 million, or 13 cents per share, in the same period last year. Revenue was $30.6 million, compared with $26.1 million last year.

Archive Corp. reported net income of $2 million, or 18 cents per share, for the third quarter, compared with net income of $430,000, or 4 cents per share, in the like quarter last year. Revenue was $24.4 million, compared with $19.3 million for the like period last year.

Cipher Data Products, Inc. announced revenue for the fourth quarter ended June 30 of $42.2 million, compared with $50.6 million in the previous year. Profits were $1 million, or 7 cents per share, compared with $3.8 million, or 26 cents per share, in the previous year. For the year, the company reported revenue of $178.2 million.

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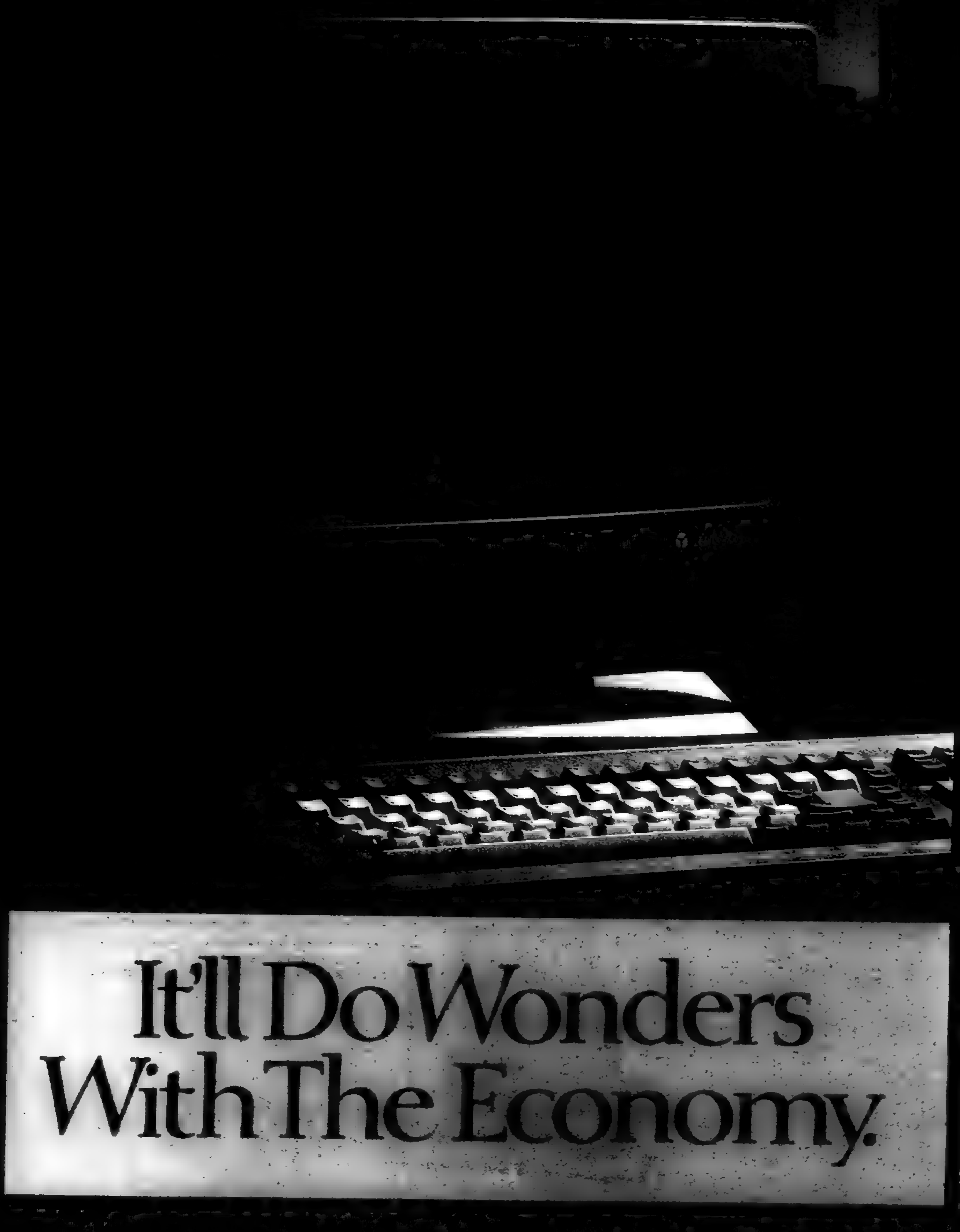
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EXECUTIVE CORNER

Hercules Computer Technology, Inc., a manufacturer of graphics cards for the IBM Personal Computer and Personal System/2 lines, announced the appointment of **Jim Harris** as company president and chief executive officer.

Harris has served as a business consultant for Hercules since the company's inception five years ago.

Lee Data Corp. announced that **Robert D. Gordon** has joined the company as senior vice-president and chief financial officer, with overall responsibility for finance, accounting, information services and customer administration.

He succeeds **Duane S. Carlson**, who remains executive vice-president and a member of Lee Data's board of directors.

Gordon joins Lee Data from First Bank System, Inc., where he was executive vice-president and managing director for corporate banking.

Planning Research Corp. (PRC), a wholly owned subsidiary of Emhart Corp., announced that U.S. Undersecretary of Commerce **Anthony J. Calio** has been appointed senior vice-president for management and operations, effective this month.

In the newly created position, Calio will assist PRC President **Wayne Shelton** with the management of corporate functions and activities, oversight of government operations and support and coordination of the firm's government activities.

The company also announced the appointment of **Francesco A. Calabrese** as a senior vice-president of PRC and president of PRC Government Information Systems.

Scientific Computer Systems has named **Jack W. Hugus** chairman of the board in addition to his responsibilities as chief executive officer.

Hugus joined the company in October 1985 as president and chief operating officer and was named chief executive officer in March.

Applitek Corp. announced the election of **Larry H. Holswade** as president and chief executive officer. **Ashraf M. Dahod**, founder of the company, remains on Applitek's board of directors.

Holswade formerly served as vice-president and general manager of Data General Corp.'s Federal Systems Division.

Fibercom, Inc. has appointed **Richard Popp** president and chief executive officer. Before joining Fibercom, Popp was with Paradyne Corp. of Largo, Fla., for 5½ years, most recently as corporate vice-president for product development.

Summa Four, Inc. announced the appointment of **Barry R. Gorsun** to the position of executive vice-president and chief operating officer. In this newly created position, Gorsun is responsible for the day-to-day management of the firm's Business Products and Network Systems operations.

Control Data Corp. has promoted **Kenneth E. Hendrickson** to the position of vice-president of the Large Disk Division in the Data Storage Products Group. He previously served as vice-president of engineering for the same division.

Before joining CDC in March, Hendrickson was responsible for several disk drive functions at IBM, including the low-end storage independent business unit, which developed and manufactured the 5¼-in. file for IBM's Personal Computer AT, and the 8- and 14-in. manufacturing programs at IBM's Rochester, Minn., facility.

Monte D. Lien has been appointed vice-president of research and development for DSC Nestar Systems, Inc., a member of the Business Network Systems Group of DSC Communications Corp. Lien will oversee three product development groups: hardware engineering, software engineering and engineering support.

Prior to joining DSC Nestar, Lien was director of software development for AIT, Inc., a performance CPU and computer systems builder. Previously, he served as director of advanced development for Bridge Communications, Inc.

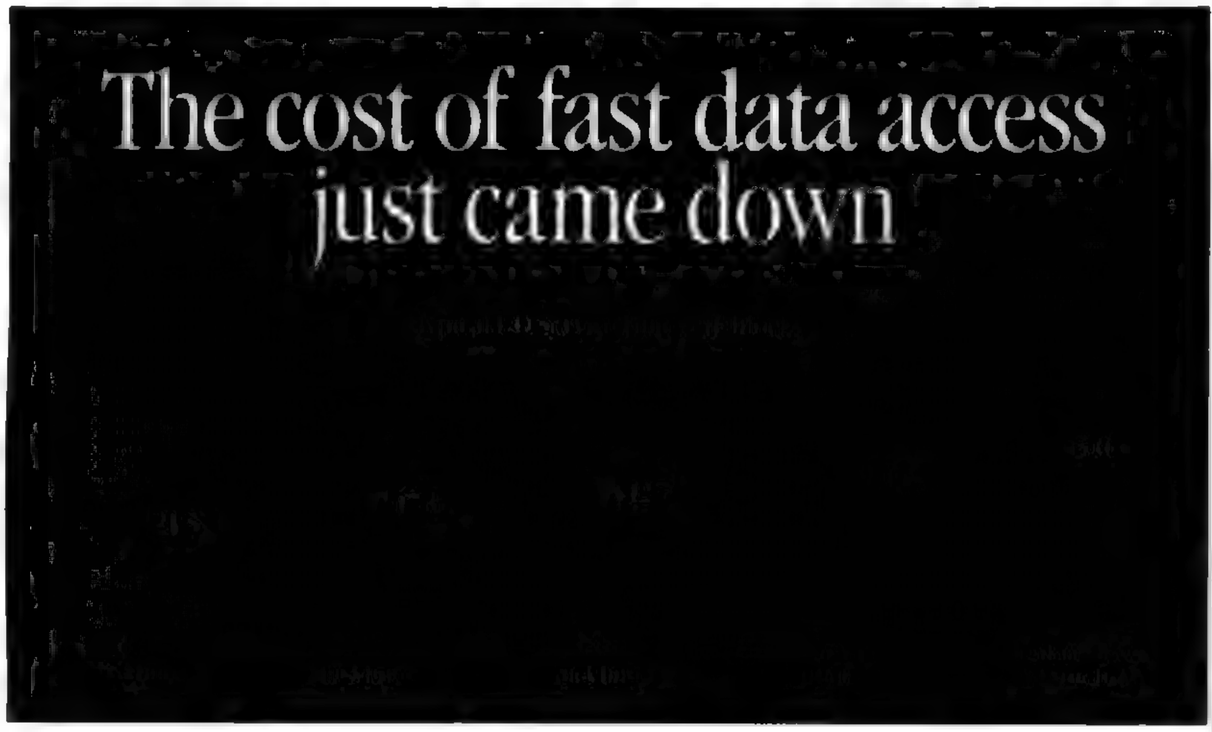
Apollo Computer, Inc. has appointed **William J. Cunningham** to the position of vice-president and general manager of manufacturing.

Cunningham joined Apollo from Honeywell Bull, Inc. in Billerica, Mass., where he was vice-president of U.S. manufacturing and product operations.

Alliant Computer Systems Corp. announced the appointment of **John M. Harte** as president of European operations. Harte most recently held the post of vice-president of worldwide sales, service and marketing at Floating Point Systems, Inc.

Ungermann-Bass, Inc. has promoted **Gary A. Wetsel**, vice-president of finance, to the post of vice-president and chief financial and administrative officer.

Wetsel replaces **Robert K. Dahl**, who resigned from his day-to-day management responsibilities at Ungermann-Bass. Dahl will continue to serve as a member of the company's board of directors.



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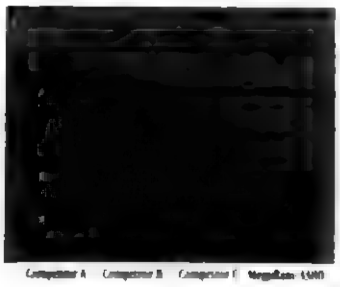

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SPOTLIGHT

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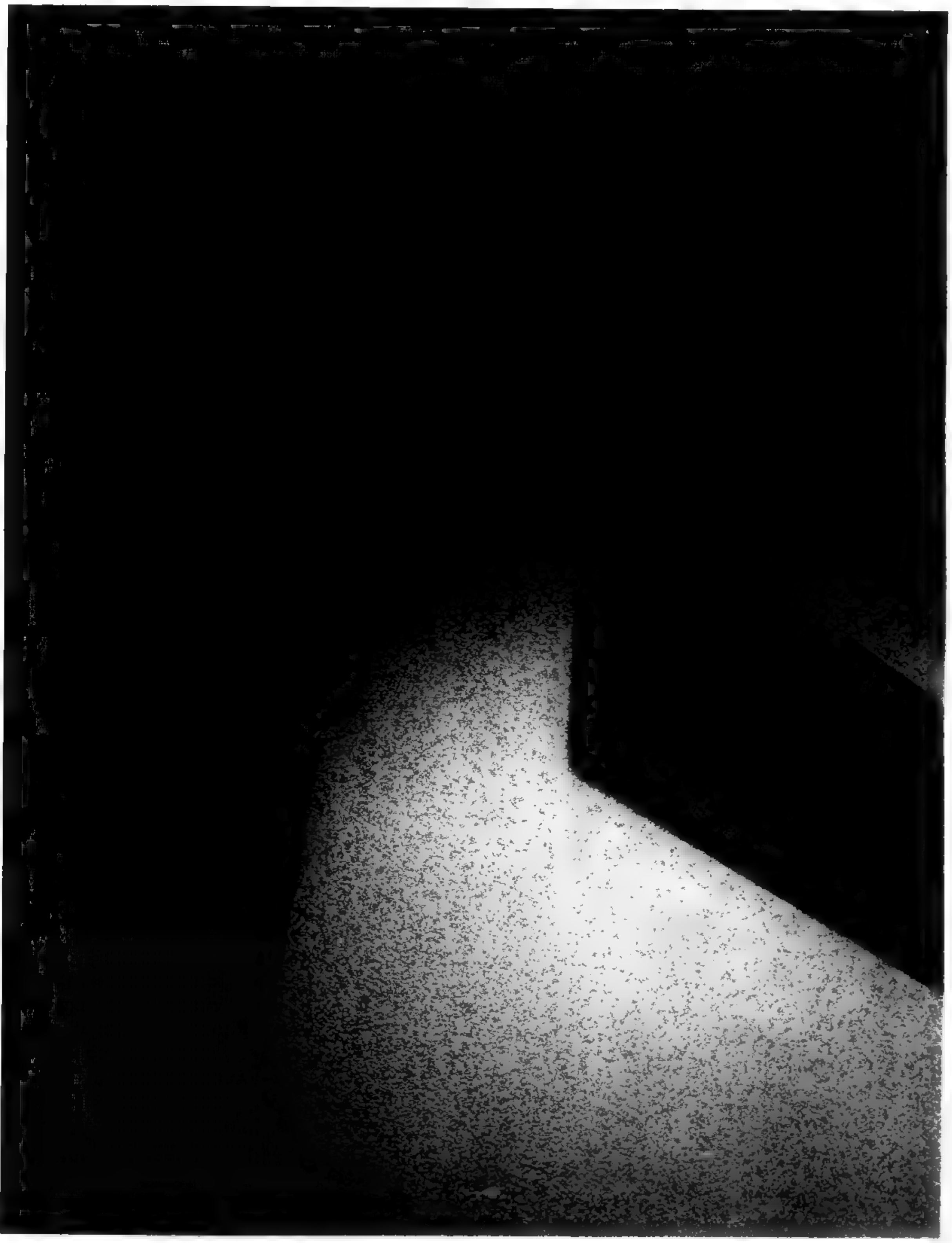

What kind of mainframe should you buy and how much will it cost? The first installment of 1987's Hardware Roundup helps MIS find an answer to this question.

SEPTEMBER 21, 1987 • SPOTLIGHT NO. 22

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This year, the aggressiveness of the 'big two' signaled a potentially long war for the distributed processing market.

IBM REGROUPS; DEC RIDES HIGH

BY JAMES CONNOLLY

Major developments at a glance

The year in big boxes since the last Hardware Roundup

▶ **October 1986:** Amdahl introduced 4.5M byte/sec. channel rates. IBM brought out 9370. Unisys added MCP/AS to A10 and introduced mid-range 2200/200 series.

▶ **December 1986:** Honeywell announced plans to spin off Honeywell Information Systems.

▶ **January:** DEC targeted data centers with VAX 8974 and VAX 8978. IBM replaced original 3090 with E models and added 300E and 600E. NAS announced dyadic AS/XL 70 and 6M byte/sec. channel speeds. Wang unveiled VS 7000.

▶ **February:** Amdahl answered IBM's 3090 moves with its own E versions. Cray introduced low-end X-MP/14SE. DEC reworked pricing and announced 8250, 8350 and 8530. Honeywell cut DPS 90 prices by 10%.

▶ **March:** CDC moved into departmental systems with Cyber 180 Model 930. NAS raised AS/XL memory to 2G bytes and announced AS/VL mid-range line. Unisys merged Unix families and expanded V series.

▶ **April:** ETA Systems announced ETA 10. Honeywell Bull revealed DPS 7000 as first product. Prime released high-end 6350 and 6550. Unisys added MCP/AS to A15 and A12.

▶ **May:** IBM enhanced 4381 with 20 series, overlapped 4381 with low-end 3090 120E.

▶ **June:** Honeywell Bull replaced DPS 8 with DPS 8000.

▶ **July:** Cray added Cray-2S.

▶ **August:** DEC cut low-end prices while hiking high-end prices. HP shipped first HP 3000 Model 930s.

▶ **September:** IBM announced 4.5M byte/sec. channels.

CW CHART

Decentralization. Distributed processing. Networking. These buzzwords rang familiar this year for computer industry veterans who remembered the minicomputer invasion of the 1960s and the births of Digital Equipment Corp.'s VAX and the enigmatic IBM 8100 in the 1970s.

Those concepts, particularly distributed processing, reasserted themselves this past year, perhaps more strongly and with a greater sense of permanence than before. Advocates of decentralization took to soapboxes to speak of off-loading the mainframe, peer-to-peer networking and serving the end user.

During the year since *Computerworld* published its last Hardware Roundup, DEC has built on the success that stunned the industry in 1986. The company promoted its network and the strength of its VAX architecture in a bid to edge into IBM's corporate computing stronghold, where DEC targets the smallest departments and the largest data centers.

But while DEC advanced seemingly unopposed for much of 1986, in the past year IBM has been on the offensive. The company responded to DEC's success in three ways: with the celebrated rollout of the 9370, a system IBM calls a "superminimainframe"; uncharacteristically candid promises of the System/36 and 38 successor known as Silverlake; and a string of connectivity and productivity announcements, including Systems Application Architecture and low- and high-end VM packages.

The aggressiveness of the two leading computer companies, both on the hardware and the software fronts, combined with the lurking specter of standards-oriented vendors of Unix and microprocessor-based systems, signal a war for the distributed processing market that could last for years.

"IBM is getting back into it," notes John McCarthy, research manager for Cambridge, Mass.-based Forrester Research, Inc. "It's the 9370. There's an appeal to that machine. People have been waiting for it for years. The DP guy has been saying for all that time, 'We're waiting for IBM to announce.' Well, IBM finally announced."

McCarthy says the attraction of the 9370 is not just a processor or architecture but the repackaging that goes with it. He cites the rack-mounted peripherals, tiered software pricing and the offering of VM/IS and the promise of MVS/IS for unsophisticated users.

In addition, DEC is losing steam, McCarthy maintains, in part because of overemphasis on the Decworld show that wound down last week. He claims potential DEC customers asking about product directions tired of being told for months, "Wait until Decworld." He adds that a year ago, IBM's principal weapon against DEC's low-end offerings was the System/36. Now, IBM wields 9370s and the threat of Silverlake.

But, according to another consultant, DEC — taking advantage of the ongoing confusion in

---

Connolly is *Computerworld*'s senior editor, systems & peripherals.

IBM regroups

FROM PREVIOUS PAGE

connection with IBM's overlapping product lines and compatibility problems — will continue at a strong pace, at least until it is hit with the challenge of maintaining the systems that have boosted its revenue.

"DEC is riding high, and I think they will keep going strong for at least a year until the [system] maintenance catches up to them," says Shaku Atre, president of Atre International Consultants, Inc. in Rye, N.Y.

IBM fortifies position

Meanwhile, most analysts say that IBM has recognized the need to strengthen its mid-range offerings through the 9370, Silverlake and varied communications and software announcements.

> "THERE is a perception that IBM is slowing down, and IBM is concerned about that perception."
>
> OMRI SERLIN
> ITOM INTERNATIONAL CO.

The product line that IBM calls System/3X — including the System/3, 32, 34, 36 and 38 — has an installed base of more than 200,000 computers, according to analyst Omri Serlin, owner of Itom International Co. in Los Altos, Calif.

"That makes it by far the most successful mid-range computer of all time. Nonetheless, there is a perception that IBM is slowing down, and IBM is concerned about that perception," Serlin says.

IBM has responded by doing things that were unheard of a year ago, he adds, citing IBM's release of benchmark numbers for the 9370 and other mid-range systems at a Dallas analysts' briefing.

"IBM is going to be screaming by 1990. They are taking their licks now, but they are setting up to dominate by controlling all of the standards for the 1990s," says analyst Kimball Brown, formerly of the market research firm Dataquest, Inc. and now with Prudential-Bache Securities, Inc.

Brown reports that, hidden in key products, IBM has "hooks" that will let the company control standards.

He cites the proprietary Micro Channel bus and the Presentation Manager in the Personal System/2 environment as well as the implementation of VM/XA SP through microcode in the 3090E models announced in January. He maintains that IBM could use the Presentation Manager as a lever to control the Unix market and the personal computer arena.

Many of these hooks are communications oriented. While the minicomputer growth of the '60s and '70s was based largely on stand-alone or poorly networked systems, the latest efforts focus on merging departmental computers with more versatile software and enterprise networks, whether they are based on Ethernet or proprietary networks such as DEC's Decnet and IBM's Systems Network Architecture (SNA).

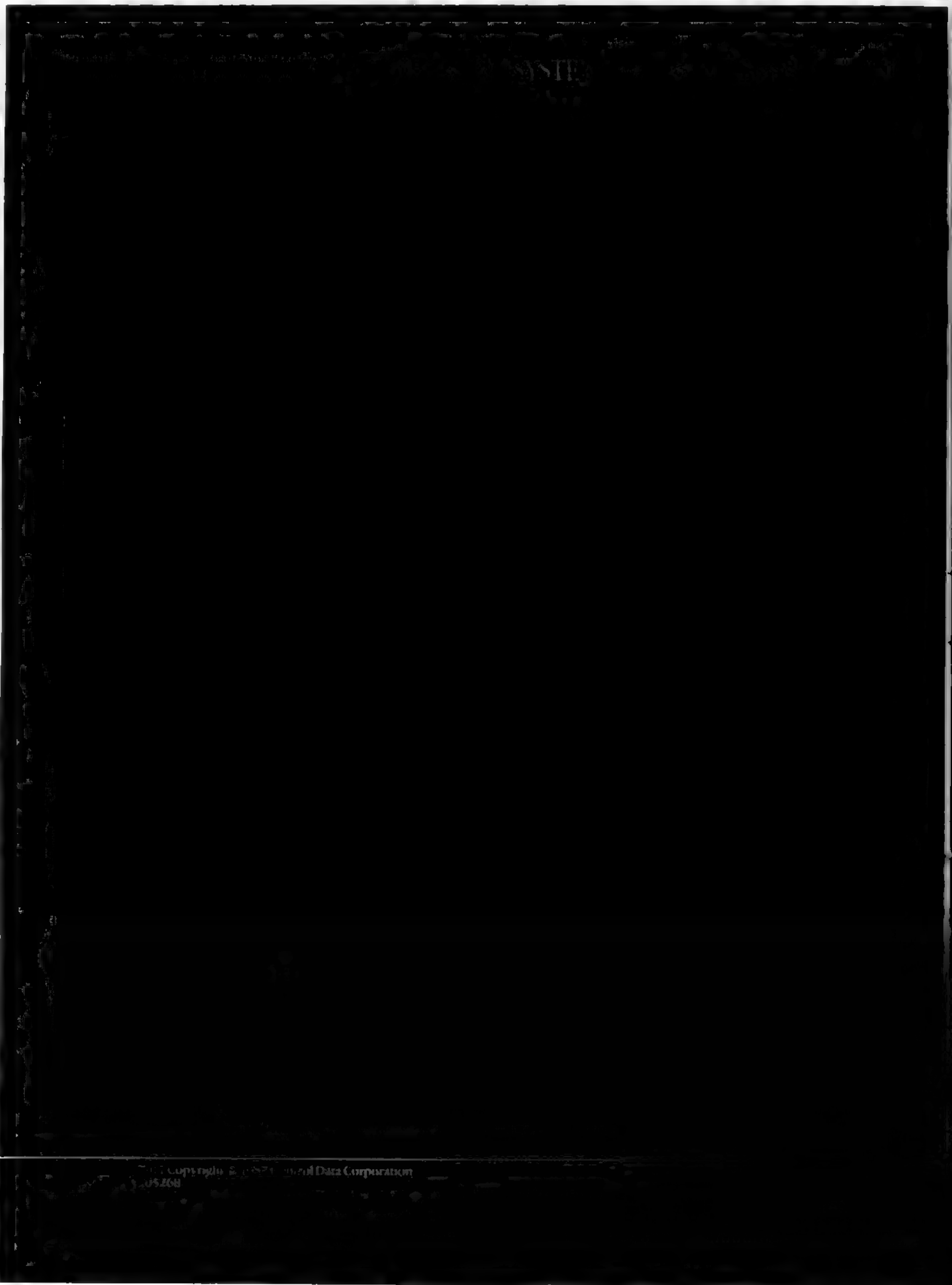
Dumb terminals down

In addition, the past year has seen continued slippage in the use of dumb terminals, be they attached to minicomputers or mainframes. Microcomputers are squeezing out dumb terminals and, at the same time, pressuring minicomputers from below.

While minicomputer vendors such as DEC and Prime Computer, Inc. boast of mainframe-class processing power, PCs based on the Intel Corp. 80386 chip now pack three times the raw CPU punch of the VAX-11s that were the heart of DEC's product line only three years ago.

Meanwhile, even in a market that most observers acknowledge to be slow, the corporate mainframe has its supporters. The most notable is IBM, which envisions a world in which its PS/2s are tied to Silverlake and 9370 minicomputers via an IBM Token-Ring network, and,

Continued on page S4



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Roundup: Evaluation criteria

Comparing computers made by different vendors — or even within a single company in the cases of multi-product-line companies such as IBM or Unisys Corp. — has never been easy.

"Somebody ought to come up with some benchmark that can be universally accepted by all hardware vendors. But maybe that's utopia," says Shaku Atre, president of Atre International Consultants, Inc. in Rye, N.Y.

Even assigning millions of instructions per second (MIPS) ratings, which tend to reflect raw CPU power, to varied systems can be risky. As Atre notes, system measurement has always been complicated by differences in operating systems and factors such as I/O and cache, and it is becoming even tougher with the availability of varied data base management systems.

Many people who evaluate systems are looking for a single set of numbers showing how all types of computers handle a particular, well-defined set of tasks. Atre suggests that the federal government, a university, a large user company or vendor should take the initiative.

In the absence of such a set of numbers, the latest edition of *Computerworld*'s annual Hardware Roundup includes MIPS ratings — either provided by vendors or, based on vendors' claims, estimated by *Computerworld* — and other performance numbers supplied by vendors in response to a questionnaire. The overall goal was to show how systems perform in selected environments.

The performance numbers indicate millions of floating-point operations per second and Dhrystone, ET1 debit-credit, Linpack and Livermore Loops benchmarks. Benchmarks were added after years of vendor complaints that MIPS ratings are meaningless.

Computerworld has tried to present a comprehensive and accurate listing, contacting vendors directly for information. However, several vendors chose not to participate in the survey, and still others provided limited details. Left with the choice of ignoring those systems or offering incomplete information, we filled in the omitted details where possible; based on the vendors' own product literature.

Among the vendors who refused to participate was Digital Equipment Corp. IBM, Hewlett-Packard Co. and Amdahl Corp. provided limited details about selected products.

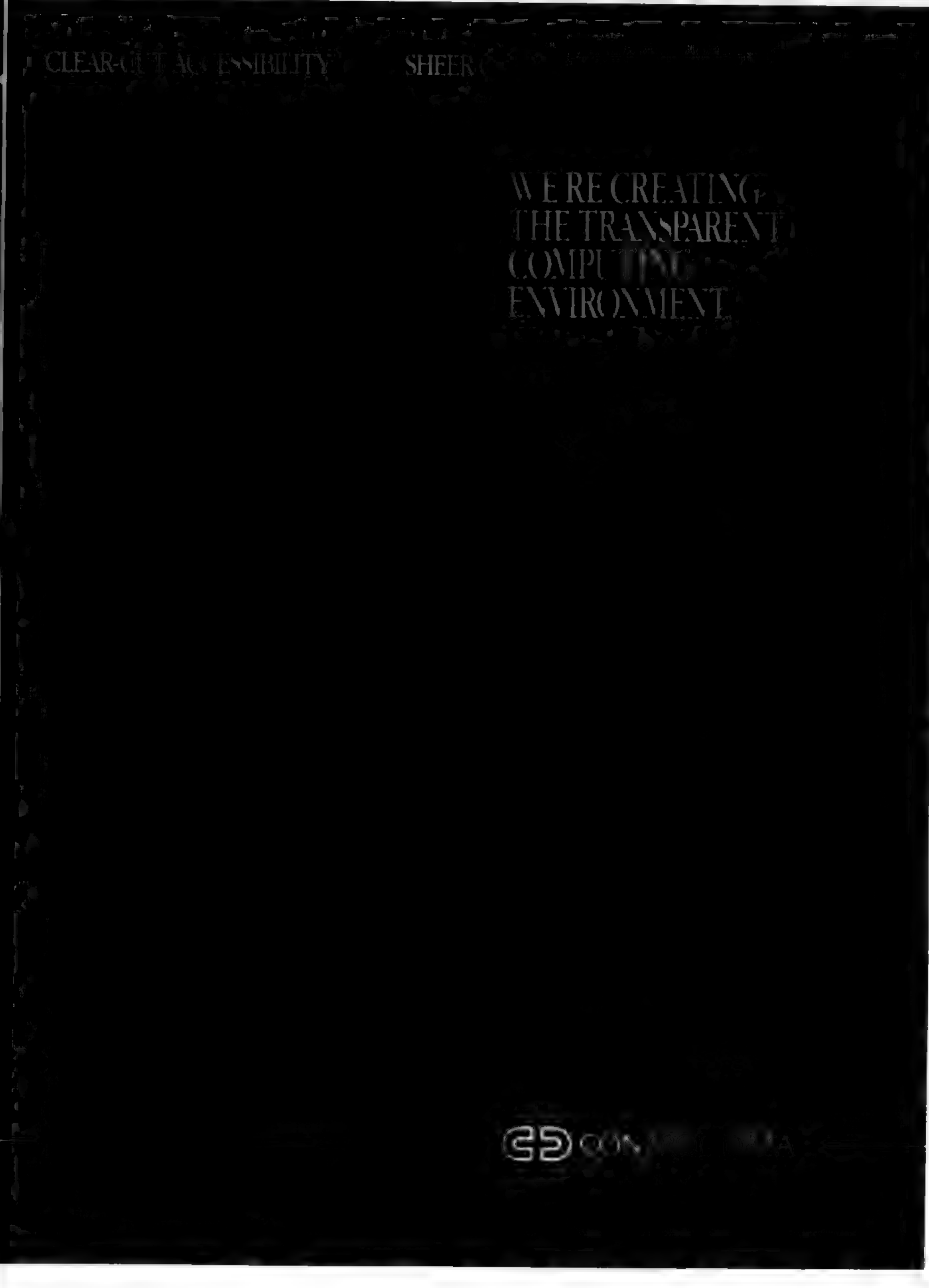
Where possible, the parameters used to group computer systems with their likely competitors come from market research firm International Data Corp. (IDC) definitions.

According to IDC, large systems typically cost more than $1 million and support more than 128 users. Medium-scale systems normally support 17 to 128 users and are generally priced in the $100,000 to $1 million range. Special-purpose systems are typically high-speed scientific computers that include supercomputers, minisupercomputers and vector processing machines such as those from Cray Research, Inc. and Control Data Corp.

The roundup, which will continue during the next two issues with small-scale systems and personal computers and workstations, is intended as a guide for readers to compare products.

In the roundup charts, the designation "NA" can stand for "not applicable" as well as "not available."

JAMES CONNOLLY



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IBM regroups

CONTINUED FROM PAGE S2

eventually, to IBM 3090-class mainframes via IBM's SNA.

In addition, to serve those who need more host processing, the most powerful commercial computers ever designed — including the 3090, National Advanced Systems Corp.'s (NAS) AS/XL and Amdahl Corp.'s 5890 — have been enhanced and moved into the prime of their product lives during the past year.

These are mainframes with performance ratings of more than 70 million instructions per second (MIPS) — more than double the power of comparable systems four years ago.

Former BUNCH get face-lifts

Elsewhere in the mainframe world, three companies long associated with "big boxes" spent much of their efforts molding new images.

Burroughs Corp. and Sperry Corp. ceased to exist in mid-1986, their places being taken by a firm called Unisys Corp. And Honeywell, Inc. placed a for-sale sign on its Information Systems Division and found buyers in Compagnie des Machines Bull and NEC Corp.

Unisys spent much of the year merging work forces and, in some areas, blending product lines such as the Burroughs and Sperry Unix-based systems.

At the same time, the new company expanded its mid-range lines with the introduction of the 2200 series, which is compatible with the former Sperry 1100 mainframe family, and new models for the former Burroughs V series.

At the high end, the 1100 series sat largely unenhanced, but Unisys brought out new models of the former Burroughs A 15 and A 12 series running a new operating system, MCP/AS. MCP/AS addresses a theoretical limit of 24G bytes, compared with the 6M bytes that a single program could address under the older MCP. Unisys took advantage of MCP/AS by hiking the A 12's memory from 96M to 144M bytes and by claiming performance gains of about 20% with the operating system.

Early this month, Unisys filled out the low end of its A series with the introduction of the 9370 competitors: the A 1, A 4 and A 6.

The new Honeywell, known as Honeywell Bull, Inc., made its first moves in the upper mid-range with the introduction of the DPS 7000 as a replacement for the DPS 7 and the DPS 8000 as a successor to the DPS 8.

The restructuring of Honeywell, Burroughs and Sperry signaled the demise of the non-IBM-compatible mainframe group known as the BUNCH companies.

For the two remaining former BUNCH companies, NCR Corp. and Control Data Corp., much of the past year's action has been in the mid-range. NCR has been promoting its latest multiprocessor systems — the NCR 9800 series and the Tower 32/800. Meanwhile, CDC introduced the Cyber 180 Model 930, the company's first office environment superminicomputer.

The MIPS race continued in the IBM-compatible mainframe world with IBM announcing the 3090E models — claiming 25% to 28% price/performance gains — and Amdahl responding with its own E versions.

Amdahl and NAS both claimed higher uniprocessor performance than IBM, and both apparently matched IBM's price/performance moves. However, it remains to be seen, as analyst Brown notes, what surprises besides VM/XA SP IBM's E models have in store for the plug-compatible vendors.

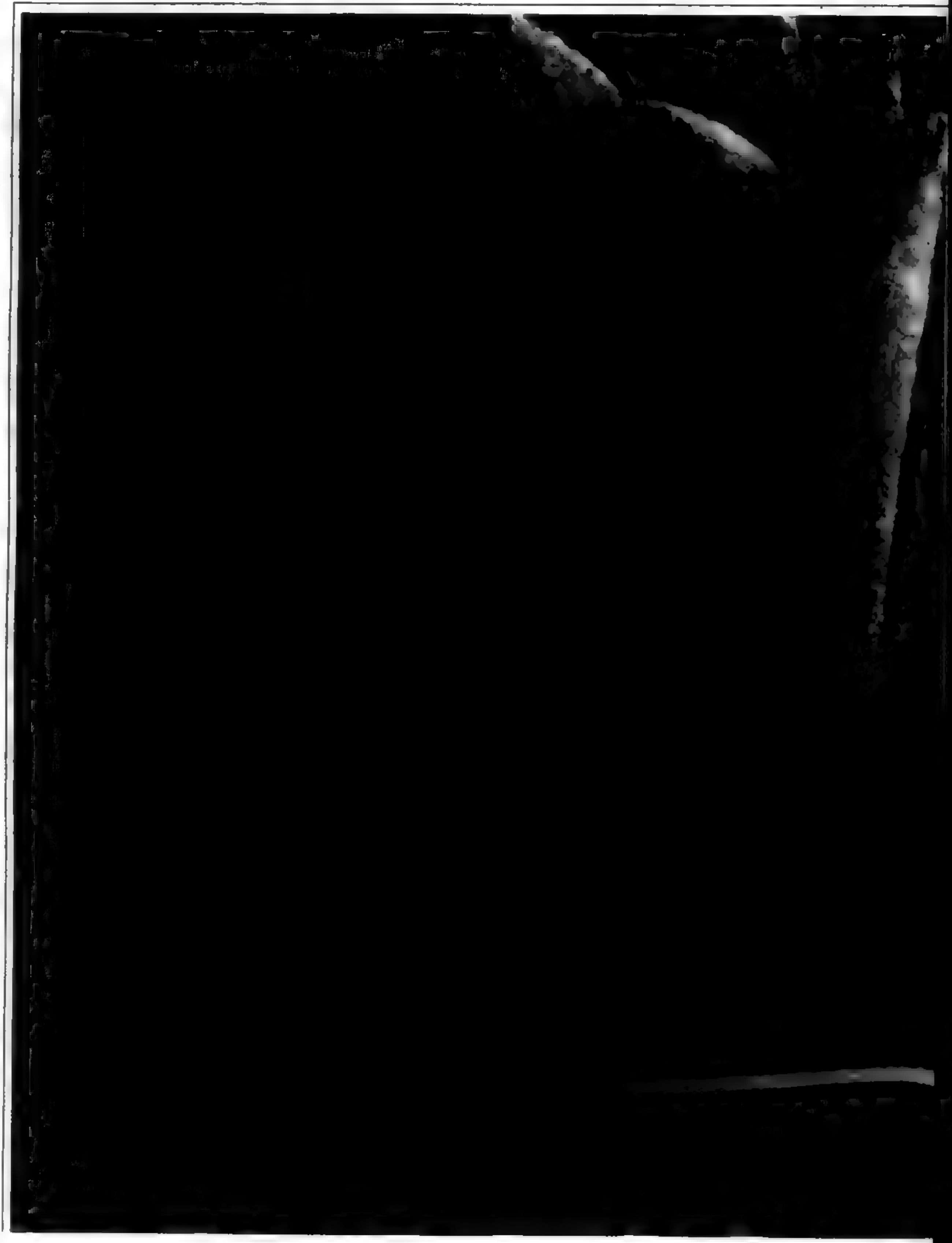
One possibility Brown cites is that the E models may have components that would allow them to be upgraded to the expected next generation of IBM mainframes, code-named Summit. Brown notes also that he would not be surprised if Summit came earlier than most analysts expect — in early 1988 rather than 1989 or 1990.

> "DEC IS DOING WELL and appears to be saying, 'We are good and we can do what we want. Take it or leave it.' And what do you do if you already have DEC machines? You have to buy from DEC. DEC will get away with it just like IBM got away with increasing software prices."
>
> SHAKU ATRE
> ATRE INTERNATIONAL CONSULTANTS, INC.

In another move, IBM extended the high end of its 4381 series with the 4381 Models 21 through 24 and dropped the entry point of the 3090s to where the 4300s and 3090s overlap for the first time with the announcement of the 3090 Model 120E.

In the meantime, DEC, Prime and Tandem Computers, Inc. staked their claims to segments of the large-scale markets.

DEC, which had abandoned the mainframe business when it stopped enhancing the Decsystem-10 and Decsystem-20 in 1983, targeted the corporate data



center with its VAX 8974 and VAX 8978, which are four- and eight-CPU clusters of the VAX 8700.

DEC also boosted performance in its mid-range with the introduction of the DEC VAXBI-based VAX 8530, which, when paired with the VAX 8550, helped to effectively make obsolete the Unibus-based VAX 8600 and VAX 8650. But while adding performance kicks for some superminicomputer users, DEC also raised prices for most of its high-performance systems, including the VAX 8800 and the VAX 8700, neither of which received the power improvements.

Consultant Atre suggests, "DEC is doing well and appears to be saying, 'We are good and we can do what we want. Take it or leave it.' And what do you do if you already have DEC machines? You have to buy from DEC. DEC will get away with it just like IBM got away with increasing software prices for so long."

Two other long-time minicomputer makers that drove their product lines into the traditional mainframe class were Prime, with claims of 23 MIPS for its 6550, and Tandem, which claimed to rival the IBM 3090's transaction processing power with the VLX series.

And, finally, among other supermini vendors, Hewlett-Packard Co. began shipments of its HP 3000 Series 930, its first commercial computer using reduced instruction set computer architecture.

Data General Corp., which had announced its high-end MV/20000 in 1986, filled in the middle of its product line with the MV/15000 — the replacement for the MV/10000 and MV/8000.

Wang Laboratories, Inc. built upward and downward on the architecture of its VS 300 with a VS 7000 product line that includes the older VS 300 and a planned dual processor.

Long associated with the real-time computing market, Harris Corp.'s Computer Systems Division added a pair of Unix-based superminis to its HCX series with performances ranging up to 7.5 MIPS and the goal of extending into the more general-purpose marketplace.

Tandem's rival in on-line transaction processing, Stratus Computer, Inc., increased its transaction throughput by tenfold with the introduction of the XA 2000 family of multiprocessors. •

Super competition heats up

The past year has seen competition intensifying in supercomputing, a field long dominated by crosstown Minneapolis rivals Cray Research, Inc. and Control Data Corp., as new forces split up a booming market.

Cray and CDC's ETA Systems, Inc. subsidiary still vie in the high-performance market, where Cray holds a commanding lead. But new players have joined the competition.

"The most significant thing that has happened is the entry of many new competitors at all levels of the high-performance class," says Marcia Brooks, an analyst for International Data Corp., a Framingham, Mass., market research firm. Brooks notes that minisupercomputer vendors like Convex Computer Corp. and the massively parallel processors made by companies like BBN Advanced Computers, Inc. and Intel Corp. can chip away at Cray's dominance.

She explains that the minisuper vendors introduced the element of price into Cray's market, offering dedicated machines to individual users who in the past used supercomputers on a time-sharing basis. Cray's attempts in the past year to improve the price/performance of its Cray-2 and Cray X-MP models all are signs that the company recognizes "it can no longer be cavalier about prices," Brooks says.

Both Brooks and analyst Omri Serlin, owner of Itom International Co. in Los Altos, Calif., note that a key development has been the movement of those minisupercomputers into new markets, such as financial modeling and industrial control.

"It is simply a case of discovering new applications for existing features rather than having manufacturers change the products so they will fit," Serlin says.

Brooks says the massively parallel computer vendors as well as others testing new architectures present very specific threats to Cray. She notes that one architecture likely to draw attention in coming years is the matrix computer announced by Saxpy Computer Corp.

Meanwhile, ETA announced its ETA-10, which holds the promise of being 10 times as powerful as the older CDC Cyber 205 and more powerful than the Cray-2. However, Cray is said to be working on its own next-generation systems — the Y-MP and the Cray-3 — for introduction during the next two years, and Japanese supercomputers, in particular those from NEC Corp. and Fujitsu Ltd., are starting to make inroads into the U.S. market.

JAMES CONNOLLY

What ISDN is doing for McDonald's data networking capabilities is no small potatoes.

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"In business language, this means we're going to do an even better job for the 30 million customers that we serve every day," said Bonnie Kos, McDonald's Vice President of Facilities and Systems.

"ISDN provides an information outlet to every workstation, thereby eliminating time-consuming and costly wiring, as well as enhancing messaging and network control capability."

Thanks to ISDN, McDonald's will enjoy better customer service, more current market information, better tracking of product promotions, more efficient inventory control, and reduced administrative workloads.

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You can tell each blank:

- A formula for automatic calculation with that data and where to put the result.
- Other locations where this data should go on the form and other forms.
- What other forms should be included in the set.
- Criteria for valid data: whether it should be letters, numbers, dollars, how many digits, how many decimal places, and so forth.

How the smart form can "teach" the user.

When you tell the smart form what to do, you can also tell the user what to do. You can create individual help windows *for each blank*. When the user gets stuck, a touch of F10 brings up a window with detailed instructions on what the company wants in that blank.

Your forms become the capture point.

Most companies spend money to capture the same information twice: First when someone puts it on a form, and later when someone reads it off the form and enters it into the computer. Electronic forms end this duplication because data entered for the form can be exported to a DOS file for use in all your other applications. Data capture for the form and data capture for the computer are one.

When someone fills out an order form, for example, the sales information could be automatically sent to your inventory application. Travel expenses could be automatically copied from expense reports to a Lotus® spreadsheet in the department head's PC. Billable hours could be sent from individual time sheets into the billing and accounts receivable package.

To tell the system where to send the data, you create an "external data map" with software from Electronic Form Systems. Data can be exported (or imported) in Data Interchange Format, PRN (delimited ASCII), or System Data Format. In addition to Lotus, Electronic Form Systems supports dBase III, communications software and customer-supplied file transfer packages.

A true electronic form will eliminate hidden costs.

The smart form from Electronic Form Systems is more than a better way to make forms. It's a better way to manage information. It lets people work faster. It lets you stop handling the same information twice. And it cuts several other costs associated with paper forms. Some of those costs are visible, but the largest of them are hidden.

Visible cost — Creating forms.

With the Formcoder from Electronic Form Systems, you can create a new electronic form *and be using it* in less than two hours. No typesetting, no artwork, no printing. And it doesn't take a programmer; a good word processing operator can do it.

Visible cost — Inventorying forms.

Your company now leases thousands of square feet to store forms. And money is tied up in forms inventory, probably six figures.

Electronic forms are stored in the

Electronic Form Systems is a division of Computer Language Research, Inc.

When the same information goes on several pages, you enter it only once. The system can automatically fill in standard information like a customer's address.

You can pull data in from other files and export data for use with other applications.

You can create help windows for each blank on a form. Then the F10 brings up a window with instructions on what the company wants in that blank.

You can set criteria for any field. The system alerts the user if the wrong type of data is entered — a letter where a number should be, for example.

The form can do calculations. For instance, it can add total costs on a requisition order and automatically place the sum in the proper space below.

To tell the smart form what to do with the data entered in each blank, you create a "form map" with software from Electronic Form Systems. It doesn't require programming skills; it's less complex than a spreadsheet.

computer so most of that money goes right to the bottom line. You can store as many as 5,000 different forms on an IBM® microcomputer and an unlimited number on a mainframe.

One insurance company projects annual savings of $1.8 million in warehousing costs alone.

These savings are significant, but the visible costs of paper forms are only the tip of the iceberg. The hidden costs can be ten, twenty, maybe fifty times greater.

Hidden cost — Using the wrong form.

There's a Murphy's law of forms: If the wrong form *can* be used, it *will* be.

With electronic forms you can control *who* uses a form, *which* form they use, and what they use it *for.*

You can restrict certain forms to certain people or departments.

Nobody will confuse two forms that look alike. They request a form by name or number and that's the form the computer gives them.

When a form is revised, you simply replace the old one with the new one in the computer.

Hidden cost — The cost of running out.

Right now, several people in your company have run out of a form they need. They're wasting time looking for more. The missing form is also *delaying revenue,* slowing the whole financial pulse of your company.

Electronic forms never run out. Supply always equals demand. One insurance company produces 15,000 policies every night using electronic forms. They are never short a single policy page.

Hidden cost — Forms obsolescence.

Needs change, laws change, and suddenly a lot of your paper forms aren't worth the paper they're printed on. One bank estimates that out-of-date forms were costing them $35,000 per month.

Electronic forms eliminate this waste entirely. When a form goes out of date, you just move it to another computer file and put the new one in its place.

Hidden cost — Forms management and enforcement.

With technology from Electronic Form Systems, the creation, management and processing of every form in your company are brought into a single integrated system. You'll get up-to-the-minute summaries of how many times a form has been used, how long since it was revised, what the current revision looks like, and so forth. Bootleg forms disappear.

Combine the power of forms and computers.

The computer has given business paperless typing, paperless filing, and paperless mailing. No large company could afford to be without them today.

Now the paperless form is here. And Electronic Form Systems offers proven hardware and software that are already working in hundreds of installations. It is the only fully integrated system capable of handling forms creation, forms management, and forms processing. You can implement it as a centralized system based on your IBM mainframe or as a distributed system using IBM microcomputers. You don't have to rewrite your applications software to use it, and it works with several different makes of printer.

Electronic forms. They do everything your paper ones do. Without the paperwork.

Send for free information. Call 1-800 FORM-FREE. Or fill out the coupon below.

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Hardware Roundup: Large systems

VENDOR	PRODUCT	DATE FIRST INSTALLED	PRIMARY MARKET[1]	MOST COMPATIBLE IBM OR DEC SYSTEM	PERFORMANCE (MIPS)	PERFORMANCE (MFLOPS[2])	BENCHMARK[3]	MACHINE CYCLE TIME (NSEC)	MEMORY (MBYTES)	DISK TRANSFER RATE (MBYTES PER SECOND)	PORTS	CHANNELS	OPERATING SYSTEMS	MAXIMUM NUMBER OF USERS	TYPICAL NUMBER OF USERS	WORD LENGTH (BITS)	BASE PRICE
Amdahl Corp. (408) 746-6000	Model 5890-180E	March 1987	DP	IBM 3090 Model 180E	32*	NA	NA	15	32-256	3-4.5	NA	16-48	MVS/SP, VM/SP, VM/XA SP, UTS/580	NA	NA	NA	$2.625 million with 16 channels, 32M-byte memory, console, power supply
	Model 5890-200E	March 1987	DP	IBM 3090 Model 200E	33.6*	[illegible]	NA	15	64-256	3-4.5	NA	32-64	MVS/SP, VM/SP, VM/XA SP, UTS/580	NA	NA	NA	$3.825 million with 64M-byte memory, 32 channels, console, power supply
	Model 5890-300E	June 1987	DP	IBM 3090 Model 300E	41*	NA	NA	15	64-256	3-4.5	NA	32-64	MVS/SP, VM/SP, VM/XA SP, UTS/580	NA	NA	NA	$4.5 million with 64M-byte memory, 32 channels, console, power supply
	Model 5890-400E	Fourth quarter 1987	DP	IBM 3090 Model 400E	55.3*	NA	NA	15	128-512	3-4.5	NA	[illegible]	MVS/SP, VM/SP, VM/XA SP, UTS/580	NA	NA	NA	$7.27 million with 128M-byte memory, 64 channels, 2 consoles, 2 power supplies
	Model 5890-600E	Fourth quarter 1987	DP	IBM 3090 Model 600E	70*	NA	NA	15	128-512	3-4.5	NA	64-128	MVS/SP, VM/SP, VM/XA SP, UTS/580	NA	NA	NA	$8.5 million with 128M-byte memory, 64 channels, 2 consoles, 2 power supplies
Control Data Corp. (612) 853-8100	Cyber 180 Model 860A	NA	SE	NA	9.5	NA	2.1M[4] LP (actual)	16	16-128	12	30	24-34	NOS/VE, NOS, NOS/BE	NA	150-250	64	$1.24 million with 16M-byte memory, 16K-byte cache, power supplies
	Cyber 180 Model 870A (dual CPU)	NA	SE	NA	17.1	NA	4.2M[4] LP (actual)	16	16-128	12	30	24-34	NOS/VE, NOS, NOS/BE	NA	100-250	64	$1.982 million with 16M-byte memory, 15K-byte cache, power supplies
	Cyber 180 Model 990E	NA	SE	NA	28.2 (scalar)	NA	12M[4] LP (actual)	16	16-128	12	30	29-34	NOS/VE, NOS, NOS/BE	NA	200-300	64	$2.35 million with 16M-byte memory, 32K-byte cache, power supplies
	Cyber 180 Model 995E (dual CPU)	NA	SE	NA	50.8 (scalar)	NA	24M[4] LP (actual)	16	16-128	12	30	29-34	NOS/VE, NOS, NOS/BE	NA	200-300	64	$3.815 million with 16M-byte memory, 32K-byte cache, power supplies
Digital Equipment Corp. Contact local sales office	VAX 8974	1987	DP	NA	17*	NA	NA	45	128-512	1	NA	NA	VMS	NA	NA	32	$2.6 million with 128M-byte memory, 2.5G-byte disk, tape drive, Decserver, console, operating system, Ethernet
	VAX 8978	1987	DP	NA	31*	NA	NA	45	256M-1G	1	NA	NA	VMS	NA	NA	32	$4.7 million with 256M-byte memory, 2 tape drives, 5G-byte disk, 2 Decservers
Honeywell Bull, Inc. (800) 328-5111, ext. 98	DPS 8000/81	Third quarter 1987	DP, TP	IBM 4381 Model 24	2.75*	NA	60 DC (estimate)	NA	32-128	3	NA	16	GCOS 8	NA	460	36	$675,000 with CPU, I/O processor, 16M-byte memory, service processor, console, power
	DPS 8000/82T	Third quarter 1987	DP, TP	IBM 3090 Model 180E	5.5*	NA	110 DC (estimate)	NA	[illegible]	3	NA	[illegible]	GCOS 8	NA	[illegible]	36	$1.3 million with 2 CPUs, 2 I/O processors, 32M-byte memory, 2 service processors, 2 consoles, power
	DPS 88/881	March 1985	DP, TP	IBM 3090 Model 150E	5.4*	NA	64 DC (estimate)	NA	32-64	3	NA	64	GCOS 8	NA	725	36	$1.74 million with CPU, 32M-byte memory, I/O processor, system support facility, power
	DPS 88/882	March 1985	DP, TP	IBM 3090 Model 180E	9.72*	NA	117 DC (estimate)	NA	32-128	3	NA	64-128	GCOS 8	NA	1,375	36	$2.775 million with 2 CPUs, 32M-byte memory, I/O processor, system support facility, power
	DPS 88/882T	March 1985	DP, TP	IBM 3090 Model 180E	9.72*	NA	117 DC (estimate)	NA	64-128	3	NA	64	GCOS 8	NA	1,375	36	$3.475 million with 2 CPUs, 64M-byte memory, 2 I/O processors, 2 system support facilities, power
	DPS 88/891	March 1984	DP, TP	IBM 3090 Model 180E	14.6*	NA	97 DC (estimate)	NA	32-64	3	NA	[illegible]	GCOS 8	NA	1,150	36	$2.85 million with CPU, 32M-byte memory, I/O processor, system support facility, power
	DPS 88/892	March 1984	DP, TP	IBM 3090 Model 200E	26.3*	NA	176 DC (estimate)	NA	32-128	3	NA	64-128	GCOS 8	NA	2,080	36	$3.81 million with 2 CPUs, 32M-byte memory, I/O processor, system support facility, power
	DPS 88/892T	March 1984	DP, TP	IBM 3090 Model 200E	26.3*	NA	176 DC (estimate)	NA	64-128	3	NA	128	GCOS 8	NA	2,080	36	$4.51 million with 2 CPUs, 64M-byte memory, 2 I/O processors, 2 system support facilities, power
	DPS 90/91	Fourth quarter 1984	DP, SE, TP	IBM 3090 Model 180E	10.8*	27 (P)	137 DC (estimate); 5M LP, 3.84M LL (actual)	NA	[illegible]	3	16	[illegible]	GCOS 8	NA	1,675	36 (72 in SE)	$3.56 million with CPU, 32M-byte memory, I/O processor, system control center, power
	DPS 90/92	Second quarter 1985	DP, SE, TP	IBM 3090 Model 200E	19.4*	54 (P)	247 DC (estimate); 10M LP, 7.68M LL (actual)	NA	32-128	3	32	64	GCOS 8	NA	[illegible]	36 (72 in SE)	$4.5 million with 2 CPUs, 32M-byte memory, I/O processor, system control center, power
	DPS 90/92T	Third quarter 1985	DP, SE, TP	IBM 3090 Model 200E	19.4*	54 (P)	247 DC (estimate); 10M LP, 7.68M LL (actual)	NA	64-256	3	32	64	GCOS 8	NA	[illegible]	36 (72 in SE)	$5.63 million with 2 CPUs, 64M-byte memory, 2 I/O processors, 2 system control centers, power
	DPS 90/93	Third quarter 1986	DP, SE, TP	IBM 3090 Model 400E	28*	81 (P)	356 DC (estimate); 15M LP 11.52M LL (actual)	NA	64-256	3	48	64	GCOS 8	NA	4,270	36 (72 in SE)	$6.5 million with 3 CPUs, 64M-byte memory, 3 I/O processors, 2 system control centers, power

*Computerworld estimates based on vendor-supplied information.
[1] Commercial data processing (DP); scientific/engineering (SE); office automation (OA); on-line transaction processing (TP).
[2] Full-precision millions of floating-point operations per second (MFLOPS). Sustained (S); peak (P).
[3] Per-second performance ratings, based on the following industry-standard benchmarks: Dhrystone, Version 1.1, peephole optimization only (DH); Debit-Credit (ET1) transactions based on 95% subsecond responses (DC); Linpack 100 x 100 full-precision (LP); Livermore Loops harmonic mean, 14 loops (LL). Vendors supplied either actual or estimated benchmark figures.
[4] Running under NOS/VE
[5] Local-area network interfaces.
[6] Unisys uses data link processors in place of conventional channels on these systems.

The companies included in this chart responded to a recent written survey conducted by *Computerworld*. Further product information is available from the vendors.

VENDOR	PRODUCT	DATE FIRST INSTALLED	PRIMARY MARKET[1]	MOST COMPATIBLE IBM OR DEC SYSTEM	PERFORMANCE (MIPS)	PERFORMANCE (MFLOPS[2])	BENCHMARK[3]	MACHINE CYCLE TIME (NSEC)	MEMORY (MBYTES)	DISK TRANSFER RATE (MBYTES PER SECOND)	PORTS	CHANNELS	OPERATING SYSTEMS	MAXIMUM NUMBER OF USERS	TYPICAL NUMBER OF USERS	WORD LENGTH (BITS)	BASE PRICE
Honeywell Bull, Inc. (800) 328-5111, ext. 60	DPS 90/94	Fourth quarter 1986	DP, SE, TP	IBM 3090 Model 600E	36.7*	100 (P)	466 DC (estimated); 20M LP, 15.36M LL (actual)	NA	64-256	3	64	96	GCOS 8	NA	5,000	36 (72 in SD)	$7.6 million with 4 CPUs, 64M-byte memory, 4 I/O processors, 2 system control centers, power
IBM Contact local sales office	3090 Model 120E	Oct. 1987	DP	NA	7.5*	NA	NA	18.5	32	3-4.5	NA	16-24	MVS, VM	NA	NA	64	$985,000 with controller, 32M-byte memory, 16 channels
	3090 Model 150E	1987	DP	NA	10.1*	NA	NA	18.5	32-64	3-4.5	NA	16-32	MVS, VM	NA	NA	64	$1.65 million with 32M-byte memory
	3090 Model 180E	1987	DP	NA	15.6*	NA	NA	18.5	32-64	3-4.5	NA	16-32	MVS, VM	NA	NA	64	$2.6 million with 32M-byte memory
	3090 Model 200E	1987	DP	NA	31.2*	NA	NA	18.5	32-64	3-4.5	NA	32-64	MVS, VM	NA	NA	64	$4.5 million with 32M-byte memory
	3090 Model 300E	1987	DP	NA	46.9*	NA	NA	18.5	64-128	3-4.5	NA	32-64	MVS, VM	NA	NA	64	$5.6 million
	3090 Model 400E	1987	DP	NA	61.5*	NA	NA	18.5	128-256	3-4.5	NA	64-128	MVS, VM	NA	NA	64	$8.375 million with 128M-byte memory, 64 channels
	3090 Model 600E	1987	DP	NA	79*	NA	NA	18.5	128-256	3-4.5	NA	64-128	MVS, VM	NA	NA	64	$10.3 million
ICL Co. 061-223-1301 (Manchester, England)	Series 39 Level 60/1	Aug. 1985	DP, TP	IBM 3090 Model 120E, VAX 8700	7.1	NA	36 DC (estimate)	25	16-96	3	NA	3-8*	VME	5,000	1,200	32	$818,000 with 16M-byte memory
	Series 39 Level 60/2	Aug. 1987	DP, TP	IBM 3090 Model 180E, VAX 8974	14	NA	65 DC (estimate)	25	16-96	3	NA	3-16*	VME	5,000	2,300	32	$1.60 million with 32M-byte memory
	Series 39 Level 80/1	Nov. 1985	DP, TP	IBM 3090 Model 150E	17.5	NA	53 DC (estimate)	25	16-128	3	NA	3-8*	VME	5,000	1,800	32	$1.396 million with 16M-byte memory
	Series 39 Level 80/2	Nov. 1986	DP, TP	IBM 3090 Model 200, VAX 8978	34	NA	100 DC (estimate)	25	16-128	3	NA	3-16*	VME	5,000	3,200	32	$2.837 million with 32M-byte memory
	Series 39 Level 80/3	Sept. 1987	DP, TP	IBM 3090 Model 300E	51	NA	130 DC (estimate)	25	NA	3	NA	3-16*	VME	5,000	4,500	32	$4.230 million with 48M-byte memory
	Series 39 Level 80/4	April 1988	DP, TP	IBM 3090 Model 400E	67	NA	NA	25	NA	3	NA	3-16*	VME	5,000	6,400	32	$5.7 million with 64M-byte memory
NCR Corp. Contact local sales office	V-8800 series	NA	DP	IBM 4381, 3090	1.5-12	NA	NA	38	4-64	1.5	16-256	16-256	VRX	NA	NA	32	$290,000-$2.199 million with 1 to 8 processors, 4M- to 32M-byte memory, 16 to 32 channels, 1 to 4 dual consoles
National Advanced Systems Corp. (408) 970-1000	AS/XL-50	March 1987	DP	IBM 3090 series	22*	NA	NA	15	32M-1G	3-6	NA	16-48	MVS/XA, MVS/SP	NA	NA	32-64	$3.06 million with CPU, console, 32M bytes, 16 channels, power
	AS/XL-60	May 1986	DP	IBM 3090 series	28*	NA	NA	15	64M-1G	3-6	NA	32-64	MVS/XA, MVS/SP	NA	NA	32-64	$4.35 million with CPU, console, power, 64M bytes, 32 channels
	AS/XL-70	March 1987	DP	IBM 3090 series	35*	NA	NA	15	64M-1G	3-6	NA	NA	MVS/XA, MVS/SP	NA	NA	32-64	$5.28 million with CPU, console, power, 64M bytes, 32 channels
	AS/XL-80	Aug. 1986	DP	IBM 3090 series	50*	NA	NA	15	64M-1G	3-6	NA	NA	MVS/XA, MVS/SP	NA	NA	32-64	$7.2 million with CPU, console, power, 64M bytes, 32 channels
	AS/XL-90	1987	DP	IBM 3090 series	67.2*	NA	NA	15	128M-2G	3-6	NA	NA	MVS/XA, MVS/SP	NA	NA	32-64	$9.9 million with CPU, 2 consoles, power, 128M bytes, 48 channels
	AS/XL-100	1987	DP	IBM 3090 series	81.3*	NA	NA	15	128M-2G	3-6	NA	NA	MVS/XA, MVS/SP	NA	NA	32-64	$12.00 million with CPU, 2 consoles, power, 128M bytes, 48 channels
Prime Computer, Inc. (800) 343-2540, (800) 322-2450 (Mass.)	Model 6550	Fourth quarter 1987	DP, SE, OA, TP	VAX 8974, IBM 3090 Model 180E	23.6	NA	NA	44	32-64	2.46	8	0	Primos	254	NA	32	$804,000 with 32M-byte memory, 770M-byte disk, color system console, operating system
Tandem Computers, Inc. (408) 725-6000	Nonstop VLX300 series (2-16 CPUs)	April 1986	TP	IBM 4381 Model 13	6-48	NA	14-28 DC (actual)	83.3	20-256	1.3-5	NA	2-4	Guardian 90	NA	NA	32	$895,000 with 2 CPUs, 16M-byte memory, 1.6G-byte disk, terminal, tape drive, power supplies
	Nonstop VLX800 series (2-32 CPUs)	May 1987	TP	IBM 3090	24-96	NA	56-200 DC (actual)	83.3	128-512	1.3-5	NA	8-32	Guardian 90	NA	NA	32	$2.141 million with 8 VLX CPUs, 64M-byte memory, 2.7G-byte disk, tape drive, terminal, power supplies
Unisys Corp. (formerly Burroughs Corp.) (313) 351-3000	A 12	Second quarter 1986	DP	IBM 3090 Model 150E	7.6*	NA	NA	65	24-144	3	NA	16*	MCP/AS	NA	NA	48	$1.4 million with CPU, I/O processor, 24M-byte memory, console
	A 15 FX	Second quarter 1987	DP	IBM 3090 Model 180E	15.2*	NA	NA	65	24-96	3	NA	48*	MCP/AS	NA	NA	48	$2.94 million with CPU, I/O processor, 24M-byte memory, console
	A 15 IX	Second quarter 1987	DP	IBM 3090 Model 200E	27.7*	NA	NA	65	24-192	3	NA	96*	MCP/AS	NA	NA	48	$4.57 million with 2 CPUs, 2 I/O processors, 24M-byte memory, console
	A 15 KX	Second quarter 1987	DP	IBM 3090 Model 300E	39.6*	NA	NA	65	24-192	3	NA	96*	MCP/AS	NA	NA	48	$6.12 million with 3 CPUs, 2 I/O processors, 24M-byte memory, console
	A 15 MX	Second quarter 1987	DP	IBM 3090 Model 400E	51.1*	NA	NA	65	24-192	3	NA	96*	MCP/AS	NA	NA	48	$7.665 million with 4 CPUs, 2 I/O processors, 24M-byte memory, console
Unisys (formerly Sperry Corp.) (215) 542-4011	1100/91 SV	July 1985	DP, TP	IBM 3083 BX	5.52*	NA	NA	30	8-16	2.1	NA	12	OS/1100	NA	NA	36	$1.8 million with 8M-byte memory, console, 12 channels, power supply
	1100/91	Dec. 1983	DP, TP	IBM 3090 Model 120E	7.5*	NA	NA	30	8-64	2.1	NA	12	OS/1100	NA	NA	36	$2.4 million with 8M-byte memory, console, 12 channels, power supply
	1100/92 SV	July 1985	DP, TP	IBM 3090 Model 150E	10.3*	NA	NA	30	8-64	2.1	NA	12	OS/1100	NA	NA	36	$2.7 million with 2 CPUs, 16M-byte memory, 2 consoles, 12 channels, power supply
	1100/92	Dec. 1983	DP, TP	IBM 3090 Model 180E	14.04*	NA	NA	30	8-64	2.1	NA	12	OS/1100	NA	NA	36	$3.6 million with 2 CPUs, 16M-byte memory, 2 consoles, 12 channels, power supply
	1100/93	Dec. 1983	DP, TP	IBM 3090 Model 180E, Model 200E	20*	NA	NA	30	8-64	2.1	NA	24	OS/1100	NA	NA	36	$5.1 million with 3 CPUs, 32M-byte memory, 3 consoles, 24 channels, 2 power supplies
	1100/94	Dec. 1983	DP, TP	IBM 3090 Model 200E	25*	NA	NA	30	8-64	2.1	NA	24	OS/1100	NA	NA	36	$6.7 million with 4 CPUs, 64M-byte memory, 4 consoles, 24 channels, 2 power supplies

Hardware Roundup: Special-purpose systems

VENDOR	PRODUCT	DATE FIRST INSTALLED	PRIMARY MARKET[1]	MOST COMPATIBLE IBM OR DEC SYSTEM	PERFORMANCE (MIPS)	PERFORMANCE (MFLOPS[2])	BENCHMARK[3]	MACHINE CYCLE TIME (NSEC)	MEMORY (MBYTES)	DISK TRANSFER RATE (MBYTES PER SECOND)	PORTS	CHANNELS	OPERATING SYSTEMS	MAXIMUM NUMBER OF USERS	TYPICAL NUMBER OF USERS	WORD LENGTH (BITS)	BASE PRICE
Alliant Computer Systems Corp. (617) 486-4050	FX/1	Sept. 1985	SE	VAX 8600	5	8.6 (S), 11.8 (P)	5,000 DH (actual), 2.0M LP (actual)	170	8-64	2.5	NA	2	Concentrix	16	16	64	$99,500 with 16M-byte memory, console, 536M-byte disk, tape drive, 2 ports
	FX/8 (1-8 processors)	June 1985	SE	VAX 8800, IBM 3090	40	68.5 (S), 94.4 (P)	5,000 (per processor) DH (actual), 11M LP (actual), 7.6M LL (actual)	170	16-256	2.5	NA	12	Concentrix	128	32	64	$285,000 with 16M-byte memory, console, 536M-byte disk, tape drive, 2 ports
Amdahl Corp. (408) 746-7050	Model 500 vector processor	Nov. 1984	SE	IBM 3090 Model 200	NA	143 (P)	15M LP (actual)	7-14	32-128	3	256	32	MVS/XA with Amdahl VP/XA	NA	NA	16-128	$3 million with 32M-byte memory, 16 channels, vector unit, scalar unit
	Model 1100 vector processor	Sept. 1985	SE	IBM 3090 Model 300	NA	286 (P)	17M LP (actual)	7-14	32-128	3	256	32	MVS/XA with Amdahl VP/XA	NA	NA	16-128	$4 million with 32M-byte memory, 16 channels, vector unit, scalar unit
	Model 1200 vector processor	March 1986	SE	IBM 3090 Model 400	NA	571 (P)	19.5M LP (actual)	7-14	64-256	3	256	32	MVS/XA with Amdahl VP/XA	NA	NA	16-128	$5.5 million with 64M-byte memory, 16 channels, vector unit, scalar unit
	Model 1400 vector processor	NA	SE	NA	NA	1,142 (P)	NA	7-14	64-256	3	256	32	MVS/XA with Amdahl VP/XA	NA	NA	16-128	$6 million with 64M-byte memory, 16 channels, vector unit, scalar unit
BBN Advanced Computers, Inc. (617) 497-3700	Butterfly Parallel Processor	1981	DP, SE	NA	Up to 250	80 (S)	NA	NA	Up to 1G	NA	256	256	Chrysalis	256	4-16	32	$375,000 with 32M-byte memory, 32 channels, operating system
Convex Computer Corp. (214) 952-0200	C-1 series	1985	SE	NA	6.4	16 (S), 20 (P)	7,249 DH (actual), 3.1M LP (actual)	100	16-64	4	128	5	Unix 4.2	128	10-60	64	$350,000 with 16M-byte memory, 16 ports, 500M-byte disk, tape drive
Cray Research, Inc. (612) 333-5889	Cray X-MP/14 SE	1987	DP, SE	IBM 3090	NA	160* (P)	NA	8.5	Up to 32	5.9-9.6	NA	NA	Unicos, COS	NA	NA	64	$2.5 million with power disk unit
	Cray X-MP/1	1982	SE	NA	NA	200-235* (P)	NA	8.5	32-128	5.9-9.6	NA	NA	Unicos, COS	NA	NA	64	$5.5 million with 32M-byte memory
	Cray X-MP/2	1983	SE	NA	NA	400-666 (P)	NA	8.5	16-128	5.9-9.6	NA	NA	Unicos, COS	NA	NA	64	$6 million with 16M-byte memory
	Cray X-MP/4	1982	SE	NA	NA	1.2G FLOPS (P)	NA	8.5	32-128	5.9-9.6	NA	NA	Unicos, COS	NA	NA	64	$12 million with 32M-byte memory
	Cray-2S series	Third quarter 1987	SE	IBM 3090	NA	2.1G FLOPS (P)	NA	4.1	512M-1G	9.6	20-40	2-4	Unicos	NA	NA	64	$12 million with 512M-byte memory
	Cray-2	1985	DP	NA	NA	1.73G FLOPS (P)	NA	4.1	Up to 2G	9.6	20-40	2-4	Unicos	NA	NA	64	$15.5 million with Cray-2/4-256 system
CSP, Inc. (800) 325-3110 (617) 272-6020 (Mass.)	Mini-MAP XL array processor	May 1982	DP	NA	NA	38 (P)	NA	125	Up to 16	NA	4	NA	VMS, MicroVMS, RSX	4	1	32	$32,500 with 5M-byte memory, power supply, Fortran cross-compiler
ETA Systems, Inc. (612) 642-3421	ETA-10 (1-10 CPUs)	April 1987	DP, SE	NA	NA	4G FLOPS (S), up to 10G FLOPS (P)	NA	10.5-7	32 per CPU plus 512M-4G shared memory	96M bit/sec.	18	6	ETA VSOS, Unix	5,000	100-	64	$5 million to $32.5 million
Floating Point Systems, Inc. (503) 641-3151	M64 series minisuper-computers	1981	SE	NA	NA	6-341 (P)	5.9M (M64/60) LP (actual)	53 (M64/60)	8-128	2	6	6	SJE	NA	12	64	$100,000 with 8M-byte memory, disk subsystem, Fortran compiler
	T series (up to 16,384 nodes)	April 1986	SE	NA	7.5 per node	12 per node (S), 12 per node (P)	NA	67	1 per node	2	NA	NA	FPS, TSE	NA	NA	64	$1 million with 16 nodes, front-end computer, backup disks, power supplies
Gould, Inc. Computer Systems Division (800) GOULD-10	Sel-Connection	March 1987	SE	Microvax	3.262-35.096	0.106 (S)	0.106M LP (actual)	150	2-144	NA	256-2,048	16-128	MPX-32	2,048	128	32	$80,000
	NP1 Model 110	June 1987	DP	VAX 8800 series	10	NA	NA	53	32M-4G	3	256	128	Unix System V, Unix 4.2	256	128	32	$375,000 with processor 64M-byte memory, controllers

*Computerworld estimates based on vendor-supplied information.

[1] Commercial data processing (DP); scientific/engineering (SE); office automation (OA); on-line transaction processing (TP).

[2] Full-precision millions of floating-point operations per second (MFLOPS). Sustained (S); peak (P).

[3] Per-second performance ratings, based on the following industry-standard benchmarks: Dhrystone, Version 1.1, peephole optimization only (DH); Debit-Credit (ET1) transactions based on 95% subsecond responses (DC); Linpack 100 x 100 full-precision (LP); Livermore Loops harmonic mean, 14 loops (LL). Vendors supplied either actual or estimated benchmark figures.

The companies included in this chart responded to a recent written survey conducted by *Computerworld*. Further product information is available from the vendors.

VENDOR	PRODUCT	DATE FIRST INSTALLED	PRIMARY MARKET[1]	MOST COMPATIBLE IBM OR DEC SYSTEM	PERFORMANCE (MIPS)	PERFORMANCE (MFLOPS[2])	BENCHMARK[3]	MACHINE CYCLE TIME (NSEC)	MEMORY (MBYTES)	DISK TRANSFER RATE (MBYTES PER SECOND)	PORTS	CHANNELS	OPERATING SYSTEMS	MAXIMUM NUMBER OF USERS	TYPICAL NUMBER OF USERS	WORD LENGTH (BITS)	BASE PRICE
Gould, Inc. Computer Systems Division (800) GOULD-10	NP1 Model 110 SP	June 1987	SE	VAX 8000 series	13.1	10 (S), 20 (P)	16,700 DH (actual), 3.15M LP (actual)	52	32M-4G	3	256	7	Unix System V, Unix 4.3	256	128	64	$435,000 with processor, 64M-byte memory, controllers
	NP1 Model 120	June 1987	DP	VAX 8000 series	20	NA	NA	52	32M-4G	3	NA	7	Unix System V, Unix 4.3	256	128	32	$460,000 with processor, 64M-byte memory, controllers
	NP1 Model 120 SP	June 1987	SE	VAX 8000 series	26.2	20 (S), 40 (P)	33,400 DH (actual), 6.30M LP (actual)	52	32M-4G	3	256	7	Unix System V, Unix 4.3	256	128	64	$545,000 with processor, 64M-byte memory, controllers
	NP1 Model 240	June 1987	DP	VAX 8000 series	40	NA	NA	52	32M-4G	3	512	14	Unix System V, Unix 4.3	512	256	32	$926,000 with 4 processors, 128M-byte memory, controllers
	NP1 Model 240 SP	June 1987	SE	VAX 8000 series	52.4	40 (S), 80 (P)	66,800 DH (estimate), 12.6M LP (estimate)	52	32M-4G	3	512	14	Unix System V, Unix 4.3	512	256	64	$1.01 million with 4 processors, 128M-byte memory, controllers
	NP1 Model 360	June 1987	DP	VAX 8000 series	60	NA	NA	52	32M-4G	3	768	21	Unix System V, Unix 4.3	768	384	32	1.22 million with 6 processors, 192M-byte memory, controllers
	NP1 Model 360 SP	June 1987	SE	VAX 8000 series	78.6	60 (S), 120 (P)	100,200 DH (estimate), 18.9M LP (estimate)	52	32M-4G	3	768	21	Unix System V, Unix 4.3	768	384	64	$1.475 million with 6 processors, 192M-byte memory, controllers
	NP1 Model 480	June 1987	DP	VAX 8000 series	80	NA	NA	52	32M-4G	3	1,024	28	Unix System V, Unix 4.3	1,024	512	32	$1.6 million with 8 processors, 256M-byte memory, controllers
	NP1 Model 480 SP	June 1987	SE	VAX 8000 series	104.8	80 (S), 160 (P)	133,600 DH (estimate), 25.2M LP (estimate)	52	32M-4G	3	1,024	28	Unix System V, Unix 4.3	1,024	512	64	$1.940 million with 8 processors, 256M-byte memory, controllers
Honeywell-NEC Supercomputers, Inc. (617) 270-7600	SX 2 series (3 models)	1987	SE	NA	NA	330M-1.3G (P)	NA	6	Up to 8G	3	NA	NA	SXCP	NA	NA	32-64	$7 million to $20 million
Integrated Inference Machines, Inc. (714) 978-6776	SM 45000	Jan. 1987	DP, SE	NA	NA	15 (S), 30 (P)	NA	67	Up to 360	NA	2	10	Common LISP, MS-DOS	1	1	40	$30,000 with 16M-byte memory, 33M-byte disk, 2 processors
Intel Scientific Computers (503) 629-7629	IPSC series	July 1985, Jan. 1988	SE	NA	512	427 (P)	90M (64 CPUs) LP (estimate)	NA	64M-1G	NA	NA	1-448	Unix	4	1-8	32-64	$45,950 with 140M-byte disk, 1 tape drive, 9 ports
Multiflow Computer, Inc. (203) 488-6090	Trace 7/200	July 1987	SE	NA	53	6.0 (S), 10 (P)	6.0M LP (actual)	130	16-512	3-12	64	2	Unix 4.3	64	48	256	$290,500 with 16M-byte memory, 515M-byte disk, processor, operating system, Fortran compiler
National Advanced Systems Corp. (415) 962-6361	AS/XL vector series	Oct. 1986	SE	IBM 3090	NA	108 (per processor) (P)	NA	18	512M-2G	3-6	NA	Up to 128	IBM-compatible operating systems	NA	NA	32-64	$3.6 million to $14.2 million with host CPU, vector processor
Numerix Corp. (617) 964-2500	NMX-464 array processor	April 1987	SE	NA	NA	12 (P)	2.0M LP (actual)	125-250	Up to 64	NA	3	NA	VMX, Ultrix	NA	NA	64	$85,000
	NMX-432 array processor	Aug. 1983	SE	NA	NA	30 (32-bit) (P)	NA	100	Up to 64	NA	4	NA	VMX, Ultrix	1	1	32	$64,000
Pixar (415) 499-3600	Pixar Image Computer	Oct. 1985	SE	NA	40	NA	NA	100	24-48	NA	NA	NA	Unix	1	NA	16	$79,000
Scientific Computer Systems Corp. (619) 546-1212	SCS-40	July 1986	SE	NA	18	40 (S), 44 (P)	8M LP (actual)	45	8-32	1.8-12	NA	8	CTSS	32	15	64	$575,000 with 16M-byte memory
Star Technologies, Inc. (800) 782-7005	ST-50 array processor	Oct. 1985	SE	NA	NA	50 (S), 50 (P)	NA	80	Up to 4G	8	3	3	Attached host operating system	16	1	32	$115,000 with 8M-byte memory, host interface, power supply
	ST-100 array processor	July 1983	SE	NA	NA	100 (S), 100 (P)	NA	40	Up to 4G	8M	7	7	Attached host operating system	NA	1	32	$265,000 with 8M-byte memory, host interface, power supply
Symbolics, Inc. (617) 621-7500	3650 Symbolic Processing System	1986	DP	NA	NA	NA	NA	NA	4-16	NA	2	NA	Genera	NA	1	36	$35,900 with processor, 190M-byte disk, 4M-byte memory
	3630	1986	DP	NA	NA	NA	NA	NA	4-64	NA	2	NA	Genera	1	1	36	$42,000 with processor, 190M-byte disk
	3675	1986	DP	NA	NA	NA	NA	NA	4-30	NA	NA	NA	Genera	1	1	36	$80,000 with processor, 5.5M-byte drive
Teradata Corp. (213) 827-8777	DBC/1012 (3-1,024 CPUs) data base machine	Dec. 1983	DP	IBM 3090	3-1,024	NA	NA	125	NA	1.8	1-512	NA	Teradata operating system	61,440	700	32	$165,000 with 6M-byte memory, 1G-byte disk

Hardware Roundup: Medium-scale systems

VENDOR	PRODUCT	DATE FIRST INSTALLED	PRIMARY MARKET[1]	MOST COMPATIBLE IBM OR DEC SYSTEM	PERFORMANCE (MIPS)	PERFORMANCE (MFLOPS[2])	BENCHMARK[3]	MACHINE CYCLE TIME (NSEC)	MEMORY (MBYTES)	DISK TRANSFER RATE (MBYTES PER SECOND)	PORTS	CHANNELS	OPERATING SYSTEMS	MAXIMUM NUMBER OF USERS	TYPICAL NUMBER OF USERS	WORD LENGTH (BITS)	BASE PRICE
AT&T Contact local sales office	3B4000 (1-4 CPUs)	March 1986	DP, TP	NA	1.8-43	NA	NA	NA	4-16 (per CPU)	NA	NA	NA	Unix System V, Rel. 3.1.1	300	NA	32	$187,000 with 8M-byte master CPU, 4M-byte adjunct CPU, 600M-byte disk, tape drive
Celerity Computing (800) 433-4481 (800) 443-0940 (Calif.)	C1230	Nov. 1985	DP, SE	VAX 8500	10	1.5 (P)	0.58M LP (actual)	100	4-24	2.3	128	2	Unix 4.3, Unix System V	128	70	32	$76,000 with CPU, 4M-byte memory, 337M-byte disk, operating system
	C1260	Dec. 1985	SE	VAX 8600	20	3(P)	0.88M LP (actual)	100	4-24	2.3	256	2	Unix 4.3	256	150	32	$110,000 with CPU, 4M-byte memory, disk, operating system
Computer Consoles, Inc. (800) 345-1942 (800) 227-4822 (Calif.)	Power 6/305	Jan. 1987	OA	VAX 8250	5	NA	NA	100	4-16	10M bit/sec	96	3	CCI System V	64	NA	32	$88,950 with CPU, 4M-byte memory, 380M-byte disk, controller, operating system
	Power 6/32X	July 1984	SE	VAX 8300	8	0.5 (S), 0.5 (P)	NA	100	16-32	14.4M bit/sec	384	32	CCI System V	128	NA	32	$173,000 with CPU, floating-point processor, 16M-byte memory, controller, operating system
	Power6/32XX	NA	OA	VAX 8200	5	NA	NA	100	16-32	14.4M bit/sec	384	32	CCI System V	64	NA	32	$145,000 with CPU, floating-point processor, 8M-byte memory, disk, controller, operating system
	Power 6/32SX	Jan. 1987	OA	VAX 8300	8	NA	NA	100	4-16	10M bit/sec	96	5	CCI System V	96	NA	32	$100,950 with CPU, 4M-byte memory, 380M-byte disk, controller, operating system
	Power 6/32MP	Feb. 1987	SE	VAX 8700	25	NA	NA	100	16-32	14.4M bit/sec	384	32	CCI System V	180	NA	32	$257,000 with 2 floating point processors, 16M-byte memory, disk, controller, operating system
Computer Designed Systems, Inc. (812) 545-3855	Advancer series Model 2200/2900	1985	DP	IBM 4381; VAX 8600, 8800	16	NA	NA	75 standard, 25 optional	4-64	3.5-5	32 per channel	NA	Avon, Unix	400	160-270	64	$135,000 with CPU, 12M-byte memory
Concurrent Computer Corp. (800) 631-2154	Model 3230XP	1985	DP, SE, TP	VAX 8250	1	1 (S)	4.6 DC (actual)	200	1-16	3	16	NA	OS/32, Xelos	128	64	32	$92,000 with 2M-byte memory
	Model 3230MPS (1-6 CPUs)	1986	DP, SE, TP	VAX 8300, 8530	1.9-6.5	1.9-6.5 (S)	4.6 DC (actual)	200	2-16	3	16	NA	OS/32	128	64	32	$140,000 with 2M-byte memory
	Model 3252XP	1986	DP, SE, TP	VAX 8300	1.4	1.4 (S)	4.9 DC, 0.17 LP (actual)	200	2-16	3	32	NA	OS/32, Xelos	256	128	32	$171,000 with 2M-byte memory
	Model 3280MPS (1-10 CPUs)	1986	DP, SE, TP	VAX 8550, 8700	2.3-8	2.3-9 (S)	5.0 DC (actual)	200	2-16	3	32	NA	OS/32	256	160	32	$300,000 with 2M-byte memory
	Model 3280MPS (1-6 CPUs)	1986	DP, SE, TP	VAX 8550, 8700, 8800	6.4-38.0	6.4-38.0 (S)	4,500 DH, 10.8 DC, 0.87 LP (actual)	100	2-16	3	32	NA	OS/32	512	160	32	$395,000 with 4M-byte memory
Control Data Corp. (612) 853-3400	Cyber 180 Model 930-11	NA	DP, SE	NA	1.8	NA	0.37M LP (actual)	50	8-64	1.8	10	12	NOS/VE	NA	40-60	64	$59,900 with 32K-byte cache, 8M-byte memory, power supplies
	Cyber 180 Model 930-31	NA	DP, SE	NA	3	NA	0.58M[4] LP (actual)	50	8-64	1.8	10	12	NOS/VE	NA	50-100	64	$125,900 with 32K-byte cache, 8M-byte memory, power supplies
	Cyber 180 Model 840A	NA	DP, SE	NA	4.7	NA	0.99M[4] LP (actual)	16	16-128	12	30	24-34	NOS/VE, NOS, NOS/BE	NA	100-200	64	$580,000 with 16M-byte memory, 16K-byte cache, power supplies
	Cyber 180 Model 850A	NA	DP, SE	NA	6.7	NA	1.6M[4] LP (actual)	16	16-128	12	30	24-34	NOS/VE, NOS, NOS/BE	NA	100-200	64	$830,000 with 16M-byte memory, 16K-byte cache, power supplies
Convergent Technologies, Inc. (408) 434-2848	S/1280 (1-4 CPUs)	Oct. 1986	DP	VAX 8250	2.5-8.5	NA	NA	200	3-24	8M-24M bit/sec	100	NA	Unix V.2, Unix V.3	128	40	32	$36,000 with 2M-byte memory, 16 ports, 84M-byte disk, tape, power supply, operating system
Data General Corp. (617) 870-7755	MV/15000 Model 8	Dec. 1986	DP, SE, OA, TP	VAX 8530; IBM 9375 Model 60	3	0.4450 (S)	2,702 DH (actual)	85	4-32	2.2	416	2	AOS/VS, DG/VX, AOS/RT32	150	40-80	32	$57,200 with 4M-byte memory, 2 channels, power supply, operating system
	MV/15000 Model 10	Dec. 1986	DP, SE, OA, TP	VAX 8530; IBM 9377 Model 90	4.4	0.5876 (S)	4,672 DH (actual)	85	4-32	2.2	416	2	AOS/VS, DG/VX, AOS/RT32	250	60-120	32	$123,100 with power supply, 2 channels, 8M-byte memory, operating system
	MV/15000 Model 20	Dec. 1986	DP, SE, OA, TP	VAX 8550; IBM 4381 Model 13	6.8	0.7262 (S)	8,928 DH (actual)	85	4-32	2.2	416	2	AOS/VS, DG/VX, AOS/RT32	300	80-160	32	$204,500 with 8M-byte memory, power supply, operating system
	MV/20000 Model 1	March 1986	DP, SE, OA, TP	VAX 8700	6.8	0.7262 (S)	8,928 DH (actual)	85	Up to 64	2.2	1,000	5	AOS/VS, DG/VX, AOS/RT32	400	100-250	32	$271,000 with 16M-byte memory, power supply, operating system
	MV/20000 Model 2	Nov. 1986	DP, SE, OA, TP	VAX 8800	13.3	1.475 (S)	15,833 DH (actual)	85	Up to 64	2.2	1,000	5	AOS/VS	800	150-350	32	$374,000 with 16M-byte memory, power supply, operating system
Datapoint Corp. (512) 699-7000	Model 7900 Starship II	Sept. 1986	DP, OA	IBM 9375 Model 60, IBM 9377 Model 90; VAX 8250, 8530	1.5-3	NA	NA	100	4-16	1.5-5	Up to 3,000	3-16	Datapoint RMS/XA	200	50-100	32	$79,000 with 4M-byte memory, 2 CPUs, 2 I/O ports, power supply

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Computerworld estimates based on vendor-supplied information.

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[3] Per-second performance ratings, based on the following industry-standard benchmarks. Dhrystone, Version 1.1, peephole optimization only (DH); Debit-Credit (ET1) transactions based on 95% subsecond responses (DC); Linpack 100 x 100 full-precision (LP); Livermore Loops harmonic mean, 14 loops (LL). Vendors supplied either actual or estimated benchmark figures.

[4] Local-area network interfaces.

[5] Unisys uses data link processors in place of conventional channels on these systems.

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VENDOR	PRODUCT	DATE FIRST INSTALLED	PRIMARY MARKET[1]	MOST COMPATIBLE IBM OR DEC SYSTEM	PERFORMANCE (MIPS)	PERFORMANCE (MFLOPS[2])	BENCHMARK[3]	MACHINE CYCLE TIME (NSEC)	MEMORY (MBYTES)	DISK TRANSFER RATE (MBYTES PER SECOND)	PORTS	CHANNELS	OPERATING SYSTEMS	MAXIMUM NUMBER OF USERS	TYPICAL NUMBER OF USERS	WORD LENGTH (BITS)	BASE PRICE
Digital Equipment Corp. Contact local sales office	VAX 8350	1987	DP	NA	2.5*	NA	NA	NA	32-128	1	NA	NA	VMS	NA	24-96	32	$124,000 with 32M-byte memory, operating system
	VAX 8530	1987	DP	NA	4*	NA	NA	NA	32-256	1	NA	NA	VMS	NA	48-192	32	$342,000 with 32M-byte memory, operating system
	VAX 8550	1986	DP	NA	6*	NA	NA	45	32-384	1	NA	NA	VMS	NA	72-320	32	$506,000 with 32M-byte memory, operating system
	VAX 8700	1986	DP	NA	6*	NA	NA	45	48-256	1	NA	NA	VMS	NA	72-320	32	$592,000 with 48M-byte memory, operating system
	VAX 8800	1986	DP	NA	12*	NA	NA	45	48-256	1	NA	NA	VMS	NA	100-400	32	$885,000 with 48M-byte memory, operating system
Edge Computer Corp. (602) 951-2020	Edge 1 Model 500	Jan. 1986	SE, TP	VAX 8600	6	NA	NA	130	8-64	NA	Up to 200	NA	Unix System V.2	200	64-128	32	$100,000 with 8M-byte memory, 337M-byte disk, cabinet
	Edge 1100	July 1987	SE, TP	VAX 8650	6	NA	NA	130	8-64	NA	200	NA	Unix V and Pick	256	96-250	32	$105,000 with 8M-byte memory, 600M-byte disk, cabinet
	Edge 1200	Aug. 1982	SE, TP	VAX 8800	11	NA	NA	130	8-64	NA	Up to 500	NA	Unix V.2, Pick	500	250-300	32	$125,000 with 8M-byte memory, 600K-byte disk, cabinet
Encore Computer Corp. (617) 460-0500	Multimax 120 (2-20 CPUs)	Dec. 1985	DP, SE	VAX 8700, IBM 4381	1.5-15	Up to 5 (S), up to 6 (P)	1,300 DH (actual)	0.08M (per CPU) LP (actual)	4-128	1.5-4	NA	15	Umax 4.2, Umax V, Mach	1,000	100	32	$112,000 with 8M-byte memory, terminal, 500M-byte disk, tape, 2 CPUs
	Multimax 320 (2-20 CPUs)	June 1987	DP, SE	VAX 8800, IBM 4381	4-40	Up to 2 (S), up to 40 (P)	3,781 per CPU DH (actual), 2.16 per CPU LP (actual)	80	4-128	1.5-4	NA	15	Umax 4.2, Umax V, Mach	1,000	200	32	$142,000 with 8M-byte memory, terminal, 500M-byte disk, tape, 2 CPUs
Elxsi Ltd. (408) 942-0900	System 6400 (1-12 CPUs)	Dec. 1983	SE	VAX 8700, VAX 8800	12-144	4 (S), 6.7 (P)	9,549 DH (actual)	50	Up to 2G	2.4	128	8	EMBOS, EMS, Unix System V, Unix 4.2	1,000	100-300	64	$390,000 with 16M-byte memory, 1 474M-byte disk, power supplies, cabinet, tape
Flexible Computer Corp. (214) [illegible]	Flex/32 Multicomputer Series 600 (2-4 CPUs)	Aug. 1986	SE	VAX	6-12	0.6-1.2 (S), 2-4 (P)	NA	45-100	2-67.5	2.5	205	205	Unix System V, MMOS	256	20-30	32	$80,000
	Flex/32 Multicomputer Series 1200 (2-8 CPUs)	Aug. 1986	SE	VAX	12-24	1.2-2.4 (S), 4-8 (P)	NA	45-100	2-67.5	2.5	1,000	1,000	Unix System V, MMOS	1,000	30-60	32	$90,000
	Flex/32 Multicomputer Series 2000 (2-10 CPUs)	Jan. 1985	SE	VAX	24-30	2.4-3 (S), 8-10 (P)	NA	45-100	2-80	2.5	2,040	2,000	Unix System V, MMOS	2,040	70-80	32	$150,000
	Flex/32 Multicomputer Series 3000 (2-30 CPUs)	Feb. 1985	SE	VAX	30-60	3-6 (S), 10-20 (P)	NA	45-100	2-180	2.5	2,500	2,500	Unix System V, MMOS	2,500	90-100	32	$300,000
	Flex/32 Multicomputer Series 6000 (22-60 CPUs)	Nov. 1986	SE	VAX	60-120	6-12 (S), 20-40 (P)	NA	45-100	24-240	2.5	5,100	5,100	Unix System V, MMOS	5,100	100-120	32	$600,000
Gould Inc., Computer Systems Division (800) GOULD-10	Concept 32/67 series	June 1983	SE	VAX 11/782	3.262	0.166 (S)	0.166M LP (actual)	150	2-16	NA	256	16	MPX-32	256	128	32	$40,000
	Concept 32/97 series	March 1984	SE	VAX 8600	10.7	0.593 (S)	0.591M LP (actual)	75	4-16	NA	256	16	MPX-32	256	128	32	$200,000
	Powernode 60 series	Nov. 1984	SE	VAX 11/782	4.2	0.25 (S)	0.25M LP (actual)	150	2-16	NA	256	16	MPX-32	256	128	32	$40,000
	Powernode 90 series	Dec. 1984	SE	VAX 8600	13.5	0.91 (S)	0.94M LP (actual)	75	4-16	NA	256	16	MPX-32	256	128	32	$200,000
Harris Corp. Computer Systems Division (800) 4-HARRIS	MCX-5 Model 30	Feb. 1987	SE	Microvax	4.1	NA	4,444 DH (actual), 325K LP (actual), 302K LL (actual)	60	2-16	650K-2.4M	32	20	Unix System V with real-time extensions	32	2-16	32	$27,500 with CPU, 2M-byte memory, 650K-byte disk, power supply, two-user Unix license
	MCX-3 Model 60	Jan. 1986	SE, OA	VAX 8200	10.5	NA	11,332 DH (actual), 829K LP (actual), 1M LL (actual)	60	2-16	650K-2.4M	19	13	Unix System V with real-time extensions	32	2-16	32	$32,400 with CPU, 2M-byte memory, 650K-byte disk, two-user Unix license, power supply
	MCX-5 Model 60	Jan. 1986	DP, OA, SE	VAX 8500, 8550	10.5	NA	11,332 DH (actual), 829K LP (actual), 1M LL (actual)	60	4-16	650K-2.4M	64	24	Unix System V with real-time extensions	64	32	32	$39,800 with CPU, 4M-byte memory, 650K-byte disk, power supply, two-user Unix license
	MCX-5 Model 70	Jan. 1986	DP, SE	VAX 8800	17.2	NA	18,666 DH (actual), 1.365M LP (actual), 1.646M LL (actual)	60	4-32	650K-2.4M	96	40	Unix System V	96	64-100	32	$73,000 with 2 CPUs, 4M-byte memory, 650K-byte disk, 16-user Unix license, power supply
	HCX-5	July 1987	DP, SE, OA, TP	VAX 8530	5	0.28 (S), 0.52 (P)	4,946 DH (actual)	100	4-32	2.46	32	6	HCX/UX	32	16	32	$124,500 with 4M-byte memory, 32-user HCX/UX license, power supplies
	HCX-9	May 1987	DP, SE, OA, TP	VAX 8700	8	0.46 (S), 0.87 (P)	10,156 DH (actual)	100	4-128	2.46	256	40	HCX/UX	256	96	32	$196,500 with 4M-byte memory, 32-user HCX/UX license, power supplies
	HCX-7	June 1985	DP, SE, OA, TP	VAX 8650	7.5	0.40 (S), 0.87 (P)	10,156 DH (actual)	100	2-32	1.8	235	35	HCX/UX	235	96	32	$302,500 with 2M-byte memory, 32-user HCX/UX license, power supplies
	H800	June 1984	SE	NA	0.88	NA	NA	300	1.5-12	2.4	48	6	RT-VOS/MP, RT-VOS, VOS, VUE	48	NA	32-48	$48,000

VENDOR	PRODUCT	DATE FIRST INSTALLED	PRIMARY MARKET[1]	MOST COMPATIBLE IBM OR DEC SYSTEM	PERFORMANCE (MIPS)	PERFORMANCE (MFLOPS[1])	BENCHMARK[2]	MACHINE CYCLE TIME (NSEC)	MEMORY (MBYTES)	DISK TRANSFER RATE (MBYTES PER SECOND)	PORTS	CHANNELS	OPERATING SYSTEMS	MAXIMUM NUMBER OF USERS	TYPICAL NUMBER OF USERS	WORD LENGTH (BITS)	BASE PRICE
Harris Corp. Computer Systems Division (800) 4-HARRIS	**H700**	**April 1983**	**SE**	**NA**	**0.80**	**NA**	**NA**	**300**	**12**	**2.4**	**128**	**31**	**RT-VOS/MP, RT-VOS, VOS, VUE**	**128**	**NA**	**32-48**	**$56,000**
	H800	**Aug. 1982**	**SE**	**NA**	**1.58**	**0.23 (S)**	**0.23M LP (actual)**	**150**	**12**	**2.4**	**128**	**31**	**RT-VOS/MP, RT-VOS, VOS, VUE**	**128**	**NA**	**32-48**	**$164,000**
	H900	**Aug. 1987**	**SE**	**NA**	**4.8**	**0.57 (S)**	**0.57M LP (actual)**	**75**	**12**	**2.4**	**96**	**18**	**RT-VOS/MP, RT-VOS, VOS, VUE**	**192**	**NA**	**32-96**	**$240,000**
	H1000	**Jan. 1984**	**SE**	**NA**	**4.8**	**0.57 (S)**	**0.57M LP (actual)**	**75**	**12**	**2.4**	**192**	**31**	**RT-VOS/MP, RT-VOS, VOS, VUE**	**192**	**NA**	**32-96**	**$250,000**
	H1100	**Aug. 1987**	**SE**	**NA**	**5**	**0.85 (S)**	**0.85 LP (actual)**	**75**	**12**	**2.4**	**96**	**19**	**RT-VOS/MP, RT-VOS, VOS, VUE**	**224**	**NA**	**32-96**	**$280,000**
	H1200	**June 1985**	**DP**	**NA**	**5**	**0.85 (S)**	**0.85M LP (actual)**	**75**	**12**	**2.4**	**224**	**31**	**RT-VOS/MP, RT-VOS, VOS, VUE**	**224**	**NA**	**32-96**	**$290,000**
	H1500	**Aug. 1987**	**SE**	**NA**	**10**	**1.70 (S)**	**1.70M LP (actual)**	**75**	**24**	**2.4**	**320**	**50**	**RT-VOS/MP, RT-VOS, VOS, VUE**	**320**	**NA**	**32-96**	**$555,000**
	H1600	**Sept. 1987**	**SE**	**NA**	**15**	**2.55 (S)**	**2.55M LP (actual)**	**75**	**36**	**2.4**	**416**	**60**	**RT-VOS/MP, RT-VOS, VOS, VUE**	**416**	**NA**	**32-96**	**$795,000**
Hewlett-Packard Co. Contact local sales office	HP 3000 Series 58	1985	DP	IBM System/38	0.57*	NA	NA	105	4-8	1	152	5	MPE V	60	30-40	16	$75,000 with 4M-byte memory
	HP 3000 Series 70	April 1986	DP	IBM 4381 Model 11	1.7*	NA	NA	75	8-16	1	400	15	MPE V	NA	16	16	$150,000 with 8M-byte memory
	HP 3000 Series 930	1987	DP	VAX 8600, IBM 4381 Model 12	4.5	NA	NA	125	32-96	1	400	14	MPE XL	400	200	48	$186,500 with 16M-byte memory
	HP 3000 Series 950	Fourth quarter 1987	DP	VAX 8700, IBM 4381	7	NA	NA	73	32-128	1	NA	NA	MPE XL	NA	NA	48	$300,000
	HP 9000 Series 800 Model 840S	1986	SE	VAX 8600, 8530	4.5	NA	NA	125	8-96	1.2	128	NA	HP-UX	NA	16-50	32	$81,500 with 8M-byte memory, operating system
	HP 9000 Series 800 Model 850S	Fourth quarter 1987	SE	VAX 8550, 8700	7	NA	NA	NA	16-128	NA	NA	NA	HP-UX	90	50-80	NA	$200,000 with 16M-byte memory, operating system, power supply
Honeywell Bull, Inc. (800) 328-5111 ext. 90	**DPS 7000 Model 10**	**First quarter 1986**	**DP, TP**	**IBM 9370 series**	**0.60***	**NA**	**NA**	**150**	**2-16**	**1.8**	**4**	**4**	**GCOS 7**	**NA**	**15**	**32**	**$112,000 with CPU, 4M-byte memory, 4 ports, 700M-byte disk, tape**
	DPS 7000 Model 20	**Aug. 1987**	**DP, TP**	**IBM 9370 series**	**0.60***	**NA**	**NA**	**150**	**2-16**	**1.8**	**4**	**4**	**GCOS 7**	**NA**	**30**	**32**	**$70,000 with CPU, 8M-byte memory, 4 ports, console**
	DPS 7000 Model 30	**Aug. 1987**	**DP, TP**	**IBM 9370 series**	**1.0***	**NA**	**NA**	**150**	**2-16**	**1.8**	**4-8**	**4-8**	**GCOS 7**	**NA**	**80**	**32**	**$100,000 with CPU, 8M-byte memory, 4 ports, console**
	DPS 7000 Model 40	**Aug. 1987**	**DP, TP**	**IBM 9370 series**	**2.10***	**NA**	**NA**	**150**	**2-16**	**1.8**	**4-8**	**4-8**	**GCOS 7**	**NA**	**150**	**32**	**$140,000 with CPU, 8M-byte memory, 4 ports, console**
	DPS 7000 Model 80	**Fourth quarter 1987**	**DP**	**IBM 9370 series**	**3.8***	**NA**	**NA**	**150**	**2-16**	**1.8**	**4-8**	**4-8**	**GCOS 7**	**1,000**	**300**	**32**	**$193,200 with 2 CPUs, 8M-byte memory, 4 ports, console**
	DPS 8/47	**First quarter 1983**	**DP, TP**	**IBM 4381 Model 21**	**0.73***	**NA**	**10 DC (estimate)**	**NA**	**8-64**	**1.2**	**10**	**25**	**GCOS 8**	**NA**	**115**	**36**	**$153,000 with CPU, 4M-byte memory, console**
	DPS 8/49	**First quarter 1983**	**DP, TP**	**IBM 4381 Model 22**	**1.1***	**NA**	**17 DC (estimate)**	**NA**	**8-64**	**1.2**	**10**	**25**	**GCOS 8**	**NA**	**170**	**36**	**$225,000 with CPU, 4M-byte memory, console**
	DPS 8/52	**Second quarter 1980**	**DP, TP**	**IBM 4381 Model 22**	**1.1***	**NA**	**17 DC (estimate)**	**NA**	**8-64**	**3**	**16**	**32**	**GCOS 8**	**NA**	**170**	**36**	**$450,000 with CPU, 8M-byte memory, console**
	DPS 8/62	**Second quarter 1980**	**DP, TP**	**IBM 4381 Model 22**	**1.2***	**NA**	**21 DC (estimate)**	**NA**	**8-64**	**3**	**16**	**32**	**GCOS 8**	**NA**	**230**	**36**	**$550,000 with CPU, 8M-byte memory, console**
	DPS 8/70	**Second quarter 1980**	**DP, TP**	**IBM 4381 Model 23**	**1.8***	**NA**	**27 DC (estimate)**	**NA**	**8-64**	**3**	**16**	**64**	**GCOS 8**	**NA**	**300**	**36**	**$700,000 with CPU, 8M-byte memory, console**
IBM Contact local sales office	9373 Model 20	July 1987	DP, SE, OA, TP	NA	0.5*	NA	0.137M LP (actual)	90	4-16	Up to 3	NA	NA	VM/SP, VM/IS, VSE/SP, IX/370	NA	20-50	32	$31,000 with 4M-byte memory
	9375 Model 40	Oct. 1987	DP, SE, OA, TP	NA	0.5*	NA	0.18M LP (actual)	90	8-16	Up to 3	NA	NA	VM/SP, VM/IS, VSE/SP, IX/370	NA	NA	32	$65,000 with 8M-byte memory
	9375 Model 60	July 1987	DP, SE, OA, TP	NA	1.3*	NA	0.40M LP (actual)	90	8-16	Up to 3	NA	NA	VM/SP, VM/IS, VSE/SP, IX/370, MVS/370	NA	NA	32	$93,000 with 8M-byte memory
	9377 Model 90	Oct. 1987	DP, SE, OA, TP	NA	2.6*	NA	0.78M LP (actual)	50	8-16	Up to 3	NA	NA	VM/SP, VM/IS, VSE/SP, IX/370, MVS/370	NA	NA	64	$90,000 with 8M-byte memory
	System/38 Model 100	1986	DP	NA	0.31*	NA	NA	133-400	2-4	2.5-3	4	NA	CPF	128 (local)	NA	48	$37,500 with 2M-byte memory, 64M-byte disk
	System/38 Model 200	1986	DP	NA	0.47*	NA	NA	NA	4-6	2.5-3	NA	NA	CPF	NA	NA	48	$62,500 with 4M-byte memory
	System/38 Model 300	1986	DP	NA	0.63*	NA	NA	NA	6-8	2.5-3	NA	NA	CPF	NA	NA	48	$107,500 with 6M-byte memory
	System/38 Model 400	1986	DP	NA	0.82*	NA	NA	NA	6-8	2.5-3	NA	NA	CPF	NA	NA	48	$142,500 with 6M-byte memory
	System/38 Model 600	1986	DP	NA	0.89*	NA	NA	NA	8-16	2.5-3	NA	NA	CPF	NA	NA	48	$182,500 with 8M-byte memory

VENDOR	PRODUCT	DATE FIRST INSTALLED	PRIMARY MARKET[1]	MOST COMPATIBLE IBM OR DEC SYSTEM	PERFORMANCE (MIPS)	PERFORMANCE (MFLOPS[3])	BENCHMARK[2]	MACHINE CYCLE TIME (NSEC)	MEMORY (MBYTES)	DISK TRANSFER RATE (MBYTES PER SECOND)	PORTS	CHANNELS	OPERATING SYSTEMS	MAXIMUM NUMBER OF USERS	TYPICAL NUMBER OF USERS	WORD LENGTH (BITS)	BASE PRICE
IBM **Contact local sales office**	**System/38 Model 700**	**1986**	**DP**	**NA**	**1.5[5]**	**NA**	**NA**	**67-207**	**16-32**	**3**	**12**	**NA**	**CPF**	**256 (local)**	**NA**	**48**	**$352,000 with 16M-byte memory, 64M-byte disk**
	4381 Model 11	**1986**	**DP, SE, TP**	**NA**	**1.0[5]**	**NA**	**0.39M LP (actual)**	**69**	**4-16**	**3**	**NA**	**6-12**	**VM/XA, VM/SP, MVS/XA, MVS/SP, IX/370**	**NA**	**NA**	**32**	**$175,000 with 4M-byte memory, 4K-byte buffer, 6 channels**
	4381 Model 12	**1986**	**DP, SE, TP**	**NA**	**2.0[5]**	**NA**	**0.95M LP (actual)**	**69**	**8-32**	**3**	**NA**	**6-12**	**VM/XA, VM/SP, MVS/XA, MVS/SP, IX/370**	**NA**	**NA**	**32**	**$330,000**
	4381 Model 13	**1986**	**DP, SE, OA**	**NA**	**2.7[5]**	**NA**	**1.2M LP (actual)**	**56**	**8-32**	**3**	**NA**	**6-12**	**VM/XA, VM/SP, MVS/XA, MVS/SP, IX/370**	**NA**	**NA**	**32**	**$440,000**
	4381 Model 14	**1986**	**DP, SE, TP**	**NA**	**6.2[5]**	**NA**	**NA**	**56**	**16-32**	**3**	**NA**	**12-18**	**VM/XA, VM/SP, MVS/XA, MVS/SP, IX/370**	**NA**	**NA**	**32**	**$680,000**
	4381 Model 21	**First quarter 1988**	**DP, SE, TP**	**NA**	**2.3[5]**	**NA**	**NA**	**69**	**8-16**	**3**	**NA**	**6-12**	**VM/XA, VM/SP, MVS/XA, MVS/SP, IX/370**	**NA**	**NA**	**32**	**$225,000**
	4381 Model 22	**First quarter 1988**	**DP, SE, TP**	**NA**	**3.3[5]**	**NA**	**NA**	**69**	**16-32**	**3**	**NA**	**6-12**	**VM/XA, VM/SP, MVS/XA, MVS/SP, IX/370**	**NA**	**NA**	**32**	**$350,000**
	4381 Model 23	**First quarter 1988**	**DP, SE, TP**	**NA**	**4.8[5]**	**NA**	**NA**	**52**	**16-64**	**3**	**NA**	**6-12**	**VM/XA, VM/SP, MVS/XA, MVS/SP, IX/370**	**NA**	**NA**	**32**	**$530,000**
	4381 Model 24	**First quarter 1988**	**DP, SE, TP**	**NA**	**8.1[5]**	**NA**	**NA**	**52**	**16-64**	**3**	**NA**	**12-24**	**VM/XA, VM/SP, MVS/XA, MVS/SP, IX/370**	**NA**	**NA**	**32**	**$880,000**
ICL Co. (061) 223-1301 (Manchester, England)	Series 39 Level 15	June 1987	DP, TP	System/38 Model 400, VAX 8250	1.4	NA	4.3 DC (estimate)	170	NA	2.4	NA	3[4]	VME	4,000	125	32	$54,000 with 8M-byte memory, content-addressable file store (CAFS)
	Series 39 Level 25	June 1987	DP, TP	System/38 Model 600, VAX 8350	1.8	NA	5.6 DC (estimate)	170	NA	3	NA	3[4]	VME	4,000	170	32	$82,000 with 8M-byte memory, CAFS
	Series 39 Level 35	June 1987	DP, TP	System/38 Model 700, VAX 8500	2.4	NA	7.4 DC (estimate)	170	NA	3	NA	3-6[4]	VME	4,000	220	32	$109,000 with 8M-byte memory, CAFS
	Series 39 Level 35D	Oct. 1987	DP, TP	IBM 4381 Model 12, VAX 8550	4.4	NA	14 DC (estimate)	170	NA	3	NA	3-5[4]	VME	4,000	400	32	$190,000 with 16M-byte memory, CAFS
	Series 39 Level 40	Oct. 1987	DP, TP	IBM 4381 Model 21, VAX 8530	2.1	NA	11 DC (estimate)	25	NA	3	NA	3[4]	VME	8,000	350	32	$302,000 with 8M-byte memory, CAFS
	Series 39 Level 50	Aug. 1986	DP, TP	IBM 4381 Model 12, VAX 8550	3	NA	16 DC (estimate)	25	16-32	3	NA	3-6[4]	VME	8,000	550	32	$536,000 with 16M-byte memory, CAFS
	Series 39 Level 50XP	Oct. 1987	DP, TP	IBM 4381 Model 23, VAX 8800	4.2	NA	22 DC (estimate)	25	NA	3	NA	3-6[4]	VME	8,000	750	32	$608,000 with 16M-byte memory, CAFS
MAI Basic Four, Inc. **(714) 731-5100**	**MPX 8000 series**	**March 1983**	**DP, OA**	**VAX 8250, 8530, System/36, 38**	**NA**	**NA**	**NA**	**160**	**1-8**	**1.2**	**116**	**NA**	**BOSS/VS, [illegible]**	**116**	**27**	**16-32**	**$40,500 with CPU, 2M-byte memory, 4 ports, 300M-byte disk**
	MPX 9100 series	**Nov. 1985**	**DP, OA, TP**	**VAX 8530, System/38**	**NA**	**NA**	**NA**	**160**	**4-12**	**1.2**	**116**	**NA**	**BOSS/VS**	**116**	**43**	**32**	**$87,990 with CPU, 4M-byte memory, 4 ports, 300M-byte disk, controller**
	MPX series	**Nov. 1985**	**DP, OA, TP**	**VAX 8800, IBM 4300, System/38**	**NA**	**NA**	**NA**	**160**	**4-12**	**1.2**	**256**	**NA**	**BOSS/VS**	**256**	**73**	**32**	**$114,950 with CPU, 4M-byte memory, 4 ports, 300M-byte disk, controller, 32K-byte cache**
McDonnell Douglas Computer Systems Co. (714) 250-1000	M9200 series	1981	DP	System/38	NA	NA	NA	130	1-8	20M bit/sec.	208	3	Reality	208	48-80	32	$82,450 with 1M-byte memory, 130M-byte disk, 16 ports
	Series 18	1987	DP	IBM 4381, VAX 8500	NA	NA	NA	130	4-16	20M bit/sec.	400	4	Reality	400	NA	64	$395,000 with 4M-byte memory, 500M-byte disk, 64 ports
Modular Computer Systems, Inc. **(305) 974-1380**	**Classic II/76**	**1982**	**DP**	**NA**	**1**	**NA**	**NA**	**125**	**1-4**	**NA**	**NA**	**32-64**	**MAX IV**	**256**	**NA**	**16**	**$86,600 with 1M-byte memory, console, power supplies**
	Classic 32/87	**1987**	**DP**	**NA**	**2.4**	**NA**	**NA**	**110**	**Up to 256**	**Up to 5**	**NA**	**32-64**	**MAX 32, MAX IV, Realix**	**256**	**NA**	**32**	**$148,500 with 64K-byte cache, 2M-byte memory, console, power supplies**
National Advanced Systems Corp. (415) 962-6000	AS/VL 40	NA	DP, SE, TP	IBM 4381 Models 13, 14	5[5]	NA	NA	22	32-128	3-6	Up to 32	Up to 32	VM, MVS, DOS	NA	NA	[illegible]	$638,000 with 32M-byte memory, 8 channels
	AS/VL 50	NA	DP, SE, TP	IBM 4381 Models 13, 14	7.5[5]	NA	NA	22	32-128	3-6	Up to 32	Up to 32	VM, MVS, DOS	NA	NA	32	$891,000 with 32M-byte memory, 8 channels
	AS/VL 60	NA	DP, SE	IBM 4381 Models 13, 14	10[5]	NA	NA	22	32-128	3-6	Up to 32	Up to 32	MVS, VM, DOS	NA	NA	[illegible]	$1.27 million with 32M-byte memory, 8 channels
	AS/VL 80	NA	DP, SE, TP	IBM 3090 Model 150E, 4381 Model 14	17[5]	NA	NA	22	32-56	3-6	Up to 32	Up to 32	MVS, VM, DOS	NA	NA	[illegible]	$2.1 million with 32M-byte memory, 8 channels

LARGE AND MEDIUM-SCALE SYSTEMS

SPOTLIGHT

VENDOR	PRODUCT	DATE FIRST INSTALLED	PRIMARY MARKET[1]	MOST COMPATIBLE IBM OR DEC SYSTEM	PERFORMANCE (MIPS)	PERFORMANCE (MFLOPS[2])	BENCHMARK[3]	MACHINE CYCLE TIME (NSEC)	MEMORY (MBYTES)	DISK TRANSFER RATE (MBYTES PER SECOND)	PORTS	CHANNELS	OPERATING SYSTEMS	MAXIMUM NUMBER OF USERS	TYPICAL NUMBER OF USERS	WORD LENGTH (BITS)	BASE PRICE
NCR Corp. [illegible]	[illegible]	NA	DP	NA	NA	NA	NA	[illegible]	NA	[illegible]	[illegible]	NA	Tower operating system	[illegible]	[illegible]	32	[illegible]
	Tower [illegible] (1-4 application processors)	1987	DP	[illegible]	8	NA	NA	NA	4-64	NA	128	NA	Unix	128	NA	32	$127,000 with 2 application processors, [illegible] memory, [illegible] disk, operating system
	[illegible]	[illegible]	DP	NA	0.27	NA	NA	100	1-8	1.5	[illegible]	NA	ITX	[illegible]	NA	32	[illegible] memory, 72M-byte disk, tape drive, operating system
	[illegible]	[illegible]	DP	NA	0.67	NA	NA	[illegible]	[illegible]	1.5	[illegible]	NA	ITX	NA	NA	32	[illegible] memory, [illegible] disk, tape drive, operating system
	[illegible]	[illegible]	DP	NA	1.1	NA	NA	NA	2-16	1.5	[illegible]	NA	ITX DP	NA	NA	32	$119,800 with 2 CPU boards, [illegible] memory, tape drive
	[illegible]	NA	DP, TP	IBM 9370, 4300 series	1	NA	NA	[illegible]	4-16	1.5	11-16	11-16	VRX/E	NA	NA	32	$41,250 with 1 application processor, 4M-byte memory, 11 channels, console
	[illegible]	NA	DP, TP	IBM 9370, 4300 series	2	NA	NA	[illegible]	[illegible]	1.5	[illegible]	[illegible]	VRX/E	NA	NA	32	[illegible] with 2 application processors, [illegible] memory, 18 channels, console
	[illegible]	NA	DP, TP	IBM 9370, 4300 series	2	NA	NA	[illegible]	[illegible]	1.5	[illegible]	[illegible]	VRX/E	NA	NA	32	[illegible] with 2 application processors, [illegible] memory, [illegible] channels, dual consoles
	[illegible]	NA	DP, TP	IBM 9370, 4300 series	3	NA	NA	[illegible]	[illegible]	1.5	[illegible]	[illegible]	VRX/E	NA	NA	32	$145,610 with 3 application processors, [illegible] memory, [illegible] channels, dual consoles
	[illegible]	NA	DP, TP	IBM 9370, 4300 series	4	NA	NA	[illegible]	[illegible]	1.5	[illegible]	[illegible]	VRX/E	NA	NA	32	$173,100 with 4 application processors, [illegible] memory, [illegible] channels, dual consoles
	[illegible]	NA	DP, TP	IBM 9370, 4300 series	6	NA	NA	[illegible]	[illegible]	1.5	[illegible]	[illegible]	VRX/E	NA	NA	32	$256,[illegible] with 6 application processors, [illegible] memory, [illegible] channels, dual console
	[illegible]	NA	DP, TP	IBM 9370, 4300 series	6	NA	NA	[illegible]	[illegible]	1.5	72-128	[illegible]	VRX/E	NA	NA	32	$340,500 with 8 application processors, [illegible] memory, 72 channels, dual consoles
Norsk Data NA (617) 366-4462	Nord 500 series	1983	DP SE	VAX 8600, 8800	7	NA	NA	120	4-200	2.1	250	4	Sintran	256	60	32	$90,000 with 128M-byte disk, 6M-byte memory
[illegible]	[illegible]	[illegible] 1987	DP	[illegible]	[illegible]	NA	NA	170	[illegible]	1.5	[illegible]	NA	[illegible]	[illegible]	[illegible]	36	[illegible] memory, [illegible] ports, [illegible] disk, operating system
	[illegible]	[illegible]	DP	[illegible]	[illegible]	NA	NA	64	[illegible]	1.5	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible] memory, [illegible] ports, [illegible] disk, operating system
Prime Computer, Inc. (800) 343-2540 (800) 322-2490 (Mass.)	Model 2755	Jan. 1987	DP, SE, OA, TP	VAX 8250, 8350, IBM 9370 Model 60	1.6	NA	NA	120	Up to 16	2.46	2	0	Primos	128	NA	32	$95,050 with central processor, 4M-byte memory, disk, operating system
	Model 9755	May 1986	DP, SE, OA, TP	VAX 8530, IBM 9370 Model 90	3.4	NA	NA	80	Up to 16	2.46	8	0	Primos	196	NA	32	$238,200 with 8M-byte memory 496M-byte disk, operating system
	Model 9955 II	May 1986	DP, SE, OA, TP	VAX 8700, IBM 4381 Model 12	5	NA	NA	64	Up to 32	2.46	8	0	Primos	254	NA	32	$356,500 with 16M-byte memory operating system, 496M-byte disk
	Model 6350	May 1987	DP, SE, OA, TP	VAX 8800, IBM 3090 Model 150E	11.0	NA	NA	64	Up to 32	2.46	8	0	Primos	254	NA	32	$549,000 with 32M-byte memory 770M-byte disk, operating system
[illegible]	[illegible]	NA	DP, OA, TP	[illegible]	[illegible]	[illegible]	[illegible] (actual)	[illegible]	[illegible]	1.0-2.4	[illegible]	0	[illegible]	[illegible]	[illegible]	32	[illegible] memory, [illegible] ports, [illegible] disk, operating system
	[illegible]	[illegible] 1987	DP, OA, TP	[illegible]	7	[illegible]	[illegible] (actual)	[illegible]	[illegible]	1.0-2.4	[illegible]	0	OSx	[illegible]	[illegible]	32	[illegible] memory, [illegible] ports, [illegible] disk, operating system
	[illegible]	[illegible]	DP, OA, TP	[illegible]	15	[illegible]	[illegible] (actual)	[illegible]	[illegible]	1.0-2.4	[illegible]	0	OSx	[illegible]	128	32	[illegible] memory, [illegible] ports, [illegible] disk, operating system
	[illegible]	NA	DP, OA, TP	[illegible]	10	[illegible]	[illegible] (actual)	[illegible]	[illegible]	1.0-2.4	[illegible]	0	OSx	[illegible]	[illegible]	32	[illegible] memory, [illegible] ports, [illegible] disk, operating system
	[illegible]	NA	DP, OA, TP	[illegible]	25	[illegible]	[illegible] (actual)	[illegible]	[illegible]	1.0-2.4	[illegible]	0	OSx	[illegible]	[illegible]	32	$814,[illegible] memory, [illegible] ports, [illegible] disk, operating system
Ridge Computer Co. [illegible]	Ridge 3200	Nov 1986	SE, TP	VAX 8650	Up to 6	NA	7,100 DH (actual), 9.51 LP (actual)	83	Up to 128	2.4	64	10	Unix System V	64	20	32	$43,000 with operating system, 8 ports, 6M-byte memory, 60M-byte tape
Sequent Computer Systems, Inc. [illegible]	Balance [illegible]	Dec. 1984	DP, TP	VAX [illegible]	[illegible]	[illegible]	NA	NA	[illegible]	2.4	[illegible]	2	Dynix	[illegible]	[illegible]	32	[illegible] with 2 processors, [illegible] disk, tape, [illegible] memory
	Balance [illegible]	Sept. 1986	DP, TP	VAX [illegible]	[illegible]	[illegible]	NA	NA	[illegible]	2.4	[illegible]	6	Dynix	[illegible]	[illegible]	32	$120,000 with 4 processors, [illegible] memory, [illegible] disk, tape
	Symmetry S27 (2-10 CPUs)	Fourth quarter 1987	DP, SE	VAX [illegible]	[illegible]	[illegible]	[illegible] (per CPU) DH (actual)	[illegible]	[illegible] per CPU	3	[illegible]	2	Dynix	[illegible]	[illegible]	32	[illegible] with 2 CPUs, [illegible] memory, [illegible] disk, 16 ports, tape
	Symmetry S81 (2-30 CPUs)	Third quarter 1987	DP, SE	VAX [illegible]	[illegible]	[illegible]	[illegible] (per CPU) DH (actual)	[illegible]	[illegible]	3	[illegible]	8	Dynix	[illegible]	[illegible]	32	$164,000 with 2 CPUs, [illegible] memory, 16 ports, [illegible] disk, tape
Sequoia Systems, Inc. (800) 562-0011 (800) 345-4033 (in Mass.)	Series 100 (2-64 CPUs)	Oct. 1986	TP	IBM 3090, 3080	Up to 48	NA	10 (per 2 CPUs) DC (actual)	40	2G	1.86	Up to 96	Up to 12	Topix	1,000	300-500	32	$300,000 with 2 processors, 32M-byte memory
Stratus Computer, Inc. (617) [illegible]	FT-200	1982	TP	[illegible]	0.7*	NA	5 DC (actual)	[illegible]	4-64	1.2	[illegible]	14	VOS	1,000	[illegible]	32	[illegible] memory, operating system, [illegible] disk, 32 ports
	XA400	NA	TP	[illegible]	2*	NA	10 DC (actual)	[illegible]	4-64	1.2	[illegible]	14	VOS	1,000	[illegible]	32	$211,000 with [illegible] memory, [illegible] disk, operating system
	XA2000 series Models 110, 120, 130, 140	1987	TP	[illegible]	3-6*	NA	53 (Model 140) DC (actual)	[illegible]	4-64	1.2	[illegible]	14	VOS	1,000	[illegible]	32	$300,000-$1.1 million with [illegible] memory, [illegible] disk, 32 ports, operating system
Systems Concepts, Inc. (415) 984-1000	SC-20	April 1987	DP SE	Decsystem-10 Decsystem-20	2	NA	NA	160	4.5-36	3	200	4	TOPS-10, TOPS-20	150-200	60-100	36	$200,000 with 4.5M-byte memory 2 channels
	SC 30	Oct 1985	DP	Decsystem-10 Decsystem-20	4	NA	NA	80	4.5-144	3	400	8	TOPS-10, TOPS-20	300-400	150	36	$500,000 with 18M-byte memory 12M-byte disk

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VENDOR	PRODUCT	DATE FIRST INSTALLED	PRIMARY MARKET[1]	MOST COMPATIBLE IBM OR DEC SYSTEM	PERFORMANCE (MIPS)	PERFORMANCE (MFLOPS[2])	BENCHMARK[3]	MACHINE CYCLE TIME (NSEC)	MEMORY (MBYTES)	DISK TRANSFER RATE (MBYTES PER SECOND)	PORTS	CHANNELS	OPERATING SYSTEMS	MAXIMUM NUMBER OF USERS	TYPICAL NUMBER OF USERS	WORD LENGTH (BITS)	BASE PRICE
Tandem Computers, Inc. (408) 725-6000	NonStop TXP (2-16 CPUs)	Oct. 1983	TP	IBM 4381	4-32	NA	9-72 DC (estimate)	83.3	16-256	1.3-5	NA	2-6	Guardian 90	NA	NA	32	$200,000 with 2 CPUs, 16M-byte memory, power supply
	NonStop EXT25 (2-4 CPUs)	Aug. 1986	TP	IBM 4381 Model 21, 9377 Model 90	4-8	NA	9-18 DC (estimate)	83.3	16-64	1.3-5	NA	2-4	Guardian 90	NA	NA	32	$250,000 with 2 CPUs, 16M-byte memory, 512M-byte disk, power supplies
Texas Instruments, Inc. (800) 527-3500	System 1500 (1-4 CPUs)	Oct. 1986	DP	VAX 8200, 8300	2.5-10	NA	4,545 DH (actual)	180-480	2-20	1.81	6-21	NA	TI System V	128	96	32	$59,995 with 2M-byte memory, 140M-byte disk, 60M-byte tape, 8 ports, power supply
Tolerant Systems, Inc. (408) 433-5500	Eternity Series P200 (1-40 CPUs)	Dec. 1985	TP	System/88, VAX 8800	3-4 (per CPU)	NA	NA	NA	4-12	3	1-2 (per CPU)	1-2 (per CPU)	TX	200 (per CPU)	50-100 (per CPU)	32	$93,000 with CPU, 4M-byte memory, 336M-byte disk, tape, 12 ports, console
The Ultimate Corp. (201) 887-9222	Ultimate Model 6000	NA	DP	NA	NA	NA	NA	300	Up to 4	1.2	8	1	Ultimate Operating System	NA	NA	16	$35,300 with CPU, operating system, 512K-byte memory, 86M-byte disk, 7 ports
	Ultimate Model 7000	NA	DP	NA	NA	NA	NA	300	Up to 4	1.8	32	1	Ultimate Operating System	NA	NA	32	$310,000 with CPU, 4M-byte memory, 32 ports, 515M-byte disk, operating system
	Ultimate Model 3010	NA	DP	NA	NA	NA	NA	165	Up to 512K	1.21	7	1	Ultimate Operating System	NA	NA	16	$43,000 with CPU, 512K-byte memory, 227M-byte disk, 7 ports, operating system
	Ultimate Model 3020	NA	DP	NA	NA	NA	NA	165	1-2	1.21	15	1	Ultimate Operating System	NA	NA	16	$55,000 with operating system, CPU, 227M-byte disk, tape drive, 15 ports, 1M-byte memory
	Ultimate Model 3025	NA	DP	NA	NA	NA	NA	165	Up to 2	1.21	15	1	Ultimate Operating System	NA	NA	16	$69,000 with operating system, CPU, 15 ports, 2M-byte memory, 344M-byte disk
	Ultimate Model 3030	NA	DP	NA	NA	NA	NA	NA	2-4	NA	15	1	Ultimate Operating System	NA	NA	16	$81,000 with operating system, CPU, 15 ports, 2M-byte memory, 344M-byte disk
	Ultimate Model 3040	NA	DP	NA	NA	NA	NA	NA	2-4	NA	31	1	Ultimate Operating System	NA	NA	16	$112,000 with operating system, CPU, 31 ports, 2M-byte memory 510M-byte disk drive
Unisys Corp. (formerly Burroughs Corp.) (313) 972-7000	7000/30	Nov. 1986	DP, SE	VAX 8700, 8800	NA	NA	NA	100	4-32	1.25	100	NA	Unix System V.2	100	50	32	$74,500 with processor, cabinet, power supply
	7000/40	March 1985	DP	VAX 8700, 8800	7.7*	NA	NA	100	4-32	1.25	240	NA	Unix System V.2	240	120	32	$103,840 with processor, cabinet, power supply
	A 3	Sept. 1984	DP	System/38 Model 300	0.63*	NA	NA	NA	3-48	3	16*	NA	MCP/AS	NA	NA	48	$96,500 with 6M-byte memory, 125M-byte disk, console
	A 4	Sept. 1987	DP, TP	System/38 Model 400, VAX 8250	8	NA	NA	12-48	NA	3.4	NA	16	MCP/AS	NA	25-75	48	$55,000 with CPU, 12M-byte memory
	A 9F	Sept. 1986	DP	System/38 Model 700	1.4*	NA	NA	NA	6-24	3	NA	NA	MCP/AS	NA	NA	48	$224,000 with 6M-byte memory, 125M-byte disk, console
	A [illegible]	Dec. 1987	DP, TP	IBM 9370 Model 90, VAX 8350	1.6	NA	NA	12-48	NA	3.4	NA	24	MCP/AS	NA	50-200	48	$245,583 with CPU, 12M-byte memory
	A 10 DX	Sept. 1986	DP	IBM 4381 Model 12	2*	NA	NA	72.5	12-24	3	NA	40*	MCP/AS	NA	NA	48	$410,000 with 12M-byte memory
	A 10 FX	Sept. 1986	DP	IBM 4381 Model 13	2.9*	NA	NA	72.5	12-48	3	NA	40*	MCP/AS	NA	NA	48	$580,000 with 12M-byte memory
	A 10 HX	Sept. 1986	DP	IBM 4381 Model 14	5.5*	NA	NA	72.5	24-96	3	NA	80*	MCP/AS	NA	NA	48	$962,000 with 2 CPUs, 24M-byte memory
	V 310	June 1986	DP	IBM 9375 Model 60	0.91*	NA	NA	110	5-30	3	NA	32*	MCP/AS	NA	NA	40	$128,000 with 8M-byte memory
	V 340	Nov. 1985	DP, TP	IBM 4381 Model 11	1.30*	NA	NA	110	10-40	3	NA	32*	MCP/AS	NA	NA	40	$254,000 with 10M-byte memory
	V 380	Oct. 1985	DP, TP	IBM 4381 Model 12	2.10*	NA	NA	110	10-40	3	NA	64*	MCP/AS	NA	NA	40	$457,000 with 10M-byte memory
	V510	First quarter 1988	DP, TP	IBM 3090 Model 120E	4.0*	NA	NA	48	20-80	3	NA	64*	MCP/AS	NA	NA	40	$950,000 with 20M-byte memory
	V 530	Fourth quarter 1987	DP, TP	IBM 3090 Model 150E	4.57*	NA	NA	48	40-100	3	NA	64*	MCP/AS	NA	NA	40	$1,775,000 with 40M-byte memory
Unisys Corp. (formerly Sperry Corp.) (215) 542-4011	Series 80 Model 10	July 1987	DP	System/38 Model 300	1.05*	NA	NA	102	2-8	2.2	28	8	OS/3	NA	NA	32	$94,000 with 2M-byte memory
	Series 80 Model 20	July 1987	DP	System/38 Model 700	2.2*	NA	NA	102	4-16	2.2	28	8	OS/3	NA	NA	32	$178,920 with 4M-byte memory
	2200/201	Jan. 1987	DP	IBM 9375 Model 60	1.2	NA	NA	108	Up to 24	1.4	NA	NA	OS/1100	NA	NA	36	$138,100 with 8M-byte memory, 2 170M-byte disks
	2200/202	Jan. 1987	DP	IBM 9377 Model 90	2.28*	NA	NA	108	Up to 24	1.4	NA	NA	OS/1100	NA	NA	36	$218,290 with 8M-byte memory, 2 CPUs, 2 170M-byte disks
	2200/203	Second quarter 1987	DP	IBM 4381 Model 13	3.3*	NA	NA	108	Up to 24	1.4	NA	NA	OS/1100	NA	NA	36	$327,850 with 3 CPUs, 8M-byte memory, 2 170M-byte disks
	2200/204	Second quarter 1987	DP	IBM 4381	4.2*	NA	NA	108	Up to 24	1.4	NA	NA	OS/1100	NA	NA	36	$400,450 with 4 CPUs, 8M-byte memory, 2 170M-byte disks
Wang Laboratories, Inc. (617) 459-5000	VS 7110	Jan. 1987	DP	NA	1.7*	NA	NA	200	4-16	1.8	265	16	VSOS	128	25-70	32	$90,000 with 4M-byte CPU, 32 ports
	VS 7120	Jan. 1987	DP	NA	2.3*	NA	NA	180	4-16	1.8	265	16	VSOS	128	50-100	32	$120,00 with 4M-byte CPU, 32 ports
	VS 7150	Jan. 1987	DP	NA	3.4*	NA	NA	130	4-16	1.8	265	16	VSOS	128	60-125	32	$160,000 with 4M-byte CPU, 32 ports
	VS 7310	Jan. 1987	DP	NA	3.4*	NA	NA	130	8-16	1.8	265	15	VSOS	196	100-180	32	$232,000 with 8M-byte CPU, 32 ports

THE Kingdom of Thailand. 200,000 square miles of dense jungle and rugged mountains that need sensors to watch for missiles and jets flying faster than sound.

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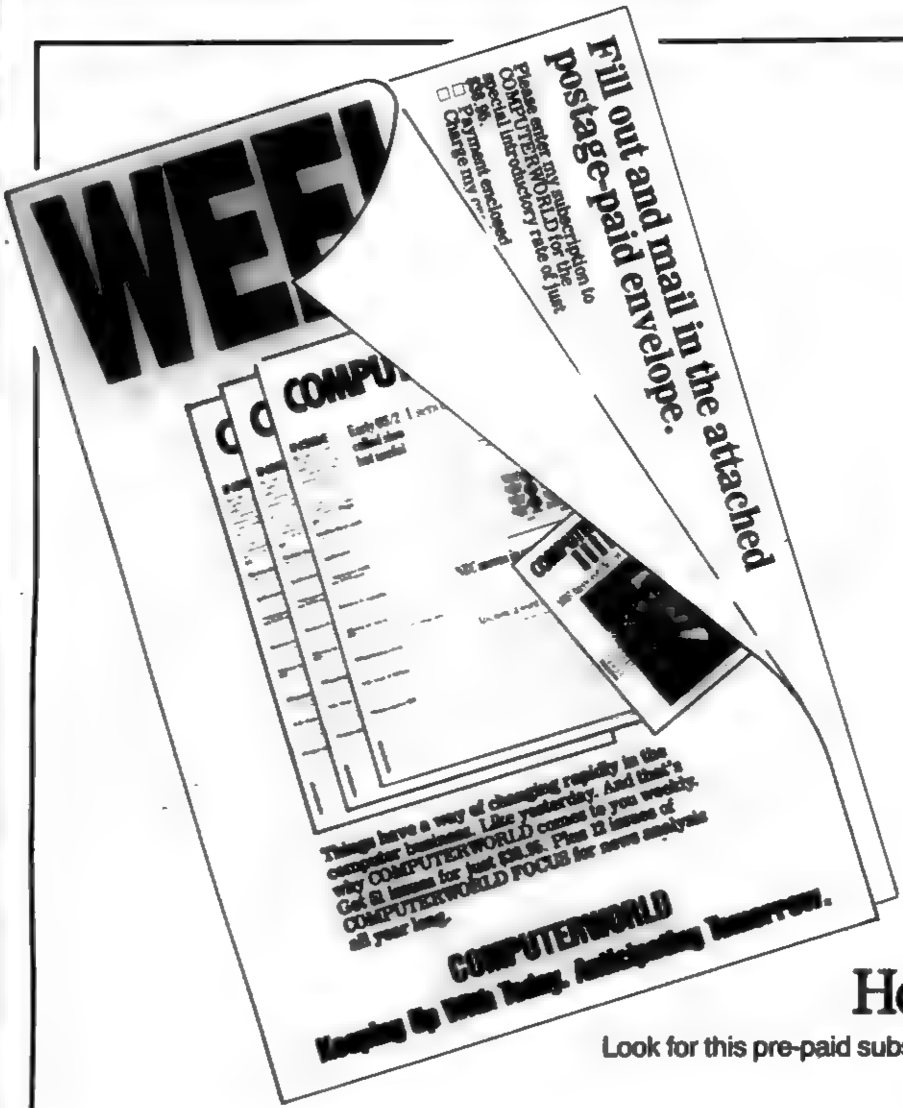
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Medical centers invest in MIS

Automation becoming critical as cost-cutting focuses on productivity

BY ROSE MULA
SPECIAL TO CW

Faced with rising health care costs, medical facilities are slashing expenses wherever possible. But MIS is one of the few segments of the health care industry receiving increased resources.

In this cost-conscious atmosphere, achieving savings through productivity is the key to survival for many hospitals, says Debby Schumann, MIS director of the Waltham-Weston Hospital & Medical Center in Waltham, Mass. "The opportunity to save money in a hospital by improving productivity is overwhelming," Schumann says. "And the way to improve productivity is through expanded computerization."

For that reason, says William Read, vice-president of MIS for the Geisinger Medical Center in Danville, Pa., MIS in the health care industry is enjoying a growth spurt.

More than saving money

Not only does automating existing manual processes result in dramatic savings, but installing new computer systems is the only feasible way to deal with the deluge of new reports required by Diagnostic Research Groups — Medicare regulations that determine payment and length of stay for specific illnesses.

"It would be expensive, impractical, even impossible to churn out manually all the necessary paperwork," Read says.

Besides automating manual systems, MIS departments in hospitals are implementing applications to provide additional support for patient services.

Funding up

"We're seeing a lot more funding than before; in fact, we're getting just about everything we ask for," says Chuck Karashin, associate director of development for North Carolina Memorial Hospital in Chapel Hill. "Now we're extending computerization to include health care services, and we're getting the funding we need to catch up."

As a result, he says, the picture for MIS professionals at North Carolina Memorial is rosy indeed. "In the last year, we filled a number of new positions, both in management and programming — which is extremely unusual for us," Karashin says.

He adds that he attributes this circumstance mainly to the hiring five years ago of a new director of operations, who assigned a high priority to upgrading the hospital's meager computer services.

"Prior to that time," Karashin says, "our Information Services Division was used only for financial data processing and to generate bills."

Such a practice is typical in most hospitals, Schumann says. "And you can't cut costs solely through efficient billing; it's the wrong focus."

Karashin also says that a number of hospitals throughout the country are starting to hire chief information officers, to whom the MIS director reports.

> BECAUSE hospitals are nonprofit, they lack the competitiveness of private industry. But rising costs are causing them to become more business-oriented.

"This is a new trend in the hospital setting," he says.

New reporting requirements are causing software vendors to develop new packages for the health care industry. They are also helping to foster the demand for programmers to modify off-the-shelf software and develop custom programs.

To support other departments, hospital MIS organizations are also seeking professionals who possess expertise in communications, or networking, as well as those with PC programming ability.

However, professionals with strong technical expertise who also have a thorough knowledge of health care procedures can write their own tickets, Karashin says.

"You have to understand an application before you can automate it," he adds.

Despite the increased demand for MIS professionals in health care, the opportunities are still not as plentiful as in other industries, according to Geisinger Medical Center's Read. Hospitals have not yet built up the complex internal information systems that their business counterparts have in place.

Yet in some respects, the health care environment is more satisfying than industry, he says. "You're actually involved in patient care, albeit indirectly," Read says. "That can be very gratifying. You get an emotional boost from knowing that what you're doing can have a beneficial effect on patients."

Professionals considering entering the health care field must decide whether the atmosphere balances the relatively low pay.

Historically, salaries for hospital support personnel have lagged behind those in industry because, traditionally, health care facilities operate on a nonprofit basis, Read says.

Bigger pay may be ahead

But he adds that he expects the pay imbalance to change as the complexion of health care changes and as small hospitals merge into groups that will share corporate data centers. "As the health care industry takes more of a business stance, salaries will begin to follow suit," Read says.

Because hospitals are nonprofit, they lack the competitiveness of private industry. But rising costs are causing them to become more business-oriented.

"Hospitals are extremely reluctant to pay the going rate for MIS people," Schumann says.

However, she adds, there are advantages to accepting the lower salaries and fewer benefits of the health care industry. "Professionals who can establish themselves and stick through the shakeout will be the golden boys and girls of tomorrow," Schumann says.

The best parts of the country for MIS health care professionals are places where hospitals compete against each other in close proximity. Two areas that offer potential opportunities are the Northeast, especially Boston, and Florida, because of the high elderly population who require frequent hospitalization.

Mula is a Waltham, Mass.-based freelance writer.

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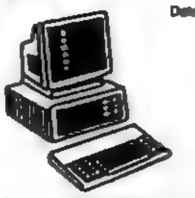

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	EAST	**MIDWEST**	**WEST**	**TOTAL U.S.**
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Subtotal	**573,358**	**405,542**	**311,174**	**1,290,074**
Digital News	106,468	52,252	53,280	212,000
Federal Computer Week	74,412	20,883	25,083	120,378
Computer Currents Northern California Edition			225,000	225,000
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National Combination Buys

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  2-5 years structured coding experience in a development environment versus a maintenance environment. Highly desired experience would include: DATACOM; COBOL; IDEAL; CICS.
- **Systems Analysts**
  5-plus years experience in a development environment versus a maintenance environment. Highly desired experience would include: Structured analysis techniques; Relational Data Modeling; DATACOM/DB; On-line real-time systems; Arthur Andersen's Method/1; Prototyping; Application Generators.

CP&L offers competitive salaries, excellent benefits, and opportunities to advance. If interested in becoming part of our important team of professionals, send resume with salary requirements to: [illegible] Brown, Recruitment Representative, Dept. CW9/21, CAROLINA POWER & LIGHT COMPANY, P.O. Box 1551, Raleigh, NC 27602. An Equal Opportunity/Affirmative Action Employer.

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Several talented tech. contributors needed by fast-paced BOSTON fin'l. svcs. org. IBM 308X OS/MVS COBOL, IDMS ADS/O environ. w/on-line develop. apps. projs. Outstanding mix of technical, analytical & user comm. skills. Salaries to $38,000.

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HP3000 - Nat'ly. known SUBURBAN hi-tech firm seeks proven Proj. Mgr. to supv. fin'l. apps. team. Must have ASK fin'l. pkg. exp. on H-P or VAX sys. Oppty. to play key hi-vis. role in expand. MIS dept. Salary $45,000.

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Large SUBURBAN fin'l. svcs. firm seeks Sr. VM Sys. Prog. to assist in migration to MVS/XA. Must have hvy. VM + DOS/VSE exp. pref. Oppty. to be a ldr. in attract. MIS org. as it upgrades for future growth. Salary to $40,000+.

HARTFORD

MVS SYSTEMS PROGRAMMER

SUBURBAN oppty. for MVS sys. prog w/min. 2 yrs. exp. Oppty. to be involved w/perf., capacity planning & VTAM, SNA install's. Excellent growth potential for indiv. seeking a tech. challenging position. Salary $34,000 to $40,000.

HARTFORD

IDMS

3+ yrs. COBOL/IDMS w/fin'l. ins or mfg. bkgrd. qualifies for oppty's. w/clients throughout New England. Salaries to $35,000.

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(617) 423-1200
111 Pearl St., Hartford, CT 06103
(203) 278-7170

Client Companies Assume All Fees.

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(207) 773-4749

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- PROGRAMMER/ANALYSTS
- SYSTEMS ANALYSTS
- PROJECT LEADERS
- SYSTEMS PROGRAMMERS

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Please send resume in confidence to:

[illegible] PLACEMENT ASSOCIATES [illegible]

Computer Programming Systems & Engineering Professionals

Through our screened & selected affiliates, we'll get your resume to employers with applicable job openings in your targeted geographic areas. ***Openings for systems software & applications programmers & analysts & HW/SW engineers.*** No fee, contract or obligation. At least two years experience required. U.S. citizens & permanent residents only. Send resume to:

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dp

ATLANTA DALLAS dp

COMMUNICATIONS SOFTWARE ANALYST

Position supports GEMCOS, COMS and NDLII on a Burroughs A-Series mainframe. Also acts as project manager for application systems written in COBOL. Req's 2 years of progressive exp. in data communications on an A-Series system; 3 years in programming with 1 year as a Programmer/Analyst. We offer competitive salaries and benefit program. Send resume and salary history to:

Human Resources
John C. Lincoln Hospital
9211 North 2nd St
Phoenix, AZ 85020
Call collect (602) 870-6316
EOE

SYSTEM PROGRAMMER

Broward Community College is seeking a qualified System Programmer with a minimum of four years related experience and strong knowledge in VM, DOS, VSE, CICS, NCP and VTAM.

Salary range: $31,000 - $39,000.

Resumes must be received by October 8, 1987 at Broward Community College, Human Resources Management Department, 225 E. Las Olas Blvd., Ft. Lauderdale, FL 33301.

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JH Heafner Company, a major distribution company is seeking qualified individuals for immediate openings in our MIS division.

Programmer Analyst
We are seeking an individual with 3 or more years working knowledge of Honeywell L/64-DPS 7 GCOS, TDS and COBOL.

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Minimum of 2 years Structured Cobol Coding experience in a development environment.

JH Heafner offers competitive salaries, excellent benefits and opportunities to advance. If interested in becoming a part of our team of professionals, send resume with salary requirements to:

JH Heafner Co., PO Box 837,
Lincolnton, NC 28093,
Attn: Personnel Dept.

CAD Software Development Engineer. Develop 3-dimensional designing systems Computer Aided Design (CAD) software for apparel, footwear & furniture design, using Unix Operating System, "C", and Intel-8086 programming language. Research & Development in Computer Aided Manufacture (CAM). 8:30-12:30, 2:00-6:00 40 hr/wk. $26,500/yr B.S. in E.E. or Computer Science required. Job site Grand Rapids, MI. Send resume to Job #42687, 7310 Woodward Avenue, Room 415, Detroit, Michigan 48202 before Oct. 7

Synergy

It's a beautiful system and it works.

When each crew member pushes past the limits towards their best performance, it's their combined energy that catapults the team to the winner's circle. NAS bases its winning strategy on the synergistic combination of excellent technology, top-rated service, and a growing matrix of partnerships. Our business alliances stem from a worldwide network of branch offices where we work in a partnership to serve major business, commercial, engineering and scientific corporations with IBM compatible mainframes and storage solutions. The success of our strategy has created dynamic growth and excellent opportunities for top professionals.

As a Marketing Representative or Systems Engineer at National Advanced Systems, you'll find a flexible marketing structure which allows us to be responsive to our customer's needs; and an outstanding support network which frees you to reach for your best performance. The result is positive synergy — the creative accomplishments of many individuals at NAS produce the most advanced technology and the greatest total value in customer service and support.

Marketing Representatives

You will develop strategies and contact prospective customers, while servicing established accounts. Our ideal candidate will have 2-4 years' sales experience which relates to the IBM compatible environment. You should also be an energetic individual who enjoys independence and teamwork.

Marketing opportunities are available in Atlanta, Boston, Chicago, Cincinnati, Denver, Detroit, Itasca (IL), Houston, Long Beach, Nashville/Memphis, Philadelphia, St. Louis, Stamford, Syracuse and in the state of New Jersey.

Systems Engineers

Your major focus will be to provide technical support for marketing activities, working closely with prospects and customers. To qualify you should have at least 5 years of data processing industry experience in an IBM 4300, 308X, 3090 or large-scale IBM compatible environment.

We also require a BS degree in a related technical field or equivalent and externals/internals knowledge of one or more of the following: MVS/370, MVS/XA, VM/SP, DOS/VSE or any applicable subsystems.

Technical support opportunities are available in Amarillo, Atlanta, Baltimore, Cincinnati/Louisville, Dallas, Detroit, Minneapolis, New York City, Phoenix, St. Louis, San Francisco, Seattle, and Washington, D.C.

Why try to beat a beautiful system? Synergy works at NAS and it can work for you too. If you're qualified and interested in working in the markets listed above, we'd like you to call us at:

(408) 970-1054
(For Western States)
or
(617) 964-9000
(For Eastern States)

If unable to call during business hours, please forward your resume in confidence to: National Advanced Systems, Dept. CW4, MS32-88, 750 Central Expressway, Santa Clara, CA 95051 (For Western States). Or Two Newton Executive Park, Third Floor, Newton, MA 02162 (For Eastern States). We are an equal opportunity employer.

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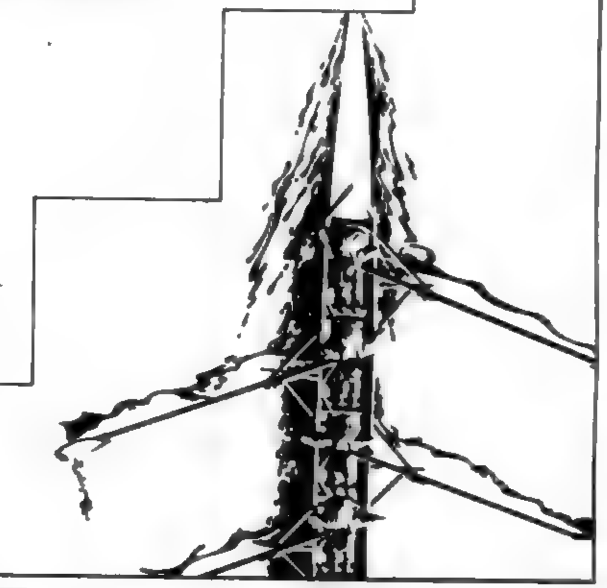

Computer Careers

Growth
Charter Medical is one of the world's leading providers of psychiatric services. Today, we are international in scope with 83 hospitals and plans for continued aggressive expansion.

Opportunities
Our Charter Medical Information Services Department (CMIS) is a vital part of our corporate staff. This group of professionals is challenged with the management of existing systems, as well as the development of new projects designed to support our corporate, strategic goals. Current opportunities include:

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- **Sr. Programmer Analyst**
- **Technical Consultant**
- **Hospital Systems Consulting (Travel Required)**

We are looking for individuals whose background and experience is compatible with our IBM 3083 mainframe environment operating under MVS/XA using COBOL, on-line language of CICS, batch JCL with TSO/ISPF editor, and/or WANG/VS, IBM PCs, FOCUS. Healthcare applications a real plus.

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In Macon, GA, you can enjoy art, culture, and tradition in a community free from traffic hassles and big city stresses.

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Charter Medical is a company whose proven success can give you stability, advancement and a full line of excellent benefits including medical, life and disability insurance, 401K retirement plan, employee stock purchase plan, tuition reimbursement, relocation assistance and supported country club and health memberships. For immediate consideration, please send a resume with salary history, in confidence to:

CHARTER MEDICAL CORPORATION

Charter Medical Corporation
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Macon, GA 31298

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Phoenix

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Our Customer Service Division is bringing those new ideas and new energies to the task of providing customer service to one of the industry's largest installed customer bases—10,000 strong. Honeywell Bull CSD is also the established national service provider for over fifty U.S. and foreign computer manufacturers

We are dedicated to providing state-of-the-art cost efficient solutions to our customers' service requirements

We seek qualified, self-motivated network professionals with a Bachelor's degree or equivalent in Electrical Engineering or Computer Science, and 3+ years experience with DDP, strong data communications background, including knowledge of SNA or OSI network standards, WAN or LAN, a customer satisfaction orientation, excellent communication skills and an ability to participate directly in consulting projects with clients to join our National Network Center of Expertise in Phoenix, AZ. The following positions are currently open as part of our long-range staffing plan

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- **Network Planning Consultants**
- **Network Support Analysts**
- **Telecommunications Consultants**

Honeywell Bull offers a competitive salary and comprehensive benefits package in a professionally challenging environment.

For prompt consideration, please forward your resume to the attention of David Barriga, Honeywell Bull, MS S46, 2626 W. Beryl Avenue, Phoenix, AZ 85021-1669.

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DATA PROCESSING

Advanced Systems Division

DATA BASE ADMINISTRATORS

Call Ellen Cane Collect at (714) 250-0437 to Arrange an Interview

Northrop Advanced Systems Division in Pico Rivera, Southern California, is searching for a data processing professional to work with the most sophisticated DB2 systems in the business. And since we're listed in *The 100 Best Companies To Work For In America*[1], you'll work with the most advanced technology in the most advanced environment. So if you're a data processing professional, call Ellen if you can meet the challenges of this position.

You will perform data analysis, modeling and normalization activities in support of a three-schema, data driven approach to application systems development. You will also develop logical and physical data structures, supervise test and production data base maintenance and support activities, provide data base performance analysis and tuning activities. Develop data base related standards and procedures.

Senior level and specialist level positions are available for individuals with at least 8 years data processing experience including IMS DB/DC applications analysis and programming, and 3-5 years recent background as a Data Base Analyst or Administrator in an IMS DB/DC and DB2 environment. Background including Manufacturing, Engineering and/or Logistics applications preferred.

If unable to call, please send your resume including salary history to: Steven Martin, NORTHROP ADVANCED SYSTEMS DIVISION, Employment Office, Dept. CW2524, P.O. Box 1138, Pico Rivera, CA 90660-9977. Northrop provides its employees with a competitive, comprehensive benefits package.

MODEM USERS: You can access a complete listing of career positions now available with your home computer and a modem. Dial (612) 941-5723 and enter the password "Career Access" for 24-hour information. ***Bit settings: data 8, stops 1, no parity, full duplex 300/1200 baud, enter password (Career Access), (CR) upon entry.***

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[1] Levering, Moskowitz and Katz: *The 100 Best Companies To Work For In America*, © 1987, by New American Library, reprinted by arrangements with Addison-Wesley Pub. Co. Inc., Reading, MA 01867

NORTHROP

Advanced Systems Division

THE SYSTEMS CHALLENGE

NEW positions have been created in response to NEW DEVELOPMENT and EXPANSION within the Group Health Systems area.

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(Printing & Publishing Applications)

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- Integrated Publishing Software Development
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We offer a career opportunity with an excellent salary, comprehensive benefit packages, paid overtime, and other incentives to qualified candidates.

We invite you to call Jenn Heranza at 1-800-328-9929 or send resume to:

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BROADWAY & SEYMOUR, INC., a nationally recognized Charlotte, N.C. based software consulting company, has openings for PROGRAMMER ANALYSTS in the following areas:

- Data General COBOL
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If you have 2+ years of actual experience in any of the above skills, please send your resume to:

Fred Brillante
BROADWAY & SEYMOUR, INC.
362 S. Tryon Street
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SYSOREX INTERNATIONAL, a California corporation and a systems management company, now developing innovative multi-technology systems in Saudi Arabia, has the following challenging position:

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BS in Computer Science or related field required. Responsible for the analysis, design, testing and implementation of computerized business and financial applications.

Requires at least 5 years systems analysis experience on medium and large scale projects. Experience in the tools and techniques of structured analysis and design is essential. Must have good written and verbal communication skills. Previous experience with STRADIS, DATAMANAGER, TSO/ISPF and DFDdraw is preferred.

Please send resume with present salary to Personnel, SADC Project, Dept. CW-9/21, SYSOREX INTERNATIONAL, INC., 10590 N. Tantau Ave., Cupertino, CA 95014. U.S. CITIZENSHIP REQUIRED. Principals only apply.

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CW-B4967
Computerworld
Box 9171
Framingham, MA 01701-9171

Systems Analyst - Manhattan to develop, implement, modify and maintain market research, scheduling, and other systems and programs for use on VAX machines. Also convert existing systems and programs to VAX and implement and support software on clients VAX machines. Supervise 2 - 4 programmers. Associates Degree in Computer Science and 2 years experience or 6 years experience without degree. Must be experienced in VAX/VMS Operating Systems. 40 hours/week 9am to 5pm. $35,000/year. Must be authorized for employment in the U.S. Send resume or letter in duplicate describing qualifications to: RG#23, Rm 501, One Main St., Brooklyn, NY 11201.

Engineer, Associate Systems - Hardware computer mainframe design, CAD/CAM, logic simulation using workstations and firmware implementation in processor I/O areas. Timing analysis, VLSI gate array. Perform design and implementation of input/output (IOP) processors on mainframe computers. Bachelor of Science degree in Electrical Engineering or Computer Engineering plus 2 years experience or Master of Science degree in Electrical Engineering or Computer Engineering. Knowledge of computer networking and ARPANET and ETHERNET computer networks. Salary: $710.00 per week. Send resume to: Box #CW-B4963, Computerworld, P.O. Box 9171, Framingham, MA 01701-9171.

PROGRAMMER/ ANALYST
Berea College

Assist students, faculty, and staff in better use of the Prime 9750 and Macintosh. Requires bachelor's degree, master's preferred, COBOL knowledge, programming experience, and demonstrated ability to teach others. Send resume by October 2, 1987 to: Martin May, CPO 2289, Berea, Kentucky 40404. Applications from women and minorities particularly welcome.

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Office located at New York City. Design and develop software to perform high level numerical and statistical analysis, using knowledge of C Language, VAX/VMS and advanced numerical and statistical mathematics. Conduct mathematical analyses of end-user requirements, design, code and debug large-scale mathematical analysis programs. Must have M.S. in Computer Science, or Physics or Mathematics with 1 yr. exp. as numerical and computer analyst, or 2 yrs in programming position using above knowledge. 40 hrs/5 days/wk. $33,000/year. Applicants must be authorized for employment in the U.S. Send only a resume or letter in duplicate describing qualifications to: SL#38, Room 501, One Main Street, Brooklyn, N.Y. 11201

Systems Engineers Systems Architects
Software Developers

AT&T Research and Development

The second wave of the information age is here, and is rich in promise for business, industry and consumers.

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Our challenge is to develop networks of computer intelligence that will support functions never performed by any other means. These networks will link—and fully utilize—the machine intelligence that drives factories, offices and homes.

We will make it possible to marshall information in the form of voice, data or video across vast distances.

To meet this challenge we have remarkably talented individuals from a wide variety of technical backgrounds working together, networking their insights and knowledge. In our environment, every person has the opportunity to make unique contributions.

We invite you to join us in developing the networks of the future.

Opportunities are available at our facilities in New Jersey, Illinois, Indiana, Colorado, Massachusetts and Ohio for people who can create forward-looking solutions, evaluate alternative architectures, perform competitive analyses, assess service viability, define, implement and measure systems or develop strategies to get products to market.

If you have a Master's or PhD in Systems Engineering, Computer Science, Electrical Engineering, Mathematics, Physics, Statistics or Operations Research with software and/or hardware experience, or a BS in these fields with a minimum of 5 years highly relevant experience, please send your resume to:

Director, Technical Employment,
AT&T Bell Laboratories, Dept. 63/7539/87,
101 J.F. Kennedy Parkway, Short Hills, NJ
07078-0905.

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Specific expertises being sought:

☐ Communications planning
☐ Computer graphics
☐ Computer networking
☐ Data communications protocols/networking
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☐ Network optimization tools
☐ Network planning and design
☐ Operating systems
☐ OSI protocols
☐ Packet switching
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For immediate consideration, please send your resume to US Sprint, Dept. MR-CW, P.O. Box 11315, Kansas City, MO 64112. We're an equal opportunity employer.

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US Sprint

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$36,780-$45,036

East Bay Municipal Utility District has an immediate opening for an experienced DOS/VSE (SP) systems programmer. Be part of a growing technical support team for the West's largest independently operated water utility. Our environment includes multiple IBM 43XX CPU's, VM/SP, CMS, CICS/VS, VTAM, Oracle, FOCUS, networked PC's, and multiple DEC VAX/VMX processors.

Requires at least one year each applications and systems programming experience. Successful candidate will be familiar with the installation and maintenance of DOS/VSE and supporting products, VSE/POWER, JCL, and must also have good working knowledge of VSAM/IDCAMS.

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Exam Unit
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P.O. Box 24055
Oakland, CA 94623
(415) [illegible]

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PDP 11

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SYSTEM ANALYST: Plan, develop, install and modify insurance software system. Develop policy writing system for insurance industry, including claims management and accounting. Train personnel in the use of the system. Requires BBA or equivalent - Management Information Systems and 3 years experience as System Analyst or in Insurance Software Development. Knowledge of BASIC, policy-writing systems (Insurance System 3000), algorithms, programming and programming applications, information systems analysis and design, and operations research. Experience with IMAGE Data Base Management System, software applications in the insurance industry, HP 3000 and IBM PC, LOTUS 123, MULTIMATE. 40 hours per week. $2211 per month. Send resume indicating reference Job Bank I.D. Number of [illegible] to Hawaii State Employment Services, Oahu Job Bank, 830 Punchbowl St., Room 332, Honolulu, Hawaii 96813. Resumes will be accepted to and including October 12, 1987.

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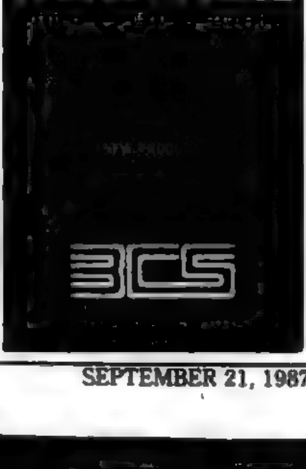

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Organisations capable of providing suitable software are invited to submit written details of their system in response to our requirements. Responses should be addressed to:

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Responses will be accepted up to 10 a.m. on Thursday, October 8, 1987.

It is anticipated that Bids may be issued in early 1988.

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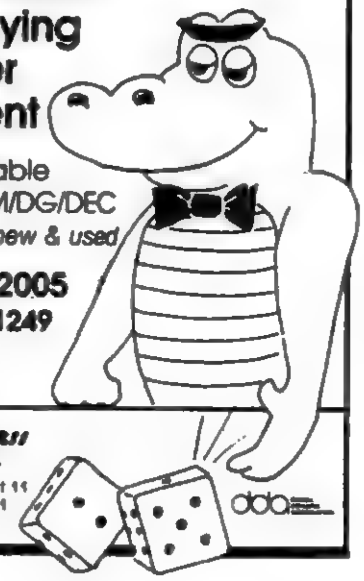

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Request for Proposal No. 1284, due Friday, October 9, 1987 at 3:30 p.m. for the upgrade of the NCR V8565 - II processor and enhancement of data communications subsystems for DELTA STATE UNIVERSITY of Cleveland, Mississippi. No charge.

Request for Proposal No. 1286, due Wednesday, October 14, 1987 at 3:30 p.m. for the acquisition of an Altos 686T-50 system and peripherals for the DEPARTMENT OF HEALTH. No charge.

Detailed specifications may be obtained free of charge from the CDPA office or at the specified cost by submitting a written request accompanied by the appropriate payment. NOTE: Valid forms of payment are corporate check on a Mississippi bank, certified check or POSTAL money order. NO CASH OR OUT-OF-STATE CHECKS. The CDPA reserves the right to reject any and all bids and proposals and to waive informalities.

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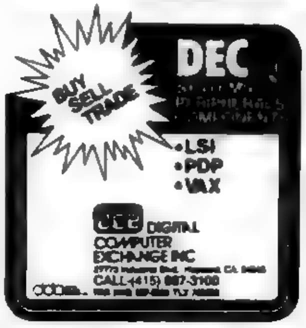

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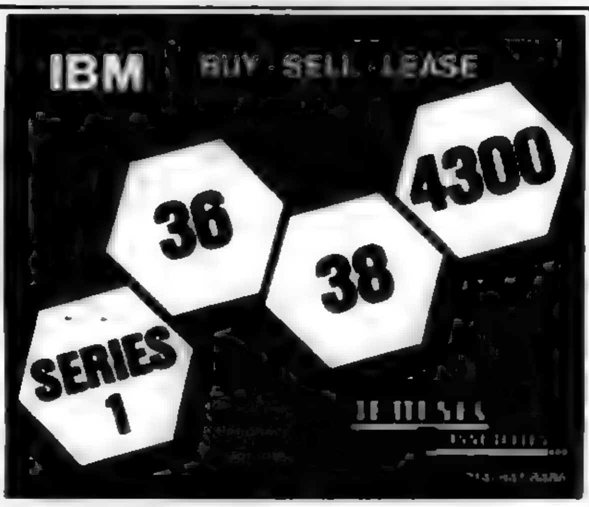

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BIDS & PROPOSALS

NOTICE OF PUBLIC SALE OF COLLATERAL PURSUANT TO SECTION 9-504 OF THE ILLINOIS COMMERCIAL CODE

Pursuant to the Illinois Uniform Commercial Code, and the terms of agreements between Business Computer Systems, Inc. (debtor) and MDS Qantel, Inc. (secured party) dated February 28, 1986 and March 20, 1986, MDS Qantel will sell all property of Business Computer Systems, in which it holds a collateral security interest, at public auction at the offices of Barack, Ferrazzano, Kirschbaum & Perlman, 333 West Wacker Drive, Chicago, Illinois on September 28, 1987 at 10:00 a.m. Such collateral consists of:

Any and all rights (including, without limitation, exclusive rights) to end-users of Business Computer Systems, Inc. as defined in the VAD Agreement dated March 18, 1986 by and between MDS Qantel, Inc. and Business Computer Systems, and rights to Customers of Business Computer Systems as defined in the Dealer Agreement dated March 20, 1986 by and between MDS Qantel and Business Computer Systems, including all accounts receivable, all data and documents maintained or controlled by Business Computer Systems relating thereto, Customer lists, and end-user lists, prospect lists, sales and advertising literature and materials, correspondence and other materials and information relating to Customers, end-users and prospects, documents which permit access to applications software programs of Customers and end-users and the specifications and current source code and source documentation relating thereto for use in providing Customer and end-user software support only, and any other documentation of a similar nature.

The sale will be subject to the following restrictions:

1. The above-described property will be sold to the highest bidder. There will be required a 20% deposit with each bid, with the balance of the bid price to be paid no later than the second (2nd) day after acceptance of any bid. All funds shall be paid in cash, certified check or cashier's checks payable to the order of MDS Qantel. MDS Qantel reserves the right to bid at the sale without cash, certified check or cashier's check deposit as required for other bidders. MDS Qantel reserves the right within twenty four (24) hours after the completion of bidding to reject all bids.

2. If the successful bidder defaults on the balance, bidder's initial deposit shall be forfeited to MDS Qantel, and MDS Qantel may sell to the next highest bidder.

3. The debtor has the right to redeem the collateral at any time up to the time the sale is held by tendering monies sufficient to satisfy all of its obligations due MDS Qantel.

4. MDS Qantel reserves the right to and intends to seek and enforce judgments against the debtor and guarantors for any deficiency remaining due on the underlying indebtedness after the public sale.

To the best knowledge of MDS Qantel, Business Computer Systems, Inc. has been engaged in the business of selling MDS Qantel hardware and providing software and support service for that hardware to commercial and industrial end-users in the United States. MDS Qantel has limited information regarding the business of Business Computer Systems, Inc. which it cannot and does not warrant to be accurate, current or complete. To gain access to such information, contact Mr. Ray Larson (312) 964-2282. Parties planning to attend the public sale are encouraged to notify Mr. Mark Weinberg at the offices of Barack, Ferrazzano, Kirschbaum & Perlman, attorneys for MDS Qantel at (312) 781-6882.

METROPOLITAN TRANSPORTATION AUTHORITY NOTICE is hereby given that the Metropolitan Transportation Authority will receive proposals for the licensing by it of the software indicated below. Proposals submitted shall include Vendor Qualifications, and Technical and Price proposals. An oral presentation and product demonstration may also be required. The product will be selected using the following selection criteria:

1. Level of menu driven and user friendly features and capabilities as defined in the product specification;
2. The number of standard reports that meets MTA's needs and requirements;
3. The experience of the firm and proposed individuals relating to similar conversions;
4. The product's ability to provide end user adhoc reporting;
5. The quality and comprehensiveness of software documents (i.e. Operating Manual), product support and product training;
6. Product's ability to operate with MTA's present hardware and software without procuring third party additional hardware or software;
7. Total cost of the system. This shall include the cost of any new hardware and software which MTA would be required to purchase or license from other suppliers for the proposed product to function in accordance with the attached product specification;
8. The proposal's responsiveness to the Request for Proposal.

Proposals must comply with the Authority's Contract Documents. The Authority, at its option, may enter into negotiations with one or more proposers it selects as provided for in the Information for Proposers section of the Contract Documents. Copies of such Documents may be secured from B. DeBois, Deputy Director of Procurement Services, Metropolitan Transportation Authority, 347 Madison Avenue, New York, NY 10017.

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For additional information contact Mr. Q.W. Stanton at (412) 237-3083 by September 25, 1987.

Sealed bids are due on October 9, 1987.

REQUEST FOR PROPOSALS

The City of Warwick is soliciting proposals for two mid-range computer systems and applications software. One system will support Computer Aided Dispatch and Police Records. The other system will support municipal finance and administration. Proposals are due 11 A.M., Friday, October 16, 1987. For information write or call

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The State of Alaska is considering upgrade or replacement of its payroll system. A software search is underway to identify qualifying package software. To qualify software must be operating in a government environment utilizing ADABAS database management system. Qualified vendors should contact the Department of Administration, Division of Finance, PO Box C, MS 0204, Juneau, AK 99811 or call Keith Busch at (907) 465-2240 before November 15, 1987.

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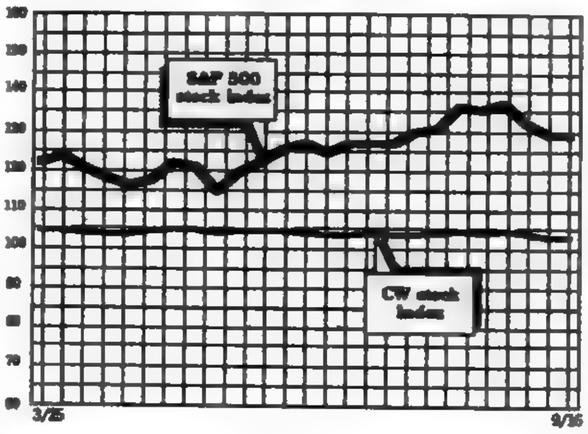

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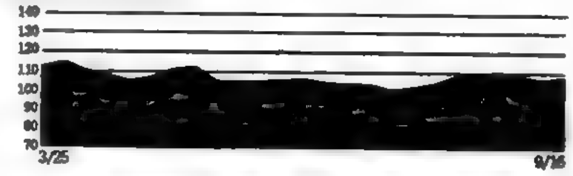

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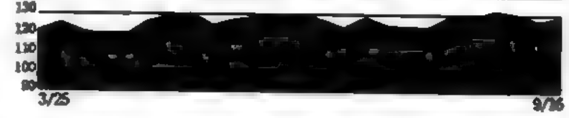

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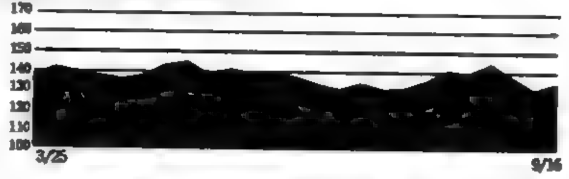

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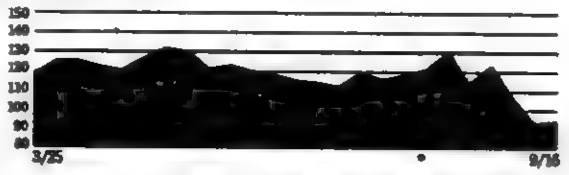

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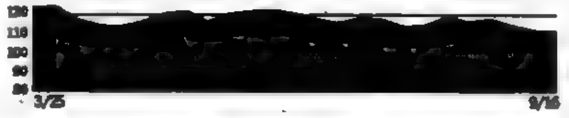

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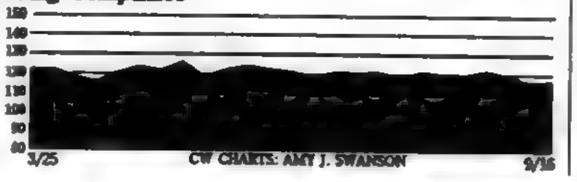

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N	AMERICAN INFO TECHS CORP	100	77	94.25	+1.1	+1.2
Q	ANDREW CORP	19	14	16.00	+1.0	+6.7
Q	ARTEL COMM CORP	5	2	2.88	+0.3	+9.5
N	AT&T	36	22	31.63	-0.6	-1.9
Q	AVANT GARDE COMP INC	7	3	4.75	-0.5	-9.5
Q	AVANTEK INC	19	13	15.75	+1.5	+10.5
N	AYDIN CORP	38	18	32.25	+0.1	+0.4
N	BELL ATLANTIC CORP	77	62	74.63	+0.8	+1.0
N	BELLSOUTH CORP	44	35	39.63	+0.0	+0.0
Q	BRIDGE COMMUNICATION	29	11	27.88	+1.4	+5.2
Q	COMPRESSION LABS INC	10	4	5.38	-0.1	-2.3
Q	COMPUTER NETWORK TECH	6	3	3.00	-0.1	-4.0
O	CONTEL CORP	40	27	36.25	+0.4	+1.0
Q	DATA SWITCH CORP	9	5	7.00	-0.1	-1.8
Q	DIGITAL COMM ASSOC	48	19	42.25	+1.0	+2.4
Q	DYNATECH CORP	44	27	30.00	-0.3	-0.8
Q	EQUATORIAL COMM CO	5	2	3.13	+0.0	+0.0
Q	GANDALF TECHNOLOGIES	11	6	6.88	+0.4	+5.8
Q	GENERAL DATACOMM INDS	14	8	7.63	+0.0	+0.0
N	GTE CORP	45	34	40.38	-0.8	-1.8
Q	INFOTRON SYS CORP	12	7	9.00	+0.3	+2.9
N	ITT CORP	66	47	60.75	-1.1	-1.8
N	M A COM INC	16	12	14.88	-0.1	-0.8
Q	MCI COMMUNICATIONS CORP	10	5	9.25	+0.5	+5.7
Q	MICOM SYS INC	18	10	11.75	-0.3	-2.1
Q	NETWORK SYS CORP	19	9	10.00	+0.0	+0.0
N	NORTHERN TELECOM LTD	24	14	22.00	+0.1	+0.6
Q	NOVELL INC	27	10	24.00	+0.8	+3.2
N	NYNEX CORP	77	58	73.63	+1.8	+2.4
N	PACIFIC TELESIS GROUP	32	23	29.00	+0.3	+0.9
N	PARADYNE CORP	9	4	7.13	-0.1	-1.7
A	PENRIL CORP	6	4	4.25	-0.4	-8.1
N	PLESSEY PLC	41	24	32.50	+1.7	+5.5
N	SCIENTIFIC ATLANTA INC	20	9	17.13	-0.5	-2.8
N	SOUTHWESTERN BELL CORP	42	33	38.13	-0.1	-0.3
Q	3 COM CORP	24	9	20.00	+0.8	+3.9
N	TIMEPLEX INC	41	15	28.25	+1.4	+5.1
Q	UNGERMANN BASS INC	16	7	9.00	-0.3	-2.7
N	U S WEST INC	58	45	54.63	-0.1	-0.2

Computer Systems

EXCH		52-WEEK RANGE (1)		PRICE CLOSE SEPT 16 1987	WEEK NET CHNGE	WEEK PCT CHNGE
Q	ALLIANT COMPUTER SYS	37	15	16.50	-0.5	-2.9
Q	ALPHA MICROSYSTEMS	7	3	4.88	+0.0	+0.0
Q	ALTOS COMPUTER SYS	17	10	13.88	+1.6	+13.3
A	AMDAHL CORP	45	19	42.50	+1.9	+4.8
Q	APOLLO COMPUTER INC	25	11	20.13	+0.0	+0.0
Q	APPLE COMPUTER INC	56	16	51.75	-1.0	-1.9
N	BOLT BERANEK & NEWMAN	30	19	20.50	-0.5	-2.4
Q	BRITTON LEE INC	5	3	3.81	+0.3	+8.9
N	COMPAQ COMPUTER CORP	61	14	57.50	+0.8	+1.3
Q	COMPUTER AUTOMATION INC	17	2	12.50	-1.5	-10.7
A	COMPUTER CONSOLES INC	12	4	5.50	-0.4	-6.4
Q	CONCURRENT COMP CORP	24	13	19.50	-0.5	-2.5
N	CONTROL DATA CORP DEL	37	24	34.00	+0.5	+1.5
Q	CONVERGENT TECH	12	4	7.38	+0.3	+3.5
Q	CONVEX COMPUTER CORP	22	8	14.38	-0.1	-0.9
N	CRAY RESH INC	136	69	96.50	-0.1	-0.1
Q	DAISY SYS CORP	13	7	7.38	+0.4	+5.4
N	DATA GEN CORP	39	25	30.50	-0.4	-1.2
N	DATAPOINT CORP	9	4	7.75	-0.4	-4.6
N	DIGITAL EQUIP CORP	198	89	186.88	+4.9	+2.7
N	FLOATING POINT SYS INC	17	8	9.13	+0.0	+0.0
N	GOULD INC	25	16	23.13	+1.5	+6.9
N	HARRIS CORP	43	28	39.25	+2.3	+6.1
N	HEWLETT PACKARD CO	69	37	63.75	-0.3	-0.4
N	HONEYWELL INC	91	58	80.75	-3.5	-4.2
N	IBM	176	116	154.63	-0.6	-0.4
Q	INFORMATION INTL INC	17	13	13.00	+0.3	+2.0
Q	IPL SYS INC	3	2	2.94	-0.1	-2.1
Q	MASS COMPUTER CORP	12	5	11.50	+1.0	+9.5
N	MATSUSHITA ELEC INDL LTD	179	93	179.25	+9.3	+5.4
Q	MEGADATA CORP	7	2	6.00	+0.5	+9.1
Q	MENTOR GRAPHICS CORP	37	13	34.13	-0.4	-1.1
N	NBI INC	14	8	10.88	-0.5	-4.4
N	NCR CORP	87	42	79.13	-1.4	-1.7
N	PRIME COMPUTER INC	31	16	26.88	+0.8	+2.9
Q	PYRAMID TECHNOLOGY	12	4	8.63	+0.9	+11.3
Q	STRATUS COMPUTER	41	18	28.25	-0.5	-1.7
Q	SUN MICROSYSTEM INC	46	13	35.63	-1.8	-4.7
Q	SYMBOLICS INC	7	4	4.00	-0.3	-5.9
N	TANDEM COMPUTERS INC	38	17	30.13	+0.4	+1.3
N	TANDY CORP	56	31	47.63	+1.8	+3.8
N	ULTIMATE CORP	33	13	30.88	+0.9	+2.9
N	UNISYS CORP	48	23	43.50	+2.0	+4.8
A	WANG LABS INC	19	11	17.63	+0.1	+0.7

Software & DP Services

EXCH		52-WEEK RANGE (1)		PRICE CLOSE SEPT 16 1987	WEEK NET CHNGE	WEEK PCT CHNGE
Q	ADVANCED COMP TECH	5	3	3.81	+0.2	+5.2
N	ADVANCED SYS INC	29	12	27.50	-0.3	-0.9
N	AGS COMPUTERS INC	22	8	21.25	+1.8	+9.0
Q	AMERICAN MGMT SYS INC	19	7	17.00	-0.4	-2.2
Q	AMERICAN SOFTWARE INC	22	8	13.13	+0.5	+4.0
N	ANACOMP INC	11	3	9.63	+0.5	+5.5
Q	ANALYSTS INTL CORP	9	3	7.75	+0.0	+0.0
Q	ASHTON TATE	30	12	24.00	-0.3	-1.0
Q	ASK COMPUTER SYS INC	17	10	13.38	-0.6	-4.5
Q	AUTODESK INC	34	10	28.75	+1.8	+6.5
N	AUTO DATA PROCESSING	56	30	49.25	+0.0	+0.0
Q	BOOLE & BABBAGE INC	12	4	10.25	+0.3	+2.5
N	COMPUTER ASSOC INTL INC	33	11	32.00	+1.8	+5.8
Q	COMPUTER HORIZONS CORP	15	10	11.50	+0.3	+2.2
N	COMPUTER SCIENCES CORP	66	30	58.38	-0.4	-0.6
N	COMPUTER TASK GROUP INC	18	11	14.38	+1.0	+7.5
Q	COMSHARE INC	28	11	24.00	+1.0	+4.3
N	CULLINET SOFTWARE INC	14	6	12.75	-0.1	-1.0
Q	CYCARE SYS INC	11	7	9.50	+0.3	+2.7
Q	DUQUESNE SYS INC	33	13	15.50	-0.8	-4.6
Q	ENDATA INC	16	5	16.38	+1.5	+10.8
N	GENERAL MTRS (CLS E)	49	24	47.75	+1.8	+3.8
Q	HOGAN SYS INC	17	8	7.63	-0.8	-9.0
Q	INFORMIX CORP	23	7	22.25	+0.5	+2.3
Q	INTELLICORP INC	11	4	7.00	-0.1	-1.8
Q	KEANE INC	10	5	8.13	+0.6	+8.3
Q	LOTUS DEV CORP	37	12	30.00	+1.3	+4.3
Q	MANAGEMENT SCI AMER	21	11	12.25	-0.8	-6.8
Q	MICRO PRO INTL CORP	8	2	6.19	+0.9	+16.5
Q	MICROSOFT CORP	128	28	116.75	+4.0	+3.5
Q	NATIONAL DATA CORP	34	17	32.63	+0.9	+2.8
Q	ON LINE SOFTWARE INTL INC	22	6	19.63	-0.4	-1.9
Q	ORACLE SYS CORP	30	7	27.50	+2.1	+8.4
N	PANSOPHIC SYS INC	23	12	20.88	-0.1	-0.8
Q	POLICY MGMT SYS CORP	30	15	24.25	+1.3	+5.4
Q	PROGRAMMING & SYS INC	13	8	12.25	-0.5	-3.9
Q	REYNOLDS & REYNOLDS CO	39	27	33.75	+0.0	+0.0
Q	SEI CORP	18	8	16.50	+0.5	+3.1
Q	SHARED MED SYS CORP	53	23	25.63	-1.0	-3.8
Q	SOFTWARE AG SYSTEMS INC	19	10	12.25	-0.4	-3.0
Q	SOFTWARE PUBG CORP	17	5	9.25	-0.3	-2.6
A	STERLING SOFTWARE INC	16	9	8.75	-0.3	-2.8
Q	SUNGARD DATA SYS INC	21	10	17.00	+0.0	+0.0
Q	SYSTEMATICS INC	30	14	27.38	+1.1	+4.3
N	URS CORP	22	13	22.13	+3.0	+15.7
Q	VM SOFTWARE INC	46	15	15.75	-0.5	-3.1

Semiconductors

EXCH		52-WEEK RANGE (1)		PRICE CLOSE SEPT 16 1987	WEEK NET CHNGE	WEEK PCT CHNGE
N	ADV MICRO DEVICES INC	25	13	20.88	+0.8	+3.7
N	ANALOG DEVICES INC	24	14	19.25	-0.1	-0.6
Q	ANALOGIC CORP	13	10	12.00	+0.0	+0.0
Q	INTEL CORP	58	18	54.00	+0.9	+1.8
Q	LSI LOGIC CORP	17	8	12.75	+0.1	+1.0
N	MOTOROLA INC	72	34	65.00	+0.8	+1.2
N	NATL SEMICONDUCTOR	18	8	17.00	+0.5	+3.0
N	TEXAS INSTRS INC	78	35	71.88	+1.9	+2.7
A	WESTERN DIGITAL CORP	33	13	23.00	-0.9	-3.7

Peripherals

EXCH		52-WEEK RANGE (1)		PRICE CLOSE SEPT 16 1987	WEEK NET CHNGE	WEEK PCT CHNGE
N	AM INTL INC	9	5	7.50	+0.3	+3.4
Q	AST RESH INC	23	11	18.88	+2.0	+11.9
Q	AUTO TROL TECH CORP	9	3	5.94	+0.1	+1.1
Q	BANCTEC INC	16	7	12.25	+0.8	+6.5
Q	CIPHER DATA PRODS INC	18	9	11.50	+0.6	+5.7
A	COGNITRONICS CORP	5	2	4.00	+0.0	+0.0
N	COMPUGRAPHIC CORP	26	16	25.50	+0.3	+1.0
N	COMPUTERVISION CORP	23	13	14.38	+0.1	+0.9
A	DATAPRODUCTS CORP	16	10	11.25	+0.1	+1.1
A	DATARAM CORP	9	7	7.63	+0.4	+5.2
N	DECISION INDS CORP	13	7	11.00	+0.0	+0.0
N	EASTMAN KODAK CO	104	52	99.00	+0.6	+0.6
Q	E M C CORP MASS	29	7	25.75	+1.5	+6.2
Q	EMULEX CORP	10	6	6.88	-0.5	-6.3
Q	EVANS & SUTHERLAND	40	21	27.50	-2.8	-9.1
Q	ICOT CORP	13	5	6.13	+0.1	+2.1
Q	INTERLEAF INC	20	8	15.88	+1.1	+8.3
Q	IOMEGA CORP	10	2	2.88	+0.0	+0.0
Q	LEE DATA CORP	10	5	5.63	+0.0	+0.0
Q	MASSTOR SYS CORP	6	3	3.88	-0.5	-11.4
Q	MAXTOR CORP	24	10	11.88	+0.4	+3.3
Q	MICROPOLIS CORP	44	14	29.25	-4.8	-13.7
Q	MINISCRIBE CORP	16	6	13.88	+0.9	+6.7
N	MINNESOTA MNG & MFG CO	84	50	75.75	+0.4	+0.5
A	MSI DATA CORP	24	10	22.50	+2.0	+9.8
Q	PRIAM CORP	6	2	2.75	-0.3	-8.3
Q	PRINTRONIX INC	14	10	11.38	+0.4	+3.4
N	QMS INC	26	11	25.00	+3.1	+14.3
Q	QUANTUM CORP	35	15	17.25	+0.3	+1.5
Q	RAMTEK CORP	6	4	5.00	-0.3	-4.8
N	RECOGNITION EQUIP INC	27	12	16.50	-0.3	-1.5
Q	REXON INC	14	5	8.00	-0.3	-3.0
Q	SCAN TRON CORP	17	11	12.75	+1.0	+8.5
Q	SEAGATE TECHNOLOGY	46	13	22.00	-6.6	-23.1
N	STORAGE TECH CORP	5	2	3.00	+0.1	+4.3
Q	TANDON CORP	7	2	3.00	-0.5	-14.3
A	TEC INC	7	3	4.63	+0.0	+0.0
N	TEKTRONIX INC	43	30	35.50	-2.1	-5.6
Q	TELEVIDEO SYS INC	3	2	2.94	+0.0	+0.0
N	TELEX CORP	102	51	51.38	-16.1	-23.9
Q	WYSE TECH	36	13	33.88	+1.6	+5.0
N	XEROX CORP	85	51	78.50	+2.5	+3.3
Q	XIDEX CORP	17	11	11.25	-0.1	-1.1

Leasing Companies

EXCH		52-WEEK RANGE (1)		PRICE CLOSE SEPT 16 1987	WEEK NET CHNGE	WEEK PCT CHNGE
N	COMDISCO INC	35	15	32.50	+1.5	+4.8
N	CONTINENTAL INFO SYS	14	7	10.00	-0.3	2.4
Q	PHOENIX AMERN INC	8	3	4.50	-0.1	2.7
Q	SELECTERM INC	7	5	6.13	+0.1	+2.5
N	U S LEASING INTL	55	40	48.50	+0.5	+1.0

EXCH: N—NEW YORK; A—AMERICAN; Q—NATIONAL
O—OVER-THE-COUNTER; S—SPLIT

O-T-C PRICES ARE BID PRICES AS OF 3 P.M. OR LAST BID
(1) TO NEAREST DOLLAR

Is it terminal?

Low-end competition from HP crushes Telex in down week

It was a down week for the stock market, but few companies suffered as badly as Tulsa, Okla.-based terminal maker Telex Corp.

Following Monday's announcement that its second-quarter earnings would be some 33% lower than projected, Telex stock plunged 13½ points to 51⅜. Monday's massive sell-off moderated during the next three days, and Telex closed Thursday at 51.

Telex reduced its quarterly earnings estimate from $21.9 million, or $1.50 per share, to $14.6 million, or $1 a share. Analysts attributed the reduction to the firm's unanticipated low-price competition from Hewlett-Packard Co., which introduced the $695 HP-700/71 terminal for IBM systems in August. Estimates for the quarter ending Sept. 30 are also well below the year-earlier quarter.

Intel Corp., which has ridden the technology stock rally of recent months nicely, announced a 3-for-2 stock split Thursday, with the effective date to be determined. Intel rose a quarter of a point Thursday to 54¼; it has traded as low as 18 within the past year.

Computer Associates International, Inc. continued its recent strength, rising 1¼ points Thursday to a new high of 33¼.

CLINTON WILDER

Amdahl unaffected by partner Fujitsu's gains

BY JEFFRY BEELER
CW STAFF

SUNNYVALE, Calif. — Amdahl Corp.'s effort to develop an IBM MVS-like operating system is unlikely to be affected by the settlement of a software copyright dispute between IBM and Fujistu Ltd., the latter of which owns 49% of Amdahl, industry sources said.

Amdahl's Aspen project is believed to be an MVS-like operating system for on-line transaction processing and has been under development for several years. Last week's settlement of the conflict theoretically frees Fujitsu to launch an Aspen-like effort of its own.

The possibility that Fujitsu might develop such an operating system on its own triggered speculation last week that the Fujitsu-IBM accord might render Amdahl's project redundant by permitting the Japanese company to develop and sell proprietary systems software directly to the U.S. market.

But a knowledgeable source, who requested anonymity, discounted such theorizing.

"Fujitsu has never shown any interest in involving itself in Aspen," he said. "In fact, they're terrified that IBM would claim the results of the Aspen project as its own intellectual property."

Aspen, whose existence Amdahl acknowledged nearly four years ago, constitutes an Amdahl-directed effort to develop value-added systems software for on-line transaction processing. But "value-added software on both the application and systems sides has historically been a Japanese weakness," said Jeff Canin, an investment analyst with Hambrecht & Quist, Inc.

Nothing in last week's agreement with IBM is likely to prompt the Tokyo-based company to reconsider its role, Canin said.

Nor will Fujitsu likely view the accord as an opportunity to turn its American business partner into a U.S. outlet for Japanese operating systems. Because Amdahl's software efforts focus primarily on adding value, "I think the two companies would have very little interest" in entering into that kind of arrangement, Canin said. Instead, Amdahl users will continue to license their control programs directly from IBM, he said.

Because "Aspen is not a direct replacement for MVS/XA, it won't be affected by the agreement between IBM and Fujitsu," an Amdahl spokesman said.

Arbitration way of future?

Arbitration is the most formal and binding procedure in alternative dispute resolution and an increasingly popular method of reaching legal agreements. Arbitration may prove to be the wave of the future in settling computer vendor disputes for several reasons:

- Once the participants have agreed to submit to the arbitrators' decision, it is legally binding and cannot be appealed or otherwise challenged for the duration of the settlement. IBM will save an estimated $30 million or more by submitting to arbitration rather than fighting Fujitsu Ltd. in court, according to John R. Logan, an analyst with The Yankee Group in Boston and a consultant to IBM at the time it fought off a dozen antitrust lawsuits in the 1970s.
- It settles disputes much faster than the courts can, a key advantage in an industry in which the time to market is a critical success factor.
- Arbitration decisions are not bound by the traditional legal constraints of existing statutory or case law.
- The arbitration process — hearings, written and oral testimony and cross-examination of witnesses — is completely private. In most cases, the arbitrators' final decision and award is not made public. Because of the size and significance of the IBM-Fujitsu settlement, the arbitrators chose to make it public but prohibited the companies from commenting beyond the brief statements released last week.

CLINTON WILDER
and CHARLES BABCOCK

Amdahl beefs up front end with ECL performance jolt

BY JEFFRY BEELER
CW STAFF

SUNNYVALE, Calif. — Amdahl Corp. last week countered IBM's 3725 communications processor with the long-expected introduction of two front ends that it said use emitter-coupled logic (ECL) to provide 20% to 80% better performance than Amdahl's previous offerings.

By incorporating 20,000-gate-per-chip CMOS technology, the 4725 Models 30 and 40 also boast 40% to 50% higher reliability than Amdahl's existing 4705E network controller, according to Tim Logan, Amdahl's communications product director.

With the 4725 models all configuration variables are defined or redefined in microcode — an approach that spares customers from having to buy options, Logan said.

'Ahead of game'

While Amdahl emphasized the 4725 front ends' reliability, Bill McMinn, voice and data communications manager for Dallas-based Southland Corp., a major Amdahl account, cited the improved performance as the key feature. "From my standpoint, the chief advantage of the two products seems to be their capacity and throughput," McMinn said. "If you can replace five or six 4705s with three or four 4725s, you're that much ahead of the game."

In the 4725 front ends, ECL chips boast a 30-nsec machine cycle, compared with 200 nsec on their IBM counterpart, the 3725, according to Amdahl communications product manager, William Caroli.

The 4725 models' improved reliability, meanwhile, stems from their heavy dependence on CMOS circuitry, a high-density technology that minimizes parts counts and thus eliminates many potential sources of hardware failure, Caroli said. Use of CMOS has enabled Amdahl to squeeze a line-attachment base (LAB) that formerly required 32 boards onto one and reduce the product footprints by 30% compared to the earlier model.

Moreover, the Amdahl network controllers support up to 64 lines operating at 64K bit/sec. and use a 26M bit/sec. bus as opposed to 7M bit/sec. for the IBM machine, Logan said.

Expandable to 3M bytes of main memory, the 4725 front ends support up to 256 half- or full-duplex lines ranging in speed from 50K to 256K bit/sec. The machines come with a 20M-byte hard disk to receive downloaded NCP code and can be remotely troubleshot from Amdahl's diagnostics assistance center.

A minimally configured Model 30, which can be upgraded in the field to a Model 40, combines 512K bytes of main memory with two LABs. It costs $71,500.

At the other end of the 4725 price scale, a Model 40 with 3M bytes of internal storage, eight LABs, six channel adapters and 64 lines sells for $545,160. Deliveries of the larger Amdahl front end start immediately with shipments of the entry-level versions set for 1988.

'Never mind'

FROM PAGE 1

time-consuming than the benefits you get."

Two years ago, many Fortune 1,000 firms were pressuring microcomputer software vendors for the freedom to copy and distribute software for a fixed price. While many smaller vendors relented in hopes of quickly gaining market share, the Big Three have stood their ground. Now, users say administrative overhead has made site licensing much less attractive.

Overhead is only one of a raft of problems that have prevented the idea from taking hold. The difficulty that MIS managers have in convincing management to commit a large up-front sum to a small microcomputer vendor, the lack of a plan from Lotus, Microsoft or Ashton-Tate and the usual legal entanglements have all blocked the concept's momentum.

Upper management in Fortune 1,000 companies remains skeptical about signing site licenses with small companies because it feels it would lose its investment if the company went out of business. While a few small developers have signed deals with major corporate accounts, it usually takes a considerable leap of faith by both parties for a deal to be signed.

"There is a basic problem that has to do with commitment vs. discount, and they [software vendors and corporations] can't seem to meet in the middle," says Dave Smoot, chairman and chief executive officer of Software Funding International in Deerfield, Ill.

Software Funding offers one solution to the problem by making the up-front payment to the vendor on behalf of the corporation, which pays back the loan over a period of time.

"If someone buys 1,000 copies, it takes months to install and educate people, so their payback is somewhat aborted," Smoot says. Software Funding has negotiated $4 million worth of site-licensing agreements with Fortune 1,000 firms since February, he says.

While Software Funding might help small to medium-size companies, several Fortune 1,000 firms interviewed said the loan approach would not help them much, since they are already well-funded and have sophisticated MIS departments.

Many large corporate accounts say they would be interested largely in site licenses with the Big Three. "For us to make a big up-front payment, it would have to be a viable company, like a Microsoft or an Ashton-Tate. With smaller companies, it's very hard for us to convince management," says B. J. Garnett, manager of Hughes Aircraft Co.'s management systems department.

If site licensing were to fade away, many second-tier companies say they would be at an even bigger disadvantage to the Big Three.

"It would be a shame for the second tier, because the end-user community wouldn't realize there is a hell of a lot of good software out there other than [that from] the top 10," Smoot says.

Long legal process

Another stumbling block to site licensing is the lengthy legal process that precedes such agreements.

"What happens is the paperwork and legal aspects are such long procedures that, in the meantime, these companies start buying on a volume-purchase agreement basis," says Richard Rabins, president of Alpha Software Corp. in Burlington, Mass.

Few companies have signed site licenses with small software vendors. General Electric Co. has signed unlimited site licenses with several software companies, including Alpha Software, Office Solutions, Inc. and Computer Associates International, Inc.

Besides saving money, GE signed the agreements to hasten the creation of standards within the company, according to Jeff Ehrlich, manager of product technology for GE Corporate Information Technology in Bridgeport, Conn.

"I don't know why more companies haven't signed them. It has been really effective for us," Ehrlich says.

One option that interests some large user organizations is a license that allows them to download copies of micro programs from mainframes. So far, only Lotus has beta-tested such an approach (with Exxon Corp.), but it has yet to announce an agreement.

Electronic distribution "is the direction we are heading in," says Jim Morison, manager of end-user computing at Douglas Aircraft Co. "Now, we are individually installing software and want to get away from that."

Most software companies say they do not think this trend will become a reality for quite some time. However, Ansa Software is exploring the possibility and currently beta-testing the idea with universities. According to Ansa President Ron Posner, most large universities are better set up for downloading software from mainframes than are many corporations.

Fujitsu

FROM PAGE 1

Nonetheless, most industry observers and MIS executives interviewed were skeptical about the prospects for true competition in IBM mainframe operating systems, particularly in the U.S.

"Fujitsu got the sleeves of the vest — not the whole thing," said Rick J. Martin, a former IBM employee now following the company for Sanford C. Bernstein & Co. "They don't get the use of IBM's code, just the chance to look at it. In the long run, I don't think the balance of power has shifted at all."

The huge upheaval of converting a mainframe operating system will remain a formidable market obstacle for Fujitsu. "The few users who might be price-sensitive still have the threat of future incompatibility after the five- to 10-year time frame," said Peter Burris, a software research analyst for International Data Corp. "In the long run, IBM is still going to control the environment, not Fujitsu."

The settlement gives Fujitsu access to IBM source code for more than 750 programs, including the OS, MVS, VSE and VM operating systems, along with many system utilities and major MVS subsystems such as CICS, JES2 and JES3. Fujitsu's access, in some cases, will go beyond what IBM has so far elected to share with its large customers.

Fujitsu will also gain access to 55 IBM manuals, including yet-to-be-published documentation on Systems Application Architecture and Systems Integration Architecture.

It is significant, however, that Fujitsu will have no access to microcode. That factor could accelerate IBM's effort to embed more operating systems source code in hardware.

IBM has been retracting customer source code access during the past two years, according to Martin Goetz, senior vice-president of technology at Applied Data Research, Inc. and chairman of the IBM Interface Committee of ADAPSO. Customers do not get source code with newer products like DB2 and are gradually losing access to code for existing products.

The arbitration process began in July 1985, when the two companies agreed to submit to binding arbitration to resolve IBM's charge that Fujitsu was violating terms of several agreements reached in 1983. Under those agreements, Fujitsu made semiannual payments in exchange for IBM's sharing of software interface information.

But the pacts quickly collapsed in a spate of bitter charges and disagreements regarding "ill-defined" concepts, AAA's Jones said. Among other allegations, IBM charged that Fujitsu's OSIV/F4 MSP contained trade secrets from MVS/XA and that Fujitsu was not paying IBM the agreed-upon percentages of Fujitsu's operating system license fees.

Observers likened the effect of the arbitration settlement to that of IBM's 1983 agreement with the world's other leading maker of IBM plug-compatible mainframes, Hitachi Ltd. Hitachi has paid IBM a rumored $300 million fee to license mainframe operating systems.

Yashuhi Sayama, deputy general manager of Hitachi America Ltd. in Tarrytown, N.Y., said his company does not know the details of Fujitsu's negotiations but that he believes the outcome is similar to the Hitachi settlement. "We feel that customers of both Fujitsu and Hitachi won't have to worry about the future of the IBM-compatible business," he said. "Now, we and Fujitsu can start a new round of competition on equal terms."

Since Fujitsu does not currently sell its products directly in the U.S. because of its agreement with Amdahl Corp., the settlement's biggest short-term effect will be in the European and Asian markets. Fujitsu has been significantly hindered by user and OEM customer concerns about the threat of IBM litigation.

Most significantly, Siemens AG, Fujitsu's OEM channel in West Germany, decided in 1986 not to market the operating system at the heart of the IBM dispute.

Sources said the development of the IBM-compatible Aspen operating system by Amdahl, a firm in which Fujitsu owns almost half the stock, would probably not be affected by the IBM-Fujitsu arrangement (see story page 148).

An often overlooked aspect of the settlement is that IBM will be allowed to license Fujitsu operating systems. That may give IBM Japan Ltd. more leverage in penetrating Fujitsu accounts in Japan, Bernstein's Martin said. In its market share battle with Fujitsu and Hitachi, IBM Japan has begun selling its 3090s through OEM agreements with Toshiba Corp., Mitsubishi Corp. and Oki Electric Industry Co.

But Japanese sources said there are difficulties with IBM and Fujitsu cross-licensing each other's operating systems, at least for the near term. An IBM Japan spokesman said Fujitsu programs could not run on IBM mainframes without modification. Also, many of the IBM programs are based on English-language software but rewritten, using the same coding, in Japanese Kanji ideographs.

A Fujitsu spokeswoman added that most Fujitsu software is in Kanji, with limited English-language system sales in Australia and Spain. She also stressed the incompatibility of the two firms' programs, noting that Fujitsu has a proprietary operating system, data base management system and Japanese processing system. During a New York press conference beamed by satellite to Tokyo, AAA's Jones and Mnookin focused on the secure facilities aspect of the order. At such facilities, Fujitsu will be allowed to examine IBM's programming information under very controlled conditions, they said.

Arbitrator Jones

Should Fujitsu decide that it wants a specific piece of information, the data must be written on a formal survey sheet that will be reviewed by IBM and AAA officials before it leaves the premises. Once outside, the information belongs to Fujitsu, with IBM having no grounds for complaint. Fujitsu will pay a fee for whatever information it secures.

The contents of the sheets and which parts of the massive tomes of IBM information can be removed are still under discussion.

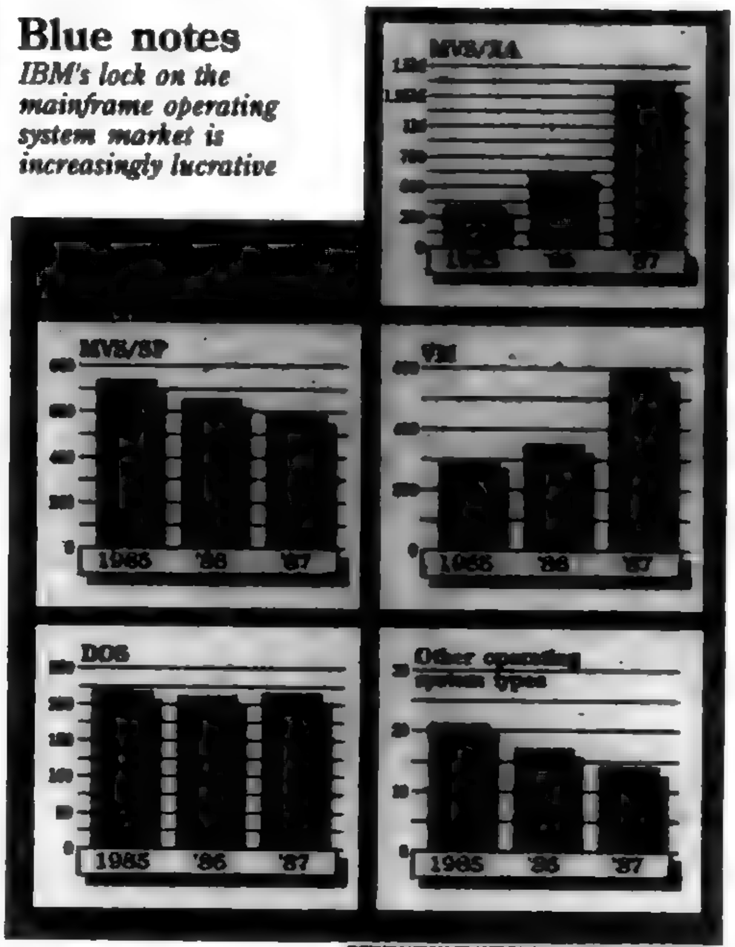
Jones, the retired executive vice-president of MIS at Norfolk Southern Corp. and past chairman of the committee that developed Cobol, said arbitration was essential to getting beyond the impasse created by IBM and Fujitsu's 1983 agreements.

To stay within the 1983 framework "would have only generated more disputes, more confusion and tremendous uncertainty for both companies and for their customers," Jones said.

Senior Editor Charles Babcock, Midwest correspondent Jean S. Bozman and IDG News Service Tokyo correspondent Lori Valigra contributed to this report.

Blue notes

IBM's lock on the mainframe operating system market is increasingly lucrative



INFORMATION PROVIDED BY ANNEX RESEARCH, INC.
CW CHART

Yawns from users

Last week's settlement between IBM and Fujitsu Ltd. may have been an unprecedented arrangement for two computer vendors, but it was met with a shrug of indifference by many mainframe shops.

"Given the fact that costs continue to go up, it would be nice to have real competition," said Daniel Leskinen, manager of information systems at Detroit Edison Co., which uses both IBM and Amdahl Corp. hardware. "But most of us have accepted where we are at."

MIS directors contacted by *Computerworld* last week said they doubt the settlement will impact their operations. While they said they would like to see serious competition in the mainframe operating systems market, they also said it is highly unlikely that they will convert to a Fujitsu offering.

User sites may eventually benefit by getting better products at lower prices from IBM, but the managers said that may take years.

"From a hardware standpoint, our mind-set changed a long time ago. We decided to get more bang for the buck," said Donald Breitenbach, vice-president of MIS at American Family Mutual Insurance Co. in Madison, Wis., which runs an Amdahl system. "But with the operating system, that would be much more difficult."

David Kearney, vice-president of MIS at Southland Corp., also said the highly critical nature of an operating system makes him leery of considering another vendor. "There certainly would be an advantage to have an alternative, because IBM has a monopoly here," Kearney said. "But at the same time, the operating system is so critical and complex that we would be very cautious."

Kearney's facility runs an Amdahl Model 5890-300 and an IBM 3090 Model 200. Like other managers, he said it will take time before Fujitsu can be considered a legitimate competitor to IBM.

One user said his IBM shop would only consider a Fujitsu operating system if it had a drastically lower price than IBM's software. "If the price was much lower, we'd take a look at it," said Robert Bone, director of data processing at Bergen Brunswig Corp., a drugs and medical supplies distribution firm.

ROSEMARY HAMILTON

Paradox leading Borland drive

Sews up Ansa deal to begin determined push into corporate accounts

BY STEPHEN JONES
CW STAFF

SANTA CLARA, Calif. — Borland International last week outlined its bid for a larger share of the corporate marketplace by finalizing its $30 million acquisition of Ansa Software and announcing a spate of upcoming products based on Ansa's Paradox relational data base.

New versions of Paradox will move the product line across a variety of operating environments and architectures, including Unix and IBM's OS/2, and hardware based on Intel Corp.'s 80386 microprocessor. An additional release is scheduled to include SQL capabilities that allow microcomputer users to access data stored on minicomputers and mainframes. The firm declined to give pricing for any of the upcoming products.

Like the current Ansa line, the new products are aimed directly at stealing sales from Ashton-Tate and its Dbase III Plus data base.

Borland "stands a very good chance of gaining share in the overall data base marketplace," said Brian Mutert, an analyst with Robertson, Colman & Stephens in San Francisco.

Philippe Kahn

The Paradox product line is the first in a series of mainstream business programs that Borland said it will begin shipping in the next several months.

In order to grow

"We want to grow, and when you want to grow, you have to move to different areas. For us, that means big corporations and the government," said Borland President Philippe Kahn.

The Paradox products were in the works long before Borland and Ansa started merger talks in July.

The offerings include the following:

- A program designed to run on 386-based microcomputers, which Ansa officials claimed will break the 640K-byte random-access memory barrier. The package will be released in the fourth quarter, according to Ansa Vice-President Robert Shostak.
- Unix and OS/2 operating environment versions that are expected to provide full file and application compatibility with existing Paradox products. The Unix version is set to ship in mid-1988. For the OS/2 version, the company has an ambitious plan to ship concurrently with OS/2.
- A package that will extend Paradox's graphical interface to run under Microsoft Corp.'s Windows and IBM's Presentation Manager. It is slated to be available shortly after IBM releases the Presentation Manager, expected sometime next year.
- An SQL version that company officials claimed will be able to call up a table located on an SQL-based mainframe and automatically translate the SQL table structure into the standard Paradox query format. Conceding that SQL is a difficult technology to implement, officials did not give a specific release date for the product.
- A jointly developed product that would put Borland's Turbo C and Turbo Pascal on the front end of a programming development environment in which programmers would have access to Paradox features, including querying, sorting and indexing.

Phoenix deepens accord with BIOS

NORWOOD, Mass. — Phoenix Technologies, Ltd. last week announced its next generation of BIOS compatibility, which is made up of a series of major enhancements to its IBM Personal Computer AT-compatible ROM BIOS products based on Intel Corp.'s 80386 and 80286 chips.

The 80286-based ROM BIOS Plus supports systems operating at 16 MHz with zero-wait states. A series of design recommendations that address bus timing and speed-switching will be provided to licensees, according to company spokesmen.

The 386-based ROM BIOS Plus supports 386-based systems operating at speeds of up to 25 MHz. It offers support for Intel's 80387 math coprocessor. As with the 80286 version, design recommendations that address bus timing and speed switching will be provided.

Laptop ROM BIOS Plus provides extended support for low-power consumption components and LCD logic. The product supports Intel 8086-, 80286- and 80386-based systems.

Phoenix also announced 80386 BIOS Plus, which provides full support for AT-compatible systems that are built around Chips and Technologies, Inc.'s Chipset.

Major enhancements made to Phoenix's existing product line include optimized support for the IBM and Microsoft Corp. OS/2 operating system; 3½-in., 1.44M- or 720K-byte disks; a setup program in read-only memory, or ROM; extended Microsoft Windows support; and improved speed-switching.

INSIDE LINES

Meet me at the station. Apple is putting the finishing touches on Macworkstation, a software package that lets users hook up to a mainframe and execute host tasks without leaving the friendly confines of the Mac. Though Apple is mum on Macworkstation's features, users say it's slick and quick, retaining the Mac's interface without sacrificing much performance. There's a catch, though. Software developers have to modify their mainframe packages to work with Macworkstation. And no one's figured out yet how to represent Cullinet's IDMS/R in a bit-map icon.

Cold feet. ADAPSO and the Information Industry Association have stopped talking about a merger. Instead, the merger task force will begin today to discuss scaled-down plans for joint activities such as conferences, workshops and publications. The talks are still friendly, but "both sides realized that a merger was too far out front, and they needed to take this one step at a time," one source said.

Looking for Mr. Goodwrench. CDC's Engineering Services division said last week it has signed a contract with a maintenance subsidiary of Chicago's Comdisco, one of the largest lessors of IBM equipment. CDC will handle monthly service for Comdisco's customers, as one of several third-party maintenance providers on contract with Comdisco's Maintenance Services division.

Singing a different tune. The Codd and Date Consulting Group, which worked with ADR on Release 8 of Datacom/DB (see story page 8), will not test the relational fidelity of the release until it is delivered in full. According to E. F. Codd, some industry insiders charge that the institute evaluated vaporware when Cincom Systems made public his evaluation of its Supra data base management system — based on early documentation — in which the product passed 10 of the 12 rules of his relational model. Some of Supra's relational features, however, haven't been incorporated into the product. Codd said the current Supra release would probably not fare as well under the institute's new rating system, which includes some 150 rules and features.

Heard it through the grapevine. Banyan is expected to announce its 386-based file server today, according to users who have tested the product. The file server is expected to be positioned at the high end and reportedly will be followed by Banyan's next release of Vines in November.

Open this one. Sources say Microsoft has written a version of 386 Windows for Compaq that Compaq will bundle with its 20-MHz Deskpro 386 and Portable III scheduled to be announced next week in New York. With 386 Windows, the 20-MHz system could easily be positioned as the much-rumored graphics workstation the company has been expected to announce. It would be the first time Compaq has bundled software with its systems.

Peaks and valleys. The "software problems" often cited as the reason for the follow-on product to IBM's System/36 and 38 still being a year away were recently pinned down a little more closely. One observer said that IBM developers in Rochester, Minn., have encountered performance problems at the lower end of the processor family, code-named Silverlake. The problems now being targeted reportedly involve the challenge of integrating portions of IBM's Control Program Facility as part of a new operating system on those smaller processors. However, the source also said development has moved more smoothly at the high end, with the top Silverlake machines on target to provide 30% to 40% performance gains in comparison with the top System/38 processors.

Bring in the AUXiliary. Phoenix Technologies has developed an 8088-based coprocessor board for Apple's Macintosh II, expected to be introduced at November's Comdex/Fall '87 show. According to sources, the board allows the Mac II to run Microsoft's MS-DOS under Unix. Pricing for the board has not been determined, sources said. AUX, Apple's version of Unix originally scheduled for availability in July, has been delayed because of performance issues and is not expected until later this year.

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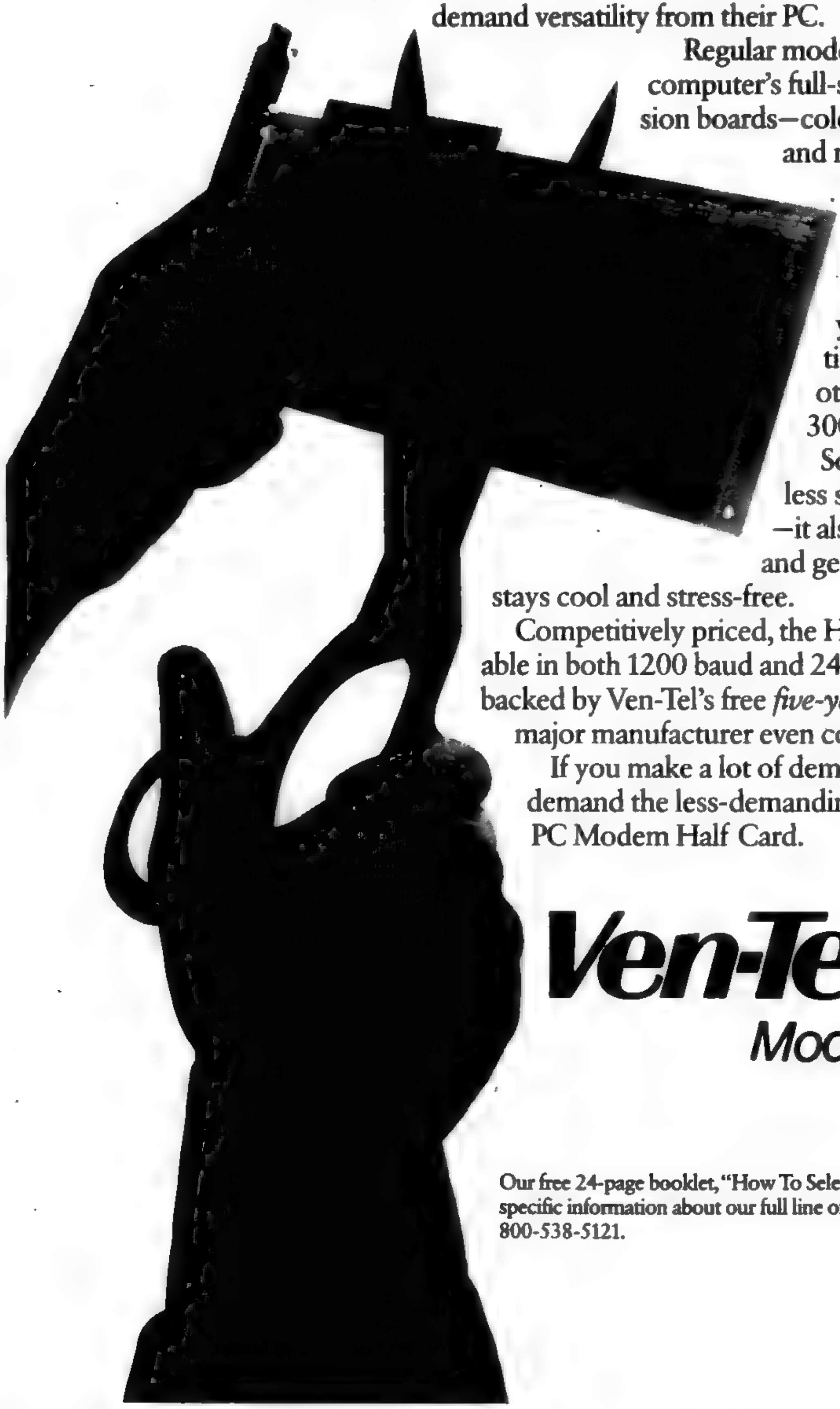

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COMPUTERWORLD

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Initial step taken in Wang's multivendor connectivity plan. Page 49.

IBM's unprecedented sales venture with Hogan fails to deliver the anticipated goods. Page 95.

Windows open to 80386 power

Microsoft delivers multiple MS-DOS sessions; effect on OS/2 questioned

BY DOUGLAS BARNEY
and STEPHEN JONES
CW STAFF

REDWOOD CITY, Calif. — Microsoft Corp. last week unveiled Windows/386, an operating environment that taps the multitasking capability of Intel Corp. 80386-based computers. Until now, these machines have functioned largely as souped-up single-task IBM Personal Computer ATs.

Despite the technical achievement, some users criticized the product. Others, however, gave it a thumbs-up.

Some said that by offering capabilities beyond those of Microsoft's MS-DOS, the $195 Windows/386 may compete with its maker's upcoming OS/2 operating system, posing a confusing choice to advanced users seeking more PC power. Others argued that the long-awaited Windows/386 provides much-needed multitasking capabilities and will serve as a highly useful tool.

"It would complicate our environment, but this package would be kind of nice. We are not, however, looking to support another environment," said David L. Lee, information center manager at M. W. Kellogg Co., a Houston-based designer and builder of petrochemical plants. Most of Lee's 386-based machines are dedicated to a single task, which makes a product such as Windows/386 less useful.

Another corporate manager lamented the "diversion" of Microsoft resources. "It is taking away resources from OS/2 development and taking away resources from applications for that environment," said Jeff Ehrlich, manager of product technology at General Electric Co.'s Corporate Information Technology. "Users are getting thoroughly confused about systems software directions at this point."

But for Michael S. Heschel, corporate vice-president of information resources at Baxter

Continued on page 6

Long wait ends as HP ships top-line Spectrum

BY JULIE PITTA
CW STAFF

LAS VEGAS — Paying off users who had gambled on its reduced instruction set computing development project, Hewlett-Packard Co. last week announced it has begun deliveries of the delayed high-end HP 3000 Series 950 general-purpose system.

Attendees at the Interex HP users group meeting here expressed relief that the company had resolved the problems plaguing its Spectrum development project. "It's been a long time in coming, but it's worth it," said Denys A. Frame, technical support manager for a branch of Northern Telecom, Inc.

"Finally," said P. H. Wergeland, financial systems supervisor for Boeing Commercial Airplane Co. "I've been hearing about this for two years."

The mood at the users group meeting sharply contrasted with the climate at last year's gathering in Detroit, where HP told users that shipments of both the 7 million instructions per second Series 950 and the 4.5 MIPS Series 930 would be delayed as a result of problems with the operating system's I/O. In the case of the top-of-the-line Series 950, HP projected that delivery could be as much as a year late.

Continued on page 130

MAP users group lays down law

BY KATHY CHIN LEONG
CW STAFF

DALLAS — In a dramatic move to provide stability in the factory automation arena, vendors offering products based on the Manufacturing Automation Protocol will be required to comply for six years with the version slated for completion in June 1988.

The MAP/TOP Users Group steering committee here last week declared that MAP Version 3.0 will undergo no major revisions during the six-year period.

The news provides comfort to potential MAP users who have been uncertain about where the specification is headed. Vendors, likewise, said they expect the announcement to cause future sales to escalate.

According to the so-called "stability document," the users

Continued on page 8

URBAN FLIGHT

Moving on out to the 'burbs

BY STANLEY GIBSON
and ALAN ALPER
CW STAFF

Frustrated by the flight of businesses from New York City, Mayor Edward I. Koch recently had himself photographed boarding up the Holland Tunnel leading to New Jersey. If the picture is accurate, Koch is not much of a carpenter.

But he does know how to drive home a point.

Koch's photograph was part of an advertising campaign designed to keep businesses, particularly data centers, from leaving his city for greener pastures in New Jersey.

New York finds itself at the top of the list of municipalities currently experiencing a DP exodus. The trend is shared to varying degrees by such cities as Washington, D.C., San Francisco, Chicago and Boston.

Cramped quarters

Data centers in many cities face ballooning rents and cramped quarters. In some localities, zoning rules and tax rates are obstacles.

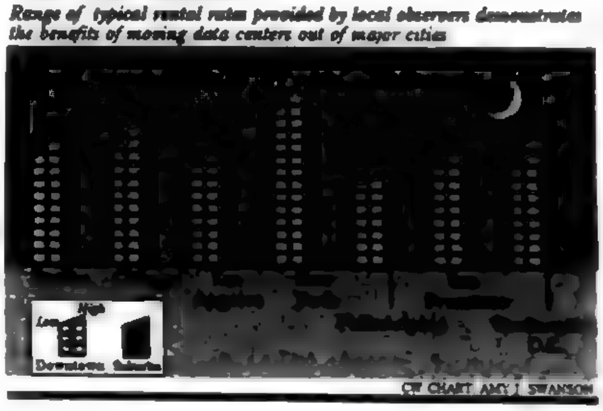
Although removing data processing operations from a crowded city and planting them in a more spacious plot is not a novel idea, the move to do so is gaining momentum.

"Everyone is moving

Continued on page 129

Call of the suburbs

Range of typical rental rates provided by local observers demonstrates the benefits of moving data centers out of major cities



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Drive option. MIS managers laud Rodime's 45.5M-byte hard disk drive for the PS/2 Model 50, a replacement the 20M-byte drive that comes in the system, but say they will test and evaluate the need for it before committing. Page 6.

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"People ask me if I'll miss having the reins, and I've been telling them that it's more like I've been pulling the wagon."

JOHN J. CULLINANE
CULLINET SOFTWARE, INC.

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Toshiba 386 laptop sited

California assembly, January delivery planned

IRVINE, Calif. — Toshiba Information Systems upped the ante in the growing market for high-performance laptop computers with the announcement last week of the T5100, the firm's first laptop based on Intel Corp.'s 80386 processor.

Toshiba, maker of the popular T3100 IBM Personal Computer AT-compatible laptop, will assemble the T5100 in Irvine, Calif.; the $6,499 machine, however, is not scheduled to be available until January 1988.

Domestic manufacturing allows the firm to skirt U.S. tariff restrictions imposed on Japanese-produced computer systems. These tariffs once threatened Toshiba's ability to compete in the U.S. laptop market and caused some dealers to stockpile Toshiba machines in an attempt to satisfy demand.

The T5100, which recently made its debut in Europe, comes equipped with an 80386 microprocessor running at 8 or 16 MHz, an 80387 coprocessor socket, 2M bytes of random-access memory (RAM) and a 40M-byte hard disk drive that offers a 29-msec average access time. The machine comes standard with Microsoft Corp.'s MS-DOS 3.2 operating system.

Users can expand the machine to up to 4M bytes of RAM to take advantage of expanded memory protocols. The combination of the 80386 chip and additional memory should allow the T5100 to run Microsoft's OS/2 operating system, scheduled to become available next year.

To ensure a measure of compatibility with IBM's Personal System/2 family of micros, the 15-lb T5100 uses a similar 1.44M-byte floppy disk drive.

In an effort to position the laptop as a usable desktop machine, Toshiba will offer an interface for a parallel printer and an RS-232C serial port. In addition, a five-card expansion chassis, compatible with the IBM PC, will be available for $1,000.

The machine, equipped with a gas-plasma display, also includes a built-in IBM Enhanced Graphics Adapter (EGA) capability and an EGA monitor port.

Options include a $400 1,200 bit/sec. modem that is Hayes Microcomputer Products, Inc. compatible, a $500 external 5¼-in. 360K-byte floppy disk drive and a $200 link system.

Computer monitoring seen as potential labor problem

BY MITCH BETTS
CW STAFF

WASHINGTON, D.C. — An estimated six million Americans have their work monitored by computer systems, a situation that could flare up as a major labor relations issue unless handled properly by management, according to a congressional study released last week.

"The Electronic Supervisor," a report from the U.S. Congress' Office of Technology Assessment (OTA), noted that many workers and their labor unions claim computer monitoring is an invasion of privacy and increases job stress.

Computer monitoring can take the form of electronic surveillance of the keystrokes made by data entry personnel, monitoring the records of digital telephone systems and spot inspections of personal computer diskettes.

The OTA's report concluded that the issue boils down to a balancing act between employers' rights to improve their facilities' efficiency, productivity and security and workers' rights to maintain privacy and dignity. The report hinted that unless managers defuse the problems, the federal government will come under increasing pressure to take action.

"Electronic monitoring is most likely to raise opposition among workers when it is imposed without worker participation, when standards are perceived as unfair or when performance records are used punitively," the OTA reported.

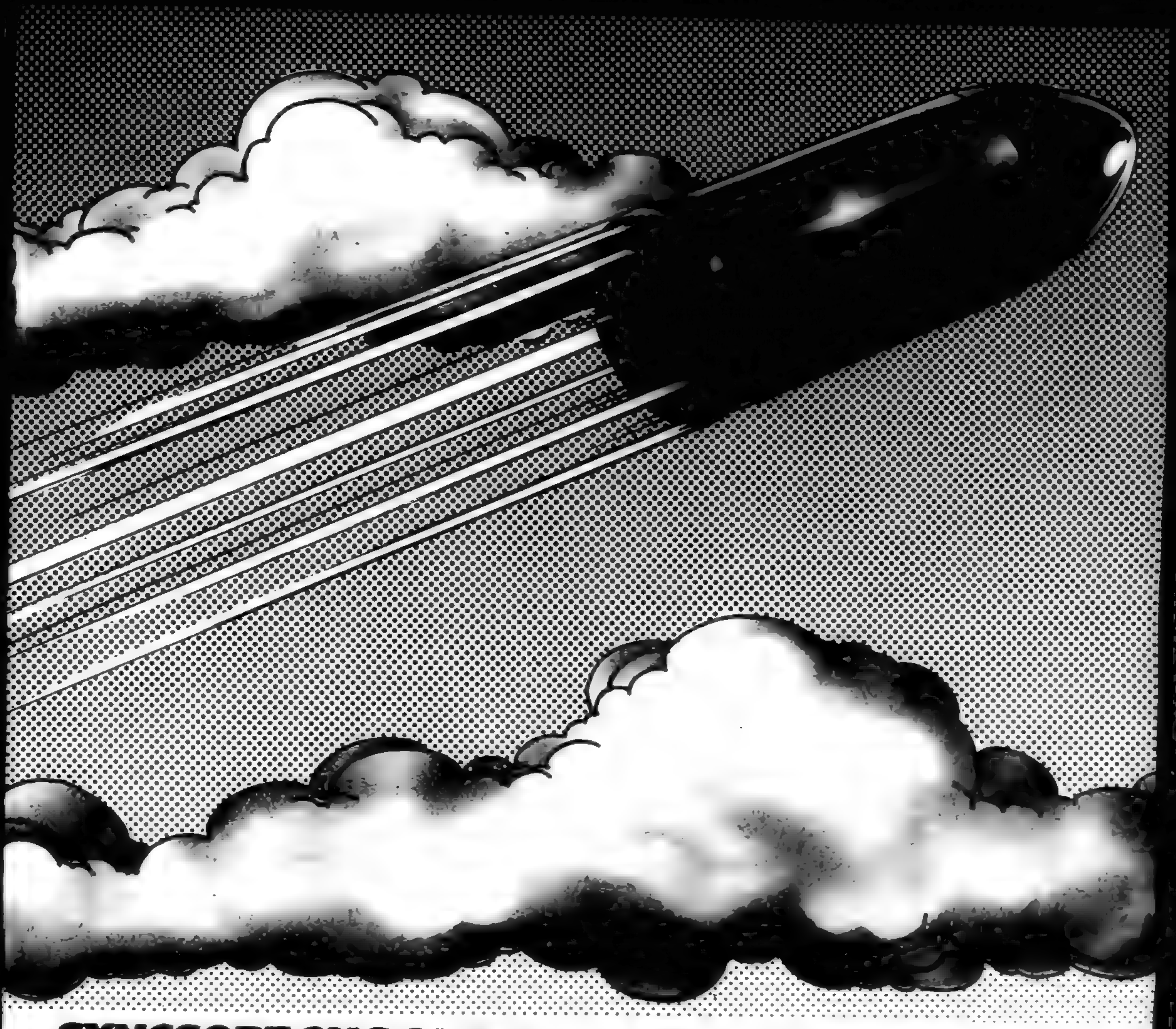
A growing threat

Rep. Jack Brooks (D-Texas) and Rep. Don Edwards (D-Calif.) requested the study. Edwards said Congress and the state legislatures should respond to the "growing threat" of computer monitoring.

"With computers, employers can monitor the most minute details of their employees' lives on the job," including how long employees are at their workstations and how many keystrokes they make, he said.

A statement by the Computer and Business Equipment Manufacturers Association (CBEMA), which stressed the positive aspects of computer monitoring, called the OTA report a balanced assessment of the issue.

In its statement, CBEMA called for the "sensible use" of computer work measurement to avoid negative reactions by employees.



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And the winner is ...

IBM, Fujitsu may both win once dust settles

BY CLINTON WILDER
CW STAFF

ANALYSIS

In promulgating and now defining the terms of the landmark IBM-Fujitsu Ltd. arbitration case announced 13 days ago, arbitrators Robert H. Mnookin and John L. Jones could indirectly be responsible for shaping new trends in the mainframe industry worldwide.

The opinions of legal and industry experts vary widely as to whether it was IBM or its leading Japanese competitor that came out ahead in the decision that gave Fujitsu, for substantial fees yet to be determined, unprecedented vendor access to IBM source code.

IBM and then the rest

Worldwide 1986 market shares for large-scale systems, based on 4,275 shipments

[illegible]	[illegible]
Siemens AG	8%
[illegible]	[illegible]
Unisys Corp.	6%
[illegible]	[illegible]
Honeywell Bull, Inc.	6%
[illegible]	[illegible]
NAS	4%
[illegible]	[illegible]
Control Data Corp.	2%
[illegible]	[illegible]
Other	3%

INFORMATION PROVIDED BY INTERNATIONAL DATA GROUP
CW CHART

Choosing a winner and loser may not be possible until those fees are announced by the arbitrators within the next few months.

However, in the long term, the real winner may not emerge until both companies — and the scores of other firms potentially affected by the decision — sail into their new courses in the marketplace as a result of the settlement terms.

"In this decision, I have a feeling we're not seeing much more than the tip of the iceberg of more global strategies for both companies," says Daniel T. Brooks, a partner in charge of the computer law practice at Cadwalader, Wickersham & Taft in Washington, D.C.

Certainly, IBM is giving up something it would have preferred not to — protection of the proprietary secrets at the heart of its mainframe software.

In a report released last week, Prudential-Bache Securities, Inc. analysts wrote that despite Fujitsu's royalty payments — which observers expect to be in the hundreds of millions — IBM would rather keep control of the software. Nonetheless, there may be benefits for IBM that are not yet apparent.

Impact from overseas

From the U.S. industry perspective, it is often disregarded that IBM, like most major vendors, derives a large chunk of its revenue from overseas sales. If the settlement terms help IBM Japan gain market share in Japan, the impact on Big Blue in the U.S. could be substantial.

IBM can now license the Fujitsu operating system for its own mainframes, which means nothing in the U.S. but could be critical in the Japanese marketplace.

The ability to offer Fujitsu software gives IBM Japan a potentially competitive weapon to penetrate current Fujitsu accounts with what would essentially be Fujitsu plug-compatible systems. These would perhaps be sold with a Japanese label through IBM OEM partners Toshiba Corp., Mitsubishi Corp. and Oki Electric Industries Co.

IBM Japan is already a remarkable U.S. success story in the world's second largest single-nation computer market, and its new cross-licensing freedom could prove lucrative.

In the U.S., the arbitration settlement may give IBM a strong shield against a threat it has historically feared more than any other — the U.S. government and its antitrust division. When IBM agreed in 1983 that major disputes arising with Fujitsu could be settled through binding arbitration, it did so with its 10-year legal battle with the Department of Justice hovering just one year behind it.

Some say IBM could have won its trade-secret theft case against Fujitsu in court, denied the Japanese firm any use of its systems software and effectively removed a competitor from the plug-compatible marketplace.

But would that result have been monumental enough to awaken the sleeping antitrust enforcement giant? Fujitsu certainly would have sounded the alarms loudly, and one suspects IBM competitors from all corners of the industry would have joined in.

However, with its mainframe software doors forced open by arbitrators, IBM can now argue that healthy mainframe competition will exist; the arbitrators said so themselves in their decision.

At least for as long as the Fujitsu access lasts, IBM gains an edge against the shifting political winds regarding antitrust — and gets a few hundred million dollars to boot.

Kapor ready to Go in with Kaplan and Carr

BY DOUGLAS BARNEY
CW STAFF

SAN FRANCISCO — The founder of Lotus Development Corp., the former chief scientist at Ashton-Tate and Lotus's artificial intelligence guru have formed a microcomputer software company that plans to develop what the men said will be a "new class of personal productivity applications."

Mitchell D. Kapor

But do not line up just yet to buy products from the new company, called Go Corp. According to its founders, the firm will be in a research and development mode for two to three years before applications debut.

These horizontal applications will be targeted at professionals and managers. The products will be based on a new concept in software, which none of the firm's principals were willing to describe.

This start-up marks the first venture for Mitchell D. Kapor, the founder and former chairman of Lotus who resigned from the board of directors earlier this year, since leaving the company. According to Kapor, Go was announced to defray rumors that were sure to arise about the company. Kapor, along with San Francisco-based Kleiner Perkins Caulfield & Byers, has invested in the firm. Kapor will also be an active member of the firm's board of directors and assist with product design and strategy.

Working with Kapor are S. Jerrold Kaplan, former principal technologist at Lotus and president of Go, and Robert M. Carr, former chief scientist at Ashton-Tate and vice-president of software for Go.

Kaplan, who has been working with Kapor on a still-unannounced product for Lotus, is a noted expert in the field of artificial intelligence. Carr, who wrote Ashton-Tate's Framework, is known for his strength in user interfaces. That combination of expertise is expected to produce products combining easy access with the ability to intuitively modify applications.

Although the applications will include some flavor of AI, they will not be so-called AI products.

"We plan to use the real thing," he said. Kapor admitted, however, that AI will play a role in the products. "They will be infected with the AI virus."

The firm said it has not decided what hardware architectures or operating systems to develop around. "We have to project what kinds of environments and systems are going to be available at that time. There are a number of routes we could take: go for portability across a series of different environments or target one that we think would be important. We just haven't decided," Kaplan said. "We'll see you in a few years."

Add-in boasts EMS support

BY JAMES A. MARTIN
CW STAFF

CLEVELAND — Tecmar, Inc. said last week it plans to be the first IBM Personal System/2 add-in board vendor to support the new Lotus/Intel/Microsoft Expanded Memory Specification (EMS) Version 4.0.

Tecmar's Microram, a previously announced memory expansion card for the PS/2 Models 50, 60 and 80, will be enhanced with a software driver compatible with EMS 4.0, the firm said. Shipment is set to begin Oct. 15.

EMS 4.0 will reportedly give PS/2 users a preliminary taste for the multitasking and expanded memory capabilities of IBM and Microsoft Corp.'s OS/2.

"The user can have memory above the current 640K-byte random-access memory limitations for running programs and storing data as well as for some multitasking environments," including Microsoft's Windows 2.0, said Dan Lucarini, director of marketing for Tecmar.

Tecmar is offering EMS 4.0 software driver upgrades to other existing memory and multifunction boards as well. The cost of Tecmar's boards is not expected to change as a result of the EMS upgrades.

Tecmar has also changed the Microram/2 name to Microram as a concession to IBM, which has recently pressured board makers to refrain from adding the "/2" suffix to product names and marketing materials.

Meanwhile, other enhancement board vendors are also working to support the new EMS version. For example, at Comdex/Fall '87, Quadram in Norcross, Ga., will reportedly announce plans to add EMS 4.0 to its boards currently supporting EMS.

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ADR tests distributed DBMS waters

BY ROSEMARY HAMILTON
CW STAFF

PRINCETON, N.J. — Applied Data Research, Inc. is readying a distributed data base management system for beta test this fall and is planning to release the product in the first quarter of 1988, company officials confirmed last week.

The debut of Inforeach comes at a time when most industry observers are saying that true distributed DBMSs are at least two years away because they pose such a difficult technological challenge.

"I'm very skeptical," said Michael Braude, a vice-president at the Gartner Group, Inc. in Stamford, Conn. "They haven't gotten it out yet, so it's still vaporware. I seriously doubt they'll be able to deliver it when they say they will. They might, but it's a lot easier to talk about."

ADR officials, however, said Inforeach will be a mature product with the key requirements for a distributed DBMS, such as a global data dictionary with subsets of that dictionary at local sites, as well as features like partioning, replication and a multinode update.

ADR said the product is at one beta-test site and will be shipped to two others within six weeks. "This is not an initial step," said Joseph Farrelly, ADR's vice-president of research and development. "No doubt there is more to do, but this is a mature distributed DBMS."

Datacom/DB partner

Inforeach is designed to work as a companion product to the company's DBMS, Datacom/DB. It provides the distributed capability to that environment and will rely on ADR's Datadictionary. Company officials said they plan to add support of IBM SQL in late 1988.

Initially, the product will be offered for the IBM MVS and VSE environments. An MVS license costs $55,000, and a VSE license will be priced at $43,000.

Farrelly pointed out that additional features will be added to Inforeach over time. The current Inforeach, for instance, has limited query-optimization features. The product cannot select the most efficient method of query once it moves beyond a local data base.

Thus if a user in San Francisco were to request data that resided in both New York and Chicago, the system would not know that it would be quicker to retrieve the data from Chicago.

Inforeach bases its roots in ADR's D-Net, a product introduced in 1983 that has approximately 100 users. D-Net provides limited distributed functions. Users can access remote data bases and view data, for instance, but they cannot update remote data.

ADR said Inforeach is actually a new release of D-Net. Because it underwent a significant amount of reworking, however, D-Net's name was changed.

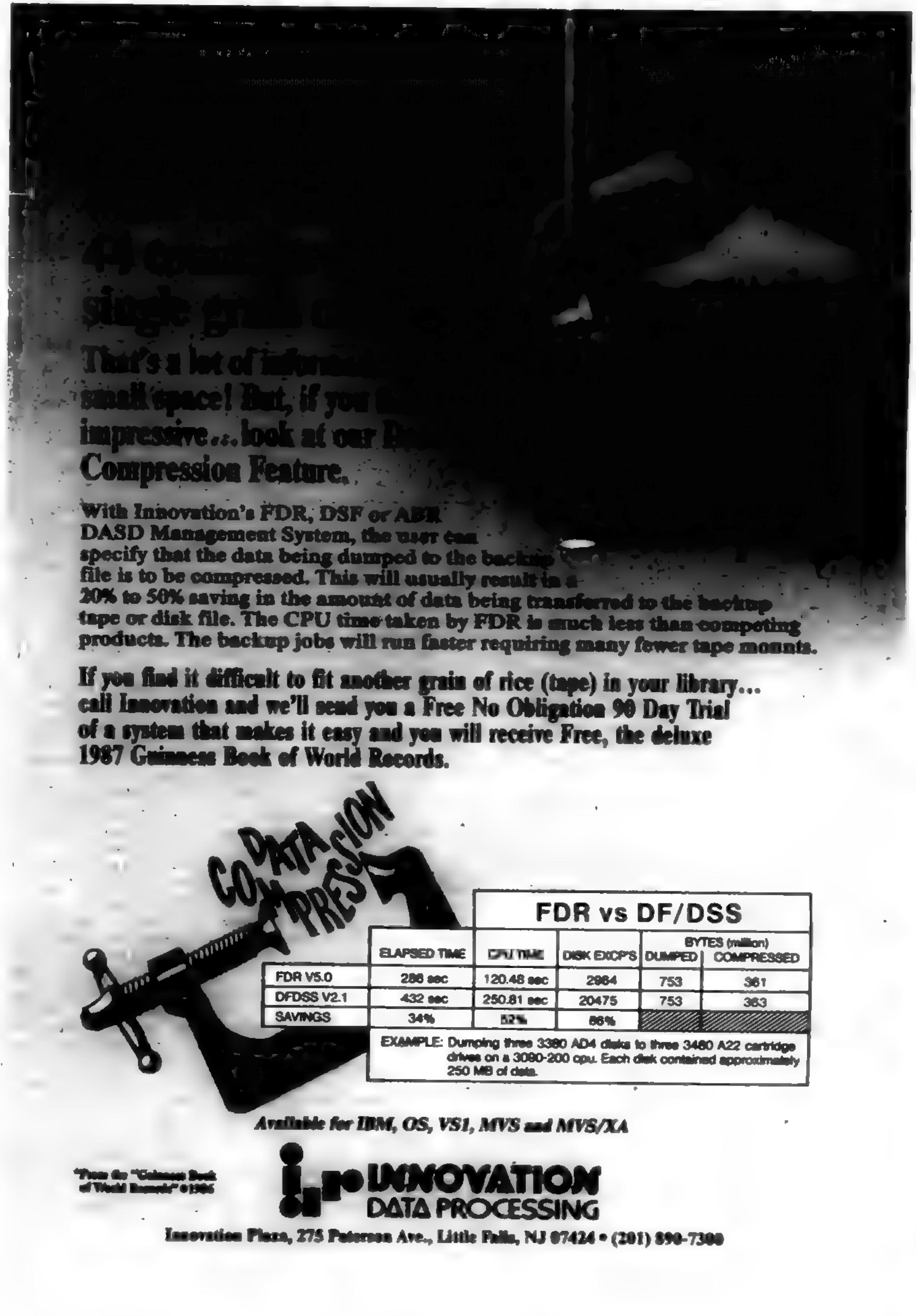
D-Net will be discontinued once Inforeach becomes generally available, a spokesman said. Current D-Net users can upgrade to Inforeach, he added.

"My initial reaction was that it was a 'me-too' product," said Shaku Atre, president of Atre International Consultants, Inc. in Rye, N.Y. "Oracle has a distributed product, Ingres is another, and now ADR is saying they have one," she said, referring to Oracle Development Corp. and Relational Technology, Inc.'s products.

"It sounds like the beginning of a distributed data base management system, but it still has to grow," she added.

Inforeach is made up of two major components, a distributed data manager (DDM) and a communications facility. The DDM manages access to multiple data bases, while the information transmission manager handles the data communications and supports IBM's System Network Architecture, LU6.2 and channel-to-channel connections.

The DDM includes the requirements for a distributed environment, ADR said.



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DFDSS V2.1	432 sec	250.81 sec	20475	753	363
SAVINGS	34%	52%	86%	▨	▨

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Rodime trumpets faster PS/2 drive

BY ED SCANNELL
CW STAFF

BOCA RATON, Fla. — Rodime, Inc. last week announced a 45.5M-byte, 28-msec hard disk drive for IBM's Personal System/2 Model 50 that will be sold to corporations and dealers as a replacement for the 20M-byte, 80-msec drives currently used in the IBM system.

Rodime is including a kit with the drive that it said allows users and dealers to remove the original drive from the Model 50 and install it in either the PS/2 Models 25 or 30. The drive — called Double Play — and installation kit carry a dealer price of $899.

Some MIS managers welcomed the substantially faster drive for the Model 50, but most said they would have to evaluate the product before committing to buying it in large numbers.

"We wouldn't make any decisions until we evaluate it to see if it performs as advertised," said Jim Appleyard, manager of data security and controls for Duke Power Co. in Charlotte, N.C. "It sounds like a good idea, though."

Rodime officials said a major advantage of Double Play is that it allows users to upgrade their Model 50s and 30s using just one upgrade kit. However, some MIS managers said they would have little use for the Model 50's 20M-byte drives because they have few or no Model 25s or 30s to use them with.

"Most of what we are doing here is 286-based, so that rules out the Model 30s," said Robert Corr, director of technology planning for Electronic Data Systems Corp.'s Dealer Systems division. "I salute them for coming out with a drive IBM should have come out with, but I just don't have away to utilize it."

If only a trade-in

"I would be interested if they offered some sort of trade-in," said Jeff Ehrlich, manager of product technology for General Electric Co.'s Corporate Information Technology staff. "I think a lot of people are buying the [PS/2] Model 60 when all they really want is a better disk drive. So I think this [Double Play] is a good thing."

While the 3½-in. drive is compatible with the Model 50, it does not take advantage of IBM's proprietary Micro Channel architecture. Rodime declined to say when a version that supports that architecture would be available.

Double Play comes with cables, interface boards, controllers and brackets for installing it in the Model 50. Installation in the Model 30 is somewhat easier than in the Model 25, according to Jamie Bankhurst, manager of product development for Rodime's retail products, although he said the process on both is fairly routine.

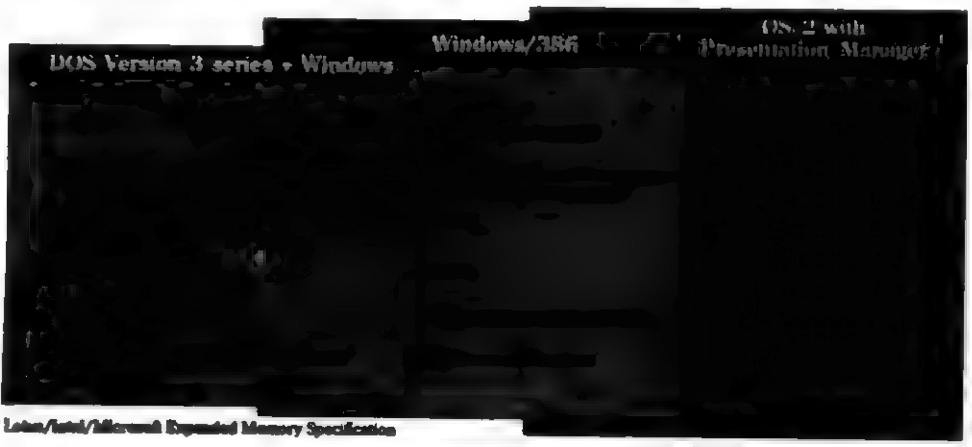
"The first time you do it, it might take a half-hour, but after you have installed a few, you can do it in 15 minutes," Bankhurst said.

Full installation and partitioning software is included with the disk, which features automatic head parking and locking, according to a spokesman. The product has a mean-time-between-failure rate of 18,000 hours, he said.

The product is available immediately.

Opening wide

Microsoft's Windows/386 expands on capabilities of earlier versions and uses same interface planned for the Presentation Manager component of OS/2



* Lotus/Intel/Microsoft Expanded Memory Specification

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CW CHART

Windows

FROM PAGE 1

Health Care Corp., Windows/386 is apparently just the ticket. The firm, based in Deerfield, Ill., has some 180 Compaq Computer Corp. Deskpro 386s, many of which may benefit from Windows/386.

"To be able to use the 386 to run multiple programs is a shot in the arm for us. We can get a lot more productivity out of [these machines]," Heschel said.

A virtual handful

Windows/386 runs multiple MS-DOS environments simultaneously by using the 80386's 8086 virtual mode to set up a handful of virtual machines. Depending on a user's hardware and software configuration, each of these machines can run a full 640K bytes of memory for such applications as Lotus Development Corp.'s 1-2-3, Microsoft Word and Ashton-Tate's Dbase III Plus.

Because Windows/386 uses its own virtual machine, each application has 640K bytes of memory available.

The package will compete primarily with Quarterdeck Office Systems, Inc.'s Desqview 2.0, a popular control program for 80386-based machines that runs in character mode.

Windows/386 also supports Lotus/Intel/Microsoft Expanded Memory Specification 4.0, which allows the user to address more than 640K bytes of random-access memory (RAM). This specification is used primarily for large data sets.

Although the product is reported to be compatible with virtually any application, Windows/386 cannot operate with some existing 386 software, such as the DOS Extender by Phar Lap Software, Inc., according to Steven Ballmer, Microsoft vice-president of systems software.

A toast to DOS

While Microsoft officials conceded that Windows/386 and other MS-DOS products would eventually be displaced by OS/2, they maintained that Windows/386 is not a temporary product.

"Over time, there will be a transition to OS/2, but MS-DOS is definitely not going away," Ballmer said.

Some observers said the announcement gives a breath of life to the DOS world, which some developers appear to have turned their backs on in favor of the pending OS/2 Release 2 and a whole line of OS/2-related applications.

"It gives a new lease on life to DOS machines and gives programmers a reason to continue to stay in the DOS environment for some time," said Craig Cline, associate editor at Seybold Publications in Malibu, Calif.

This version of Windows, along with the announcement by Windows/386 co-developer Compaq that it will bundle the software with its 386-based systems, may also give Windows a much-needed boost.

While Microsoft has shipped roughly a million copies of Windows, many of which were done through bundling arrangements with OEMs, there is still a dearth of users and a lack of major applications for it.

No dearth here

The lack of Windows applications is less an issue with Windows/386, which provides multitasking and windowing of non-Windows applications. An increase in the popularity of Windows could also lay the groundwork for the Presentation Manager, Microsoft's graphical user interface component of OS/2 that is based on Windows.

The system requires 140K bytes of RAM, a hard disk and an IBM Enhanced Graphics Adapter or Video Graphics Array display adapter. Microsoft recommends at least 2M bytes of physical memory.

Vendor support for the product was highlighted by the attendance of more than 30 software vendors and numerous hardware vendors.

Windows/386 should be available on the 20-MHz version of the Deskpro 386 and on the 80386-based version of the Compaq Portable III, both set for announcement tomorrow.

Senior Editor Ed Scannell contributed to this report.

Apple, Northern Telecom to network 1,334 Mac IIs

BY JULIE PITTA
CW STAFF

CUPERTINO, Calif. — Apple Computer, Inc.'s strategic alliance with Northern Telecom, Inc. has once again borne fruit with three networking products slated to be introduced this week.

Apple and Northern Telecom said they will introduce at the Tele-Communications Association conference (see stories page 128) Lanstar Appletalk, a networking product that enables up to 1,334 Apple Macintosh II users to share information within a department or company. It is driven from a central Northern Telecom Meridian Lanstar controller and requires a Lanstar interface card that plugs into the Mac II's Nubus slot.

Also required are a Lanlink interface cable and standard twisted-pair wiring.

Users are connected over telephone wires and can be located up to 2,000 ft from the controller. According to Apple and Northern Telecom officials, the network provides 40M bit/sec. shared bandwidth and transmission speeds of 2.56M bit/sec. Lanstar Appletalk includes a diagnostic software application package.

"It doesn't require dialing or any human interface to connect to the network," explained Bob McNinch, business development manager at Apple. "Clicking the icon once allows a user to connect to the network. Instead of being a solution for a small group of people, we wanted an establishmentwide network."

All Appletalk applications are compatible with the new network, McNinch added. The price of the Meridian Lanstar controller is $5,400; the interface card is $295.

Bridge to PCs

Also to debut is Lanstar Appletalk Bridge, a software package extending the network to include all Macintosh personal computers and peripherals as well as PCs running Microsoft Corp.'s MS-DOS. Up to 31 Appletalk devices can be connected on each package. The software is resident on a Mac II connected to the Lanstar Appletalk network and Apple's Appletalk personal network or Farallon Corp.'s Phonenet.

The package's price is $295.

Appletalk Netaccess, priced at $595, is a software package for the Mac that allows remote users to access a network's file server, Apple's Laserwriter printer or electronic mail.

A Northern Telecom Meridian SL-1 private branch exchange provides the connection to the Appletalk network using a communications server. McNinch said the connection is transparent to the user. Transmission speeds are said to be 19.2K bit/sec.

Users from up to 8,000 ft away can connect to the network via a telephone jack, while those located farther away require a modem.

All products are scheduled to be available in 60 days through Apple dealers. According to McNinch, IBM Personal Computer versions of the products are currently available through Northern Telecom.

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Edmonton, AB	October 22
Houston, TX	October 16
Indianapolis, IN	October 1
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New York City, NY	October 6
New York City, NY	November 10
Omaha, NE	October 27
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1-CWX-870928

AT&T spells out net control plan

BY ALAN ALPER
and ELISABETH HORWITT
CW STAFF

NEW YORK — AT&T last week announced plans for a unified network management architecture that potentially would allow its customer-premise equipment and service offerings to be centrally controlled through any system that complies with the CCITT X.410 network management standard.

Unified Network Architecture (UNA) is based on the Network Management Protocol (NMP), an emerging CCITT and ISO standard that will also be compatible with the Integrated Services Digital Network. It would provide configuration and fault and performance management, among other functions, for customer-premise equipment, local exchange carrier network and AT&T interexchange services, AT&T said.

The architecture is expected to evolve during the next couple of years, AT&T said. The company intends to publish initial NMP specifications within the next few months.

By publishing the specifications, AT&T will, for the first time, allow third-party service and equipment vendors direct access to — and potentially control of — its equipment and service offerings, according to George Kushin, senior vice-president of marketing for T1 switch vendor Avanti Communications Corp.

"As we bring our own offerings under the CCITT standard, users will be able to control not only their T1 equipment but also AT&T services and [private branch exchanges]; or to use AT&T's UNA to configure their T1 equipment," Kushin said.

Avanti and Timeplex, Inc. both announced last week that they would support UNA in their T1 networking products.

AT&T spokesmen were unclear as to which of the company's existing networking and network management products will be brought under the UNA umbrella through X.410 interfaces and did not specify when or if the company intends to introduce network management products under the new architecture.

Analysts lukewarm

Analysts were less than enthusiastic about AT&T's network management architecture. "It's about three or four years late and far short of the capability the world expects of a company with AT&T's resources," said Ken Bosomworth, president of International Resource Development, Inc.

AT&T introduced two products that support its new network management architecture: a workstation to provide access to a variety of network management systems through a single system and a processor to monitor network traffic.

In its initial release, AT&T's Accumaster Consolidated Workstation will provide access to AT&T's Starkeeper network management system, Dataphone II system controller, Dataphone II Acculink Network manager, Accunet T1.5 customer-controlled reconfiguration and IBM's Netview, a system for managing data networks in an IBM Systems Network Architecture environment. The company said it expects to support additional network management systems over time.

The workstation is based on an AT&T 6300 Series microcomputer and uses Microsoft Corp.'s Windows as its user interface. For multiuser applications, the system can be configured as a file server on an AT&T Starlan local-area network.

It is scheduled to be available in the first quarter next year and costs between $7,000 and $15,000 per user, depending on the configuration.

The other product, Accumaster Trouble Tracker, is a Unix-based software system running on an AT&T 3B2 computer that reportedly monitors up to 400 System 75, System 85 or Dimension private branch exchanges on a network.

Polices performance

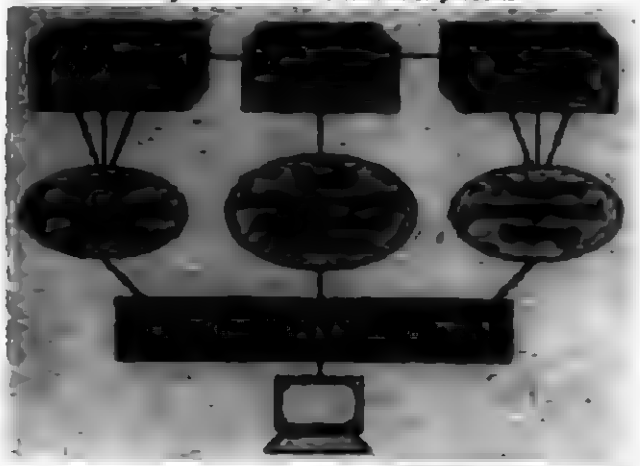
It oversees the performance by collecting alarms and issuing and tracking trouble tickets on alarms. Trouble Tracker also generates reports to help gauge equipment performance, spot developing problems and identify long-term trends.

Set to be available in the second quarter, a typical configuration costs $60,000.

As laid out last week, AT&T's UNA would link existing network management products, which monitor individual devices on the network. To integrate all management systems on the network, each would have to adhere to the NMP, noted Chuck Yates, AT&T's vice-president of marketing planning.

AT&T branches out

Network management scheme promises end-to-end user control of communications systems based on Accumaster products



INFORMATION PROVIDED BY AT&T
CW CHART

Justice Dept. scores Southwest Bell venture

BY KATHY CHIN LEONG
CW STAFF

WASHINGTON — A partial investigation by the Department of Justice has found that Southwestern Bell Corp. did violate the AT&T divestiture decree in its relationship with development company Tsunami Technologies Corp. However, until the study is complete, the Justice Department is not ready to recommend any type of enforcement action.

Southwestern Bell, which owns 80% of Sunnyvale, Calif.-based Tsunami, has been under fire since June, when the secret $11.8 million investment in Tsunami became public [CW, Sept. 7]. Tsunami is a research and development company working on a broadband local-area network with private branch exchange features.

U.S. District Judge Harold H. Greene later ordered the Justice Department to investigate the entire matter, which was initiated by former Tsunami official Don Marquart, who was terminated in August 1986.

The preliminary investigation findings claim "there were significant lapses in Southwestern Bell's compliances with the procedures mandated by Section V of the decree for informing [Bell operating company] officers and management employees about their decree obligations."

The section explains that each Bell holding company must give copies of the Modified Final Judgment and a written order to comply with the decree to "all officers and management personnel" who have large responsibility in Modified Final Judgment matters.

Southwestern Bell has admitted that new management employees of Tsunami failed to receive the needed documents but added that it has reinstituted the procedure required in Section V.

MAP group

FROM PAGE 1

group said the only changes allowed in MAP 3.0 will be corrections in the specification.

"There shouldn't be any negative impact for anyone," said Laurie Bride, Technical and Office Protocol (TOP) program manager at Boeing Computer Services in Seattle. The statement will not restrict vendors from adding new functionality to their products. "The only concern of the committee," Bride stressed, "is that the products be compatible."

Great expectations

"Right after Version 2.1 of MAP was announced, people were already talking about 3.0," observed Walt Kozikowski, a staff executive for the National Electrical Manufacturers Association in Washington, D.C.

Kozikowski, who represents the body of MAP vendors, said that vendors have been particularly disappointed in MAP 2.1 sales, which have been lower than anticipated, because of users' expectations of Version 3.0. "Now, users will feel much more confident when they are making their buying decisions."

According to Anthony Friscia, president of Advanced Manufacturing Research, Inc. in Salem, Mass., $17 million to $21 million will be the flat amount of MAP sales in 1987 compared with last year. "The key to all of this has been the need for stability," Friscia said. "MAP has always been somewhat of a moving target. Freezing things at MAP 3.0 will give users a chance to move ahead and give vendors a chance to get a return on their investments."

Under the statement of direction, issued at the MAP/TOP Users Group meeting, MAP suppliers are urged to provide "mechanisms" for backward compatibility in upcoming products. The steering committee's initial review of product compatibility comes six months after MAP 3.0 is released.

TOP seeks compatibility

The move to make the MAP specification compatible with future releases has no bearing on TOP, but a stability statement is under development and is scheduled to be presented at another users group meeting in January.

According to Bride, the direction of TOP is to maintain compatibility with MAP and Government Open Systems Interconnect Procurement. Exactly what the stability statement will contain will need to be discussed with the National Bureau of Standards, she stated.

Also at the MAP/TOP Users Group meeting, a handful of vendors issued product announcements designed to round out their product lines.

Concord Communications, Inc. introduced a $10,200 bridge that links Ethernet IEEE 802.3 networks over an IEEE 802.4 broadband backbone. The Series 4200 bridge was designed for large manufacturing sites with multiple Ethernet segments. Concord officials stressed that the product can serve as a MAP/TOP bridge, since the device lets TOP workstations on 802.3 communicate with MAP broadband nodes.

In addition, Concord unveiled a program to help vendors participate in the Enterprise Networking Event '88 International, which is slated for June in Baltimore. The crux of the event is to demonstrate interoperability among different vendors' machines. The Concord Event Starter Kit will assist customers in migrating from MAP 2.1 to MAP 3.0 applications.

In the wake of Version 3.0, Motorola, Inc.'s Microcomputer Division has dropped the price of several of its MAP products. The most dramatic reduction is the 40% price cut of its flagship product, the MVME732 Advanced MAP controller board. The 32-bit board using the MC6884 Token Bus Controller chip will reportedly be sold for $1,595.

The Motorola Semiconductor Products Division announced an enhanced Token Bus Controller and a price drop for its existing Token Bus Controller. In large quantities, the price for a single unit will be as low as $35 by the fourth quarter, the company said.

Fairchild Data Corp. recently introduced a low-cost 802.3 modem for use in TOP networks. The 10M bit/sec. modem, TOP-link M8023, features single or dual cabling capabilities and costs $2,995.

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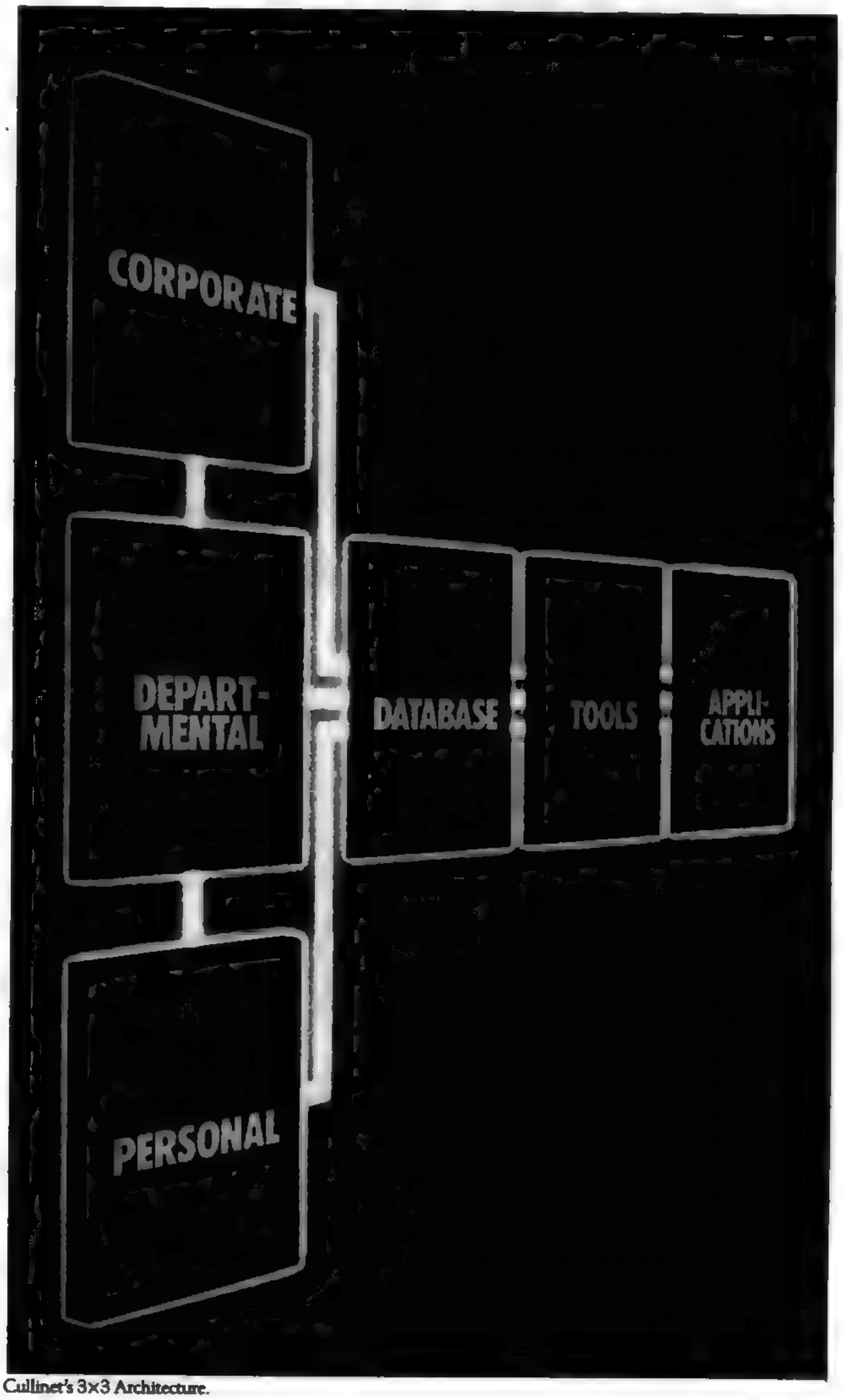

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Storage Tech boosts solid-state disk power

BY JAMES CONNOLLY
CW STAFF

LOUISVILLE, Colo. — Storage Technology Corp. last week quadrupled the capacity and expanded the communications options available on its solid-state storage devices for IBM and IBM-compatible mainframes.

With the introduction of the 3G-byte 4380 Solid-State Disk Subsystem, Storage Technology surpassed the 2G-byte storage capacity provided by competing devices from Hitachi Ltd. and marketed in the U.S. by Memorex Corp. and National Advanced Systems Corp.

The 4380 is comparable to the Hitachi units and to a 512M-byte Amdahl Corp. solid-state system, said Grant Wilcox, solid-state disk product manager for Storage Technology. "The performance, functionality and reliability are pretty much identical. What we offer is that we have been in the solid-state business for nine, going on 10 years now," Wilcox said.

Page and swap

The channel-attached solid-state devices emulate IBM 3380 disk subsystems for applications that include paging and swapping. Wilcox claimed the 4380 provides seven to 10 times the performance of a conventional rotating disk system. The solid-state devices store data on memory chips rather than magnetic disks.

While the 4305 — the first versions of which were shipped in 1979 — provides 768M bytes of storage, the 4380 stores 3G bytes of data and instructions on 1M-bit chips. The 4380 features standard dual-port and optional quad-port capabilities. The dual-port feature allows two directors, two channels and two storage modules to run simultaneously.

The quad-port option allows four directors, four channels and four storage modules to run at once. The 4380 supports 16 channels, compared with the 4305's eight channels.

The 4380 also features Storage Technology's first battery backup. The feature was designed to preserve stored information throughout a one- to three-hour power failure.

Wilcox said the quad-port option could double throughput for some users, with applications such as swapped data sets and CICS temporary storage achieving the greatest benefit.

A minimum 48M-byte 4380 configuration with a controller costs $204,000. A system with two controllers, two backup units and 768M bytes of storage costs $971,000.

Versions with up to 768M bytes are scheduled to be shipped during the fourth quarter.

Infomart opens CIM plant doors; not yet at 100%

BY ROSEMARY HAMILTON
CW STAFF

DALLAS — After a two-month delay, Infomart is slated to officially open its computer-integrated manufacturing (CIM) facility this week.

However, all the pieces that make up Infomart's Integrated Display of Enterprise Automation Center (Ideacenter) are not in place. Ironically, the Ideacenter was designed to further the concept of CIM, which integrates all facets of a manufacturer's business, but the facility has not had an easy time putting all of its components together.

This week's kickoff, for instance, will not include the center's "mini factory," which is intended to be a live CIM display in which products are actually built, said William Parmelee, Infomart's director of manufacturing and engineering markets. The mini factory is not expected to be online until early next year.

Another major component of the Ideacenter involves teaming up major manufacturing associations that can host seminars and exhibitions at the Dallas facility. So far, no major shows have been booked, according to Parmelee. The Society of Manufacturing Engineers (SME) hosted a regional show at Infomart last week, but the complete Ideacenter facilities were not available to the group.

However, Parmelee said negotiations are under way with SME, as well as with the American Production and Inventory Control Society, for exhibitions in the future.

Slow, million-dollar start

"Ideacenter is a fairly novel concept," Parmelee said. "When you're investing over a million dollars, you want to do it the right way. . . . The center is coming online this month. We are pulling the elements together."

Despite its slow start, industry observers said they expect the Ideacenter to be well received by manufacturers.

"Trade shows tend to be zoos," said Anthony Friscia, president of Advanced Manufacturing Research, Inc. in Salem, Mass. "People need a place to go where they can at least take the steps to learn about CIM."

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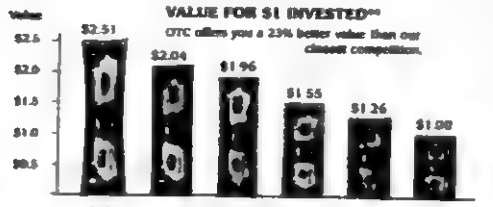

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So stop writing dead-end dBASE [illegible]

IBM slow to remedy leaky DB2 security

BY JEAN S. BOZMAN
CW STAFF

IBM will remedy design flaws in its DB2 relational data base management system that are slowing down the product's acceptance in the end-user community, industry analysts said last week. But the DB2 enhancements, which may be delivered under the banner of SAA Security Services, are not expected to be introduced for 18 to 24 months, analysts said.

IBM's anticipated actions will come in response to user requests for greater DB2 security at recent meetings of IBM's Share and Guide users groups. Meanwhile, many users have forged ahead with DB2 implementation, writing their own security extensions.

"We have known about the security problems since we got DB2 in early 1986," one Chicago user said. "But we have tried to work around the problems. Meanwhile, we hear that IBM is planning to add additional security in future releases."

"IBM is aware of security flaws in DB2," said Richard Finkelstein, vice-president of the Midwest region for Codd and Date Consulting Group, Inc. in San Jose, Calif. "These problems are not only slowing down the use of DB2, but in some cases, they are preventing DB2 from being installed at some large sites."

Audit trail difficulties

One major drawback, Finkelstein and others say, is that it is extremely difficult to create an audit trail within DB2. This often spells opposition to DB2 installation from a corporation's electronic data processing auditors. Beyond that is a series of security problems stemming from DB2's innate user friendliness and ease of access. Among them are the difficulty of restricting on-line access to DB2 tables, protecting user IDs and the ability to check the patterns of access by any individual or end-user department.

"DB2 is useful for queries from a single department or work group," said Steven Campbell, data base analyst for Public Service Electric & Gas Co. in Newark, N.J. But in a corporation with multiple work groups and multiple sites, securing the system may prove a challenge.

The security flaws are related to DB2's intended ease of use. DB2 was designed to make individual access by query easy, but in production systems with critical applications, easy access could result in security breaches.

In general, Public Service Electric & Gas prefers to let individual end users read or browse through DB2 tables rather than to allow them to update tables, Campbell said. "We don't let anybody do anything on-line. We have one authorization ID in the data base administration group, and we do everything in batch."

Some early users of DB2 did not discover the security flaws until the system had been used for months. Speakers at a Chicago conference on the Control, Audit and Security of IBM Systems held earlier this month urged users to carefully assess their security goals and to institute housekeeping measures until IBM can remedy the DB2 security problems.

IBM intends to add a layer of security through a future release of the firm's Systems Application Architecture (SAA) software, according to Michael Braude, vice-president of Software Management Strategies at the Gartner Group, Inc. in Stamford, Conn. "We believe that sometime in the next two years, a solution called Security Services will surface within SAA," he said. "It will run in parallel to DB2's SQL and Query Management Facility," Braude said, but he offered no further details.

The move would be part of an

Continued on page 13

Users see flaws in audit trails, access authority

IBM's DB2 was shipped with more built-in security features than DL/1, the widely installed data base structure used with IMS. And yet, users say, certain features of DB2 could hamper corporate security.

According to users and industry analysts, security weaknesses of DB2 include the following:

- DB2's catalog shows what data is present in the current version of the data base but leaves no historical record, thereby making it difficult to establish an audit trail.
- Update authority cannot be granted to entire groups of users. Users or programmers who have been given update authority so they can back up the data in DB2 also gain the ability to change that data.
- A valid TSO identification, if used as part of an end user's access number, will grant data base privileges irrevocable by the data base administrator.
- IBM's RACF, which is widely used to ensure security in mainframe systems, can control only external access to DB2 from other mainframe facilities, such as IMS or TSO. It makes a poor fit with DB2's built-in security systems, analysts say.

No change has been made to DB2's built-in security features since the product was shipped to customers in early 1985, said Tom Sawyer, senior consultant with Codd and Date Consulting Group, Inc. located in San Jose, Calif.

The latest release of DB2, Release 3.0, came out this July, "so I'm not looking for anything new in security for the next 18 months," Sawyer said.

The lack of comprehensive security for DB2 apparently does not trouble Dale Kutnick, executive vice-president of research at the Gartner Group, Inc.

"By the time people start using DB2 significantly in mainstream applications, IBM will fix the problem," Kutnick said.

JEAN S. BOZMAN

Slow remedy

FROM PAGE 12

overall scheme to add security to all SAA systems. "IBM intends to provide security facilities to all SAA-compliant entities," Braude said.

Only IBM can make some of the security changes, said Tom Sawyer, senior consultant with Codd and Date. "The ability to create an audit trail definitely has to come from IBM's Santa Teresa [Calif.] DB2 facility," Sawyer said. "That's because the data you're talking about getting at is data that only the data base management system knows."

Third-party solutions exist to cope with some of the problems, but most attack only one facet of security, Sawyer said. A product from Waltham, Mass.-based DBview, Inc. allows data base administrators to assign objects and people to different groups, Sawyer said. Another solution, offered by BMC Software, Inc. in Sugarland, Texas, regenerates all object relationships when a DB2 table is changed.

Some simple housekeeping rules can stave off security problems until IBM can solve them, Sawyer said. "The first line of defense is that you control who gets update authority," he said. "And you can use views to 'fence' things in. That way, end users can't see everything in the DB2 tables — just the data they are allowed to see."

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Cullinane says farewell to Cullinet

Will assist Dukakis in presidential bid; plans for new company fuzzy

BY CLINTON WILDER
CW STAFF

BOSTON — With the company he founded experiencing losses but claiming to be on the mend, John J. Cullinane last week officially departed as chairman of Cullinet Software, Inc.

Cullinane's exit came with little ceremony at the end of the Cullinet annual meeting, which was marked by financial analysts' questions about the company's recovery strategy. Cullinane, 52, said he was relieved to be moving on.

"It will be nice to just have the chance to think about some new things," he said after the meeting. "People ask me if I'll miss having the reins, and I've been telling them that it's more like I've been pulling the wagon."

Last week's passing of control to new Chairman David Chapman was more of a change in title than anything else. Cullinane will essentially continue the same role he has played at Cullinet for the last several months, working two days a week at the company and visiting key customers and prospects.

> "IT WILL be nice to just have the chance to think about some new things."
>
> JOHN J. CULLINANE
> CULLINET SOFTWARE, INC.

Cullinane will be the keynote speaker at Cullinet User Week, which begins tomorrow in Anaheim, Calif.

"I'll continue to be a sounding board, an advisor and a suggester," he said. Cullinane will move his office out of the firm's Westwood, Mass., corporate headquarters to another Cullinet facility in the neighboring town of Dedham.

New business uncertain

Although Cullinane had indicated he would start a new company outside the computer industry [CW, May 4], he was much less clear on that last week. "To be honest, I don't even know what I'll be doing with that," he said.

A sizable chunk of Cullinane's time will be devoted to advising Massachusetts Gov. Michael S. Dukakis, a longtime ally who has vaulted near the top of the Democratic presidential race since Cullinane announced his decision to leave the company last spring.

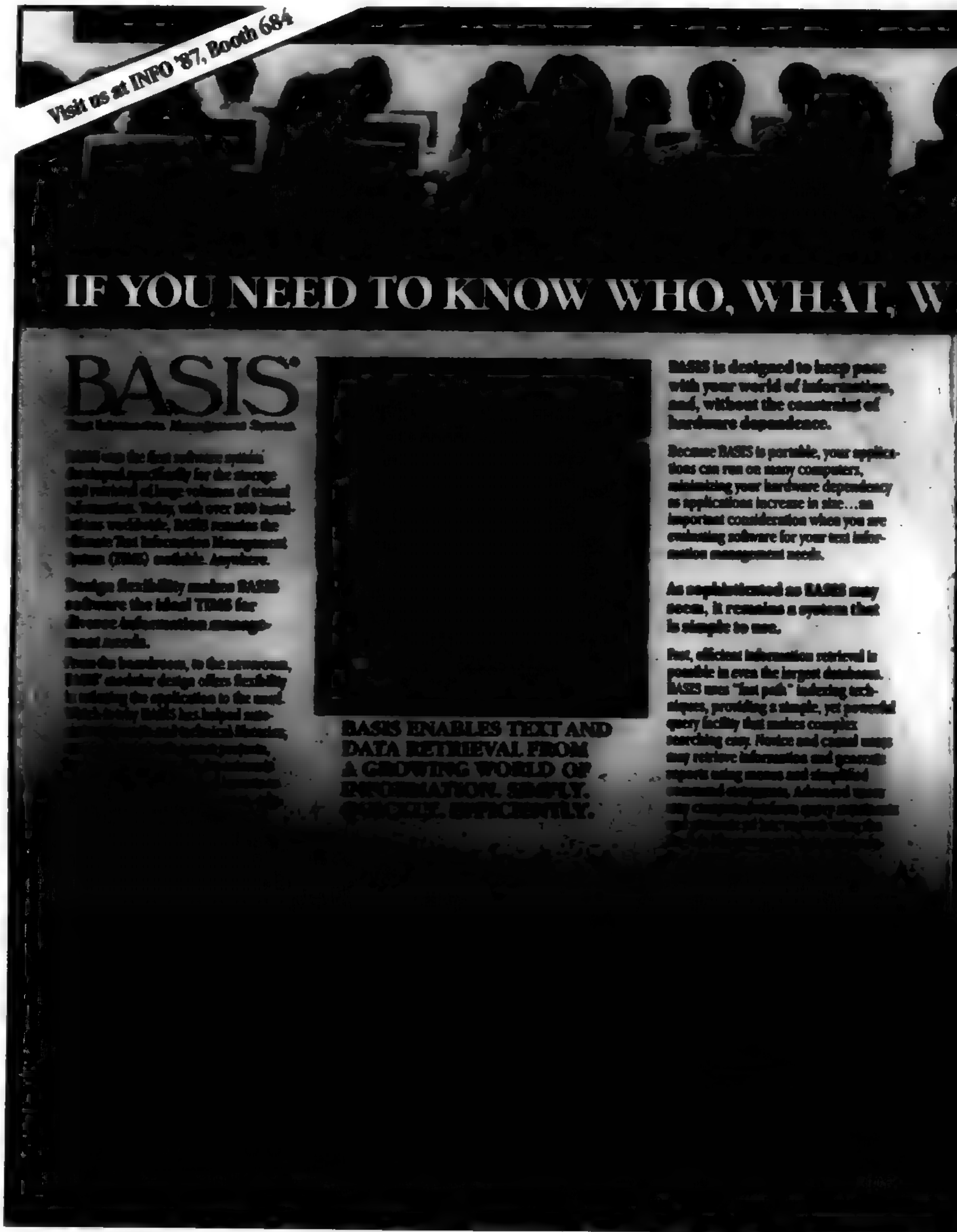
"Dukakis is interested in how he can be more responsive to the business community, and he sees me and others as sources of input," Cullinane said. "I'd like to see him work for entrepreneurial development zones and changing our financial reporting system to a longer period. The Japanese system of reporting once a year makes more sense. Three months is a bizarre window."

Cullinane, who founded Cullinet in 1968, hinted that he might sell part of his two-million-share stake in the company. "I haven't sold any in five years, so I have to decide what I might do there," he said.

The often-controversial executive said he will be devoting time to fund-raising efforts for the John F. Kennedy Library Foundation and Northeastern University, his alma mater.

GEOFF O'CONNELL

John Cullinane



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Borland raises curtain on Quattro

Touts faster recalculation, delete and page-down speeds than 1-2-3

BY ALAN J. RYAN
CW STAFF

NEW YORK — Boasting up to a 15% improvement in overall processing time over the 1-2-3 spreadsheet, Borland International's $195 Quattro will be formally introduced here today. The spreadsheet reportedly offers quicker recalculation, delete-row and page-down speeds than 1-2-3.

Quattro, which has been under development for three years, is slated to ship in the fourth quarter. It offers intelligent recalculation, which allows users to view the effect of changes in the spreadsheet without having the entire spreadsheet recalculate itself.

"I have a spreadsheet with 1,100 rows in it," said Doug Cobb, president of The Cobb Group, a software journal publishing company in Louisville, Ky. "It takes perhaps 30 seconds in 1-2-3 to recalculate. But a lot of times, I'll only change one or two numbers.

"In Quattro, it will only recalculate based on the changes you've made," Cobb said.

Borland claimed that a recalculation of a cash-flow model of 5,000 cells would take 0.27 seconds in Quattro and 2.9 seconds in Lotus Development Corp.'s 1-2-3 Release 2.01.

In addition, Quattro's pricing compares with Release 2.01 of 1-2-3, which is currently listed at $495.

Other useful features that Cobb noted include customized menus, better graphics, transcript capability, enhanced functions and complete control over color in the work sheet. Users can create an unlimited number of macros with Quattro, compared with 27 macros using 1-2-3, he said.

More memory space

But with this increased functionality comes a demand for more memory space. "It takes a little more space than 1-2-3 because it does so many things," Borland President Philippe Kahn said last week.

"For the kinds of things it does, you'd expect Quattro to be two or three times bigger [than 1-2-3], but it is only 20% bigger," Kahn added.

Cobb said an additional function he would like to see in Quattro is spreadsheet linking. Kahn maintained that while spreadsheet linking will not be available in the first release, Borland plans to eventually support that function.

In a market so dominated by 1-2-3, Cobb said he thinks Quattro can hold its own.

"I think that there is enough price sensitivity that if [a vendor] were to bring out a product that is 100% 1-2-3 compatible plus has significant additional features and is only one-third the price of 1-2-3, I think you could move quite a few units."

Not a contender

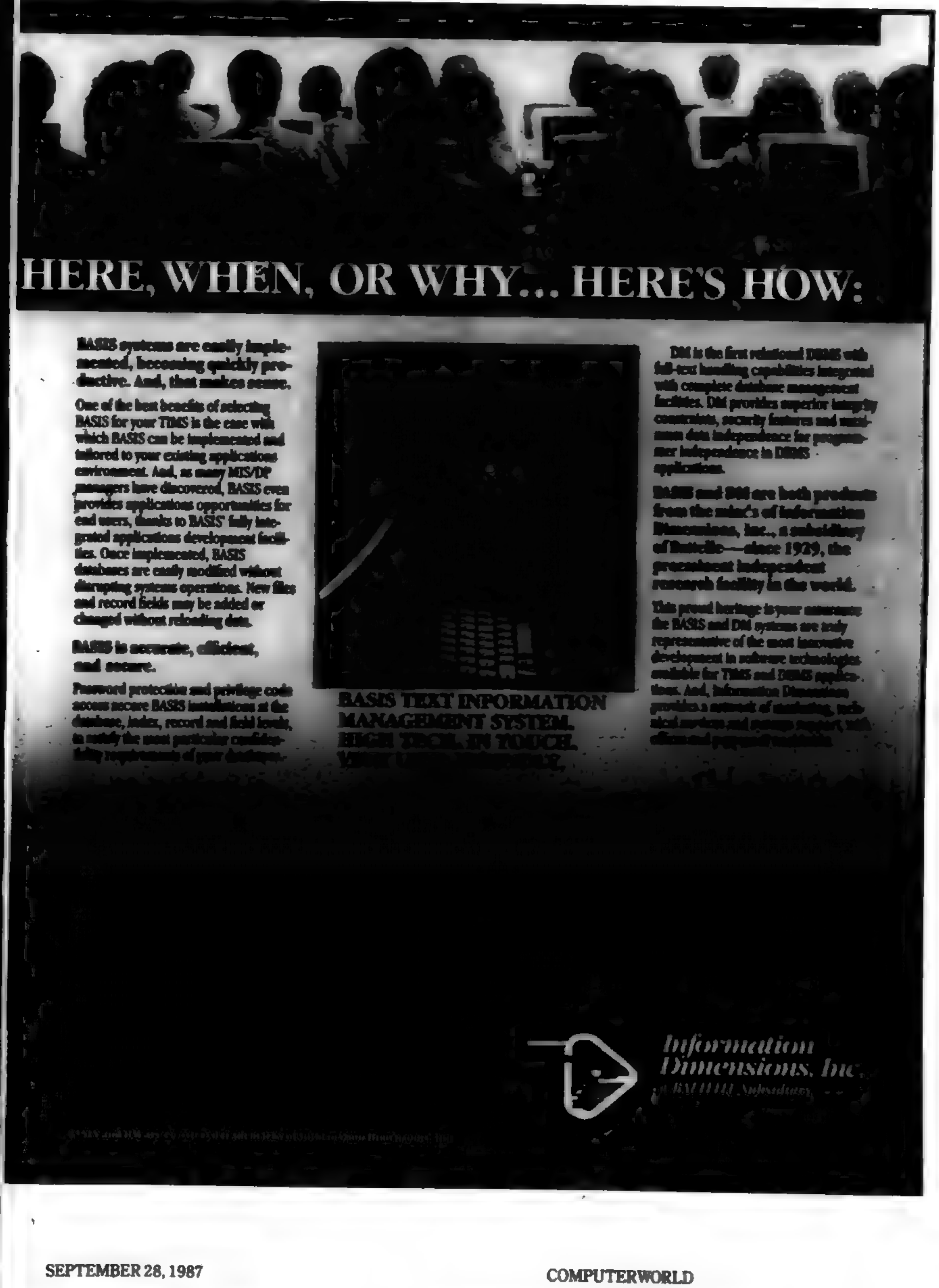
Kahn emphasized that Quattro, which is not copy protected, will not compete against the installed base of 1-2-3 users.

"Quattro is the natural evolution of 1-2-3, but users don't have to choose this instead. The programs can work side by side," he claimed.

Borland said Quattro will be available for all major operating environments. Version 1.0 is a single-user program; a networked version is planned, the company said.

Quattro will support Intel Corp. 8086-, 80286- and 80386-based computers with support for Intel's 8087 and 80287 math coprocessors. It was also designed to take advantage of the Lotus/Intel/Microsoft Expanded Memory Specification Releases 3.2 and 4.0, according to Borland.

The three-disk program runs on 384K bytes of random-access memory on the IBM Personal Computer, Personal System/2 and compatible systems, the company said.



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Pyramid joins OLTP field waving Sybase flag

BY JAMES CONNOLLY
[illegible]

MOUNTAIN VIEW, Calif. — Pyramid Technology Corp. today is scheduled to move into the on-line transaction processing (OLTP) market with the introduction of a family of Unix-based superminicomputers modified to run Sybase, Inc.'s relational data base management system.

Pyramid officials said in briefings last week that they are targeting segments of the OLTP market that need the high reliability but not the fault tolerance that companies such as Tandem Computers, Inc. and Stratus Computer, Inc. offer for uses such as automated teller machine networks and airline reservation systems.

Nick Tuttle, Pyramid vice-president for marketing, said the Pyramid RTP systems are designed for users in areas such as insurance, manufacturing and patient tracking in hospitals.

The RTP series is composed of five systems based on Pyramid 9000 reduced instruction set computers. Pyramid said that 40% of its systems are used in commercial applications, while 35% are used in software development.

The transaction processors were developed in a nine-month joint project that involved Pyramid and Berkeley, Calif.-based data base vendor Sybase. Sybase had already ported its SQL-based, transaction-oriented Dataserver and Data Toolkit to Sun Microsystems, Inc. Unix-based workstations and Digital Equipment Corp. VAXs running VMS.

Apple, PS/2 ahead

Sybase said it plans to move its data base to the IBM Personal System/2 through an agreement with Microsoft Corp. and to the Apple Computer, Inc. Macintosh.

Pyramid data base program manager Nancy Colwell said Pyramid continues OEM arrangements for other data base products, including those offered by Oracle Corp. and Relational Technology, Inc.

Pyramid claimed a sustained performance rating of 10 to 75 transaction/sec. on the TP-1 benchmark. The five RTP models correspond to full configurations of the 9000 series. Colwell said Pyramid conducted actual benchmarks on the RTP Model 100, the larger of two uniprocessors, and measured a performance range of 18 to 24 transaction/sec. She said other performance figures were estimated based on those figures.

One analyst briefed last week said Pyramid's hardware platform appears fast enough to run the Sybase system and noted that Pyramid is being realistic in expecting incremental business gains with the RTP products. "Everybody — at least the Unix vendors we meet — is talking about being in transaction processing, and Pyramid seems to be the only ones doing anything about it," said Kate Comiskey, program manager for Unix markets and strategy at International Data Corp., a Framingham, Mass.-based market research firm.

Tuttle said beta tests should be completed by the end of October and production shipments will begin then.

System prices range from $165,000 for the uniprocessor Model 50 to $675,000 for the four-CPU Model 400.

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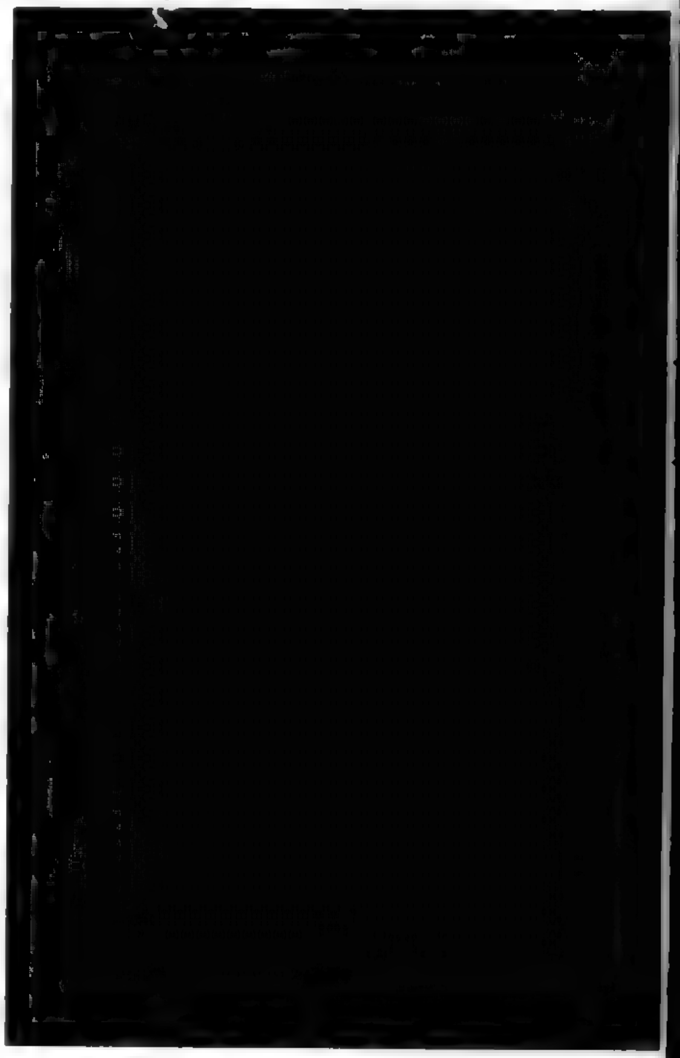

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Ridge aims to ruffle DEC, Sun with supermini

BY KATHY CHIN LEONG
CW STAFF

SAN JOSE, Calif. — With plans to remain in the technical computing market and expand its value-added reseller channels, Ridge Computers, Inc. last week announced its most powerful superminicomputer to date.

Dubbed the Ridge 5100, the Unix-based multiuser machine represents the first in a family of high-end computers built under reduced instruction-set computing architecture that uses proprietary very large-scale technology. While the company already has two technical computers on the market, Ridge is pinning its hopes on the 5100 being the main breadwinner for the company once it ships — reportedly in February 1988.

And the system should turn things around. While Ridge has been in existence for seven years, it has yet to turn a profit. One of the firm's biggest shortfalls has been its lack of product visibility compared with competitors such as Sun Microsystems, Inc., according to Larry Lunetta, Ridge's vice-president of marketing. In addition, Ridge previously supported a proprietary version of Unix, which hampered market acceptance. Since May, it has supported AT&T Unix System V.

In its product announcement, Lunetta claimed the Ridge 5100 is 40% faster than the Sun-4 high-end technical workstations. Priced between $14,000 and $109,000, the Ridge machine will also be pitted against minis from Digital Equipment Corp., Hewlett-Packard Co. and IBM, Lunetta said.

Users getting cost-conscious?

"What we are selling is performance and price," he maintained. "Even companies that are not price-sensitive now will realise there comes a point where you simply don't have to pay that much for computing power."

According to Lunetta, a comparable DEC machine would cost $750,000. The 5100 features 144M bytes of maximum main memory and can support up to 128 users. It also reportedly provides users 26 months mean time before failures.

While the firm's sales force is selling to the technical marketplace, Ridge officials said they intend to expand their presence in other markets through value-added resellers. Lunetta said Ridge is close to signing its first U.S.-based reseller.

One of Ridge's key users, Pacific Data Images in Sunnyvale, Calif., said existing users will be tempted to migrate to the new system. One Pacific Data employee who praised Ridge's machine reliability said, "So far, the price and performance looks like a real winner in the market."

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Data Design to embrace micros

BY STEPHEN JONES
CW STAFF

SAN FRANCISCO — Data Design Associates, Inc., a Sunnyvale, Calif.-based developer of mainframe financial software, last week announced the first in a series of new products aimed at opening up its software to personal computer processing.

DD-Paint reportedly allows users to design new mainframe on-line screens or customize existing ones on an IBM Personal Computer or compatible machine running IBM's PC-DOS or Microsoft Corp.'s MS-DOS. The screen and file information is downloaded to a desktop computer via DD-Link, Data Design's microcomputer-to-mainframe applications package.

The product, which was announced at a Data Design users conference here (see story page 24), is set to be released in the first half of 1988. Company officials would not disclose the price.

Screen and file changes made with DD-Paint are loaded back up to the host for use with such Data Design accounting products as General Ledger, Accounts Payable/Purchase Control and Fixed Asset systems.

Molding PCs, mainframes

The product is the vendor's first bid to integrate PC processing with its line of mainframe accounting software, according to Michael Kaiser, Data Design's director of research. Kaiser claimed that every Data Design mainframe product will eventually have a PC-based user interface similar to that of DD-Paint.

The plan is to anticipate the expected downward migration of Data Design's 700 customers toward microcomputers and distributed data processing. Instead of using dumb terminals that link many users to today's mainframes, Kaiser said, people will turn to powerful and intelligent desktop computers.

In a distributed DP environment, mainframe data is parceled out over a network of such micros. "The idea is to shift mainframe logic to the PC," Kaiser said.

Kaiser conceded that DD-Paint, with its need for downloading and uploading, does not carry out true distributed data processing. But he said the product takes the first step in porting Data Design's accounting software intelligence from mainframes to micros.

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When it comes to parts availability, in nine out of ten cases that require a customer engineer to repair equipment (and we have over 2,000 of those talented people), the part is available in a nearby branch office. In 76 countries throughout the world. (The only continent we're *not* on is Antarctica.)

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MEMOREX

EDITORIAL

A taxing situation

Despite some recent setbacks, the concept of a tax on services — all services — is on the agenda in many states. This should be worrisome to the information systems industry, because major segments of this business are inherently service-oriented.

As in the past, state legislators are running amok, trying to fill coffers from any available source they feel won't turn around and vote them out of office.

The software sales tax and the sundry forms it took throughout the country is a classic example of out-of-control taxing authorities. The software sales tax became an issue in 1983 and 1984, when state governments began to feel acutely the double bite of federal cutbacks and voter tax-cut initiatives.

As states frantically searched for new revenue, they sought to tap sources they could count on for present and future taxes. They picked software because, as market research firms attested, sales growth was virtually assured for years to come.

If the motivation behind the software sales tax was questionable, the execution of the various laws governing it was a black comedy. Some states tried to apply their sales taxes — reserved for "tangible" items — to custom software, claiming that the media on which the software is finally delivered is, indeed, tangible. Others taxed computer games differently than off-the-shelf business programs, and still others decided the matter was too complicated and made software exempt from sales tax.

The point is that the states attacked software, just as some now are launching attacks on services, for the wrong reasons: they are easy targets, and they ostensibly provide long-term growth in tax collections.

All this is not to naively point a finger at the states, which must increasingly shoulder the expenses formerly paid in part or totally by the federal government. However, underlying so many state tax programs is the arcane theory that passing the tax burdens to "outsiders," like software or computer service companies, is somehow more fair than taxing the state's inhabitants, even though they are the ones who consume the tax dollars.

Taxing — perhaps we should say overtaxing — outsiders is also pitifully shortsighted, as it can force these outsiders to take their business (and jobs) elsewhere. But in the world of two- and four-year terms of political office, this kind of tax is often the most politically expedient.

All this speaks for heightened vigilance by the ADAPSOs and CBEMAs of the world. It also speaks for commonsense tax policies from the federal government, which must recognize that the time has come to stop passing the tax collection buck and face some tough economic realities.

LETTERS TO THE EDITOR

CASEwork

Your editorial, "CASE advantage" [CW, July 27], proclaimed that "CASE is more glitter than substance" and "CASE technology is still primitive." While your characterization of this market segment was generally accurate, it lead the reader to the erroneous conclusion that there was no full-function computer-aided software engineering (CASE) solution available today, and the most promising efforts are ones that will interface disparate personal computer- and mainframe-based products from multiple vendors.

This overlooks Pacbase, an integrated, full life cycle CASE system used by major U.S. corporations to drive the development of their businesses' mission-critical systems. You might refer readers to an article in *Computerworld Focus* [July 8], which quoted CASE expert George Schussel as saying, "CGI's Pacbase is probably the closest to a true CASE system."

In addition, I am concerned by the editorial's suggestion that MIS departments go out and purchase hordes of PC-based design products that represent, in fact, only a small piece of the CASE picture. The benefits of CASE are only achieved when the concept is applied broadly to integrate the activities of all the personnel involved in applications development and maintenance.

As the CASE market explodes, let us keep our perspective. We are not developing technology for technology's sake — rather, we are trying to help U.S. businesses develop mission-critical systems to survive and prosper in an increasingly competitive environment and to help government organizations carry out increasingly complex missions in the face of budget reductions. It takes maturity to exploit CASE — purchasing a bunch of shiny workstations and calling it a day just won't cut it.

Charles H. Warhaftig
President
CGI Systems, Inc.
Pearl River, N.Y.

Ada revving up

"Ada drive stalling at DOD door" [CW, Aug. 31] is a classic case of looking at a glass that's half full and calling it half empty.

The "Ada glass" is not only half full, but rapidly filling to the brim, spurred by the recent Department of Defense prohibitions against ADA-use waivers, prohibitions that your "half-empty" article interpreted negatively. Instead, these new prohibitions are a clear and positive sign that many of the inevitable kinks inherent in new technology have now been worked out and Ada is preparing to go full speed ahead.

Everywhere I go in the defense and aerospace industry, I find Ada programs getting under way. I look at the same signs analyzed in your article and get a prognosis from users of an engine revving, not stalling.

We don't believe, for example, that Ada will be succeeded by a "Son of Ada" language by the mid-1990s. We do believe, however, that Ada will evolve naturally as any good language — any language that is going to survive — must do.

For over a year, many of us in the industry have been preparing for a major acceleration in Ada usage. And it's about to begin. We should, for example, see an immediate boost for Ada in October, as the first comprehensive computer-aided software engineering life cycle software development environments for Ada begin hitting the marketplace.

P. E. Borkovitz
Executive Vice-President
Advanced Technology
International, Inc.
New York, N.Y.

This week in history

Sept. 26, 1977
A jury orders IBM to pay Forro Precision, Inc. $2.7 million in a verdict on Forro's charges that IBM interfered with its components business by making court depositions of former Forro employees testifying in another case available to customers.

Sept. 27, 1982
Three men are arrested and charged with conspiring to steal $3 million in modems and funnel them — possibly through Mexico — to the Soviet Union. Modems are one of a score of products that come under the embargo of American-manufactured goods to the Soviet Union, which was instated when the USSR declared martial law in Poland.

Computerworld *welcomes comments from its readers. Letters may be edited for brevity and clarity and should be addressed to Bill Laberis, Editor,* Computerworld, *P.O. Box 9171, 375 Cochituate Road, Framingham, Mass. 01701.*

Riding shirttails to productivity

The information age will create high-quality, decentralized industries

JOHN BARNES

In most major industries, the word productivity is defined as "units of whatever you do per person-hour." Both the numerator and denominator of this ratio are often converted to dollars so that the statistic becomes dimensionless and can be compared with interest rates.

Management wants productivity increased — a person-hour costs a fixed amount, and management wants to get as much as possible out of it, whether it's trucks, keystrokes, loaves of bread or loan evaluations. Thus, in all the standard textbooks, the more productivity the better.

Not everyone has always looked at it this way. The ceiling of the Sistine chapel, as everyone knows, required several years to complete — and not mere person-years, but ultraexpensive Michelangelo years — yet no Vatican efficiency expert handed the artist a set of stencils and a roller.

According to studies that were done at the turn of the 20th century, the typical industrial worker owned just two shirts, each of which took a tailor four man-hours to make by hand.

Some modern machines can now turn out more shirts in a day than a skilled tailor in 1900 could produce in a year (and, remember, a standard work year at that time was 51 six-day weeks, at 12 hours a day).

Today, even minimum wage workers can afford a closet full of shirts. Of course, the work shirt of 1900 lasted 10 years and fit perfectly. (In fact, it lasted so long partly because it fit so well — very little strain on the seams).

'S, M and L'

For at least five of those years, the shirt was fit to wear to church. The modern shirt comes in "S, M and L," looks perfectly OK for perhaps 10 wearings and typically comes with a couple of flaws that the craftsman tailor of 1900 would never have permitted. However, you do get to have a lot of them — so productivity is higher.

Are we really so much different from our ancestors? Why do we pay so much money for handmade goods? Why don't Rolls-Royce and Mercedes-Benz automate more to increase productivity?

Because one unit is not always equivalent to another. A key, hidden component is information.

Until very recently, information was stored either directly in human memory or in forms that required human access — books, direction sheets, formulas, tables, yardsticks, sewing patterns, blueprints, molds, forms and dies.

HAL MAYFORTH

The industrial revolution made materials cheaper and human labor more costly; an economist would say the point of optimum revenue on the production curve shifted toward capital intensiveness.

Less technically, we got more stuff by accepting dumber stuff.

Three sizes is much less information — thus making it cheaper to produce — than the 10 or 12 measurements the tailor took. More information requires more labor and thus more expense — compare the price of an architect-designed, custom-built house with a contractor stock model, for example.

THE industrial revolution was the last revolution. The one going on now is making information cheap and accessible.

You can see it in the words we use to sell quality (or pretend that is what we're selling) — high-tech, designer, state-of-the-art, hand-crafted, gourmet. They all basically say, "Somebody who knows a lot put time into this."

However, the industrial revolution was the last revolution. The one going on now is making information cheap and accessible.

Let's look at that shirt one more time. Imagine this: You go to the neighborhood tailor, who takes your measurements and then helps you select a fabric and a shirt design.

Modern machinery

The tailor transmits these measurements, fabric specification, and design (along with your credit card number and address) to whichever manufacturer currently has the right price. Robots move a bolt of your fabric onto the line; another program adjusts the design to your measurements and feeds the description to the robot control modules.

The shirt is then cut, sewn, safety-stitched and finished to fit you, then goes out in the mail. It's as fast as modern machinery, but as good as premodern handwork.

And not just your shirt — the same process could be done for tools, sporting goods, furniture and even your car.

This idea isn't pie in the sky, due to arrive on the same "someday" as nuclear fusion or the backyard helicopter. Theoretically, Microsoft Corp.'s Windows could support just such an operation. The big historical trend toward more and worse goods is about to reverse.

We shouldn't be surprised. Technological revolutions always transform the existing industries and create new ones. Mass production, for example, made the industry of agriculture big, centralized and capital-intensive. The information age will make mass production decentralized, high-quality and information-intensive.

That is, unless we stick to the old concept of productivity. If we keep forgetting that all shirts are not the same shirt, we may miss out on a major growth area in the field. Not to mention paying too much for ill-fitting shirts.

Barnes is the Pacific Northwest area manager for ADG, a high-tech marketing organization based in San Pedro, Calif. His first novel, *The Man Who Pulled Down the Sky*, was recently published by Congdon & Weed.

Secure information is accurate information

READER'S PLATFORM

BY ROBERT HARGROVE

Those of us who practice data security find ourselves in a bit of a dilemma these days. As companies concentrate on maximizing their return on investment, we find ourselves, like everybody else, somewhat expendable. With the concentration on profit, the old arguments for the existence of an area that does not act as a profit center may go increasingly unheard.

The first of these arguments is that data security, much like insurance, is just the price of doing business. This is the "You may hate us but you gotta have us" defense.

However, some organizations have discovered the hollowness of this argument as they find that cutbacks in other departments not only save money but actually increase efficiency. Thus, the old argument is challenged by a new one: "If we need you, prove it."

Close on the heels of the "You may hate us" defense is the argument that a good security program brings about peace of mind. True, but so does profit.

This argument also points out a fault in many security justifications in that they often rely more on emotions than quantification.

And let's not forget the phrase, "We have a security issue," which is to security practitioners what "Stop the presses!" is to a newspaper. The wheels of business must screech to a halt as corporate resources sniff out the security breach.

However, as the security function comes to be recognized as just another form of management rather than as a separate entity, the response to it becomes much the same as the response would be to "We have an accounting issue." That is: "Address it."

Merely tagging an issue as a security concern does not automatically elevate it to the top of the heap; indeed, there are few functions in MIS that do not in some way affect security. From broken locks (physical security) to abends (data integrity), the list seems endless.

Attempts to quantify the usefulness and necessity of security often take the form of eye-glaring risk-analysis reports — just another use of statistics, critics might contend, to justify the continued existence of a budding corporate behemoth. Even in industry publications the emphasis today is on connectivity, implying that the key to the future lies in ease of access, not lockouts.

However, before slipping in the resume diskette, there may be a few things security administrators can do to brighten their future. Perhaps we should take a nod from one of our more illustrious vendors and realize that no matter what else we do, we are also in the marketing business.

This realization entails more than the occasional security awareness film or the periodic announcement that "information is an asset" and then, after observing the corporate heads nodding in agreement, returning to our office from a job well done.

It is an ongoing process and, along with awareness, encompasses the need to convince management that security is not separate from the profit-making process but part of it; that a security program acts as a large editing tool, a corporate strainer, trapping those commissions of accident, malice and ignorance that can cost the organization time and money; that a security program exists not just to harbor data and impede access but to keep good people from doing foolish things, as humans are wont to do.

THE emphasis today is on connectivity, implying that the key to the future lies in ease of access, not lockouts.

These mistakes can cost the organization dearly. Security practitioners, too, should realize that not every firm requires the security of a defense plant.

Calls for ever greater security, no matter how justified, smack of self-aggrandizement and turf-building. Security is a balancing act, attempting to find the right mesh between the Four P's: productivity, politics, performance and price.

The end result, then, for ongoing justification for security does not rest in such nebulous arguments as peace of mind, or "Think how expensive it would be without it," but with the rather more prosaic notion that sound business decisions can only be reached through the use of accurate information. Effective security is one of the best tools to achieve this accuracy. Security, far from being a luxury, is a vital partner to the organization in meeting the bottom line.

Hargrove is security and contingency planner within the data processing department at the University of Texas's Health Science Center at Houston.

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SOFTWARE & SERVICES

SOFT TALK

Charles Babcock

Don't shoot messenger

Despite a vigorous attack, the benchmark conducted by discount broker Charles Schwab & Co. of DB2 is ably defended by Schwab spokesmen elsewhere on this page.

This does not mean that DB2 is limited in all production applications to 18 transactions per second, as it performed in the Schwab test. On the contrary, the Schwab application was a complex one involving 11 different data bases and a requirement that a control record be established for each call-in stock order.

It is possible that this single-record update acted as a choke point for DB2 because of its page-level locking mechanism, although opinion remains divided on that point.

What is clear is that in the heavy transaction processing environment at Schwab, a competing data base management system was better suited to the task than was DB2. Nothing more and nothing less. But some people are finding that hard to accept.

Sharon B. Weinberg, president of the Codd and Date Consulting Group, has publicly critiqued the benchmark, mistakenly calling Schwab's Stock Order Entry System an application designed for the competing DBMS, Applied Data

Continued on page 25

Schwab benchmark draws fire

Consultant attacks low results for DB2; Schwab officials stand by test

BY CHARLES BABCOCK
CW STAFF

SAN FRANCISCO — A Charles Schwab & Co. benchmark on IBM's DB2 and a competing data base management system was conducted unfairly and showed below-average transaction processing results for DB2, a prominent DB2 consultant has charged.

Schwab officials stood by the benchmark and said the critic, Sharon B. Weinberg, president of the Codd and Date Consulting Group, was in error on a key point of her critique.

The charges and countercharges are the latest in an ongoing debate about the transaction processing capabilities of DB2.

Sharon B. Weinberg

IBM has stated DB2 is capable of processing 47 transactions per second and has publicized the case of Provinsbanken in Denmark, which achieved 62 transactions per second in an automated teller machine application. At a recent DB2 conference organized by Codd and Date in Toronto, Provinsbanken officials said they had achieved 100 transactions per second in tests.

At the same conference, Weinberg attacked the Schwab benchmark. Weinberg is IBM's former senior technical planner for DB2, and her firm is the consulting business offshoot of The Relational Institute in San Jose, Calif., founded by Edgar F. Codd and Chris J. Date.

The Schwab benchmark showed DB2 processing only 18 transactions per second of a complex Stock Order Entry System, compared with 36 for Datacom/DB, a DBMS from Applied Data Research, Inc. [CW, July 27].

Weinberg asserted that the Stock Order Entry application was written for Schwab's existing DBMS. "What was measured on DB2 was designed for Datacom. If it was not redesigned, it's clear it's not going to work with DB2," she asserted in a follow-up interview of her Toronto comments.

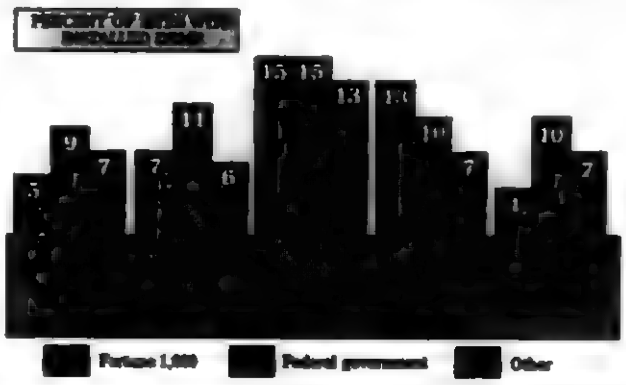
Schwab officials strongly disputed Weinberg's remarks. The Stock Order Entry application has been used for many years by the discount brokerage house and was originally written as a VSAM application, according to both James S. Rowe, senior vice-

Continued on page 30

Data View

Top five independent vendors by site type

Independents, ADR, Cincom and Software AG sell more DBMSs to the federal government than to Fortune 1,000 companies



INFORMATION PROVIDED BY COMPUTER INTELLIGENCE
CW CHART

Tool opens VTAM doors

BY ROSEMARY HAMILTON
CW STAFF

LOS ANGELES — Candle Corp. recently released a conferencing tool that would allow IBM MVS VTAM users to simultaneously view applications on separate terminals.

The first release of Candle Light (CL)/Conference 1000 is said to allow one user to originate a conference, which would display an application. An unlimited number of users can then

Continued on page 24

McClure: Integrate CASE tools

BY CHARLES BABCOCK
CW STAFF

BURLINGTON, Mass. — One way to evaluate the multitude of computer-aided software engineering (CASE) tools is to explore their level of integration, said Carma McClure, a lecturer and co-author of books on software development, at a recent CASE symposium here.

Speaking to 600 attendees at the Digital Consulting, Inc.-sponsored event, McClure said the latest CASE products begin to integrate several steps of the software development cycle. One requirement for integrating them is a central repository that can store not only code but also system specifications, designs and diagrams for reuse with future systems.

McClure also said the application of artificial intelligence techniques will aid software development by adding intelligence to tools in the 1990s.

"Suppose I want to change from one diagramming approach to another. I want an automatic capability to tell me whether I can do that.

"Right now, we have sophis-

Continued on page 26

Inside

- Data Design Associates gets kudos from its users. Page 24.
- Computer Consoles enhances Unix-based office automation system. Page 25.
- Scheduling package debuts from NBI. Page 31.

Spotlight

Wouldn't it be nice to have a couple more terminals on your desk?

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Users: Data Design software comes out on top

BY STEPHEN JONES
CW STAFF

SAN FRANCISCO — Despite its underdog role in the accounting software marketplace, Data Design Associates, Inc. last week received high marks from attendees at its eighth annual users conference here.

Customers of the Sunnyvale, Calif., vendor described the its mainframe financial software as "nearly bug-free" and praised its ease of use. One user, however, challenged a format change in a recent enhancement to the accounts payable package, saying it makes his historical information difficult to access.

Users said they chose Data Design products on those grounds and paid less attention to the company's "David-like role" in an industry dominated by such Goliaths as Computer Associates International, Inc. and Management Science America, Inc.

"Data Design was the smallest company we were looking at when we were shopping for a fixed-assets system, but the product seemed to sell itself," said Steve Chwalyk, manager of accounting operations at Sherwin-Williams Co. in Cleveland.

Not overly complex

Chwalyk said Data Design's Fixed Asset Accounting package features simple processing and easy-to-understand screens and documentation. Chwalyk characterized similar products from other companies as "overly complex."

Tammy Neils, a programmer at McKesson Corp., said she was able to teach herself how to use the Fixed Asset program relatively quickly, calling it a "stable performer."

Flexibility was a key issue for Ward Russell, manager of financial systems for American Cyanamid Co. in Clifton, N.J. He said American Cyanamid uses Data Design's Accounts Payable/Purchase Control software to process about 45,000 invoices per month.

Russell said he was attracted to the package because a user can easily modify its screens. "The screens are very flexible, and it does what you want it to do — it's a good system," he said.

While some players in the financial software marketplace have tried to diversity their application lines, Data Design continues to target a narrow range of accounting products. "We would rather focus on a few things, instead of diversifying and having our energies diffused — that could be a destructive approach for us," said David Lowry, Data Design's president and founder.

For the year ended March 31, the 14-year-old company had revenue of $16.1 million and approximately 700 customers nationwide.

Some not impressed

While most users expressed satisfaction with Data Design products, others were less impressed.

Joe Hepler, director of information systems for Vail Associates, Inc., the group that operates the Vail ski resort in Colorado, said a recently released enhancement to the Accounts Payable package has not pleased his company.

Hepler said programmers cannot convert accounts payable histories from the earlier release because the new version's formats are not compatible with its predecessor's. "It's given our accounts payable people some real headaches," Hepler said.

Service and support, while receiving praise from many, was also a sore point with others. Hepler noted that support often varies according to the product and the Data Design manager who is in charge.

"It varies, but what you usually get with complaints about the Accounts Payable product is, 'We'll turn that over to development and include it in the next release,' " Hepler said. "But who knows when the next release will be?"

Conference tools

CONTINUED FROM PAGE 23

view the application, according to Jeff Casher, a Candle product manager.

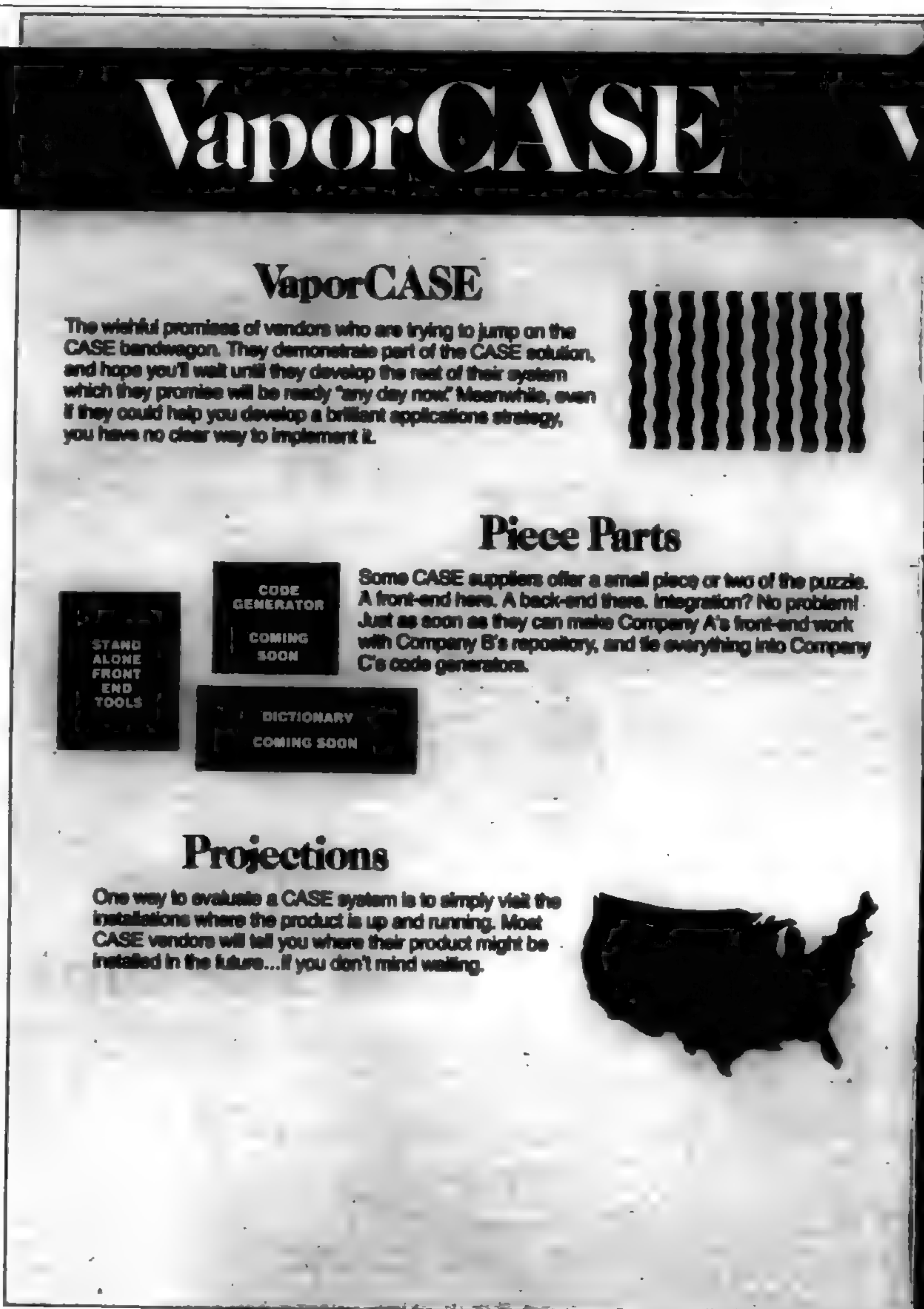
CL/Conference 1000 provides participants with read-only access, but a subsequent release will allow them to input data into a conference session, according to Casher.

The conference tool was designed to improve communications between end users and support staff by allowing a user to show support staff an application with which he is having problems rather than simply discussing it on the telephone.

It can also be used as a training aid, enabling support staff to display new product instructions to a large number of users at one time.

A conference session is set up by a user, who logs on and establishes a conference identification number for this session. He then provides the identification number to those users he would like to include in the session.

According to Casher, CL/Conference 1000 can accommodate at least 175 users. CL/Conference 1000 is currently available and carries a per-CPU license of $9,700.



VaporCASE

VaporCASE

The wishful promises of vendors who are trying to jump on the CASE bandwagon. They demonstrate part of the CASE solution, and hope you'll wait until they develop the rest of their system which they promise will be ready "any day now." Meanwhile, even if they could help you develop a brilliant applications strategy, you have no clear way to implement it.

Piece Parts

Some CASE suppliers offer a small piece or two of the puzzle. A front-end here. A back-end there. Integration? No problem! Just as soon as they can make Company A's front-end work with Company B's repository, and tie everything into Company C's code generators.

Projections

One way to evaluate a CASE system is to simply visit the installations where the product is up and running. Most CASE vendors will tell you where their product might be installed in the future...if you don't mind waiting.

CCI enhances Unix OA system

IRVINE, Calif. — Computer Consoles, Inc. (CCI) recently enhanced its Officepower Unix-based office automation system, providing increased functionality in word processing, spreadsheet applications, graphics generation and document and file conversion.

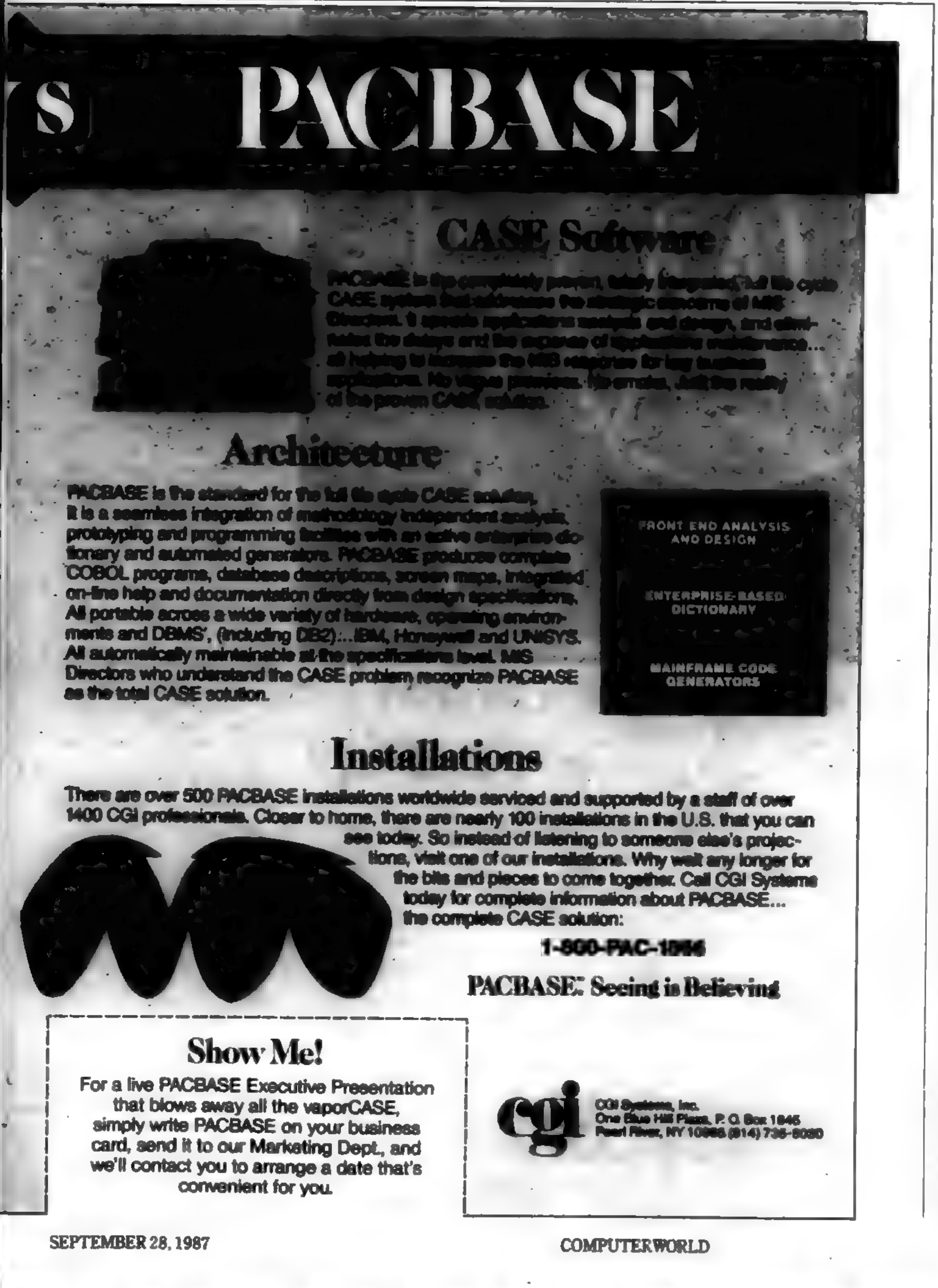
Officepower 4.0 runs on the complete line of CCI's Power 5 and Power 6 computers and is compatible with IBM Personal Computers. All CCI systems run under the vendor's CCI System V, a derivative of AT&T's Unix System V operating system.

The new release of Officepower features an integrated version of Access Technology, Inc.'s 20/20 spreadsheet with a business graphics package. Because 20/20 runs on micro, mini and mainframe computers, standardized modeling can be used, and models can be moved between PCs and Officepower processors, CCI spokesmen said.

Other enhancements to Version 4.0 include proportional spacing with support for such laser printers as Hewlett-Packard Co.'s Laserjet series and Xerox Corp.'s 2700/3700 and 4045, automatic font conversion, a redundant file system for file protection and a function that automatically compiles citations in a legal document into an alphabetically sorted list. Officepower 4.0 also supports automatic crash recovery, CCI representatives said.

Word processing features added to Officepower 4.0 include a nonbreaking return that overrides automatic pagination, a 132-column display mode and a word-preview feature that displays a document as it will appear in print.

Available now, Officepower 4.0 software for a Power 6 system costs from $20,000 for 32 users to $40,000 for an unlimited number of users. A typical mid-range configuration, including a Power 622S superminicomputer with 48 ports and Officepower 4.0 software for up to 64 users, starts at $161,400. Officepower 4.0 maintains compatibility with the previous version, Officepower 3.04, the vendor said.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CASE Software

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MAINFRAME CODE GENERATORS

Don't shoot

CONTINUED FROM PAGE 23

Research, Inc.'s (ADR) Datacom/DB, which was written as a VSAM application.

Weinberg has even questioned the motives of the people conducting the benchmark. "The client might have been saying he wanted one thing [to install DB2], then arranged it so that it wouldn't happen." This is the technology era's equivalent of shooting the messenger because you don't like the message.

The Schwab MIS officials made no pretense of conducting a benchmark for all prospective DB2 users. They conducted it for themselves. "I'm just trying to get my job done," says James S. Rowe, senior vice-president.

Furthermore, the benchmark was conducted by a longstanding customer of IBM that prizes its relationship with that company. As purchasers of two IBM 3090 Model 400s and a 3083, Schwab has little desire to inflict injury on its mainframe supplier. On the contrary, the Schwab officials were highly circumspect in how they commented on IBM and the way the benchmark came about. This observer tends to believe ADR's account of the process: IBM was seeking to displace Datacom/DB with DB2 and sought the benchmark.

If Schwab has done a good job of answering questions about the benchmark, it remains to be seen whether its critic will do the same. For example, on what basis does Weinberg claim the application in the benchmark was designed for Datacom/DB?

Spokesmen for both ADR and Schwab say they haven't spoken with anyone from Codd and Date. Weinberg says she can't divulge her sources, but she made the chance observations that "I don't know what IBM's feeling is on the Schwab benchmark," and "There's not much coming out of IBM on this."

Plain-vanilla letter

On the contrary, it appears someone highly knowledgeable about DB2 has put out a two-page letter to the IBM sales force on how to respond to the benchmark. There was no signature on the letter, which was printed on plain paper.

This letter was not handed to a *Computerworld* staff member by an IBM employee, so its author remains unknown. But the letter states at the outset that it is being published "in response to numerous field inquiries."

Its criticisms of the Schwab benchmark at this point sound familiar.

The letter asserts that "this application has been running for years and has been tuned for optimum performance in the Datacom/DB production environment. The application was not tuned to consider DB2 design. . . . A converted application [to DB2] cannot be expected to achieve the same performance and throughput as an application that has been designed to take full advantage of the power and performance capabilities of DB2."

The letter closes with: "Our published DB2 Release 2 benchmark. . . achieved 47 transactions per second. . . . Release 3 showed about a 10% and 15% performance improvement over Release 2 with no thread reuse." It concludes with a reference to the 62 transactions per second throughput achieved by Provinsbanken in Denmark.

SOFTWARE NOTES

Broker workstation tools to debut

Innovative Software, Inc. in Lenexa, Kan., will provide software for a series of intelligent broker workstations to be produced by **ADP Financial Information Services, Inc.**, a subsidiary of Automatic Data Processing, Inc. The workstations will be designed to replace quote machines with systems that can provide client information, portfolio analysis and modeling options.

Hewlett-Packard Co. will offer a version of Relational Technology, Inc.'s **Ingres** relational data base management system on HP 9000 Series 300 workstations, HP 9000 Series 800 workstations and HP Vectra personal computers. Ingres is already available on the HP 9000 Model 840.

Software AG of North America, Inc. will comarket **Corporate Data Systems, Inc.**'s Bankwide deposit software system and Customer Information Facility for large and medium-size banks. Bankwide uses Software AG's Adabas and Natural.

Terradata Corp. has signed a

Continued on page 30

Case tools

FROM PAGE 23

ticated — but dumb — tools," she told the group. Many are stand-alone units, she said, frequently operating on the mainframe or the personal computer but not able to bridge the two and not offering a common user interface throughout the process.

More and more existing tools, however, offer analysis and error-checking capabilities missing a few years ago. McClure said that these tell the user whether his work is consistent with the structured methodology he is attempting to follow.

She offered a picture of an ideal development environment in which CASE tools would work together on microprocessor-based development workstations. The tools would share a common user interface, and the work accomplished at one step of the development process would set standards and specifications that could be adopted at the next level. In the ideal environment, a team of developers on workstations would jointly develop a system that could be transferred to a variety of mainframe environments or even across hardware environments.

Distant goal

Such a high level of integration, however, is still a distant goal.

In the mid-1980s, vendors began to offer common user interfaces across several, but not all, of the steps in the development process. Their customers found that they could transfer data between a tool used at one level to one used at another. And in some cases, they are offering a central repository that stores all related information for a particular development phase, including diagrams and designs.

"Now, in the late 1980s, we want to link these techniques together. We want to be able to generate 80% to 90%, sometimes 100%, of the system from a diagram," McClure said. When analysis, specification and design can be captured in sophisticated diagrams, CASE holds out the prospect of feeding that diagram into an application generator and automatically creating the desired system.

To do so on a workstation requires an ability to bridge the mainframe and PC environments. The system developed on the workstation must be able to run on the mainframe, and "the repository will be a very important bridge to form that link," she said.

In addition, an intelligent tool would allow more "what-if" questions to be answered in the development process. One form might be path tracing, McClure explained. "Show me what happens between this source and this destination," she said.

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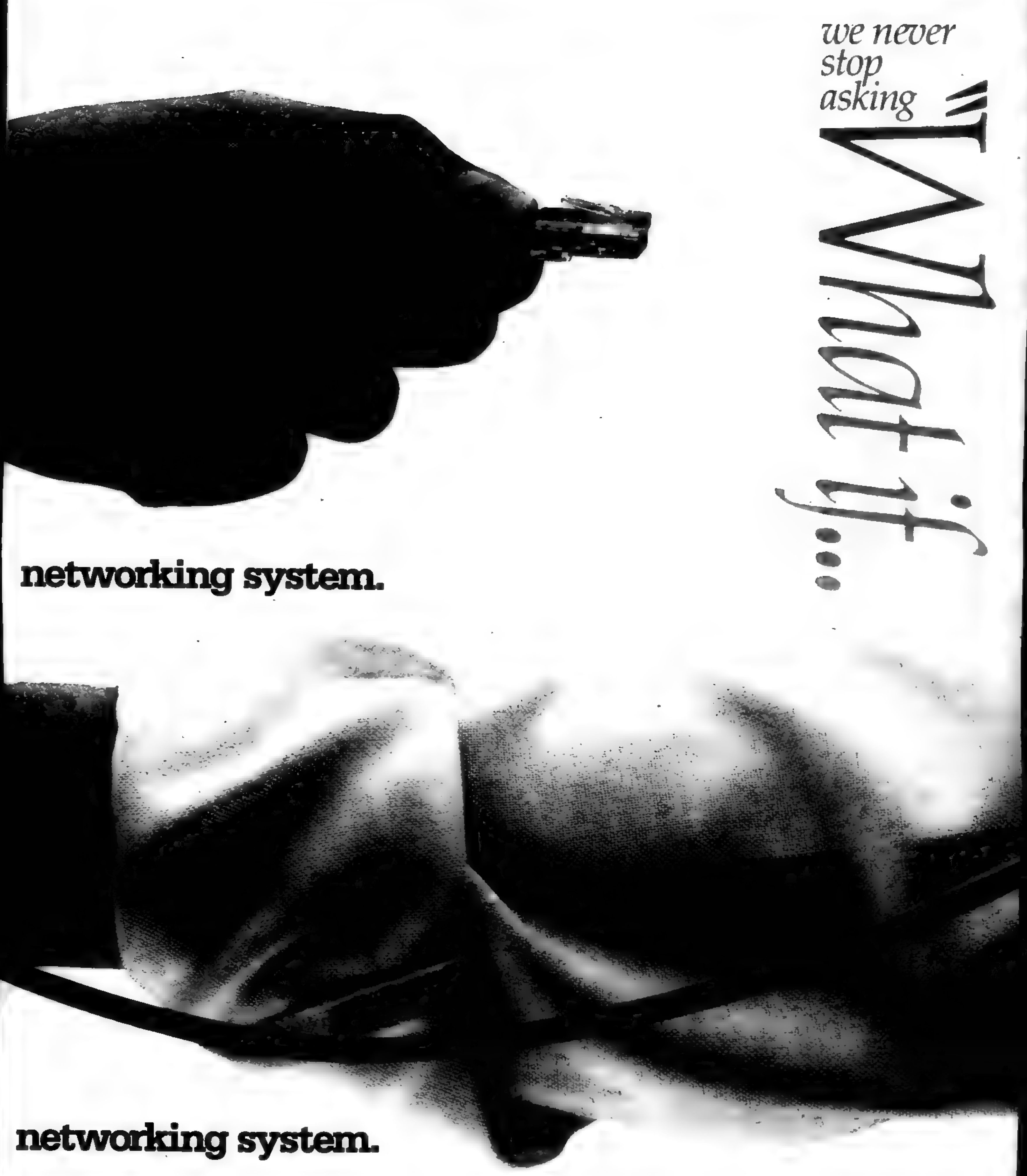

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HEWLETT PACKARD

Schwab

FROM PAGE 23

president in charge of architecture, planning and control at Schwab, and officials at ADR.

William Inmon, a senior consultant with American Management Systems in Lakewood, Colo., and author of the manual, "Building Production Systems with DB2," said a VSAM application converted to Datacom/DB offered an opportunity for an equal test in the benchmark. "If it was originally a VSAM application, you should have an almost level playing field. You should not have a bias toward Datacom or DB2," he said.

"I don't know why the benchmark was done wrong," Weinberg said. The IBM field staff might have not set up DB2 properly, or Schwab "might have been saying he wanted one thing and then arranged it so that it wouldn't happen," she said.

"She's saying that it's not fair," Rowe said. "It still happens to be factual. The deck was not stacked against DB2."

In addressing 230 current and prospective DB2 users in Toronto, Weinberg said each order processed by the application had to go through one record, which acted as a choke point for DB2 but not for Datacom/DP.

She said ADR fine-tuned its system for the benchmark, while IBM was hampered by the fact that it could not make adjustments that would allow its DBMS to perform at capacity.

"IBM is confident DB2 delivers the performance customers require for a broad range of applications," said an IBM spokesman, declining further comment.

Rowe conceded that the Stock Order Entry System's use as a production system at Schwab meant that it had been maintained and tuned for use with Datacom/DB, but he objected strongly to the charge that IBM did not have a chance to tune the application to work with DB2. "That's bull. She's taking things out of context," he said of Weinberg's accusation.

Schwab gave IBM three months to prepare for the benchmark and installed a 10G-byte string of direct-access storage devices to provide ample disk space.

The IBM team members "were given the source code and told they could modify it any way they wanted, but the output had to be the same," Rowe recalled.

Rowe said the application requires each order to process one control record so that the firm has a sequential journal of the stock purchase orders. Rowe said DB2's mechanism, which locks records at the page level and maintains them until the transaction is completed, tended to freeze up the control number records and cause CICS to crash when contention for records built up.

"That kind of design is strangling for DB2," Weinberg said. Applications can be designed around the locking mechanism, she added.

"We didn't know it had this locking mechanism. We were surprised by it. There wasn't any way around it in our application," Rowe said.

Woodson Hobbs, executive vice-president of MIS at Schwab, said the benchmark was conducted because Schwab wanted to move away from its mixed Cullinet Software, Inc. IDMS/R and Datacom/DB environment. "IBM told us under our conditions, DB2 would give us the performance we needed," so Schwab agreed to conduct a benchmark, he said.

ADR Vice-President Stephen Gerrard said his firm did not seek the benchmark and was fearful that Schwab, by running it, was preparing to justify a switch to DB2. "IBM was getting heavily into the account. If they could have proved DB2 could do the same job, we'd be out and they'd be in," he said.

Hobbs said Schwab was prepared to accept a 10% to 15% performance disadvantage with DB2 but could not accept a 2-1 performance discrepancy.

Gerrard claimed ADR had a disadvantage in the benchmark. The latest production release of Datacom/DB is 7.4, but the Schwab application was geared to work with Release 7.2. Because of that, two features in Release 7.4 that would have improved the application's transaction throughput — data clustering and joined indexes — were not used, he said.

Incom

Weinberg modified her Toronto statement that the application's requirement to go through the single control record had penalized DB2 and favored Datacom/DB. She said she did not know whether Datacom was affected by it.

Inmon said the requirement should have affected both data base systems equally.

Schwab officials attributed Datacom/DB's stronger performance to its record-level rather than page-level locking, but Inmon said record-level locking alone would not account for the margin.

Broker tools

FROM PAGE 26

joint development and marketing agreement with **Metaphor Computer Systems** in Mountain View, Calif., to produce an icon-based graphical interface for Teradata's DBC/1012 relational data base machine.

Mainframe security experts Jack Bologna and Charles Varga of **Cossac Associates** in Plymouth, Mich., are offering a program that asks 218 true/false or multiple-choice questions about computer security policies and controls. The personal computer-based program, which will retail for $150, will provide a printed report on how adequate security is at a given installation.

Tata Engineering and Locomotive Co. in Pimpri, India, has sent out a letter to software consultants saying it would like to find "well-established software consultancy organizations with specific interest in manufacturing applications. . . . We believe we have got a bank of good skills that are in big demand in the U.S. and that can be easily marketed." The letter came from the office of J. S. Parihar, a division manager with the firm.

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NEW PRODUCTS

Systems software

Western Data Systems has ported its integrated manufacturing, financial and contract-management software system for aerospace and defense contractors to the Digital Equipment Corp. VAX series of computers.

Compass Contract for the VAX runs under VMS and uses the DEC Remote Management System file-management system.

The product includes an optional integrated journaling facility.

Written in ANSI-standard Cobol 74, the system offers integrated security and a single command to access the application menu.

It is transparent to network and cluster configurations. IBM JCL batch reports can be generated through the on-line dialogue, the vendor said.

Compass Contract software costs from $100,000 running on a Microvax to $400,000 for the VAX 8800.

Western Data Systems, 22120 Clarendon St., Woodland Hills, Calif. 91367.

CICS Manager Release 2.0.0, an enhanced version of the CICS performance-management software product that features separate address-space operation, has recently been announced by **Boole & Babbage, Inc.**

Available for the IBM MVS/XA and MVS/370 environments, the new release allows users to remotely manage multiple CICS regions from a single terminal session.

The software provides users with a global view of CICS, the vendor said.

The release is also said to be ISPF-compatible. According to the vendor, it supports standard ISPF functions including split screen, general-purpose command line and the ability to jump directly to and from unrelated functions.

CICS Manager Release 2.0.0 is priced from $19,000.

Boole & Babbage, 510 Oakmead Pkwy., Sunnyvale, Calif. 94086.

Tablesonline/CICS, which is an interactive menu-driven facility for the control of CICS applications and the management of tables, has been announced by **Data Kinetics**.

Tablesonline/CICS operates in conjunction with Aratek International, Inc.'s Tablebase, an automated table management product for IBM mainframe systems.

According to the vendor, Tablesonline/CICS gives Tablebase users working in CICS a centralized, interactive data entry and validation system for creating, testing and maintaining tables on-line.

Users are said to be able to share the same table simultaneously for reading and updating.

Tablesonline/CICS works in DOS, MVS and MVS/XA environments, the vendor said.

The product is priced at $15,000.

Data Kinetics, 97 Norman St., Ottawa, Ontario, Canada K1S 3K5

Applications packages

Sales History, a sales and analysis package written in Cobol for Digital Equipment Corp. VAX computers, has been announced by **MCBA, Inc.**

The package is the 12th module in MCBA's VAX Cobol product line.

It automatically obtains data when invoices are printed and optionally allows manual entry of data.

Features include sales analysis, sales comparison and sales detail reports.

Users can specify report parameters to pinpoint the desired information.

According to the vendor, reports may be processed in the background.

Prices range from $2,000 to $4,000.

MCBA, 425 W. Broadway, Glendale, Calif. 91204.

A calendaring and scheduling software package called **Time Management** has been announced by **NBI, Inc.**

The program, designed to run on the vendor's 500 Series of minicomputers, is said to be accessible to users of NBI word processing, personal computing and electronic publishing workstations.

It consists of two integrated packages: one for calendaring and one for scheduling.

Calendaring features include the maintenance of calendars using graphic and text representations, automatic archiving of past events and printing of calendars and to-do lists, according to the vendor.

Scheduling functions include time searches designed to identify available time slots and provide user notification via electronic mail.

Time Management costs $2,000.

NBI, P.O. Box 9001, 3450 Mitchell Lane, Boulder, Colo. 80301.

Software that was designed to automate patent docketing on Wang Laboratories, Inc. VS computers has been announced by **Sotas, Inc.**

Patent Manager is said to give users the ability to generate memos on action events as well as perform correspondence to the U.S. Patent and Trademark Office without human intervention.

The software also tracks disclosure status and specific dates so that patents do not lapse because of inaction on the part of the patent holder, according to the vendor.

Other features include the ability to generate checks in-house; the ability to create, view and print reports; on-line data entry validation; and the ability to store artwork along with text and litigation.

The Patent Manager is priced from $18,000.

Sotas, 192 Merrimack St., Haverhill, Mass. 01830.

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An enhanced version of the **Tolas** application software system for distribution and financial management has been announced by **Transcomm Data Systems, Inc.**

Release 6.3 is said to be compatible with Digital Equipment Corp. VAX minicomputers running DEC's VMS operating system. It utilizes the Common Data Dictionary as a central storage facility for data definitions.

Features include functions for kit processing, invoice consolidation and future order processing. It also allows for the calculation of value-added taxes.

Modules available include order entry, inventory and purchase order management, sales analysis, accounts payable and receivable and the Tolas Information Reporting System.

License fees for Version 6.3 modules range from $3,500 to $43,000.

Transcomm, 1380 Old Freeport Road, Pittsburgh, Pa. 15238.

Languages

An enhanced version of APL designed specifically for Digital Equipment Corp. VAX computers running the VMS operating system has been announced by **STSC, Inc.**

In addition to providing standard APL features, the **APL Plus System** includes a direct interface between APL and other programming languages such as C and Fortran. Users can also execute VMS DCL commands from the APL environment. Other enhanced features include a multiuser, component-based file system, built-in error-handling capabilities; business report formatting capabilities and a library of prewritten utility software.

Prices for the APL Plus System range from $5,000 to $30,000.

STSC, 2115 E. Jefferson St., Rockville, Md. 20852.

A Modula-2 language system for the Masscomp 5000 family of technical systems has been introduced by **Ana-Systems.**

Modula-2 is a programming language derived from Pascal. With Ana-Systems' **Modula-2/68**, program modules can be compiled separately. An executable process can then be built by linking with other previously compiled modules or by linking with library procedures written in C. This allows Modula-2 modules to make use of previously written and debugged subroutine libraries in other languages.

For applications based on Motorola, Inc.'s MC68000 processors, the linked Modula-2 programs can be written in Motorola S-record format and then downloaded to standard development systems.

Modula-2/68 costs $1,200.

Ana-Systems, P.O. Box 4759, 697 Saturn Court, Foster City, Calif. 94404.

Utilities

An **Export Facility** has been announced by **Technology Information Products Corp.** (TIP) for use with its Release 1.1 of TIP Plan and TIP Define information engineering software.

The facility is said to allow users to automatically select and transfer textual and graphical information from the TIP data base to TIP Relate, TIP Repository and other system products such as IBM's DB2, independent data dictionaries and other data base management systems.

TIP Plan and TIP Define are components of TIP's integrated modular technology software for the information system planning and development process.

TIP products range in price from $20,000 to $60,000. The Export Facility, an optional feature, costs $5,000.

Technology Information Products, 12 New England Executive Park, Burlington, Mass. 01803.

An on-line disk defragmenter for the Digital Equipment Corp. Vaxstation 2000 has been announced by **Executive Software, Inc.**

Diskeeper is said to allow data to be read from the disk while grouping free space at the front of the disk. It can run on-line as a detached process while users are accessing the system.

Diskeeper for the Vaxstation 2000 costs $375.

Executive Software, Suite F, 3131 Foothill Blvd., La Crescenta, Calif. 91214.

An interface designed to link Relational Technology, Inc.'s Ingres relational data base system and SAS Institute, Inc.'s SAS System has been announced by **Software Interfaces, Inc.**

The interface, called **Istat**, enables users to combine the two programs for reporting, graphics and statistical analysis. Data can be managed in the Ingres data base system and accessed as needed for update, reports and analysis using the SAS System.

According to the vendor, the interface can be used with Relational Technology's Ingres/Star distributed data base product to enable SAS users to simultaneously access information from multiple computers.

Currently available on Digital Equipment Corp. VAX/VMS systems, the interface is priced between $2,500 and $7,500.

Software Interfaces, Suite 355, 13831 Northwest Freeway, Houston, Texas 77040.

Turbodisk Plus, a new version of the software virtual-memory device, has been announced by **EEC Systems, Inc.**

Designed for use on Digital Equipment Corp.'s Microvax II running VMS or Mi-

Continued on page 34

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Continued from page 33

croVMS and PDP-11 systems using any RSX, MicroRSX or RSX11M+-based operating system, Turbodisk Plus allows current PMI memory to coexist with up to 60M bytes of QEDI memory manufactured by Clearpoint, Inc. Facilities include automatic backup, cluster-sharable disks and a file monitoring system.

Software licenses cost $1,000 for RSX-based PDP-11 systems and $2,500 for Microvax systems.

EEC Systems, 327/E Boston Post Road, Sudbury, Mass. 01776.

A CICS tuning product for IBM DOS/VSE environments has been announced by **Data Write Co.**

The product, called **Snap**, is a group of ICS assembler programs designed to display information about the operation of a CICS/VS system in an on-line real-time mode. Snap is said to provide the ability to present a large amount of data at the user's request without waiting for CICS shutdown statistics.

Snap runs as a pseudoconversational task and is priced at $3,600.

Data Write, P.O. Box 433, Benton, Ariz. 72015.

RFU/36, a software tool for the IBM System/36 said to convert source statements from IBM's Data File Utility (DFU) into RPG program source code for list operations, has been announced by **Kisco Information Systems.**

RFU/36 translates any DFU source specification into a usable RPG II report program. According to the vendor, all features of DFU are supported, including related-master file processing. It also creates an OCL procedure and sort specifications as necessary.

RFU/36 is priced at $250.

Kisco, Suite 6-G, 120 Beverly St., Mt. Kisco, N.Y. 10549.

Release 2.0 of the **Deskworks/34-36** spreadsheet processing software program for the IBM System/36 and 38 has been announced by **System Support Products, Inc.**

Features include a file-to-spreadsheet download procedure; an exit-to-user procedure; limited library access; additional cell formats; support for string values; allowance for absolute and mixed-cell references; and enhancements to the retrieve-data-from-external-cell and -from-disk-file functions.

New commands include the change column-width command; the replicate cells and paste section commands; the insert and delete columns and rows commands; and the print spreadsheet command.

Deskworks/34-36 Release 2.0 is priced at $395.

System Support, 7620 Arlen St., Annandale, Va. 22003.

Datalock, software that is said to interactively encrypt data on Digital Equipment Corp. VAX computers to the U.S. Bureau of Standards' Data Encryption Standard (DES), has been introduced by **Interactive Technology, Inc.**

Developed by JPY Associates Ltd. in Surrey, England, Datalock reportedly provides data encryption and decryption for data storage and retrievals to and from any VAX disk.

It implements to a DES encryption algorithm by means of a pseudo-device-driver compatible with standard VMS, the vendor said.

Encryption and decryption is transparent to the user application on Deadlock due to the fact that the data is stored on the disk in an encoded form, according to the vendor.

Datalock is priced from $2,995 to $4,995 per CPU.

Interactive Technology, 460 Park Plaza W., 10700 S.W. Beaverton-Hillsdale Highway, Beaverton, Ore. 97005.

Development tools

BBN Advanced Computers, Inc. has announced that its Butterfly parallel processors now support Quantitative Technology Corp.'s **Math Advantage** scientific and engineering subroutine library.

Math Advantage provides building blocks that can be embedded in applications, including simulations of chemical processes, very large-scale integration circuit simulation, image understanding for industrial inspection and sonar signal processing.

Math Advantage, which can be programmed in C and Fortran, provides algorithms such as eigensystems, one- and two-dimensional Fast Fourier Transforms, 2-D convolutions and complex matrix operations.

Math Advantage for the Butterfly costs $5,000 for the object code and $7,500 for the source code.

BBN, 10 Fawcett St., Cambridge, Mass. 02238.

Caseware, Inc. has ported its computer-aided software engineering product, **Amplify Control**, to Sun Microsystems, Inc.'s Sun-4/200 Series workstations.

Amplify Control is a Unix-based software development environment said to automate software development tasks. Each task is accessed through a uniform graphics interface. Features include a version control facility for managing software releases, a structure diagramer, automatic generation of Unix makefiles, concurrency control and the ability to bring existing programs into the Amplify environment.

Amplify Control is licensed at a cost of $3,500 per CPU.

Caseware, 1590 Corporate Drive, Costa Mesa, Calif. 92626.

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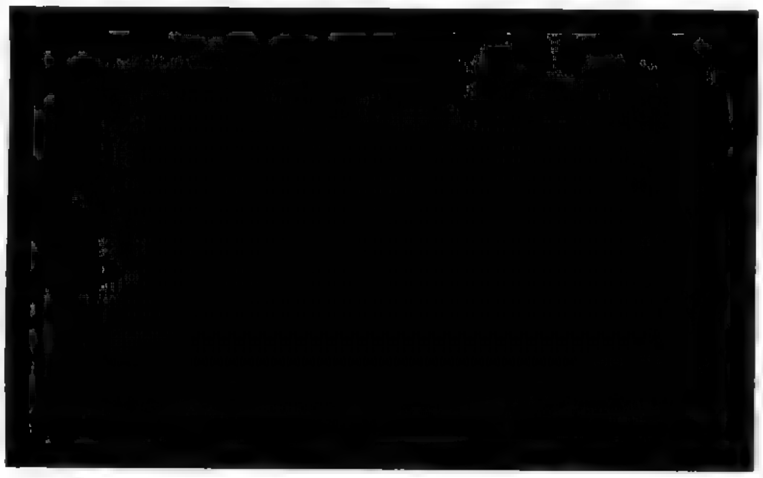
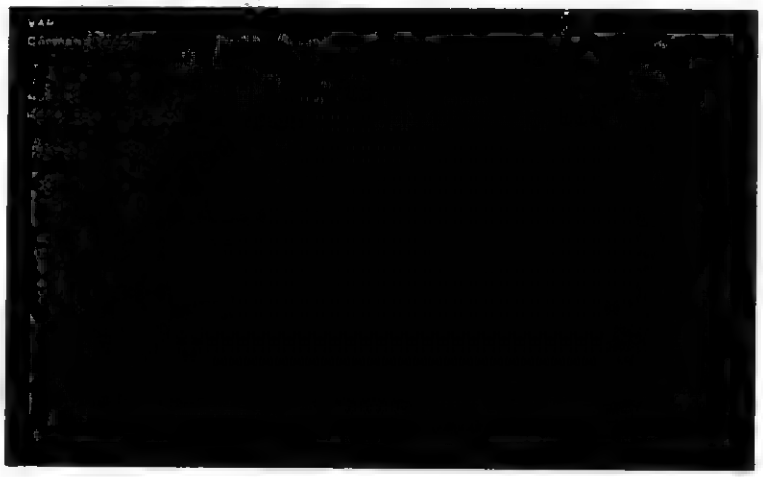
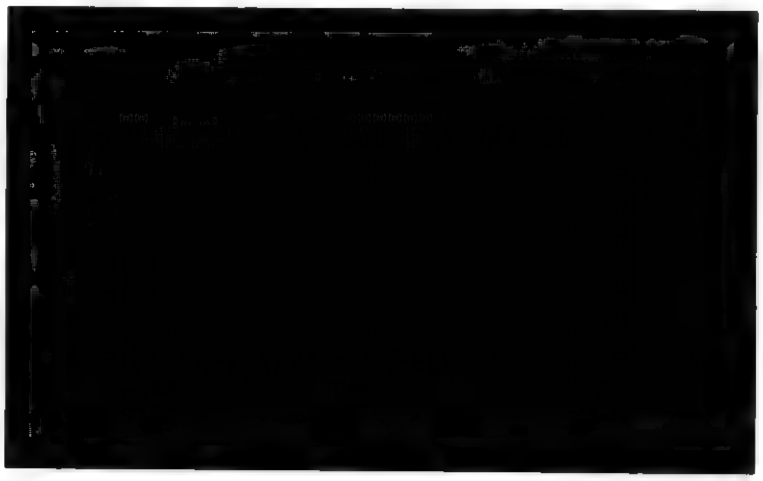


2 **Connectivity.** With the SAS System for personal computers, you get a built-in link to your host SAS System. You can download corporate data; develop, test, and run applications on your PC; or move data and applications back to the host for execution. Plus the SAS System reads data from any kind of file, including dBASEII,® dBASEIII,® and Lotus® 1-2-3.®

3 **Integration.** The SAS System runs on mainframes, minicomputers, and personal computers. The language and the syntax are the same. The full-screen text editor is the same. You only have to learn one software system no matter what hardware your company has installed.



4 **Expandability.** As your needs grow, the SAS System grows with you. We're committed to supporting all the capabilities of our mainframe software system for your PC. Whether you license one product or several, you'll enjoy the same high-quality software, training, documentation, and support we've offered for 10 years. It's all part of our site licensing plan.



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The SAS System runs on the IBM PC XT and AT, IBM 370/30xx/43xx and compatible machines, Digital Equipment Corporation's VAX™ and MicroVAX II,™ Data General Corporation's ECLIPSE® MV series, and Prime Computer, Inc.'s 50 series. Not all products are available for all operating systems.

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MICROCOMPUTING

MICRO BITS

Douglas Barney

Hurry up and wait

The microcomputer software business has been more than a bit boring lately.

Sure, some exciting things will happen next year when Microsoft's OS/2 ushers in a new era in microcomputing. By then, software will do many things at once, use gobs of memory like a mainframe and look good while sorting or recalculating.

But as far as most users are concerned, that stuff should have arrived by now, especially given that the Intel 80286-based IBM Personal Computer AT has been out for more than three years.

And like OS/2, Microsoft Windows, an interface that mimics the Apple Macintosh, was supposed to spawn a host of exciting applications.

While some companies, such as Micrografx, Inc., have introduced bold Windows products, the bulk of applications remain in the staid world of character mode.

Tired of waiting

So where is the new and exciting software that a user can buy today for an IBM PC or compat-

Continued on page 41

Mac's shifting sands

Compatibility problems continue to dog updates

BY JULIE PITTA
CW STAFF

CUPERTINO, Calif. — Apple Computer, Inc.'s Multifinder, the operating system soon to be shipped with all Macintosh personal computers, could render some previously issued software packages incompatible.

If history is any indication, however, industry observers said Apple — and its third-party developers — will move quickly to resolve the incompatibility issue.

"It's not unusual," said Tim Bajarin, industry analyst for Creative Strategies, Inc. "You'll get certain software incompatibility problems with first-time-out software."

The introduction of Macintosh II created compatibility problems with the new system and previously issued Mac software. Even Apple-developed software programs like Macwrite and Macterminal were incompatible with the new systems, a problem that was later corrected.

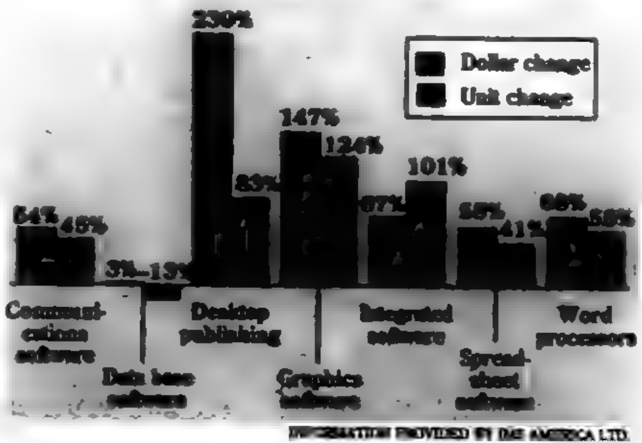
Apple downplays compatibility problems revolving around the Mac II. "There have been a few packages that don't take advantage of all the new features the Mac II has to offer, like the bigger screen," said John Zeis-

Continued on page 40

Data View

Retail shelves

Changes in store purchases of microcomputer software in first six months of 1987 from year-earlier half



INFORMATION PROVIDED BY DAS AMERICA LTD.
CW CHART

Belove: Lay groundwork before OS/2 ship sails in

As corporate vice-president of research and development at Lotus Development Corp., Edward J. Belove oversees product development.

But the Harvard University graduate, who began his career by working for IBM as a teenager, does more than the typical R&D chief.

In addition to technical duties, Belove has responsibility for business development and was instrumental in negotiating Lotus's joint development agreement with IBM, announced earlier this year.

Belove recently spoke with *Computerworld* Senior Editor Douglas Barney about users' transition to new microcomputer technology, such as IBM's Personal System/2 and Microsoft Corp.'s MS OS/2 operating system. He also revealed a glimpse of Lotus's future strategy.

What can corporations do to prepare for the new generation?

At this point, it is primarily educational. We are in a period that is confusing for users — and for us, for that matter, because we are experiencing an evolutionary change. In a way, a revolutionary change is easier because there is a nice, clean dividing line that everybody crosses over at some point.

Talk to your vendors to see what their plans are, and make sure they are consistent with the direction of your own computing.

Why should MIS be considering the change to a new operating system and applications?

It will relax some of the restrictions on current applications in terms of space and concurrent functionality.

Edward J. Belove

Before, you had to take a piece out of memory and replace it with something else to move from function A to function B. All of a sudden, you can have them both co-resident. Your perceived performance goes up, and the convenience level increases.

Continued on page 41

Inside

- Digital audio tape gains interest as storage alternative. Page 38.
- NEC announces hard drive version of IBM PC-compatible laptop. Page 40.
- Ideassociates rolls out 5251 emulation board. Page 47.

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Lack of unity endangers the promise of DAT

BY JAMES A. MARTIN
CW STAFF

Although digital audio tape (DAT) is not available yet in the U.S. consumer marketplace, the new media is generating interest as a high-capacity data storage alternative.

DAT, or Data DAT (DDAT), as industry insiders call it, promises capacity of up to 1.2G bytes and storage rates of up to 10M byte/min. This represents an improvement over current standard quarter-in. tape cartridge systems with 150M-byte capacities and storage rates of 6M to 7M byte/min.

When production volumes increase, the cost of DDAT systems is expected to drop below $1,000 at the OEM level and be competitive with the quarter-in. tape products.

DDAT is expected to be a competent archival and data and computer graphics storage backup device for a range of computer systems, particularly among high-end microcomputers.

But there are problems. The primary concern recently has been one of standards. There is still no single accepted method for the DDAT player to record data onto the tape, and many are worried that the promising new media's chances of widespread acceptance are impossible without standardization.

"It's an issue that the industry needs to address and make happen," said Lee H. Elizer, president of Peripheral Strategies, Inc., a Santa Barbara, Calif.-based data storage consulting and research firm.

"If vendors all go off and develop products independently of each other, DDAT will end up like WORM," he added, referring to write-once read-many optical-disk technology, the acceptance of which has suffered from a lack of industry standards.

Elizer is working to develop a dialogue between potential DDAT vendors and OEM customers regarding format and interface standards. He said he has scheduled a meeting Nov. 4 at Fall/Comdex '87 in Las Vegas to discuss the organization of a DDAT standards body.

East vs. West

Determining DDAT standards could well turn out to be yet another East vs. West conflict, however.

DDAT technology closely mirrors that of DAT, with the exception of the computer interface and possibly the error-correcting code and the read/write head, which can vary depending on the manufacturer. To be successful in the U.S. market, DDAT must piggyback off the acceptance of DAT in the consumer market and take advantage of existing DAT components, many of which are manufactured in Japan.

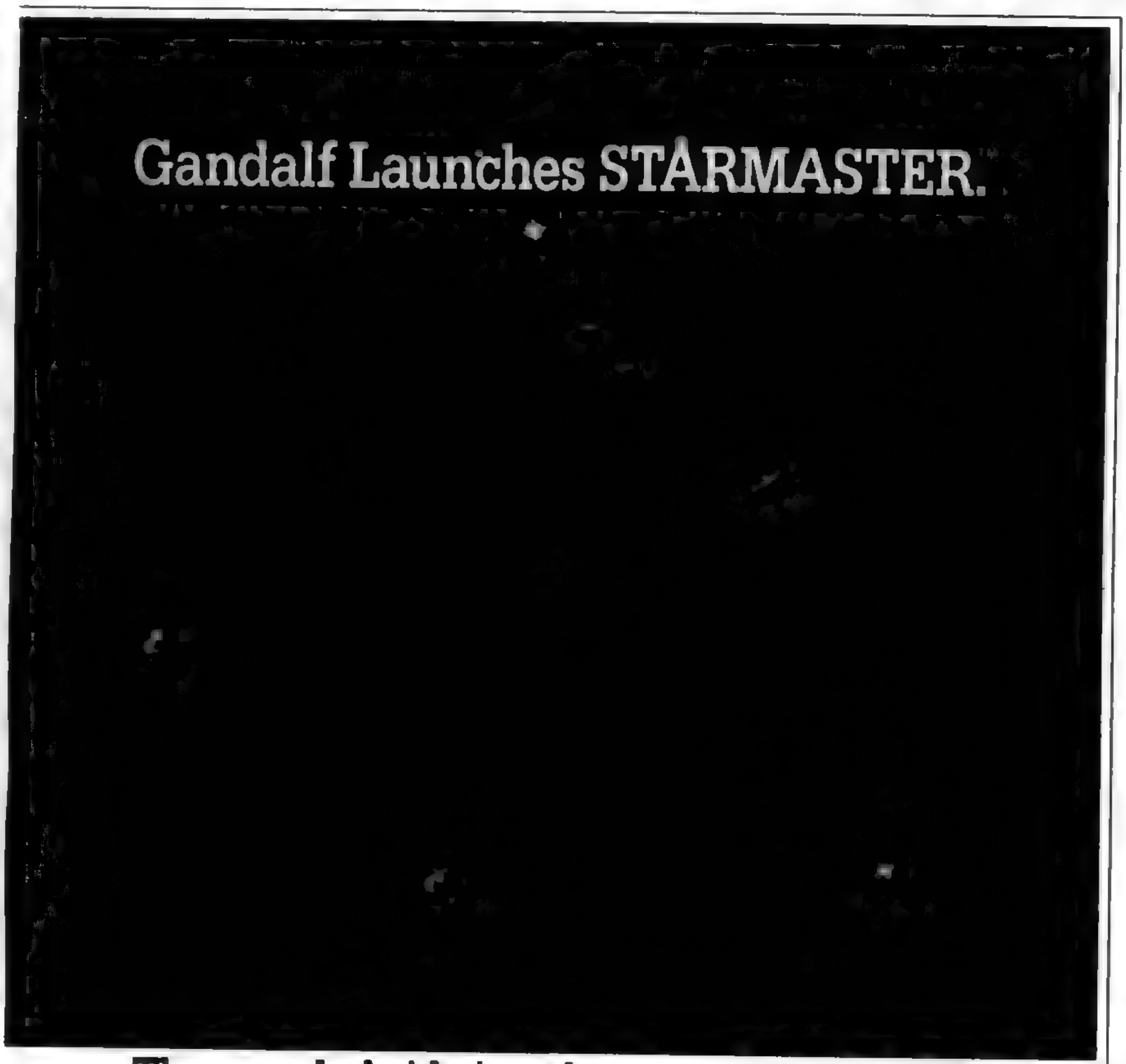
"Japan will have more leverage in setting the DDAT standard in the U.S.," predicted Bert Vermeulen, marketing program manager for Hewlett-Packard Co.'s storage division in Greeley, Colo. "It might be too late for American companies to agree on standards, because clearly the Japanese are a much bigger factor in the standard-setting process than they ever were before."

HP, Sony model

HP and Sony Corp. announced in August a joint agreement to develop DDAT players using Sony designs and HP controllers. The HP-Sony model will reportedly have a storage capacity of 1.2G bytes.

Meanwhile, Japan has a foothold on the market, in which DAT is well accepted by consumers. Hitachi Ltd. in Japan is preparing DDAT technology for the American marketplace and has displayed a prototype.

It is not known if the HP-Sony device, which will be available in late 1988, will be completely compatible with Hitachi's, however. Vermeulen declined to discuss any talks between HP, Sony and Hitachi, but added, "It would



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clearly make sense for companies like that to discuss and work together to make sure there is a common standard."

No standards assurance

But analysts warn that the fact that a major American computer systems vendor, HP, is developing a DDAT product for the American consumer market is no assurance that HP will determine DDAT standards.

"We've seen this issue before in Winchester disk drives and optical and tape drives, where there is not a critical mass of suppliers and those who agree on a common format," said Robert Abraham, vice-president of Freeman Associates, a data storage consulting firm in Santa Barbara.

"Even though Sony and HP working together were influential in establishing the 3½-in. floppy disk drive as a standard, it took them a long time to do it," Abraham warned.

It is possible that ANSI could get involved with DDAT. But the fastest route to standardization is usually paved by IBM and the like, Vermeulen said.

"If you look at the speed of setting standards, IBM and big companies do it fastest because of their clout," he said.

"IBM starts building products that others mimic soon after, while ANSI sits down and defines the standards before others start building. I can't think of many successes from that method, not in a fast-moving area of technology," Vermeulen added.

IBM has not announced plans for DDAT systems. Analysts said IBM is often lagging behind current standards in the storage area and is not expected to lead the charge here either.

When DDAT arrives in the U.S. in late 1988, it is expected to compete against existing low-end storage subsystems and future ones as well. "Along with DDAT, we'll have 5¼-in. tape drives, 8mm helical scan drives, optical WORM drives and, soon, erasable optical," Elizer said. "It should be an interesting battle."

Of those, DDAT is expected to be most competitive with erasable optical technology, which is not available but is promised for 1988. "Erasable optical spins round and round, so the access times will be faster," Elizer said. "But there's a question about how expensive erasable will be, and the capacity will not be as high as DDAT."

DDAT products are expected to offer random-access data speeds of 10 to 20 seconds, compared with erasable optical products' 50 to 100-msec speeds. But DDAT's capacity of 1.2G bytes or more far exceeds the erasable optical ceiling of some 50M bytes, according to Elizer.

Competition heating up

Another competitor in the market will undoubtedly be Exabyte Corp. in Boulder, Colo., which this summer began shipping a helical scan storage subsystem based on the 8mm VHS videocassette recorder technology. The Exabyte 8200 can backup data from a variety of computer systems up to 2G bytes at a transfer rate of 256K byte/sec., according to the company.

Exabyte is said to be "shipping thousands" of 8mm video tape drives to OEMs, and a small flurry of product announcements based on that technology is anticipated at Comdex/Fall. At $3,500, the Exabyte 8200 is seen by some as a viable archiving and backup media for high-end microcomputers and mainframes.

Nevertheless, it is still too early to tell who will set DDAT standards, how the computer industry will react to the new media and when prices will fall low enough to make the technology a viable alternative.

"The major significance of the HP-Sony announcement is that, hopefully, they will now lead the industry toward standards," Abraham said. "DDAT recording has a lot going for it — low risk, mature technology, low-cost potential, small size. But it's not going anywhere until the obstacles of standardization have been overcome."

4Word marches over to 1-2-3

CUPERTINO, Calif. — A new version of 4Word, a $99 random-access memory (RAM)-resident word processor for Lotus Development Corp.'s 1-2-3, was introduced last week by Turner-Hall Publishing.

The new release is said to allow users to integrate multiple graphs, spreadsheets and text in a single document. The product can also be used for creating presentations without buying or using separate presentation software packages, according to Tom Byers, general manager of Turner-Hall.

The product, aimed at people who use of 1-2-3 heavily but have modest word processing needs, can be invoked from 1-2-3's main menu and uses a command structure similar to 1-2-3. The package also uses Lotus .WKS files to store documents. By sharing the Lotus file structure, users can print documents using the same command that produces work sheet printouts.

Turner-Hall also addressed a common user complaint, which was that text could spill over into a spreadsheet and damage data. The new version avoids this problem by providing automatic spreadsheet protection.

Another Turner-Hall product, Spellin, a spell checker for 1-2-3 labels, can be used with 4Word. 4Word 2.0 is not copy-protected, uses approximately 60K bytes of RAM and is available now. Current 4Word users can upgrade for $25.

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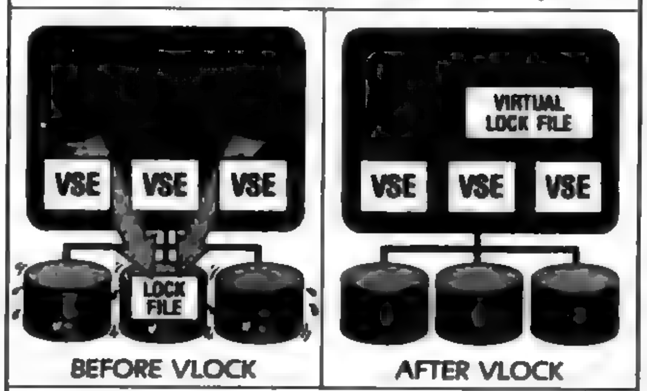

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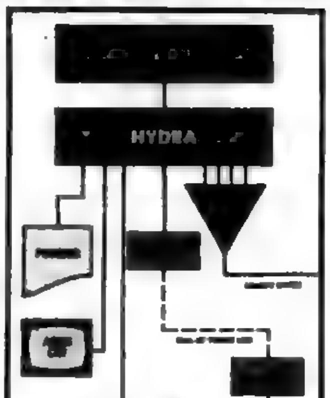

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NEC releases hard-disk Multispeed laptop

WOOD DALE, Ill. — A hard-disk-drive version of its Multispeed IBM-compatible laptop was announced last week by NEC Home Electronics U.S.A., Inc.

The popular battery-powered laptop was not previously available in a hard disk drive configuration, a feature highly sought by laptop users. The Multispeed HD comes standard with a 20M-byte hard disk drive offering 78-msec access time. The machine will be available next month, NEC spokesmen said.

Like its predecessor, the $3,695 Multispeed comes equipped with a 3½-in. floppy disk drive capable of storing 720K bytes of data or program code and uses an electroluminescent supertwist LCD screen.

No expansion chassis for expansion slots is available, but the machine does have a slot that accepts many modems, the vendor said.

Uses software revamped for PS/2

According to a NEC official, the 3½-in. floppy disk drive accepts software that vendors have reformatted for the IBM PS/2. "Those work just fine," said James D. Bartlett Jr., NEC's marketing manager for computer products in the computer products division.

The 14-lb Multispeed comes wth 640K bytes of nonexpandable random-access memory and uses a NEC V30 processor that runs at either 4.77 or 9.54 MHz. Because the machine's memory is nonexpandable and its V30 processor emulates the Intel Corp. 8086 and not the 80286, the Multispeed will reportedly be unable to run Microsoft Corp.'s OS/2 operating system, due out next year.

NEC is currently being sued by Intel for allegedly infringing on Intel's microprocessor copyrights. According to NEC's Bartlett, users should not be concerned about the lawsuit because a verdict against NEC would only affect future products.

Mac

CONTINUED FROM PAGE 37

ler, marketing vice-president for Apple software subsidiary Claris Corp. "There have been others that don't run at all. But those have been few and far between."

Incompatibility problems ranged from software packages unable to take advantage of the Mac II's display capabilities to a complete inability to function. "Some didn't run; some just had weird things happen," said Lee Coven, manager of technical computing systems for Lockheed Missiles and Space. "Incompatibility can be defined as something as minor as things looking different on the screen than they looked on the old machine," said John Dubois, senior technical consultant at Seafirst Corp., a Seattle-based subsidiary of Bankamerica Corp.

Revisions to the operating system — and, in a number of cases, the Mac II's more powerful Motorola, Inc. 68020 microprocessor — appear responsible, users said. "The operating system has experienced several small evolutions since the introduction of the Mac Plus in 1986," Dubois explained. "There are likely to be more revisions with Multifinder."

According to one user who tested the Mac II, as much as 70% of previously issued Mac software did not work with the Mac II. By the time the product was introduced in the spring, compatibility had increased to between 80% and 90%, the result of refinements to the system before its launch.

Today, Apple claims that more than 90% of current Mac software runs on the Mac II. Users can obtain upgraded versions of their current Mac software packages from Apple dealers. "It took a couple of months before the update," Dubois said. "Certainly all the software we care about is compatible."

Currently, users appear content with the amount of software available for the Mac II. "The bulk of our usage centers on a few packages," said Steven Morelli, general manager of financial planning and control for H. J. Heinz Co. "There doesn't seem to be any compatibility issues with those packages. Historically, software packages that haven't run on upgraded versions of the Macintosh were always programs that somehow didn't comply with Apple's guidelines for third-party software development. That makes me more uncomfortable with the package than Apple's hardware."

Rocky ride for users?

Multifinder could cut short the Mac II's honeymoon with users, and it could extend software incompatibility problems to the Mac SE and Mac Plus, which will also be shipped with Multifinder. One user beta-testing the system said Multifinder creates further compatibility problems.

"With Multifinder, it's going to be somewhat rocky for the next six to 12 months," the user said. Communications software packages are among the most likely to be impacted, he added, explaining that Multifinder's multitasking capabilities cause glitches with some packages.

"Some communications software packages are unable to recognize when they're being switched out in favor of another task," the user explained. "They're not incompatible in the sense that they fail, but they tend to behave erratically. You don't want a software package that sometimes misbehaves."

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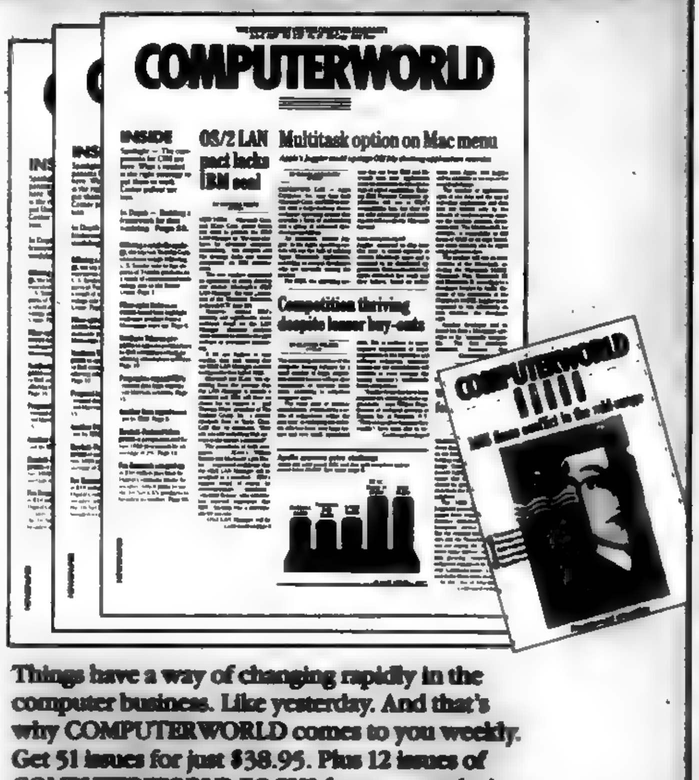
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Belove

FROM PAGE 37

What percentage of users need these features?
If you look at those users who find performance lacking and are running out of memory, it is a small percentage. But users follow a bell curve, and that curve is constantly shifting toward expecting increased functionality.

What should MIS be doing in terms of investing in hardware today? OS/2 will require an 80286 processor and lots of memory, and the Presentation Manager will add high-resolution graphics and a mouse to those requirements.
A lot of those are add-ons. Memory and mice can be added at the point they are needed. Some of the graphics pieces and the basic processor are different. It is a matter of looking at your own users and their level of sophistication and understanding to discover how long it will take to make the transition to graphics interfaces and what kind of requirements they have.

How can MIS get a handle on these transition issues?
Talk to your vendors. Understand their direction and help, at this point, to influence it. Get your two cents in. The other piece is listening to users, which MIS has been doing a lot of with their PC users.

Should MIS begin determining which users to move to OS/2?
To some extent they will self-select, in the same way users selected PCs before MIS really knew. MIS has become sophisticated enough to understand that the user drives the process.

It is, however, the time to start determining some of that, of saying what the transitional strategy is. Presumably, most corporations have a large investment in current hardware and software, and that is the investment you shouldn't throw out.

For example, the OS/2 version of 1-2-3 will be able to interchange data, templates, etc. with the MS-DOS version, so people will be able to live in mixed environments. You will not have to convert everyone, wholesale, over to a graphical interface of OS/2.

What will happen to my performance with a 286 machine running multiple applications, at least one of which is graphical?
Your performance with multiple applications will not be the same as running a single application. Because something else is running and sharing the CPU, there aren't the same number of cycles available to the foreground application. You will have some performance degradation.

The minute you turn on protected mode you lose some performance. But you will get that performance back in a few ways. More memory is available to the program, so we can design them differently. Your actual throughput running a single application may slow up, but overall, with the ability to let things run in the background and have things occur without waiting, your overall productivity will be higher.

Is a well-engineered 286 machine adequate for running multiple tasks under OS/2?
It depends on what you are doing. Different applications will have different characteristics. If I set up something in the background that is very compute-bound, just crunching numbers, clearly that will affect my foreground performance a lot more than something that is maybe a communications application running at a low speed. When you get into graphics where so much of the processor is tied up just retaining the screen, there will be some performance limitations.

How much will a 386 help eliminate potential bottlenecks?
It will help alleviate them, but it won't eliminate them. I have a Compaq 386 on my desk right now, and I can, in DOS 3.0 running graphical applications, bring it to its knees with some pathologic cases.

What are the risks for corporations that are first to go to OS/2 and OS/2 applications?
There are risks, but I have to assume that most corporations are sophisticated enough to not just go out and buy hundreds of copies of OS/2 and the new applications. In every case they have people in their experimental labs or evaluation labs, and those are going to be the first users.

Will it be difficult to maintain software compatibility when moving to OS/2?
You will need some new file formats as you add functionality, but what we are going to be doing is providing that in an invisible way. For example, 1-2-3 Release 3 will read and write Release 2 files.

How will Lotus deal with future competition?
We are expanding vertically. We will be extending the capabilities of 1-2-3; 1-2-3/M is the first step in that direction, of compatibly offering people a spreadsheet that will run across the range of platforms that their corporations are going to need and have in the future. That will tend to reinforce 1-2-3's position, because it will be the standard to use across all hardware platforms.

Hurry up

FROM PAGE 37

ible? With few exceptions, it just isn't here yet, and users are getting bored silly.

The root of the problem, it seems, is that the bigger software vendors are spending an inordinate amount of time working on software for the new, unproven and unshipped OS/2 operating system.

Meanwhile, users of Ashton-Tate's Dbase III and Lotus Development Corp.'s 1-2-3 patiently keep loading the same old software, with no hope of a dramatic breakthrough until next year.

And even if OS/2 breakthroughs arrive, this software will only affect the upper echelon of micro users — those who can afford the high cost of the next generation.

The OS/2 applications ware will probably cost more, and the hardware requirements will undoubtedly add up to quite a few bucks.

Users who are either too poor to move up, or happy with an Intel 8088 machine but are seeking more "oomph" from their software, will have to wait almost as long as those early OS/2 adopters.

Next year's models
It will most likely not be until next year that Dbase IV and 1-2-3 Release 3, both set to run on the MS-DOS 3.0 environment, hit the streets.

Much of the disturbing lack of innovation comes with the increasing control of the market by a few well-heeled vendors bent on preserving a profitable status quo. When innovative software does appear, the standardization around older core products keeps such packages from reaching their potential. As a result, the exciting software that does exist rarely makes it to a user's desk.

The drawn out delivery of OS/2, the mixed success of Microsoft Windows and the increasing oligopilization of the software business has made the PC environment fallow ground for software.

Meanwhile, many good ideas have been implemented on the Macintosh. But it is a shame to have to buy a new machine just to reach a higher software plane.

Barney is *Computerworld's* senior editor, microcomputers.

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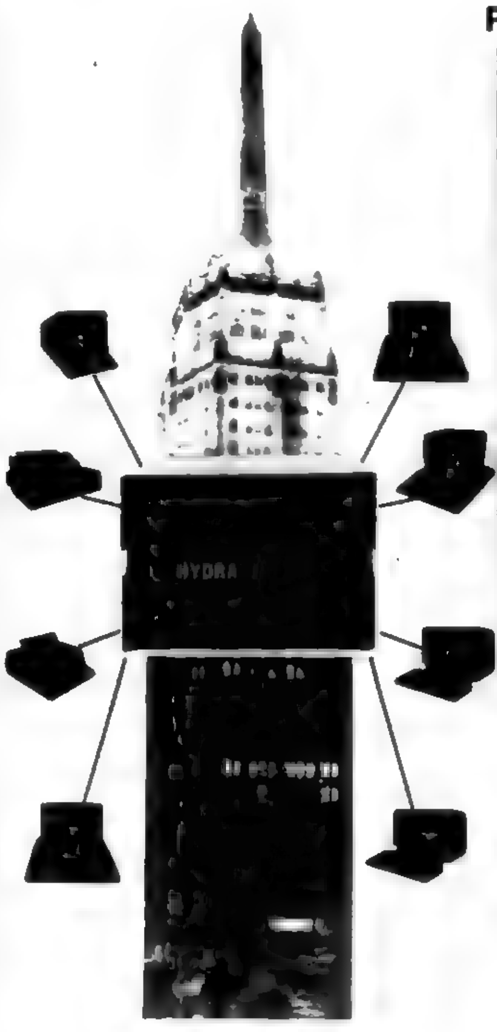

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NEW PRODUCTS

Systems

Factory automation systems providing distributed numerical control (DNC) and communications using an IBM Personal Computer and the Unix operating system have been announced by **CAD/CAM Integration, Inc.**

The **Series 1000 Factory Automation Systems** provide two-way electronic data transport of manufacturing information between a computer-aided design, manufacturing or engineering or DNC prep system and automated equipment on the shop floor.

All Series 1000 products support Ethernet and broadband local-area networks. Pricing starts at $7,500, including a 16-channel multiplexer, the Unix operating system, RS-422 or RS-232 communications, a full-screen editor and protocols.

CAD/CAM Integration, 80 Winn St., Woburn, Mass. 01801.

Software applications packages

Check-processing software for the banking industry said to support the IBM Personal System/2 and the IBM 3118 Page Scanner for signature scanning and verification has been announced by **SQN Peripherals, Inc.**

SQN Veritas software permits the capture of single and multiple signatures from application cards with data base storage and retrieval for up to one million signatures. It can also append name, account data and messages for each signature.

A complete SQN Veritas PS/2-based system with hardware for 65,000 signatures costs $17,000.

SQN Peripherals, Box 423, 65 Indel Ave., Rancocas, N.J. 08073.

A-Cross, a personal computer cross-tabulation program, has been announced by **Strawberry Software, Inc.**

A-Cross is said to be a multitasking data-analysis tool. It can create, compute and print tables simultaneously. According to the vendor, users do not need to know a command language. Formulas, which define variables, are translated into English on screen. Rows and columns are displayed in spreadsheet form as they will appear in finished tables.

A-Cross is priced at $995. A runtime version, limited to a single data base, costs $85.

Strawberry Software, 42 Pleasant St., Watertown, Mass. 02172.

A software program designed to automate the task of filling in the blanks on forms and documents has been announced by **Softstream Technologies, Inc.**

The program, called **Blankity Blank**, works directly with certain word processing programs to merge standard information into the appropriate places or blanks in each form.

The user creates an unlimited number of questionnaires that can contain up to 1,000 questions each. Questions and answers can be edited at any time. Math equations can be used as questions; the software automatically calculates the answers.

Blankity Blank runs on IBM Personal Computers or compatibles. It costs $99.50 plus $5 for postage and handling.

Softstream, 2740 Hollywood Blvd., Hollywood, Fla. 33020.

DB Graphics, a presentation software graphics package said to allow users to read Ashton-Tate's Dbase III and Dbase III Plus as well as the vendor's own R:Base data bases directly, has been announced by **Microrim, Inc.**

Users of other data base programs, such as Dbase II and Lotus Development Corp.'s 1-2-3 and Symphony, can use DB Graphics after translating into the ASCII, Dbase II or III Plus or R:Base data formats. DB Graphics can also be used as a stand-alone package.

Users can sort and group fields, create variables for graphing and make use of conditional operators. Features include eight graph types, seven text fonts and up to 16 simultaneous colors. Up to 32 windows of split-screen displays are available.

DB Graphics costs $295 in both 5¼- and 3¼-in. formats.

Microrim, P.O. Box 97022, 3925 159th Ave. N.W., Redmond, Wash. 98073.

A Lotus Development Corp. 1-2-3 add-in program that permits users to operate on Ashton-Tate Dbase-compatible files directly from the active Lotus spreadsheet has been announced by **Triple C Software, Inc.**

The program, called **DB12 III**, allows transferred data to be filtered in accordance with qualification criteria placed directly in the worksheet. It uses 1-2-3 commands and functions.

DB12 III runs on IBM Personal Computers and compatibles and requires 1-2-3 Version 2.0 or higher. It costs $149.

Triple C, Suite 217, 800 W. Oakland Park Blvd., Fort Lauderdale, Fla. 33311.

A line of integrated office automation applications designed to run under Microsoft Corp.'s Windows has been announced by **Palantir.**

The **Windows Office Automation Series** offers multisoftware applications,

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† 60-month lease rate. 36-month lease and purchase option also available.

including productivity tools and utilities. All products in the series are said to be able to share text, data and graphics.

Software in the series includes a desktop communications program, a resource scheduler, a spreadsheet, a flat-file data base application, a font editor, an image data base, a paint-and-graphics application, an image scanner and editor and a word processor.

Prices range from $80 to $1,200.

Palantir, Suite 100, 12777 Jones Road, Houston, Texas 77070.

Superproject Expert, a resource and project-management software package for IBM Personal Computers and compatibles, has been announced by **Computer Associates International, Inc.**

Superproject Expert is said to incorporate such project management features as interactive outline and work breakdown structure, local-area network capability, customizable reports and micro-to-mainframe links.

Other features include job-oriented scheduling, multiproject capabilities, import/export network capabilities, detail costing information, graphics capabilities and built-in word processing capabilities.

Superproject Expert is priced at $695.

Computer Associates, 2195 Fortune Drive, San Jose, Calif. 95131.

Software utilities

A real-time high-resolution graphics-oriented performance measurement tool for IBM's MVS/370 and MVS/XA has been announced by **Forthright Systems, Inc.**

The IBM Personal Computer-based **Forthright Real-time Environmental Display** (FRED) captures real-time graphics displays from IBM's RMF Monitor II on-line displays and instantaneously transforms them into graphics. More than 45 predefined color displays of MVS events and status indicators are included.

FRED also features remote-connect capabilities that give centrally located users the ability to monitor the performance and service levels of remote sites.

FRED is licensed starting at $5,000.

Forthright, 490 Lakeside Drive, Sunnyvale, Calif. 94086.

A personal computer version of a software package said to automatically document Information Builders, Inc.'s Focus has been announced by **Adventureware, Inc.**

PC/4th-Write establishes read access to Focexecs and Masters, parses out the essential data, loads the data into a Focus data base and produces nine systems manual reports.

Features include on-line query, screen image-fill creation and the ability to produce a file containing only the key or core statements in Focexecs.

PC/4th-Write is available for CMS and PC/Focus. The mainframe and PC versions are said to be compatible so that systems can be documented at one level and stored at another.

PC/4th-Write costs $600.

Adventureware, 3434 Huntertown Road, Allison Park, Pa. 15101.

Data storage

Bering Industries, a subsidiary of Mountain Computer, Inc., has added the **Totem II** to its Totem line of 20M-byte removable Bernoulli storage subsystems for Apple Computer, Inc.'s Macintosh computers.

Bering's *removable Totem II*

Totem II features a single 20M-byte, 5¼-in. removable Bernoulli cartridge packaged in a 3-in. box. Each cartridge is said to hold the equivalent of 10,000 pages of information.

Also announced was Bering's Totem backup and restore software for all Totem and Totem II drives.

Totem II is priced from $1,195.

Bering, 280 Technology Circle, Scotts Valley, Calif. 95066.

Three families of fixed- and removable-disk storage products for the Apple Computer, Inc. Macintosh Plus, Macintosh SE and Macintosh II have been announced by **Mountain Computer, Inc.**

The **Micro Bernoulli** is available in single and dual 20M-byte removable cartridge versions; the **Filesafe** is an external hard disk in capacities ranging from 20M to 80M bytes; and the **Micro Bernoulli Combo** units are a combination of 20M bytes of removable cartridge storage with a choice of 20M-, 40M- or 80M-byte hard disks.

The units interface to the small computer systems interface (SCSI) port on the Macintosh Plus and Mac SE and to an SCSI card on the Mac II.

Micro Bernoulli prices range from $1,895 to $2,795, and Filesafe prices range from $1,095 to $3,395. The combination units cost from $2,695 to $4,495.

Mountain Computer, 360 El Pueblo Road, Scotts Valley, Calif. 95066.

Four external products said to transport data between the IBM Personal Computer family and the IBM Personal System/2 line have been announced by **Sysgen, Inc.**

The 3½-in. **Bridge File**, priced at $325, provides a two-way link with 720K bytes and 1.44M bytes of floppy-disk storage. The 5¼-in. **Bridge File**, priced at $325, offers 360K bytes and 1.2M bytes of floppy-disk storage.

Bridge Tape, priced at $795, provides a tape-unit capacity of 42M bytes to port data to all the PCs and the PS/2 line. It also serves as a tape backup unit for both types of personal computer. The **External Durapak**, a $1,595 removable hard-disk subsystem, provides 15M bytes of memory storage.

Sysgen, 556 Gibraltar, Milpitas, Calif. 95035.

An optical-storage subsystem and software device driver for IBM Personal Computers and compatibles has been announced by **Micro Mart, Inc.**

The system, called the **MMI-100 Optidriver**, allows the users to access a write-once read-many optical disk drive as if it were a Winchester drive, the vendor said.

Users can reportedly run most application programs directly from the optical disk, use standard Microsoft Corp. MS-DOS functions on the optical drive, have multiple device drivers on the same system and access 200M bytes per side of a cartridge.

Available in an internal version, which fits in an 8-bit slot in the PC, and an external version, the MMI-100 costs $6,495.

Micro Mart, Suite 109, 8620 N. 22nd Ave., Phoenix, Ariz. 85021.

Development tools

Aries Technology, Inc. has introduced **Aries CP1100**, a Compaq Computer Corp. Deskpro 386 version of its **Conceptstation** desktop mechanical computer-aided engineering (CAE) tools.

The system is a desktop computer environment that includes solid geometric modeling, materials management, analysis, communications and access to personal productivity software.

The CP1100 upgrades the

Continued on page 44

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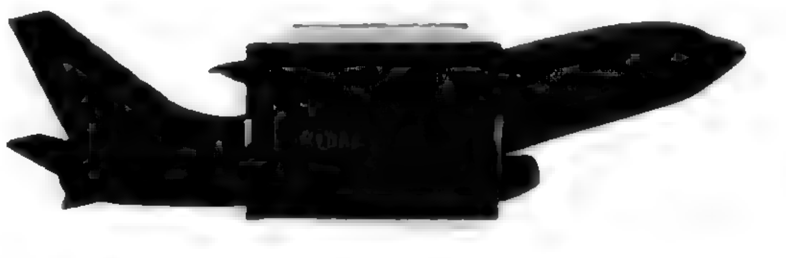

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Continued from page 43

Deskpro 386 to a stand-alone mechanical CAE system that includes Aries's proprietary graphics accelerator, a 256-color, 1,024- by 770-pixel monitor and a three-button mouse.

The CP1100 Conceptstation is base-priced at $21,850, not including personal computer, memory and disk options.

Aries, 650 Suffolk St., Lowell, Mass. 01854.

Master, a personal computer-based system for the analysis, design and documentation of data base applications, has been announced by **Infodyne, Inc.**

Developed by GESI in Rome, Master is said to support all design activities relating to the conceptual, logical and physical model of data and processes in an information system. It produces various levels and documentation, integrates local subschematica into the global design and converts the conceptual entity-relationship (ER) design into the relational model.

The basic module costs $1,900. Modules for generating the ER schema of the application and data flow diagrams and for producing standard ASCII files with the description of the data base structure cost from $495 to $795.

Infodyne, Suite 200, 227 S. Main St., South Bend, Ind. 46601.

Software enhancements

An enhanced version of the **PMS-II Project Manager System** has been announced by **North America MICA, Inc.**

Version 8.0 includes on-screen bar charts, an interactive on-screen logic diagram, an on-line diary and a comprehensive on-line technical reference manual accessible from anywhere in the program. New capabilities include a pop-up calculator, a global editor, internetwork dependencies and an interrupt feature.

Version 8.0 of the PMS-II Project Management System costs $1295.

North America MICA, Suite 110, 5230 Carroll Canyon Road, San Diego, Calif. 92121.

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Version 2.0 of the **AMX** real-time multitasking operating system for Intel Corp. 8086, 80186 and 80286-based microprocessor systems has been announced by **Kadak Products, Ltd.**

AMX is said to support 100 application tasks with up to 1,024 interval timers and 4,096 envelopes for message-passing to tasks.

Features include resource protection, even and task-synchronizing capabilities and fixed and dynamic allocation of memory for use by concurrently executing processes.

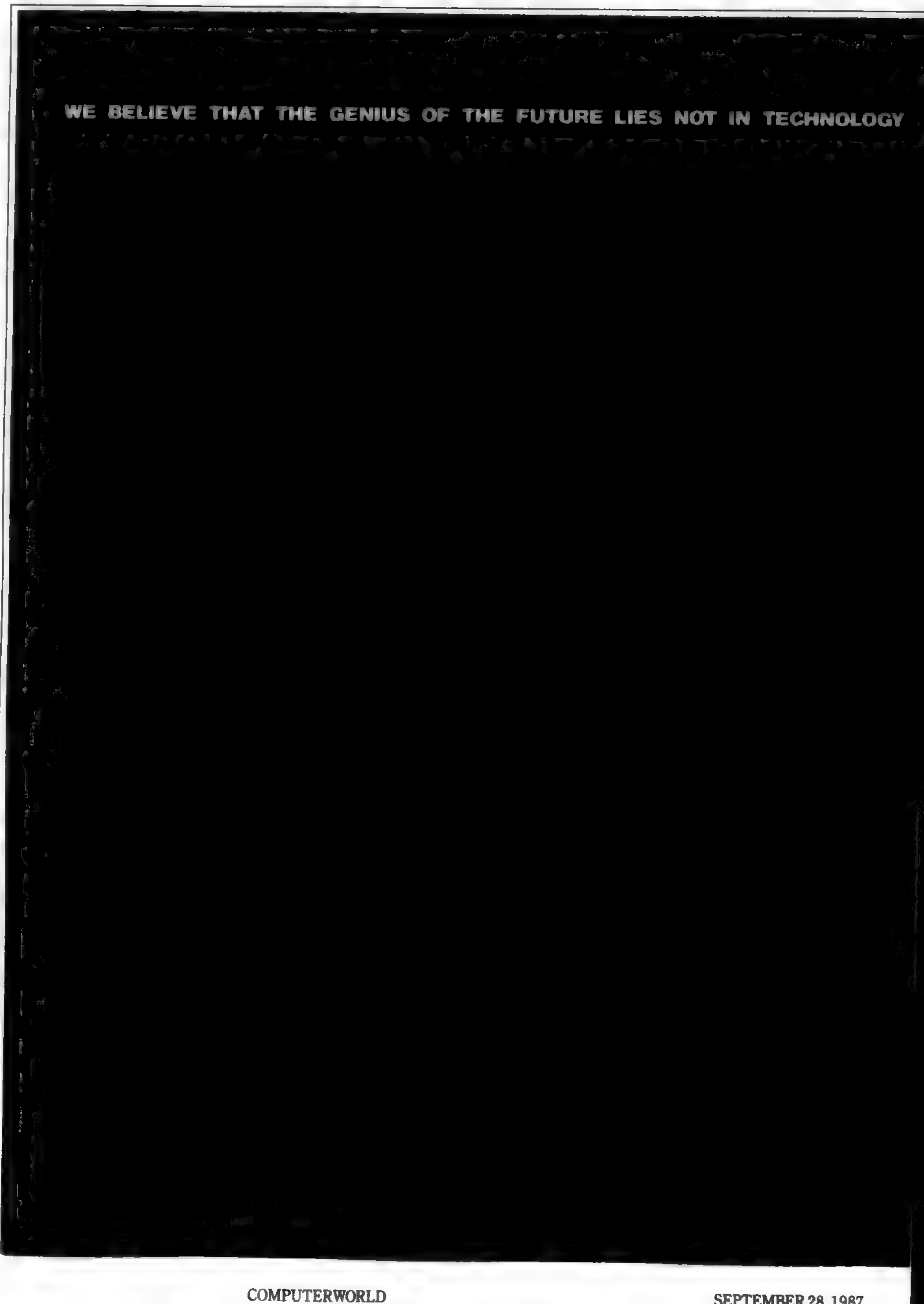
According to the vendor, when used on an IBM Personal Computer, PC XT or AT, AMX permits critical real-time event processing concurrently with IBM PC-DOS operations.

Applications using AMX can be developed using C or assembler. The AMX multitasking package costs $2,195.

Kadak, 206-1847 W. Broadway Ave., Vancouver, B.C., Canada V6J 1Y5.

A version of the **Irecognize** IBM Personal Computer-compatible image-recognition software, designed for use with the Palantir Recognition Server, has been announced by **Ibase Systems Corp.**

When used in conjunction with one central-recognition engine, Irecognize 2.0 is said to allow information and images stored on magnetic tape or opti-


WE BELIEVE THAT THE GENIUS OF THE FUTURE LIES NOT IN TECHNOLOGY

cal disk to be taken from multiple workstations and processed immediately or transferred to hard disk for later processing.

Features include automatic processing of up to 64 forms; verification editing; control of post-processing document formatting; and built-in personal computer communications.

Irecognize Release 2.0 costs $6,000. Bundled with the Palantir recognition server, it costs $29,500.

Ibase Systems, One S. Park Ave., San Francisco, Calif. 94107.

Welcom Software Technology has announced an updated version of its Microsoft Corp. MS-DOS-based project management system, **Open Plan 3.0**.

New features include contact-sensitive Help messages; access to auxiliary data files during activity-file update; the ability to store and access data on a drive separate from the software; support for the 43-line mode of IBM Enhanced Graphics Adapter boards; and zoning logic and time-phased drawings.

The product also features alternative presentation styles for logic and time-phased logic drawings, batch reporting and automatic subheading and subtotaling to 10 levels.

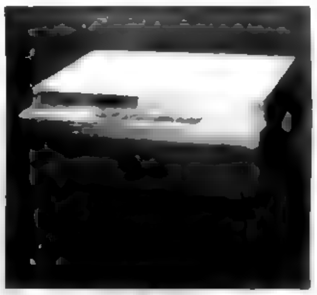
Open Plan 3.0 offers critical-path analysis and resource scheduling on arrow- and precedence-project networks of up to 32,750 activities. It costs from $4,200.

Welcom, Suite 125, 1325 S. Dairy Ashford, Houston, Texas 77077.

Printers/Plotters/Peripherals

A desktop laser printer supporting Adobe Systems, Inc.'s Postscript page-description language has been announced by **CPT Corp.**

The **CPT PS-8** printer features output speed of eight pages per minute. It has 35 resident typefaces, each of which may be rotated and scaled to any size, the vendor said. Text with line art and halftones can be accommodated on one page.



The CPT PS-8 *printer*

Emulations of Hewlett-Packard Co.'s HP Laserjet Plus, HP 7475 Pen Plotter and Xerox Corp.'s Diablo 630 are supported. The CPT PS-8 can be connected to the CPT 9000 or any IBM Personal Computer or compatible through a serial interface. It can connect to an Apple Computer, Inc. Macintosh through an Appletalk interface.

The CPT PS-8 costs $5,800.

CPT, P.O. Box 295, 8100 Mitchell Road, Minneapolis, Minn. 55440.

Saba Technologies, Inc. has begun shipping Version 2.0 of its **Handscan** hand-held data entry device that allows users of IBM Personal Computers to enter portions of documents directly into PC software programs.

Enhancements include the ability to read additional typestyles and text with underlining as well as improved accuracy when dealing with partially formed characters or those that touch other characters.

Handscan reads characters generated from typewriters and word processors, mainframe laser printers and near-letter-quality dot matrix printers.

Handscan Version 2.0 is priced at $649.95.

Saba Technologies, 9300 S.W. Gemini Drive, Beaverton, Ore. 97005.

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A laser printer/plotter called the **Laserimage 3000** that is said to feature a 15 page/min. print speed has been announced by **Personal Computer Products, Inc.**

The Laserimage 3000 offers built-in emulation of the Hewlett-Packard Co. HP Laserjet 500 Plus; the Epson America, Inc. FX-80; the IBM Graphics Printer; and the partial HP plotter. Optional pop-in cartridges provide emulation of the HP GL 7470 plotter.

Features include 1.5M bytes of memory; 300 by 300 dot/in. resolution; 31 standard fonts, which operate in portrait and landscape mode; and full bit-map, mixed-test, graphics and raster- and vector-graphic capabilities.

The Laserimage 3000 printer is priced at $6,395.

Personal Computer Products, 11590 W. Bernardo Court, San Diego, Calif. 92127.

A high-speed data processing and color graphics printer, designed to produce invoices, reports, spreadsheets and other data-sensitive documents, has been introduced by **Brother International Corp.**

The **Brother M-4018** prints at 480 char./sec. in draft elite and 400 char./sec. in draft pica. Two parallel rows of nine pins each operate simultaneously to produce two columns of data.

For word processing, the M-4018 offers a speed of 100 char./sec. in double-pass and 67 char./sec. in triple-pass mode. Users can select type styles, fonts and other options from front-panel buttons. For color, users can attach the optional four-color ribbon.

Brother's *M-4018 printer*

The M-4018 offers Epson America, Inc. and IBM emulation and parallel and serial interfaces.

The M-4018 costs $1,695.

Brother, 8 Corporate Place, Piscataway, N.J. 08854.

A version of the **Microbuffer In-Line** stand-alone printer buffer, upgraded from 256K to 1M byte, has been introduced by **Practical Peripherals.**

The 1M-byte Microbuffer In-Line features a 38K bit/sec. data-transfer rate. Front-panel controls permit users to clear buffer memory, pause operations and reproduce the last document up to 255 times without computer intervention. The 1M-byte Microbuffer can also reportedly be used as a buffer for a modem or plotter.

The 1M-byte Microbuffer costs $199.

Practical Peripherals, 31245 La Baya Drive, Westlake Village, Calif. 91362.

A 24-wire dot matrix printer, available in both monochrome and color models, has been introduced by **Fujitsu America, Inc.**

In draft mode, the **DL5600** charts 486 char./sec. in 12 char./in. and 405 char./sec. in 10 char./in.

In report mode, the DL5600 is said to print at 324 char./sec. in 12 char./in. and 270 char./sec. in 10 char./in.

Letter-quality speeds are 162 char./sec. in 12 char./in. and 135 char./sec. in 10 char./in.

The DL5600 comes with an English LCD operator panel.

Fujitsu said the printer's noise level is 55 adjusted dB, with a mean time between failures of 8,000 hours.

Features of the printer include automatic change from continuous to cut-sheet paper and a tilted bidirectional tractor with rear-bottom feed. Forms are fed at 9 in./sec.

The DL5600 is priced at $2,195 for the monochrome version and $2395 for the color version.

Fujitsu, 3055 Orchard Drive, San Jose, Calif., 95134.

A 24-pin printer offering four print speeds has been introduced by **Okidata**, an Oki America Company.

The **Microline 393** offers a top speed of 450 char./sec. in high-speed draft mode, an 80 char./sec. near-letter-quality speed, a 120 char./sec. letter-quality mode and a 360 char./sec. utility mode.

Paper-handling features of the Microline 393 include automatic switching between continuous-form and cut-sheet paper, a hinged tear bar, support for up to four-part forms and the ability to feed paper from the bottom, rear or top of the machine.

Other standard features include serial and parallel interfaces and bit-image graphics resolutions up to 360 by 360 dot./in.

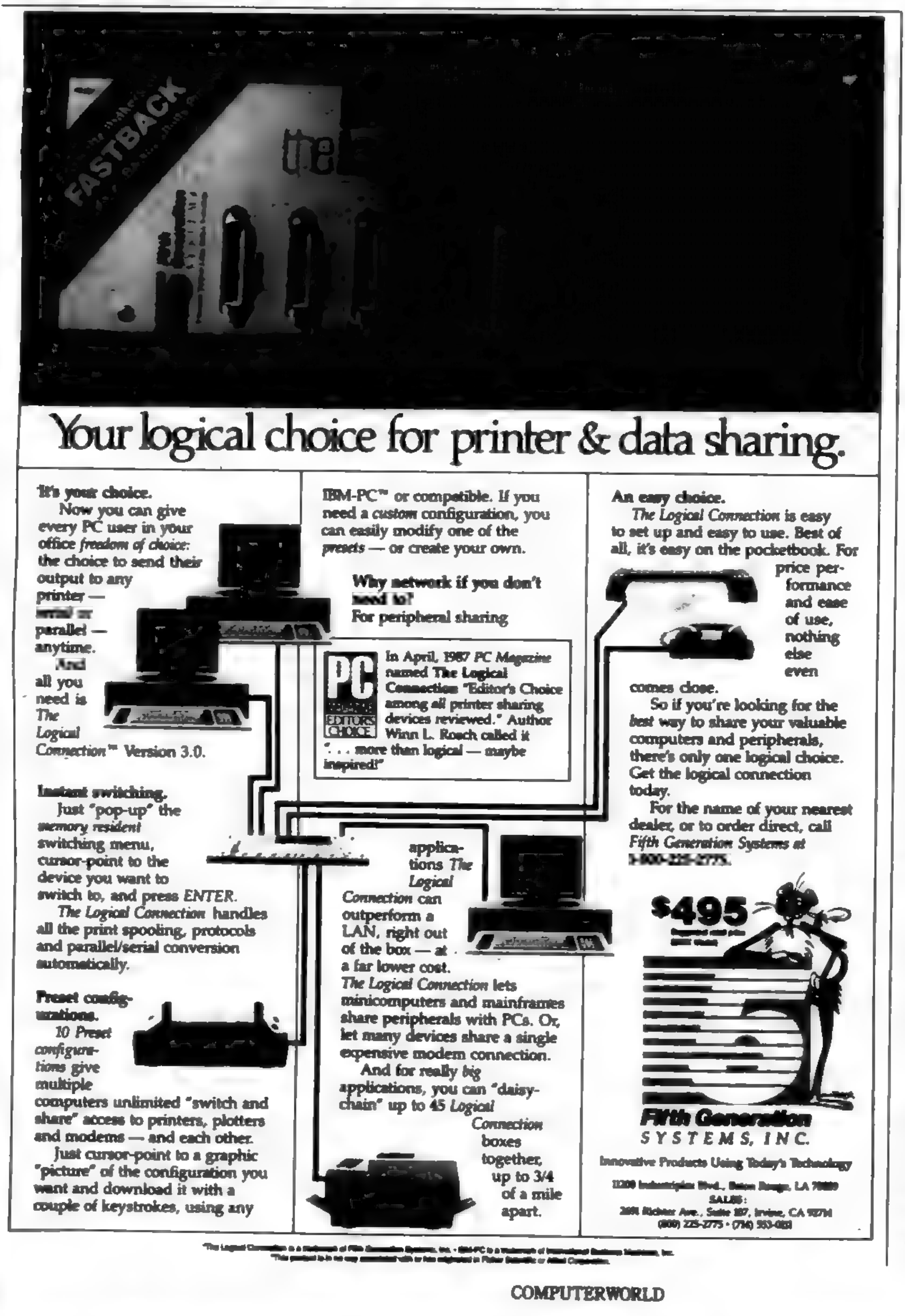
The Microline 393 costs $1,399 for the black-print model and $1,499 for the color model.

Okidata, 532 Fellowship Road, Mt. Laurel, N.J. 08054.

A 14-in. fine-dot-pitch IBM Personal System/2 Video Graphics Adapter (VGA)-compatible monitor has been announced by **Mitsubishi Electronics America, Inc.**

The **Model XC-1492C** features a 13V, 14-in. screen with a .28mm fine-dot-pitch CRT and horizontal scanning frequency of 31.5KHz.

Resolution is said to be up to



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PC EDITOR'S CHOICE
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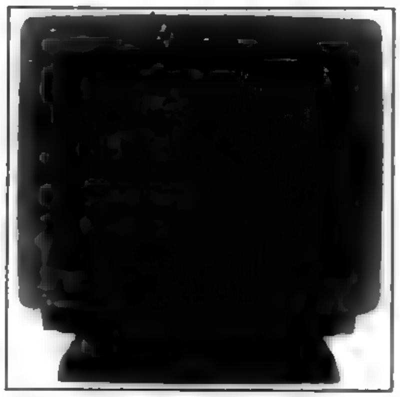
640 by 480 pixels with a vertical scanning frequency of 60 or 70Hz.

Other features include a red-green-blue analog video input signal, a precision in-line gun, a 120V, 60Hz power supply and an optional tilt-and-swivel base.



Mitsubishi's *Model XC-1492C*

The XC-1492C is priced at $685.

Mitsubishi, 991 Knox St., Torrance, Calif. 90502.

Board-level devices

A personal computer expansion card that is said to provide Datamaxx terminal emulations for Unisys Corp. mainframes has been announced by **Companion Products**, which is a division of Maxxima Corp.

The IBM Personal Computer-compatible **Termcard** contains a full Datamaxx EXT-1250 terminal emulation, including four display addresses plus a printer address, each of which makes for an independently configurable environment, the vendor said.

The product also features the capability to simultaneously communicate with two Unisys mainframes and compatibility with file-transfer software, according to the vendor.

Termcard costs $545.

Companion Products, P.O. Box 6477, 1815 S. Gadsden St., Tallahassee, Fla. 32301.

The **Multi Term Card**, a terminal-emulation board for the IBM Personal Computer and compatibles that is said to support full ASCII and ANSI terminal emulation as well as file transfer, has been announced by **Starsoft Technologies, Inc.**

The board allows users to perform bidirectional file transfer utilizing the Kermit and Xmodem protocols, according to the vendor.

Features are said to include dual-host communication in addition to split-screen functionality.

Software simulation packages available for the product include tools to emulate the Hewlett-Packard Co. 2392A and 2394, the Digital Equipment Corp. CT 52/100 and VT220 and the Wyse Technology, Inc. Wyse 50 in addition to the Televideo, Inc. 925 and 950.

The Multi Term Card is priced at $495.

Starsoft, 14884 Berry Way, San Jose, Calif. 95124.

An IBM 5251 emulation board, which was designed to connect IBM Personal System/2 Models 50 and 60 with IBM System/34, 36 and 38 minicomputers, has now been announced by **Ideassociates, Inc.**

The board, which is called the **Ideacomm 5251/MC**, offers terminal and printer emulation as well as windows with multiple sessions, according to the vendor.

It uses twinaxial cable to connect IBM Micro Channel-based personal computers to the minicomputer or to remote controllers.

The PCs have the ability to emulate IBM's 3180, 5251 Model 11, 5291 and 5292 Model 2 terminals and can be used with a color or monochrome monitor, the vendor said.

Features reportedly include support for 132-col. display and up to four concurrent host sessions in addition to printer emulation of IBM's 5224, 5225, 5226 and 5219.

The Ideacomm 5251/MC emulation board and software is priced at $895.

Ideassociates, 29 Dunham Road, Billerica, Mass. 01821.

A device said to add four expansion slots to an IBM Personal Computer has been announced by **Merak Industries**.

The **Addcard** makes available a total of eight slots inside the system unit.

Expansion cards that are connected to the Addcard have the ability to operate as a direct extension of the PC bus, according to the vendor.

The Addcard is priced at $79.

Merak, 8704 Edna St., Warren, Mich. 48093.

The **386Eagle**, an upgrade board for IBM Personal Computer ATs and compatibles, has been announced by **Applications Engineering and Associates, Inc.**

The 386Eagle allows full Intel Corp. 80386 software capabilities, according to the vendor.

The product features an 80386 CPU running at 16 MHz, an Intel 80384 clocking chip for timing control and 512K bytes of memory in addition to an 80-pin connector for an additional 2M bytes of expansion memory.

When installed, the board sidesaddles the disk controller instead of occupying a PC slot.

The 386Eagle costs $1,695.

Applications Engineering, Suite 227, 3420 E. Shea Blvd., Phoenix, Ariz. 85028.

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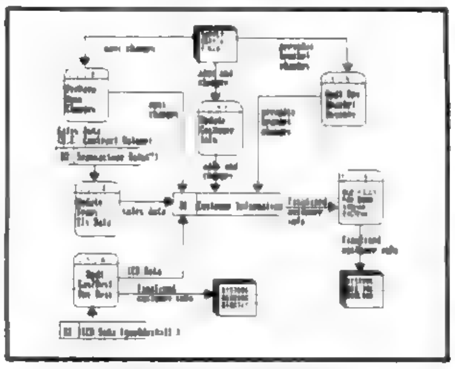

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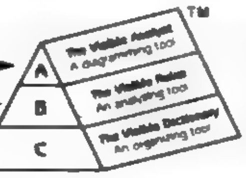

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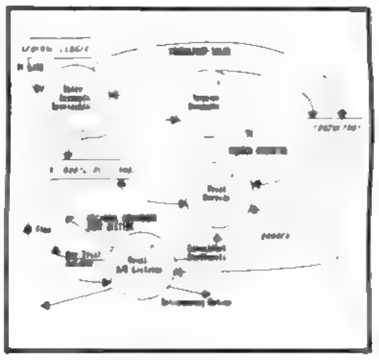

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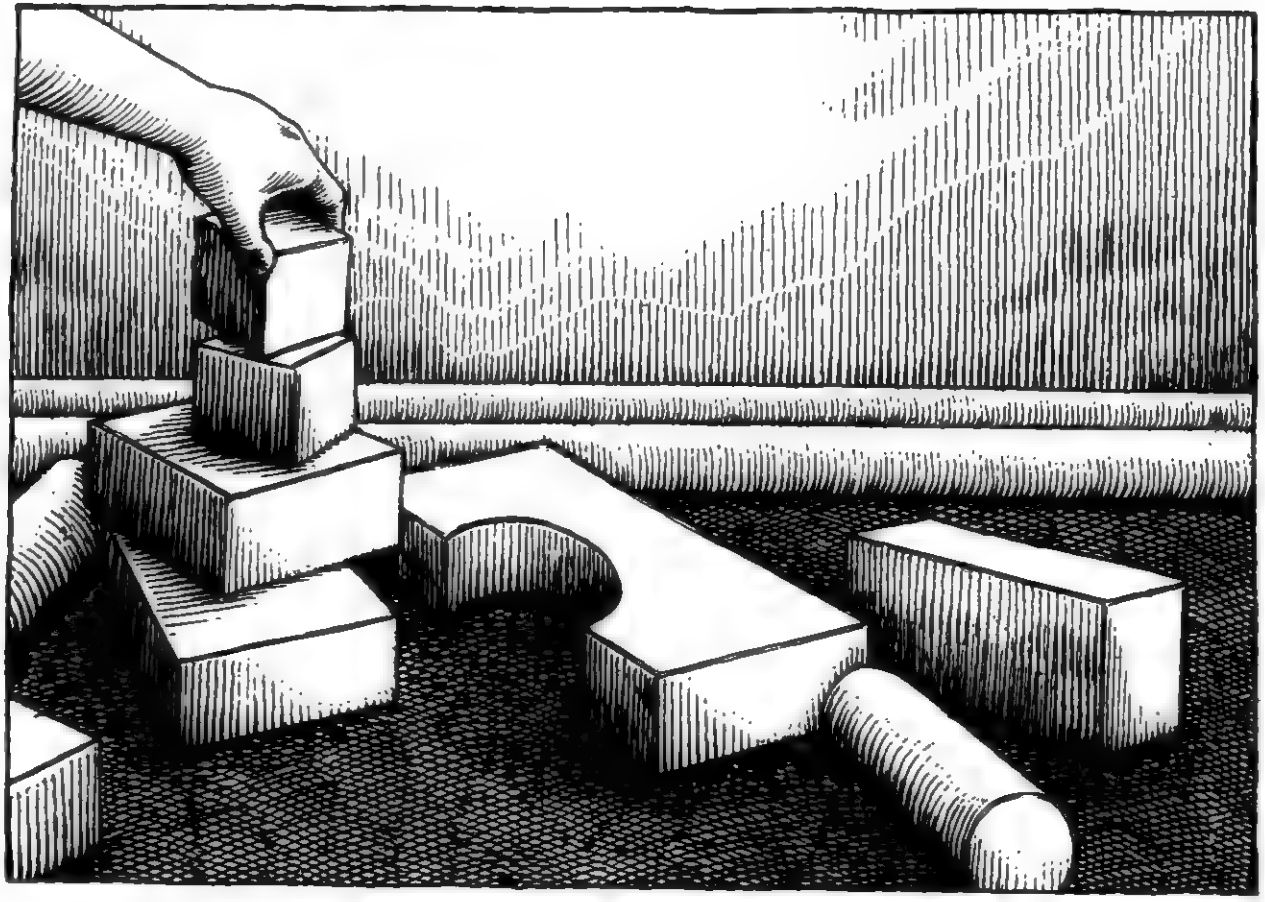

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NETWORKING

DATA
STREAM
Patricia Keefe

3Com, Bridge wedding set

Going to the Chapel. 3Com Corp., along with its intended, Bridge Communications, Inc., has moved quickly to avert any possibility of another humiliation at the altar. 3Com secured government approval to complete the proposed merger by the end of this month. The Securities and Exchange Commission has OK'd 3Com's registration statement covering the proposed issuance of 3Com common stock to Bridge shareholders under the merger. Both companies are seeking shareholder approval today. If all goes well, then maybe we can toss all the rice we've been saving for the occasion.

SAA what? If you're not exactly dying to hear the latest on IBM's Systems Application Architecture (SAA), you're not alone. "In most users minds, it's so big and complex that they don't know what it all means. In some cases, they are afraid to find out," says Thomas White, president of Infonetics, Inc. White noted that SAA is so far down the road and most users have more pressing matters to attend to. However, he says he's seeing a lot of interest in IBM's OS/2 Extended Edition. Although AT&T has promised to provide SAA-like capabilities, competitors don't need to offer complete SAA clones. SAA is the result of some unique problems faced by IBM in linking up its many disparate computer families, and not all vendors face the same issues.

Guessing games. Wouldn't it be interesting if Novell, Inc. decided it had to license OS/2 from Microsoft Corp. in order to provide OS/2 support on the server? This might be the case, unless Novell can figure it out on its own. Sources tell us that IBM is working with Novell to get around the lack of interrupts in OS/2 that aided Novell in supporting Microsoft's MS-DOS. Attendees at Novell's second annual Networld show, Oct. 20-22 in the Dallas Infomart, might glean more details

Continued on page 51

Wang takes Ethernet plunge

VS host links are first step on road to improved multivendor networking

BY ELISABETH HORWITT
CW STAFF

LOWELL, Mass. — Responding to user demand for multivendor connectivity, Wang Laboratories, Inc. last week announced an IEEE 802.3 Ethernet product platform that will eventually allow Wang VS hosts to communicate with a wide variety of systems.

The initial release only allows the VS to communicate with other VS systems through existing Wang Systems Networking (WSN) software. However, "this is only 'he first phase," said Kay Fairweather, Wang's manager of communications product marketing.

The next step for Wang will be to implement IBM Netbios-compatible software on the VS, turning it into an application, peripheral and file server for IBM Personal Computers on Ethernet, she said.

The next round of products, which Wang said it plans to announce sometime in 1988, will provide connections between the VS and other vendors' systems through the Transmission Control Protocol/Internet Protocol. Wang said it would eventually provide multivendor communications through the ISO Open Systems Interconnect standard but declined to say when.

Wangnet for all

Before the announcement, Wang allowed other vendors' products to communicate using 802.3 protocols on up to five subchannels of the broadband Wangnet local-area network (LAN), according to Robert Koch, Wang marketing manager for communications systems. "But you couldn't put any Wang systems on the 802.3 channels. Now you can put the entire VS family on Ethernet."

Wang's decision to implement 802.3 on the VS acknowledges growing support for 802.3 as an industry standard as well as user demand for cost-efficient connectivity between VS systems and other vendors' computers, Koch said.

A VS host equipped with Wang's 802.3 products can communicate over the Wangnet broadband network using 802.3 protocols. It also can communicate over an 802.3-compatible twisted-pair network via Wang subsidiary Intecom, Inc.'s IBX-Lanmark facility, Wang said.

Wang's Ethernet hardware for the VS consists of the VS 802.3 LAN Controller, the VS 9-2/3 10M bit/sec. LAN Interface

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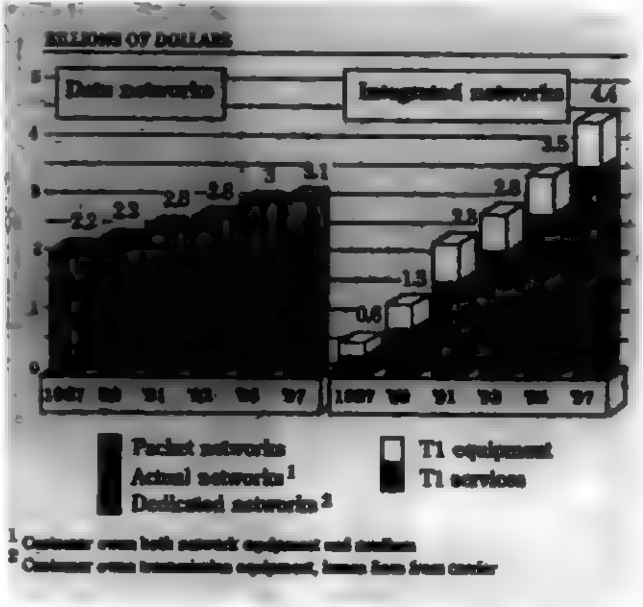
Data View

Projected growth in private network installations
Integrated T1 links are on the rise



INFORMATION PROVIDED BY INTERNATIONAL RESOURCE DEVELOPMENT, INC.
CW CHART

3Com hopes beefed-up force reins in Novell

BY PATRICIA KEEFE
CW STAFF

With shareholders voting today on its pending merger with Bridge Communications, Inc. in Mountain View, Calif., 3Com Corp. is undoubtedly anxious to cement that relationship before Novell's runaway growth gets too far out in front.

Although 3Com President Bill Krause has been fond of predicting that the combined Bridge-3Com entity — boasting total sales of $185 million — will become one of the largest networking companies in the U.S., Novell's growth has been explosive following almost two years of acquisitions.

Novell was so hot that in *Business Week*'s annual look at the year's top 100 hot growth companies, based on results from the previous 12 months, it came in second, with a 361.3% increase in sales and a 49.2% return on capital. Conversely, 3Com placed 83rd, with a 69% increase in profits and a 16.3% return on capital.

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Inside

- 3Com's Etherlink/MC connects PS/2s, Ethernet networks. Page 50.
- AMD chip set incorporates FDDI standard. Page 51.
- AT&T adds four units to Dataphone II modem line. Page 55.

Banyan uses 80386 engine to fire up file server

BY PATRICIA KEEFE
CW STAFF

WESTBORO, Mass. — Banyan Systems, Inc. last week announced plans to introduce in April, 1988 an Intel Corp. 80386-based file server and a 386 upgrade to its Motorola, Inc. 68000-based server.

Both products will run Banyan's distributed network operating system, Vines, and will support IBM's Micro Channel bus architecture, the vendor said. The high-end file server announcement will be followed by the next release of Vines, which is still on schedule, a spokeswoman said.

The Banyan/Corporate Network Server (CNS) is a pedestal-style server that reportedly will provide up to 24M bytes of memory with up to 32K bytes of memory cache for enhanced performance.

The upgrade package, called the BNS/386, will provide Banyan's 68000-based BNS server with the same 386 technology as the CNS server, Banyan said.

"Customers who purchase the BNS upgrade kit will be getting the same features, functionality and performance — at a comparable price — as customers who purchase a new [386-based CNS server]," Banyan President Dick Meise said.

Both products will feature a triple-bus architecture, including an IBM Personal Computer AT-compatible bus, a high-speed memory bus and a small computer systems interface peripheral bus.

Network support

The AT bus will support network adapter boards for any four of the many popular networks supported by Vines, including IBM's Token-Ring, Proteon, Inc.'s Pronet, 3Com Corp. and Micom-Interlan, Inc.'s Ethernet, Nestar Systems, Inc.'s Arcnet and others. Other features include support for a full 32-bit memory bus, file caching and an optional 32K bytes of high-speed, two-set associative memory cache.

The CNS will offer up to 1.2G bytes of internal storage and is equipped with a 150M-byte tape backup unit. The BNS/386 upgrade will support up to 628M bytes of internal storage. The BNS currently utilizes a 60M-byte tape unit but can be factory upgraded to support a 150M-byte tape drive, Banyan said. An additional 1.3G bytes of external storage will be available through

Continued on page 53

3Com adapter card links PS/2s, nets

Etherlink/MC lowers cost of connection to Ethernet

BY PATRICIA KEEFE
CW STAFF

SANTA CLARA, Calif. — 3Com Corp. recently announced Etherlink/MC, an adapter card that it said connects IBM Micro Channel-based Personal System/2 computers to Ethernet networks.

Etherlink/MC reportedly features an on-board Ethernet transceiver and 3Com's Link Level Library capability. The transceiver lowers the cost of the connection by $200 to $300 and is more reliable and easier to install than adapters requiring an external transceiver and transceiver drop cable, 3Com spokesmen claimed.

The new adapter card also uses the Link Level Library, which is a well-defined software interface common to all 3Com adapters that make it easier for third-party software developers to port their products to Etherlink/MC.

The Micro Channel-compatible adapter, which is slated to ship in October for $595, reportedly allows all versions of 3Com's 3+ software to run on PS/2 machines in a 10M bit/sec. Ethernet environment. With the IBM Token-Ring adapter, 3+ can also run on PS/2 computers in a 4M bit/sec. Token-Ring environment, 3Com said.

Etherlink/MC is able to drive twice the cable segment distances of the IEEE 802.3 specification, reducing the need for repeaters in large Ethernet installations, 3Com said. It is also compatible with 3Com's recently announced products that allow direct connection of Ethernet networks to installed telephone wiring.

To improve system performance, Etherlink/MC uses a 16K-byte packet buffer and a shared-memory architecture. The buffer allows reception of back-to-back Ethernet packets, which reduces network traffic and retransmission of dropped packets, 3Com said. The shared memory increases the speed at which data is transferred from the network to the PS/2 system's memory.

Token-Ring goes to twisted pair

In a separate announcement, 3Com introduced a Type 3 Modular Access Unit (MAU) said to enable plug-in installation of a 4M bit/sec. Token-Ring network on unshielded twisted-pair wiring.

Using four RJ11 ports, the unit eliminates the need for jumper cables or other adaptions necessary to tie a Token-Ring network to the data-grade telephone wire (Type 3), 3Com said. Both IBM and 3Com Token-Ring adapters are supported. Individual units measure 5 by 3 by 6 in.

Four MAU units, providing 16 RJ11 connections, can be rack-mounted into a wiring closet. Network support for as many as 72 workstations is possible by daisy chaining the MAUs, according to 3Com.

The Type 3 MAU is available now for $395. A Type 3 power supply, required for each group of five units, costs $75.

Codex reveals net management strategy

BY PATRICIA KEEFE
CW STAFF

CANTON, Mass. — Officials at Codex Corp. recently took advantage of the firm's 9800 Series network management announcement to unveil a two-pronged strategy designed to take the company through the 1990s.

First, Codex said it will offer its customers a complete set of networking elements that embody state-of-the-art technologies.

"To that end, we are expanding on our product line to develop the broadest integrated line of communications products," Codex President John Lockitt said.

"We plan to become an industry leader in the digital marketplace, [offering] a complete family of digital, transmission, switching and concentration products," he added.

Example cited

Lockitt cited the Codex 6290 Integrated Digital Exchange, which was introdued earlier this year, as an example of this commitment.

The second leg of Codex's long-term strategy involves offering customers powerful integrated network management options that will give corporations both strategic and tactical control of the network.

"For years, our customers have been telling us that they want to control this strategic asset themselves," Lockitt explained.

In addition, Codex said that future releases — beyond 1988 — of the Codex 9800 Series will allow operator consoles to be networked together as well as allow for multiple management sites through the use of a peer-to-peer communications facility.

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Wedding set

CONTINUED FROM PAGE 49

by attending a panel discussion on OS/2 and communications to be held on Wednesday, Oct. 21. Panel members will include representatives from Novell, IBM and Microsoft.

Key network support. Codex Corp.'s network management announcement two weeks ago highlighted two trends — a move among vendors currently embracing Transmission Control Protocol/Internet Protocol toward the ISO Open System Interconnect (OSI) model; and secondary support for IBM's Netview, much as any other third-party network management product will be supported.

Describing de facto standards as ultimately limiting, Codex said it will nonetheless provide support for IBM's Netview via its 4800 network management system later this year and through its 9800 Series "in the near future." Realizing that Netview and IBM's Netview/PC will be used by customers in IBM Systems Network Architecture environments, Codex said it plans to provide Netview/PC support by the second quarter of 1988, according to Jeremy Frank, program director for the Gartner Group, Inc.'s Enterprise Network Strategies in Stamford, Conn.

"Most of the customers we've talked to are not convinced that Netview will deliver the functionality for real-time network management and control until the 1990s, and they are looking for a system that will coexist next to their Netview console," Frank said. Codex's assumption that the 9800 Series will support other vendors' equipment because those vendors will support the ISO's OSI model has merit.

Anyone taking notes? As activity heats up in the network management arena and the vaporware announcements begin to pile up, vendors hard at work piecing together their strategy might want to take note of the following comments. Overheard from a frustrated user at a recent trade show: "You shouldn't have to have a Ph.D. on your staff to manage a network." And from a user forum on networking: "Most vendors today do a lousy to mediocre job at network management."

Gates speaks. Microsoft Corp. Chairman Bill Gates stopped off from his marathon publicity campaign to keynote PC Expo last month. Kernels gleaned from Gates' hour-long talk included a prediction that OS/2 will, of course, play a central role in many corporations' networking strategies. The typical networking system will run OS/2, no doubt with the LAN Manager, multiple Intel Corp. 80386 chips and be capable of supporting hundreds of micro systems, he said.

Keefe is a Computerworld *senior editor, networking.*

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AMD promotes LAN standard

SUNNYVALE, Calif. — Hoping to pave the way for widespread implementation of local-area networks (LAN) based on ANSI's Fiber Distributed Data Interface (FDDI) standard, Advanced Micro Devices, Inc. (AMD) is expected to introduce today what it claimed is the first chip set to incorporate the new standard.

FDDI uses fiber-optic media to reportedly outperform Ethernet and other LANs by a wide margin.

AMD said it had squeezed the complete capabilities of a six-board FDDI node into the five-chip Supernet set, resulting in a cost reduction of approximately 80%. According to AMD, this cost reduction makes FDDI commercially viable for the first time.

Networks based on FDDI are said to operate at 100M bit/sec. — 10 times the rate of IEEE 802.3-standard Ethernet. The fiber-optic cabling reportedly supports a maximum LAN circumference of 100 km — approximately 35 times that of Ethernet.

Not a replacement

But because of Ethernet's large base and relatively low cost, AMD said it does not expect FDDI to displace Ethernet in the near future.

"The thing that will initially keep FDDI from killing [Ethernet] is the cost of the optical data links," said Tom Slykhouse, strategic development manager for high-speed networking. "That's a significant part of the node cost."

Currently, an FDDI implementation would cost roughly five to 10 times that of a comparable Ethernet implementation, Slykhouse said.

Other benefits of FDDI include a form of fault tolerance and a timed-token protocol that guarantees network access within a specified time, AMD said.

FDDI can be implemented with two counter-rotating rings, doubling data throughput to 200M bit/sec. while having the ability to automatically reconfigure to one good ring in the event of a failure.

The Supernet chip set consists of a random-accesss memory buffer controller, a data path controller, a fiber-optic ring media-access controller, a receiver and a transmitter. AMD said it will make the chip set available in volume by the first half of 1988. In quantities of 100, the price is $625.

BIT BLAST

Harris division opens system to support token ring

Joining the recent rush to introduce token-ring products, the Dallas-based **Data Communications Division** of **Harris Corp.** opened up its proprietary 9300 network communications system to provide support for the token ring.

Harris unveiled a token-ring adapter card and enhancements to its Harrisnet network operating system designed to enable users to use the token ring as a backbone network linking multiple 9300s.

The 9300 token-ring network adapter is said to be IEEE 802.5-compatible, to transfer data at 4M bit/sec. and cost $1,295. It is scheduled to ship next month.

Communications between 9300 and non-9300 devices are not supported. Future releases will provide connectivity between personal comptuers and the 9300 using the token-ring architecture, according to the vendor.

The Association for the Advancement of Communications Technology will hold an open membership meeting on Wed., Sept. 30, from 6:30 to 9:30 p.m. at the State University of New York College of Technology at Farmingdale in the Roosevelt Hall Loft Lounge.

The campus is located off Rt. 110 on Melville Road. There will be a $5 fee to cover the cost of refreshments. The meeting is sponsored by Northern Telecom, Inc. and will focus on that vendor's SL-1, SL-1 Meridian and DVI product lines.

Digital Equipment Corp. VAX/VMS and MicroVMS systems will be able to communicate over **Proteon, Inc.** networks using Transmission Control Protocol/Internet Protocol (TCP/IP), the Westboro, Mass.-based local-area network (LAN) vendor recently announced.

Through a reseller agreement, Proteon will install the Wollongong Group, Inc.'s WIN/TCP software on its VAX and Microvax controllers for the 10M bit/sec. Pronet-10 and 80M bit/sec. Pronet-80 token-ring LANs.

Proteon already offers TCP/IP on network interfaces for IBM VM/CMS systems and Personal Computers; VAX systems running Unix; Sun Microsystems, Inc. workstations; and the Proteon Terminal Interface Unit.

IBM Personal System/2s on an Ungermann-Bass, Inc. Ethernet network will be able to access DEC hosts via micro-to-mainframe software from **Datability Software Systems, Inc.** Based in New York, Datability has ported its Remote Access Facility (RAF) to Ungermann-Bass's NIC PS/2.

Datability's RAF is said to allow microcomputers to emulate DEC VT100 and VT220 terminals and to execute programs and access files on DEC hosts. The program is priced at $395 per PS/2 or host user.

Apollo Computer, Inc. in Chelmsford, Mass., and **Ridge Computers** in Santa Clara, Calif., announced that they will jointly develop and market products that integrate Apollo workstations and Ridge reduced instruction set computing-based superminicomputers via Apollo's Network Computing System (NCS).

NCS allows applications to be distributed across multiple computing resources.

Dialcom, Inc. in Rockville, Md., and **DEC** have agreed to jointly test interoperability of their CCITT X.400 products. If the tests are successful, DEC systems running X.400-compatible All-In-1 software will be able to exchange mail with Dialcom's X.400-compliant electronic messaging service, the companies said.

In a separate announcement, **Southern New England Telecommunications** recently claimed to be the first local telephone company to offer statewide local access to Dialcom's electronic mail and information services. The independent phone company, based in Connecticut, will provide access to Dialcom services via its packet-switched offering, Connnet.

DEC and **Pacific Bell** recently announced that they have signed a contract for joint development of a CCITT X.400 internal messaging system, linking Pacific Bell's internal mail systems to DEC's Mailbus electronic messaging system. Pacific Bell's message handling system will be compliant with the X.400 series of protocols that support the ISO's Open Systems Interconnect model. The telephone company says it plans to use Mailbus to link its system to those of various vendors.

Users of two network operating systems from **Corvus Systems, Inc.** in San Jose, Calif. — Constellation and the distributed PC-NOS — can now connect those two systems using The Constellation-PC-NOS Connection from Corvus. The package reportedly enables the two operating systems to run in combination on Corvus's Omninet network. This provides users of Omnidrive servers with an upgrade path to PC-NOS file-service capabilities, as well as connectivity to Microsoft Corp.'s MS-DOS, and Apple Computer, Inc.'s Macintosh, Apple II and Laserwriter environments, Corvus said. It also provides a method for MS-DOS users on PC-NOS networks to add Apple II or Macintosh computers to their networks.

The Constellation-PC-NOS Connection is licensed for an entire Omninet network of 64 users and costs $50. For a limited time, Coruvs said it will offer the connection software free when ordered with PC-NOS.

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At 56Kb, RabbitGATE™ is the fastest 3270 and RJE remote host connection for NETBIOS LANs around. Which, in itself, is something you may not require. But isn't it nice to know you'll be able to run that fast when your needs change? And more important, it's good to know RabbitGATE outperforms the competition no matter how fast—or slow—you drive it, in either BSC or SNA.

For starters, RabbitGATE has its own onboard dedicated 80186 processor and 512k of RAM. Which is why its high speed is not limited by the PC. It also means the only gateway function required on the PC is for actual access to the LAN. So when compared to other gateway products, which downgrade your workstation into a dedicated controller, RabbitGATE can save up to 50% of your workstation's processor and RAM.

You'll also find RabbitGATE easy to use. Installation and configuration takes less than 30 minutes. As opposed to hours for the competition. In fact, initial installation and start-up is so easy, most people don't ever open the user guide.

And speaking of users, RabbitGATE allows any end-user to individually customize the keyboard—doing so simply, without technical support. Then, only one DOS command is used to run the product. And, by the way, help for first-time or infrequent

3Com, Novell

FROM PAGE 49

Novell also managed to place within the top five in two of six performance categories highlighted by *Businessweek*: sales growth (fifth, at a 180% average annual rate) and market value (fifth, at $517 million).

Moreover, in the last four quarters, Novell has kept up the pace, with growth far outstripping Santa Clara, Calif.-based 3Com. A number of analysts attribute this to Novell's Netware network operating system becoming increasingly entrenched as the de facto standard.

Douglas Whitman, a senior analyst with Alex Brown & Sons, Inc. in San Francisco, estimated that Novell's revenue is 50% software vs. 10% for 3Com. Moreover, a recent study of the Fortune 1,000 by Forrester Research, Inc. in Cambridge, Mass., revealed that 50% out of a sample of 40 Fortune 1,000 users used Netware vs. 10% for both 3Com's 3+ network software and Banyan Systems, Inc.'s Vines (see chart page 49). Whitman estimated that Netware is outselling 3+ six to one.

Even in the server market, Forrester's sampler found Novell with 33% of the users and 3Com with a mere 3%, trailing Banyan, Houston-based Compaq Computer Corp.'s Deskpro 386 and generic minicomputers used as departmental file servers.

Recent growth spurt

Novell has grown 49.8% from October 1986 to July 1987, according to Whitman. Novell's earnings per share were 16 cents in October 1986, jumping to 20 cents in its most recent quarterly results, a 25% growth rate. Meanwhile, 3Com paid out 20 cents in October 1986 and 22 cents in its last quarter.

Whitman broke down 3Com's quarterly revenue as follows: $28.3 million in November 1986, not including graphics and diskless PCs; $30.4 million in February; $31.6 million in May; and $33 million in August. "In three quarters, 3Com has grown 16%," he said. Novell, meanwhile, posted revenue of $32.5 million in October 1986, $34.5 million in January, $42.4 million in April and $48.7 million in July.

Because 3Com and Novell, once arch rivals, are diversifying so much, it is becoming harder to compare apples to apples when looking at the two companies.

Even though Novell has snapped up a number of companies, including micro-to-mainframe vendor CXI, Inc., data base software vendor Softcraft, Inc. in Austin, Texas, and hardware manufacturer Santa Clara Systems, Inc., the basis of its business remains the Netware operating system, followed by CXI, Whitman said.

Revenue booster

"Netware has increased its percent of overall revenue in the last quarter, but Novell grew their revenue $6.3 million while 3Com expects to grow only $1.4 million. 3Com's revenue on a sequential basis grew 4.7%," Whitman said.

However, Whitman said 3Com is doing well. He agreed the Bridge merger may significantly boost 3Com's fortunes, because Bridge's management team will add a lot of dimension to 3Com, as will the ability to sell through direct sales.

"Bridge's products give 3Com the necessary edge to sell to large corporations," said Eric Killorin, publisher of Andover, Mass.-based Hyatt Research Corp.'s "Netline" newsletter.

How helpful direct sales will be depends on whether 3Com can devise a program that will keep its traditional distribution channel dealers and value-added resellers happy. "I think a lot of dealers are concerned that Bridge's direct sales force will be gunning for them now," Whitman said. However, Bridge may beef up dealer sales by pumping some of its equipment through that channel.

"3Com has been hurt by not selling its driver and board to Novell. I wouldn't be surprised to see that change," Whitman predicted. He added that he believes 3Com's recent decision to sell fault-tolerance products will be a big plus.

Banyan

FROM PAGE 49

use of Banyan's BNX expansion chassis.

Both products provide seven bus slots, which can be used for memory, network adapter cards or communications boards. Up to 30 serial ports are available and can support CCITT X.25, IBM's Systems Network Architecture, High-Level Data Link Control, bisynchronous or asynchronous communications. Also, up to four serial and three parallel printers can be connected directly to the servers.

The CNS base configuration will include 4M bytes of memory, 80M bytes of storage, a 150M-byte tape drive, an internal battery backup, Vines, software to support one network and documentation. List price will be $21,995.

The base upgrade kit includes a 386-based CPU board, 4M bytes of memory, a backplane, upgrade software tape and documentation. Banyan said it will be priced at $6,125.

Wang

FROM PAGE 49

and VS 802.3 Cable Kits. Wang offers "soup-to-nuts" installation and maintenance of an 802.3 LAN, according to Koch.

The controller is priced at $2,500, the interface at $1,500 and the kits from $100 to $300.

The 802.3 software consists of WSN VS Netcore Release 8.31 and VS WSN 802.3 Transport. The WSN software can communicate with other WSN systems via other network transport protocols, including CCITT X.25 and X.21 and WSN point-to-point. The 802.3 Transport software implements OSI layers 1 to 3 and costs $750.

But speed isn't everything.

users is always just a single keystroke away.

As if saving you time and memory wasn't enough, RabbitGATE also saves you money. It's priced competitively, yet offers unique features like a built-in windowing capability, 8 host sessions per workstation, and true concurrent operation of all active sessions. It even allows you to simultaneously talk to different hosts with different protocols from anywhere on the LAN.

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NEW PRODUCTS

Local-area network hardware

A local intelligent network controller called **CY233-Linc** has been introduced by **Cybernetic Micro Systems, Inc.**

The controller is said to offer data-transfer rates of up to 38.4K bit/sec. It is a 40-pin, 5V CMOS device that interfaces serial communications to parallel TTL circuits. By using up to 255 CY233 devices, one computer can control or monitor 2,048 TTL signal lines.

Features include support for a token-passing protocol.

The CY233-Linc has a single-quantity price of $75.

Cybernetic, P.O. Box 3000, San Gregorio, Calif. 94074.

Teltone Corp. has added **Tellan/PC** to its Tellan data-over-voice local-area network (LAN).

Tellan incorporates data switching and personal computer LAN functions into modular units that transmit simultaneous voice and data on existing telephone lines. Intelligent network interface units interconnect terminals, PCs, minicomputers and mainframes.

Tellan/PC is a plug-in card that fits into an expansion slot and provides full PC LAN functionality, including PC-to-PC file transfers and access to file servers. Users can run Netbios-compatible PC network operating systems.

The Tellan network costs about $324 per port. The Tellan/PC card costs $595.

Teltone, 10801 120th Ave. N.E., Kirkland, Wash. 98033.

Customer-premise equipment

A personal computer-based voice mail system designed for use in offices with up to 75 people has been announced by **Votan**.

Called the **Telecenter Entry System**, the two-port, four-hour messaging system features the vendor's voice-recognition technology, which enables users to control the system with either voice commands or Touch-Tone signals.

The Entry System acts as a centralized message center, recording, playing back and distributing personalized messages for all callers. It can function as a standalone or as part of a private branch exchange.

The system consists of a dedicated personal computer, two Votan voice cards and software. Voice storage is provided by a 20M-byte hard disk drive. It costs $7,950.

Votan, 4487 Technology Drive, Fremont, Calif. 94538.

A control system called **Controlnet 250** has been announced by **Data Switch Corp.** for use with its DSM series of distributed data communications matrix switches.

The system is said to allow up to 37 gateways, each of which can support a user terminal, an audit-trail printer or up to eight switching systems. It utilizes an Intel Corp. 80386-based multibus architecture with 2M bytes of random-access memory, a 40M-byte hard disk, a 360K-byte floppy and a 60M-byte streaming cartridge tape.

According to the vendor, the product provides multiple levels of password security.

Controlnet is available in four models that support from five to 37 gateway ports. Prices range from $10,000 to $42,000.

Data Switch, One Enterprise Drive, Shelton, Conn. 06484.

Links

A memory-resident communications environment for IBM Personal Computers and compatibles has been announced by **Architectural Communications, Inc.**

The software, called **Hotkey**, allows users of a word processor, spreadsheet or data base applications to switch into Hotkey with a keystroke and establish a remote connection to a minicomputer, modem or data private branch exchange. When the user returns to the foreground application, Hotkey operates in the background, rerouting data.

Hotkey offers five protocols for file transfer, including ASCII, Xmodem/Checksum, Xmodem/CRC, Tmodem/Checksum and Ymodem/CRC.

Hotkey is priced at $69.

Architectural Communications, 1800 W. Park Drive, Westboro, Mass. 01581.

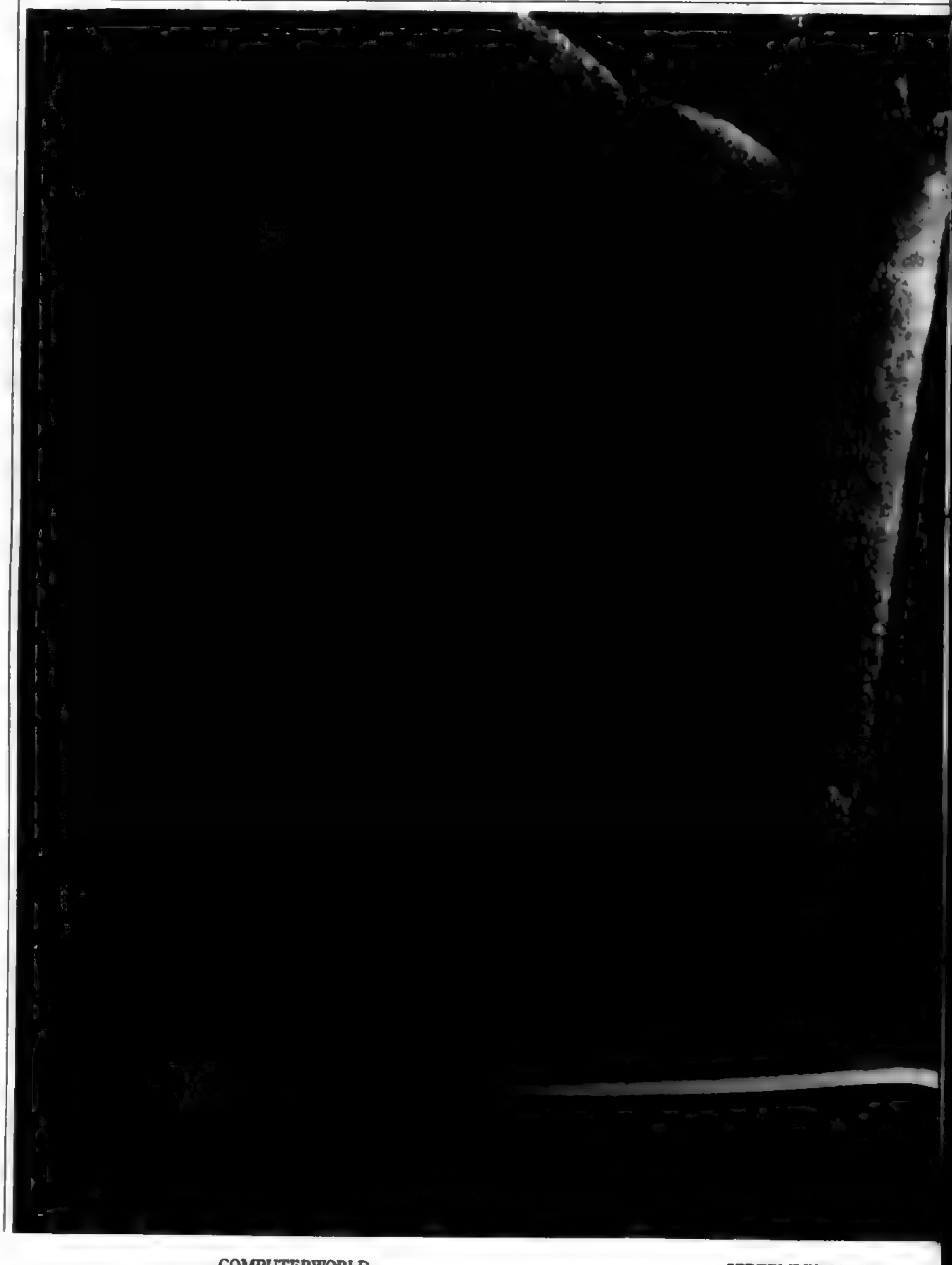
A menu-driven system said to provide IBM Systems Network Architecture (SNA) 3270 terminals with access to X.25 networks and ASCII hosts has been announced by **Simware, Inc.**

Sim/Dialout suports direct communications from SNA networks to external on-line information services. It is a VTAM application program that allows users to capture in an MVS data set all or part of the information displayed in an external application. Users may also store outgoing information in an OS data set before connecting.

Sim/Dialout is priced at $10,000.

Simware, 20 Colonnade Road, Ottawa, Ontario, Canada K2E 7M6.

Outbound, a software link designed for IBM MVS users needing to transfer files to unattended personal computers, has



been announced by **Firesign Computer Co.**

Outbound sends commands over an IBM Systems Network Architecture (SNA) network to a microcomputer with a standard IBM 3270 emulation card. PC-resident Outbound software decodes the command and reads or writes the specified file. A perpetual license for one MVS host and an unlimited number of PCs costs $24,000.

Firesign, 480 Green St., San Francisco, Calif. 94133.

Protocol converters

A bidirectional converter designed to change RS-232 data streams into RS-422-compatible data streams has been introduced by **Anaheim Automation.**

The **Model AA1709** uses a female DB255 connector for the RS-232 interface and a female DB-9S connector for the RS-422 interface.

It supports the Request to Send and Clear to Send handshake lines and uses balanced differential signals that permit communications on cable lengths to 4,000 ft..

The converter is priced at $89 in quantities of one to three.

Anaheim Automation, 910 E. Orangefair Lane, Anaheim, Calif. 92801.

File servers

Two fault-tolerant file servers have been announced by **Pajac Systems, Inc.**

The **Faultnot 286** and the **Faultnot 386** are part of Pajacs' family of Supersonic local-area network hardware products, designed, the vendor said, so that no single fault can result in a total network outage. Each Faultnot processor is linked together on a 16M bit/sec. bus, and up to 33 Faultnot systems can be interconnected.

The Faultnot 286 and 386 cost $25,000 and $35,000, respectively.

Pajac, 1 Militia Drive, Lexington, Mass. 02173.

A network file server designed for use with NEC 1500 Advanced Workstations in an Ethernet environment has been announced by **NEC Information Systems, Inc.**

The server, called the **NEC 1900**, uses the Ethernet local-area network to allow workstations to share mass-disk storage and peripheral devices. Based on the Motorola, Inc. MC68020, standard features include a 32-bit system bus, 4M bytes of main memory, a paged memory management unit and a floating-point math coprocessor.

Other features include a magentic tape cabinet, a 9-in. 395M-byte Winchester disk drive, three RS-232C serial ports and a 1.2M-byte 5¼-in. floppy disk drive.

The NEC 1900 Network File Server is priced from $54,000.

NEC Information Systems, 1414 Massachusetts Ave., Boxboro, Mass. 01719.

Modems/Multiplexors

AT&T has added four units to its **Dataphone II** modem line.

The Dataphone II 2192A model, capable of full-duplex synchronous data transmission over private line channels at up to 19.2K bit/sec., includes an integrated, six-port time-division multiplexer for testing any one of its ports without affecting service on the other five.

The Dataphone II 2296A, designed to transmit large volumes of information at one time, operates in full-duplex, synchronous or asynchronous mode over standard telephone lines at 4.8K bit/sec. and 9.6K bit/sec.

Both the stand-alone 2224CEO and the rack-mountable 2224G modems provide full-duplex communications over switched networks. Both units operate synchronously at 300, 1,200 and 2,400 bit/sec. and asynchronously at 2,400 bit/sec.

The 2192A costs $9,500. The 2296A costs from $2,500 to $3,100, while the 2224CEO is priced at $695. The price of the 2224G is $650.

AT&T, 100 Southgate Pkwy., Morristown, N.J. 07920.

An automatic dialer designed for use with IBM 3270-type terminal systems has been introduced by **Tuck Electronics, Inc.**

The **Model 1990 Auto-Dialer** is said to read telephone numbers from 3278-type screens and automatically dial the number. It is completely passive, the vendor said, and any system using the Model 1990 remains completely interactive. No tape, disk or batch work is involved, and no software or hardware modifications are required.

The Model 1990 is priced from $1,250.

Tuck Electronics, 330 Second St., New Cumberland, Pa. 17070.

A 2,400 bit/sec. stand-alone modem has been introduced by **Practical Peripherals.**

The **Practical Modem 2400 SA** is Hayes Microcomputer Products, Inc.-compatible and can store up to 10 telephone numbers for automatic dialing. Other features include automatic-answer mode selection; number of rings to answer on; speaker volume; communications rate; and guard-tone selection.

Dial features include Touch-Tone or pulse and programmable pulse interval.

The modem has separate telephone line and telephone set connectors and connects with modular jacks.

The 2400 SA costs $239.

Practical Peripherals, 31245 La Baya Drive, Westlake Village, Calif., 91362.

What ISDN is doing for McDonald's data networking capabilities is no small potatoes.

When McDonald's Corporation took a hard look at its telecommunications needs a few years ago, it saw 9400 restaurants in 46 countries, served by more than 20 networks. And a new restaurant opening every 17 hours.

McDonald's needed a telecommunications system that could grow with it, but one simple enough that the company could concentrate less on telecommunications and more on talking to customers.

The solution: the nation's first customer application of ISDN, the Integrated Services Digital Network, made possible by the cooperation of Ameritech's Illinois Bell and AT&T Network Systems.

McDonald's will use ISDN to send voice, data and video over ordinary telephone lines simultaneously. An AT&T 5ESS™ switch at Illinois Bell will support digital phones, integrated voice/data terminals, facsimile, voice mail, host access and modem pooling, giving McDonald's a real competitive advantage in its data networking capabilities.

"In business language, this means we're going to do an even better job for the 30 million customers that we serve every day," said Bonnie Kos, McDonald's Vice President of Facilities and Systems.

"ISDN provides an information outlet to every workstation, thereby eliminating time-consuming and costly wiring, as well as enhancing messaging and network control capability."

Thanks to ISDN, McDonald's will enjoy better customer service, more current market information, better tracking of product promotions, more efficient inventory control, and reduced administrative workloads.

Ultimately, higher level applications of ISDN on the public switched network will replace most of the company's myriad networks, linking all its offices and restaurants around the world.

As we are doing for McDonald's, AT&T and your telephone company can help your business realize the networking efficiencies and cost savings of ISDN. To find out all that ISDN can do for you, write on your business letterhead to: AT&T Network Systems, P.O. Box 1278, Room 2966, Morristown, N.J. 07960-1278.

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AT&T
The right choice.

A 14.4K bit/sec. full-duplex leased-line modem has been introduced by **Emulex Corp.**

The **Performance 1000/14.4** provides menu-driven operation through a 16-char. LCD. The remote Performance 1000 may also be configured and tested through the local modem's front panel without operator intervention at the far end.

The Performance 1000/14.4 costs $1,795.

Emulex, P.O. Box 6725, 3545 Harbor Blvd., Costa Mesa, Calif. 92626.

An intelligent networking T1 multiplexer said to support 508 voice-and-data ports per node has been introduced by **Paradyne Corp.**

The **3230 T1 nodal processor** supports up to six 2.048M bit/sec. aggregates for international users. Trunk aggregates may run at speeds from 48K to 2.048M bit/sec. in 8K bit/sec. increments. Voice is supported using Pulse Coded Modulation at 64K bit/sec. or Adaptive Differential Modulation at 32K or 24K bit/sec. encoding methods.

Multiple tasks may be distributed in a load-sharing fashion among multiple nodes. Features include automatic alternate routing, dynamic bandwidth allocation and priority bumping.

A starting configuration, consisting of a single chassis package with 20 voice-and-data ports, costs about $30,000.

Paradyne, P.O. Box 1347, 8550 Ulmerton Road, Largo, Fla., 33540.

A modem designed for the Toshiba Corp. T1100 Plus and T3100 Portable Personal Computers has been unveiled by **Multi-Tech Systems, Inc.**

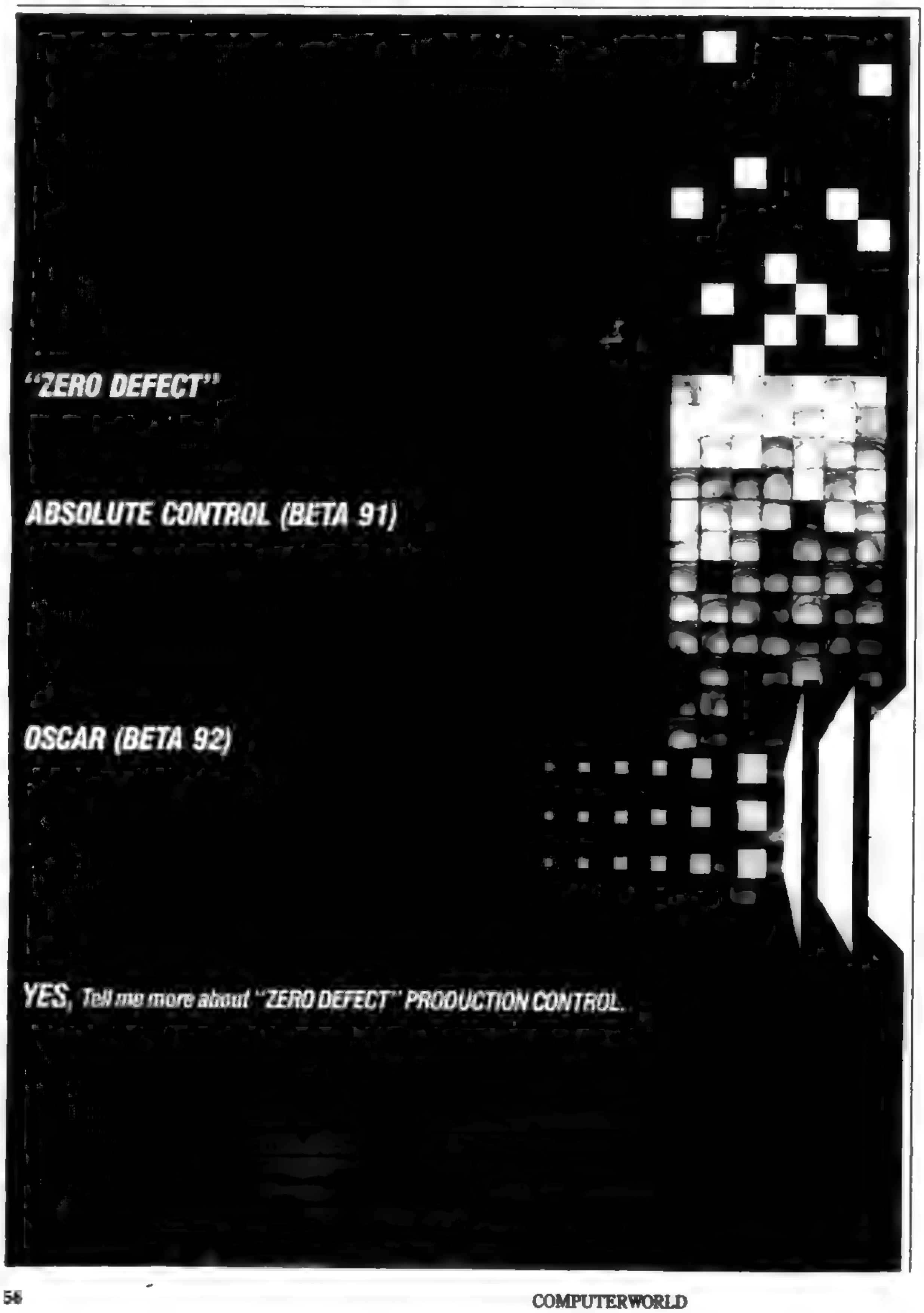
The **Multimodem212TL** operates at 1,200 and 300 bit/sec. and is compatible with the Bell 212A and Hayes Microcomputer Products, Inc. AT standards.

The plug-in card fits in the Toshiba expansion slot, providing dial-up communications for either model computer.

The modem operates in both half- and full-duplex asynchronous modes and provides automatic dialing and answering capability using both tone and pulse dialing, the vendor said.

The modem costs $299.

Multi-Tech, 82 Second Ave. S.E., New Brighton, Minn. 55112.


"ZERO DEFECT"
ABSOLUTE CONTROL (BETA 91)
OSCAR (BETA 92)
YES, Tell me more about "ZERO DEFECT" PRODUCTION CONTROL.

A 1,200 or 300 bit/sec. modem that uses the Microcom Networking Protocol error-detection and correction protocol for transmitting data over normal communications lines has been announced by **Multi-Tech Systems, Inc.**

The **Multimodem212E** desktop modem operates in synchronous or asynchronous modes and can be set to run in autodetect, with or without the MNP protocol.

According to the vendor, the modem has the ability to operate at a fixed speed of up to 9.6K bit/sec. via its RS-232C serial while at the same tine communicating at either 300 ro 1200 bit./sec. over the phone lines.

The Multimodem212E is priced at $399.

Multi-Tech, 82 Second Ave. S.E., New Brighton, Minn. 55112.

A 2,400 bit/sec. modem built on a short card to fit inside any IBM Personal Computer or compatible has been announced by **Franklin Telecommunications.**

The **FM2400I** is fully Hayes Microcomputer Products, Inc. AT command set-compatible and operates with Microcom Networking Protocol Level 4 at each speed. It operates in full-duplex mode and supports Bell 212A, Bell 103A, CCITT V.22 and CCITT V.22. The modem comes with Sofklone Distributing Corp.'s Mirror II communications software.

Features include call-progress monitoring, automatic voice-to-data switching without redialing and the ability to inform other accessible lines that the particular line is in use.

The FM2400I costs $399.

Franklin Telecommunications, 733 Lakefield Road, Westlake Village, Calif. 91361.

A family of **modems** featuring speeds ranging from 9.6K to 19.2K bit/sec., designed for use over leased lines, has been announced by **Telenetics Corp.**

The models operate synchronously at 9.6K bit/sec., 9.6K bit/sec. with a Fast Poll capability, 14.4K bit/sec. and 19.2K bit/sec. over 4-wire leased lines.

Features include automatic adaptive equalization and fixed-line and compromise equalizers.

The modems are available as stand-alones or in rack-mount versions. Pricing for the stand-alone versions ranges from $1,495 to $5,995.

Telenetics, 895 E. Yorba Linda Blvd., Placentia, Calif. 92670.

An internal modem server said to allow a personal computer to use up to 16 modems has been announced by **Omnitel, Inc.**

The **Netcomm series** consists of the hardware and software that is needed to convert an IBM Personal Computer XT or PC AT into an integrated modem server.

The series includes a half-size asynchronous card called the Netcomm V-Com; Netcomm Asynchronous Communication Server (ACS) Netbios-compatible software; and Q1200 and Q2400 internal modem cards providing access to four to 16 internal modems, according to the vendor.

The V-Com costs $179. The ACS Software costs $995.

The Q1200 costs $895, and the Q2400 costs $1,799.

Omnitel, 5415 Randall Place, Fremont, Calif. 94538.

SYSTEMS & PERIPHERALS

HARD TALK

Jean S. Bozman

Performance: Prove it!

"I'm mad as hell, and I'm not going to take it anymore." That was the credo of the anchorman in the movie *Network*. It seems that the relentless stream of news had caused him to state the obvious about the difficulty of coping with adversity.

The same feelings about adversity may be said to plague those who procure computer systems. They have, for years, tried to figure out how the systems proffered by sales representatives were going to perform once they were uncrated on a raised floor. But there was often no way to compare different systems, each of which ran vendor-specific software. If users were mad, there was no way to vent their frustration.

Recently, some cracks seem to have developed in the protective shells vendors have built around their systems. Unix, the Manufacturing Automation Protocol, Technical and Office Protocol and Open Systems Interconnect are all examples of unifying structures that can be imposed on a variety of computer systems. Now MIS directors have found a way to compare Apples with Apples, or with

Continued on page 60

Unisys adds 1100/90 models

Product line offers more memory, lower prices, less in maintenance costs

BY STANLEY GIBSON
CW STAFF

BLUE BELL, Pa. — Without fanfare, Unisys Corp. recently replaced portions of its former Sperry Corp. 1100 line with models that offer price reductions of up to 26%.

Called the 1100/90 Model IIs, the machines offer the same performance as the previous models but are priced lower because of the use of 256K-bit memory chips, according to the vendor. The earlier models used 64K-bit chips. An entry-level 1100/90 comes with 32M bytes of memory, compared with 8M bytes in the previous models.

In addition, Unisys unbundled the operating system and cut maintenance prices on the Model IIs by 30%. The maintenance price cuts were offered without any customer requirement to do additional problem and change tracking, as is required under IBM's Corporate Service Amendment plan. The maintenance cuts were offered only on the new machines because of the memory and technology improvements and the new software version, according to Joel Brody, Unisys's program marketing manager for large-scale 1100 systems.

Although Unisys did not publicly announce the new models, customers were advised of the systems in August by the Unisys sales force, according to Brody.

Brody said Unisys will continue to offer the older models, even though users who have orders in place for them can change their order to the new models. The older models cannot be upgraded to the new systems. He said some users might still want the older models because they have several of the machines already running and may want to add another with all units running the same operating system.

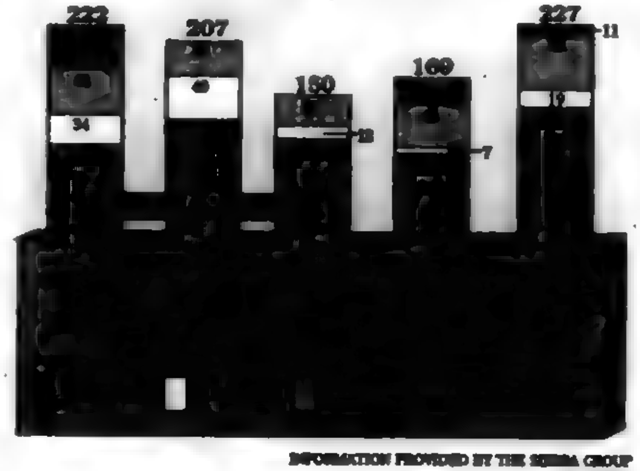
The new models require the latest version of the Unisys OS/1100 operating system.

Continued on page 60

Data View

Departmental office systems

Cost of ownership with 16 users



INFORMATION PROVIDED BY THE SIERRA GROUP
CW CHART

DEC inks co-op pacts

BOSTON — Digital Equipment Corp. used its recent Decworld '87 exposition as a forum to announce a series of partnerships intended to strengthen DEC's position in the engineering and computer-integrated manufacturing (CIM) markets.

Under a key agreement, Honeywell, Inc. is expected to develop an interface between its TDC 3000 process control system and DEC's VAX family of minicomputers. Honeywell said it will integrate VAXs into its process control offerings. A Honeywell official said his firm de-

Continued on page 59

NAS taps IBM Unix window

BY JEAN S. BOZMAN
CW STAFF

SANTA CLARA, Calif. — National Advanced Systems Corp. plans to tackle IBM on increasingly contested turf: the engineering/scientific marketplace.

Although the companies are vastly different in size, NAS said it believes the playing field is relatively even. That is because the engineering/scientific arena is dominated by a non-IBM operating system — Unix.

Through Unix, NAS hopes to provide a single window on four layers of computing: the workstation, departmental system, mainframe and supercomputer. If the effort proves successful, the value-added software segment of NAS's business would grow, reversing a five-year trend away from value-added software sales.

"I think we knew all along that value-added software was critical to growing our business," said Tom Frana, vice-president of NAS's Engineering/

Continued on page 59

Inside

- Wang transcribers translate stenography for use in applications. Page 62.
- [illegible] terminal offers VT220 emulation, Tektronix graphics. Page 65.

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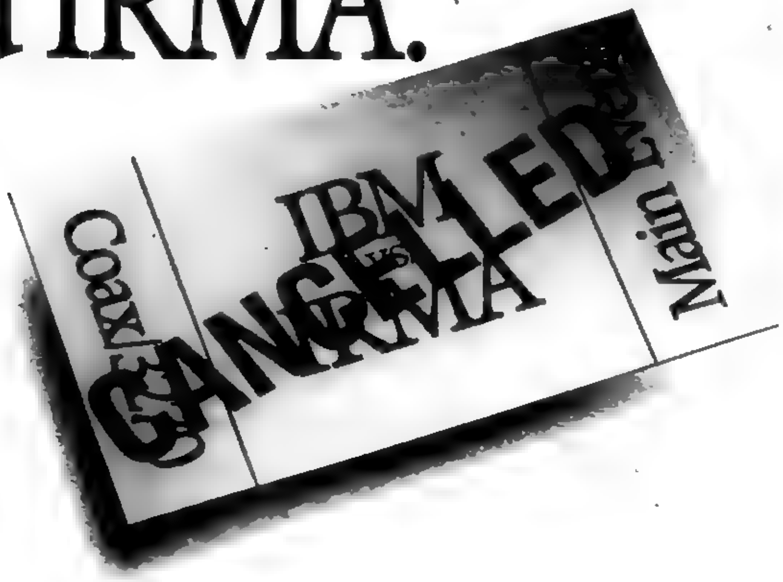
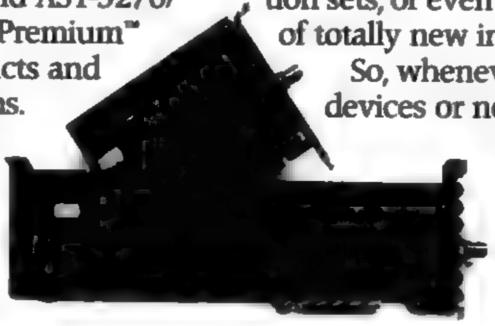
We've Decided To Call Off The Competition Between IBM® and IRMA®.



It no longer matters which 3270 emulation will become the reigning standard.

Because now you can have compatibility with both IBM and IRMA using AST's two new micro-to-mainframe communications solutions: AST-3270/CoaxIIA™ for IBM Personal System/2™ Models 50, 60 and 80; and AST-3270/CoaxII™ for AST Premium™ Computer products and PC-based systems.

Which means you can run all existing application software designed to run on either IBM or IRMA hardware today. Or take advantage of our new family of high-function, 3270 emulation software for CUT, DFT and graphics modes.



Whichever software you choose, your organization's investment will be protected from obsolescence caused by the introduction of new 3270 devices or protocols.

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NAS

CONTINUED FROM PAGE 57

Scientific Operations. "We just went through a transitional stage of trying to find unique market opportunities that would allow us to be a key player.

"One of the reasons we like this market is that there is an emerging standard — Unix. The other thing we like is that there is no predominant player across all four layers of processing."

NAS hopes to present the end user with a single Unix interface to all four levels of computing by 1990. "The end user wants to be able to run the same applications, the same packages and compilers and to get the same results at each and every level of computing," Frana said. "They're looking for simplicity of use and the ability to develop code at the workstation level and to test it on the departmental or mainframe computer."

NAS's game plan is to enlist the help of as many as 60 other firms to create a series of value-added software products that will knit together four layers of computing. So far, the firm has established relationships with only four companies and is talking with five others.

"Right now, we're operating in roughly 2½ of the four tiers of computing," Frana said. "We're in the departmental and mainframe markets, but we're only beginning to evaluate offering supercomputer power at the high end and workstations at the low end."

To get things started in the workstation environment, NAS in July announced a joint development project with Sun Microsystems, Inc. Sun reportedly will customise its SunOS operating system to run under the NAS mainframe's IBM environment [CW, Aug. 3].

Tying into IBM and DEC

Another key to the engineering market, in which NAS now has 15% to 20% of its installed base, is communications with IBM and Digital Equipment Corp. computers. That technical gap is being bridged by Interlink Computer Sciences, Inc. in Fremont, Calif.

"Our relationship with Interlink gets us better connectivity and establishes communications between the IBM and DEC machines at fairly significant transfer speeds," Frana said. Future support for DEC's VMS operating system is also a possibility, although NAS developers are focusing on support for DEC's modified Unix system, Ultrix.

By answering the end-user requirements, NAS hopes to make inroads in top Fortune 500 accounts that are having trouble bringing their Unix design and engineering environment closer to the IBM world. "Many sophisticated users at automobile and aerospace companies have figured out ways to get around their connectivity problems. What we want to do is give MIS directors a data base access capability that will seamlessly tie together their Unix and IBM-compatible machines," Frana said.

Co-op pacts

CONTINUED FROM PAGE 57

veloped several such interfaces for non-Honeywell equipment in recent years, but the company's process control efforts have focused on Honeywell Bull, Inc. DPS-6 minicomputers, which were made by Honeywell until it spun off its information systems group last year. The official said the VAXs will complement, not replace, the DPS-6.

The other partnerships announced by DEC included system cooperative marketing program (SCMP) agreements and cooperative marketing program (CMP) agreements.

Engineering solutions for VAX

According to Don McInnis, DEC vice-president for engineering systems, the 10-year-old CMP procedure calls for DEC and its software vendors to cooperatively market what he called "total solutions." Under the 2-year-old SCMP plan, third-party vendors package their software with standard DEC hardware and software.

The computer-aided engineering division of Tektronix, Inc. in Beaverton, Ore., expanded its SCMP role to include printed-circuit board, gate-array and custom integrated-circuit design packages.

Logicraft, Inc. in Nashua, N.H., signed an SCMP pact under which it will provide its 386Ware server and Cardware circuit board to add Microsoft Corp. MS-DOS productivity tools to VAXs.

Other engineering-related agreements included the Computer-Aided Design Group in Marina Del Rey, Calif., which is providing CADG + FM facilities management software, and Scientific Calculations, Inc. in Fishers, N.Y., offering its Scicards printed-circuit board design application.

In addition to the Honeywell pact, the CIM-related agreements included Bailey Controls Co. in Wickliffe, Ohio, providing its Network 90 systems for distributed process control, Effective Management Systems, Inc. in Milwaukee offering its shop floor information and management systems for discrete manufacturing industries, Epic Data Corp. in Seattle supplying automated data collection systems and GE Fanuc Automation, Inc. North America in Charlottesville, Va., selling its numerical control and monitoring system.

Other agreements were made with BBN Software Products Corp. in Cambridge, Mass., Datalogix Formula Systems, Inc. in Hartsdale, N.Y., and Setpoint, Inc. in Houston.

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Performance

FROM PAGE 57

IBMs for that matter.

The practical result, some say, is an impending revolution in the procurement process. Instead of comparing a number of claims about price/performance and MIPS, users will be able to choose an operating system, boot an application and start their stopwatches.

A multiuser horse race

In one recent case, Baxter Health Care Corp., formerly Baxter Travenol, put out a bid for a departmental system to run at 53 sites in the U.S. The application that would run on the machines, which handles billing and record processing, was already written in Unix. Although Baxter officially endorses only IBM and DEC as standards, the firm was prepared to see which bidder could run the application best.

The result, said Wayne Tracy, director of information services for Baxter's Home Respiratory Therapy division, was a horse race. The competitors — IBM, DEC, NCR, HP, Unisys and Texas Instruments — bid multiuser systems, including IBM's 9370, DEC's VAX 8250, HP's Spectrum and TI's System 1575. Based on a Unix benchmark sold by Neal Nelson & Associates in Chicago, the winner was the TI 1575, at $120,000.

Tracy said he plans to buy the system for 20 of the firm's 53 offices. The benchmark numbers were so convincing that they outweighed Baxter's standing orders for IBM, which freely participated in the horse race, and DEC, which balked at the starting gate but ultimately agreed to be tested.

It was the first time in 18 years that Tracy felt he had been able to compare machines equitably. "All the vendors tried to offer more subjective criteria for selection," he said. "But our largest investment is in the software, and we wanted the machine that would run it the best."

McDonald's recently carried out a similar exercise, using Nelson's benchmark to evaluate more than 20 Unix machines. It chose AT&T's Intel 80386-based workstations as remote systems for its U.S. company-owned stores.

"Users want to be able to compare pieces of iron," Tracy said. "As long as this performance data remains in the private domain, end users will not be able to make a choice based on the capability of a given piece of equipment."

Judging from Baxter and McDonald's, both large IBM shops, the emergence of Unix may be the start of something new in hardware procurement: the ability to choose freely from the wealth of systems.

Borman is *Computerworld*'s Chicago-based Midwest correspondent.

Unisys

FROM PAGE 57

Brody said some users have already expressed a desire to go with the older machine.

However, George Lindamood, program director for industry service at the Gartner Group, Inc., expressed doubt as to who would want an older system. Lindamood termed the new models a "mid-life kicker" for the 1100 series and said the Model IIs narrowed a price/performance gap when compared with IBM's 3090 models.

He was lukewarm on the prospects for the 1100 line. "There will be a certain number of their clientele that will stay with them, but there will be some erosion of customers and no new accounts," he said.

The price of an 1100/91 Model II with 32M bytes of memory, a word channel module and system control software is $2.1 million, compared with the previous 1100/91 at $2.8 million. The dual-processor 1100/92 Model II in a similar configuration is 23% less than the previous 1100/92, which was $3.9 million. The three-way 1100/93 Model II costs $5.1 million, while the previous 1100/93 sold for $5.6 million. And the 1100/94 Model II is now $5.6 million, down from $6.7 million for the previous 1100/94.

In addition, a 32M-byte block of memory has been cut 23%, from $592,000 to $455,000.

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Detroit	9/16, 10/15, 11/10, 12/9
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Los Angeles	8/3, 9/14, 10/28, 11/18, 12/8
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NEW PRODUCTS

Turnkey systems

The **Sun Breeze** family of workstations for composition and makeup of display advertisements, based on the Sun Microsystems, Inc. Sun-3/50 workstation, has been announced by **Camex, Inc.**

The basic Sun Breeze model is said to be capable of handling type and rules. It can be expanded, in stages, up to full-type and scanned-image capabilities. Multistation configurations are interconnected via Ethernet local-area networks (LAN). A software package, called Zephyr, permits a Sun Breeze unit with a disk to double as a file server for all workstations on the LAN.

Camex's *Sun Breeze*

A stand-alone model with a 141M-byte disk and a 60M-byte cartridge tape costs $21,500, including application software and a typesetter driver for the Camex Supersetter. A four-workstation Zephyr configuration with two disks and a cartridge tape costs $79,000.

Camex, 75 Kneeland St., Boston, Mass. 02111.

An on-line check processing system designed for financial institutions that processes up to 5,000 document passes daily has been announced by **NCR Corp.**

The NCR 7720-3101 reportedly offers single-step item processing. Users can communicate on-line with remote data centers for regular account updating. The system records up to 100 distributions and 300 totals, encodes with up to 15 line formats, offers five different check digit-verification schemes and uses intelligent sorting to feed items into up to 12 pockets.

Other features include a thermal journal printer and movable personal computer and proofing keyboards. Modules include a CRT, an encoder, a reader, an endorser, an NCR PC6 processor and single, dual, six or 12 pockets.

A single-pocket system costs $19,389.

NCR, 3095 S. Kettering Blvd., Dayton, Ohio 45439.

A series of automated computer-aided transcription offerings for court reporters and the court-related transcription industry has been announced by **Wang Laboratories, Inc.**

The series, called **Wangcat**, is based on Digitext, Inc.'s Digitext-ST single-unit computerized stenographic-type keyboard system.

According to the vendor, by combining translation logic and a patented theory of shorthand, stenographic strokes are instantly translated into English or other languages for use in text and data entry applications.

Three versions of the Wangcat system are available: a portable courtroom version, a laptop version and a stand-alone professional model. Prices range from $14,999 to $30,625.

Wang Laboratories, One Industrial Ave., Lowell, Mass. 01851.

Processors

A development system for Texas Instruments, Inc.'s VME/PDOS, the **VV-11/Model 1610**, has been announced by **Zoltech Corp.**

The Model 1610 features a 10-MHz Motorola, Inc. 68010 CPU with 512K bytes of random-access memory. Two serial I/O channels and a parallel printer port are standard. The system comes with a 20M-byte Winchester disk drive and an 800K-byte 5¼-in. floppy disk drive. The VSV-11 chassis includes a five-slot card cage with four slots free.

The basic desktop VV-11/Model 1610-A costs $5,995.

Zoltech, 7023 Valjean Ave., Van Nuys, Calif. 91406.

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The **CPU-22/23**, a 32-bit computer board designed for IBM's VMEbus, has been announced by **Force Computers, Inc.**

The 32-bit multiprocessing computer runs the Motorola, Inc. 68020 microprocessor and Motorola 68882 floating-point coprocessor at either 16.7 or 20 MHz. Up to 21 CPU-22s or 23s can share a backplane. Features include up to 1M byte of dual-port static random-access memory with interleaved operation between the VMEbus, CPU and direct-memory accesses; one-wait-state erasable programmable read-only memory architecture; 32-bit direct-memory access controller; and message passing capability.

The CPU-22/23 is priced from $6,475.

Force Computers, 727 University Ave., Los Gatos, Calif. 95030.

Datacube, Inc. has introduced **Megastore-8**, a digital video-image frame store for its Maxvideo family of VMEbus-compatible real-time image and digital-signal processing boards.

Megastore-8 is a single, standard double-height VME module that occupies one slot in a VME backplane. It is said to be capable of storing up to 8 million pixels as either large, high-resolution individual images measuring 2,048 by 4,096 by 8 bits or up to 32 standard-size images.

Megastore-8 has six Maxbus ports connected to a data cross-point switch. Each Maxbus data port is a 10M byte/sec. channel.

Megastore-8 is priced at $11,950.

Datacube, 4 Dearbord Road, Peabody, Mass. 01960.

A desktop computer-aided design (CAD) terminal, called the **DS 1082GXP**, has been announced by **Spectragraphics Corp.**

The DS 1082GXP consists of a 16-in. color monitor with 1,024- by 1,024-pixel resolution, an IBM 5080-style keyboard, a mouse and a below-desk display controller.

The base price for the DS 1082GXP is $11,900, which includes 1M byte of display-list memory, optionally expandable to 2M bytes. The base configuration is said to be compatible with the IBM 5080 Model 2A and is fully equipped to run IBM's Cadam or Catia software.

Spectragraphics, 10260 Sorrento Valley Road, San Diego, Calif. 92121.

Graphics systems

A color video processor said to process color images from most video screens in 4,096 or 125 colors has been announced by **Graftel Systems, Inc.**

The processor, called the **VP240**, is also said to be capable of transferring the entire image to most color printers or plotters through the use of built-in firmware for each output device.

The VP240 is priced at $4,495 for a 2M-byte model, including the firmware for the selected output device.

Graftel Systems, Executive Park, 400 Executive Blvd., Elmsford, N.Y. 10523.

Data storage

A 170M-byte add-on drive for the AT&T 3B2/400 computer has been announced by **Congruent Technologies, Inc.**

The drive, called the **Superstore/170**, is field-installable in one of the unused drive slots on the Model 400 or can be a replacement for one or both of the existing 72M-byte drives on the system. The drive may also be used on an AT&T XM expansion module attached externally to the 3B2/300, 310 or 400.

The drive performs with a 28-msec average access time, the vendor said.

The Superstore/170 costs $5,950.

Congruent Technologies, 9065 Jollyville Road, Austin, Texas 78759.

Cambex Corp. has introduced two IBM Series/1 data storage and backup peripherals.

The **Certainty 250-20** disk-storage system offers 512M bytes of disk storage. The **Certainty 820-10** streaming tape system can back up 260M bytes of data.

The disk-storage system is available in 512M-byte incre-

Continued on page 65

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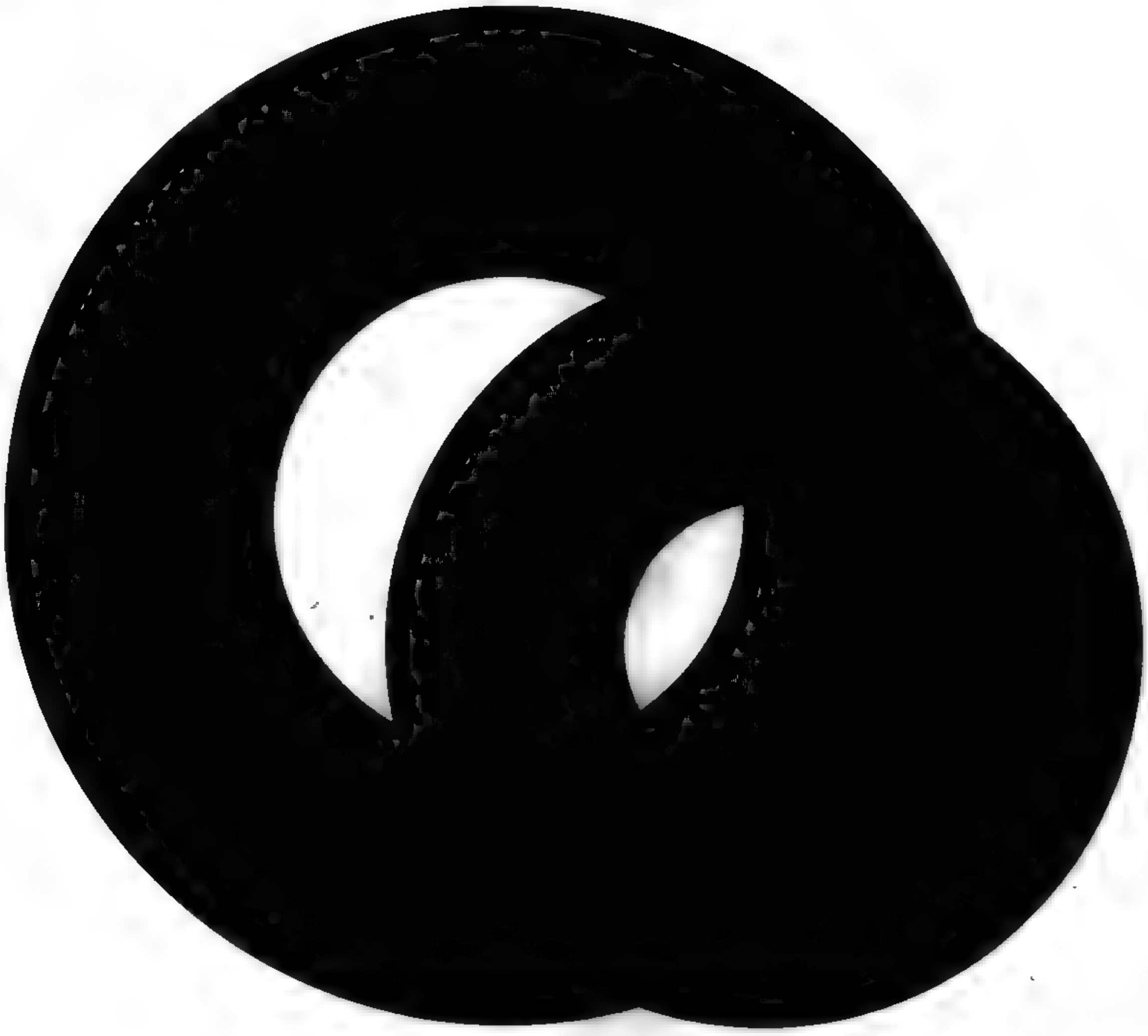

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Continued from page 63

ments, each disk requiring only half the cabinet width in the Series/1 rack enclosure. It comes with a standard cache-memory size of 512K bytes.

The streaming tape system, an industry-standard ¼-in. tape system, offers an unattended backup capability of up to 260M bytes.

The Certainty 250-20 costs $29,500. The Certainty 820-10 costs $9,950.

Cambex, 360 Second Ave, Waltham, Mass. 02154.

Terminals

A coaxial IBM 3191 plug-compatible information display station called the **Miracle-191** has been announced by **Term-Tronics, Inc.**

The Miracle-191 features a screen-image printer port and record/playback keys. Options include integrated light pen and bar code applications as well as a separately addressable printer port that provides IBM 3287-type printer emulation.

Term-Tronics' *display station*

The Miracle-191 costs $1,295.

Term-Tronics, 4990 Viewridge Ave., San Diego, Calif. 92123.

A series of intelligent workstations — the Models 1210, 1220, 1240 and 1285 — have been added to **Telex Computer Products, Inc.'s Intelligent System Series** product line.

The 1210, 1220 and 1240 are based on the Intel Corp. 80286 microprocessor. The 1210 was designed for local processing. Fully configured and featuring a network interface, it costs $2,495.

The 1220 offers a 3½-in. disk drive option, integrated video and local-area network (LAN) support. Its price starts at $2,715.

The 1240 offers two half-size drive bays with either 3½- or 5¼-in. media support and four expansion slots. Its price starts at $3,170.

Telex's Intel 80386-based 1285 was designed for use as a LAN server in computer-aided design and manufacturing applications or for desktop publishing. Prices start at $5,965.

Telex, 6422 E. 41st St., Tulsa, Okla. 74135.

The **Go-225** monochrome terminal, which was designed to provide Digital Equipment Corp. VT220 emulation and Tektronix, Inc. graphics, has been announced by **Graphon Corp.**

The terminal offers such standard features as integrated text and graphics functionality, 60Hz noninterlaced display and two memory planes. Resolution is 1,024 by 390 pixels. Support is provided for up to eight pages of linked text.

The terminal can be upgraded with such options as pan and zoom, multiple graphics planes and raster operations.

The Go-225 costs $795.

Graphon, Tower One, Fifth Floor, 1901 S. Bascom Ave., Campbell, Calif. 95008.

Printers/Plotters

McDonnell Douglas Computer Systems Co. has introduced **dot matrix**, **band** and **laser printers** for use with its relational data base management minicomputers and Series 7000 Integrated Business System.

The 10 page/min. laser printer, Model 2-1810, features 300 by 300 dot/in. character registration. It costs $4,000.

The Models 2-1010 and 2-1020 nine-pin dot matrix printers offer 110 and 136 column widths at 10 char./in., respectively. Print speeds are switch-selectable at 180 and 45 char./sec. Each costs about $700. The Model 2-1210 nine-pin, 300 char./sec. dot matrix printer costs $2,595; the Model 2-1220 18-pin, 400 char./sec. dot matrix printer costs $3,295.

The band printers are the Model 2-1610 for $8,500 and the Model 2-1620, which sells for $11,000. They offer speeds of 300 line/min and 600 line/min, respectively.

McDonnell Douglas, 17481 Red Hill Ave., Irvine, Calif. 92714.

Vector-to-raster converters that are said to offer users of Versacad software the ability to output vector data files in addition to plotting to hard-copy devices have recently been announced by **KMW Systems Corp.**

The **VP-10** converter was designed to drive low-cost devices such as A/B size color thermal printers and lasers as well as electrostatics with widths of up to 24 in.

Drawing files can be sent from Versacad to the VP-10 in Hewlett-Packard Co.'s Graphics Language, according to the vendor.

The **VP-30** was designed to drive electrostatic plotters with widths of up to 44 in.

Drawing can be sent to the VP-30 in its native format.

The VP-10 costs $5,995. The VP-30 costs $21,500.

KMW, 6034 W. Courtyard Drive, Austin, Texas 78730.

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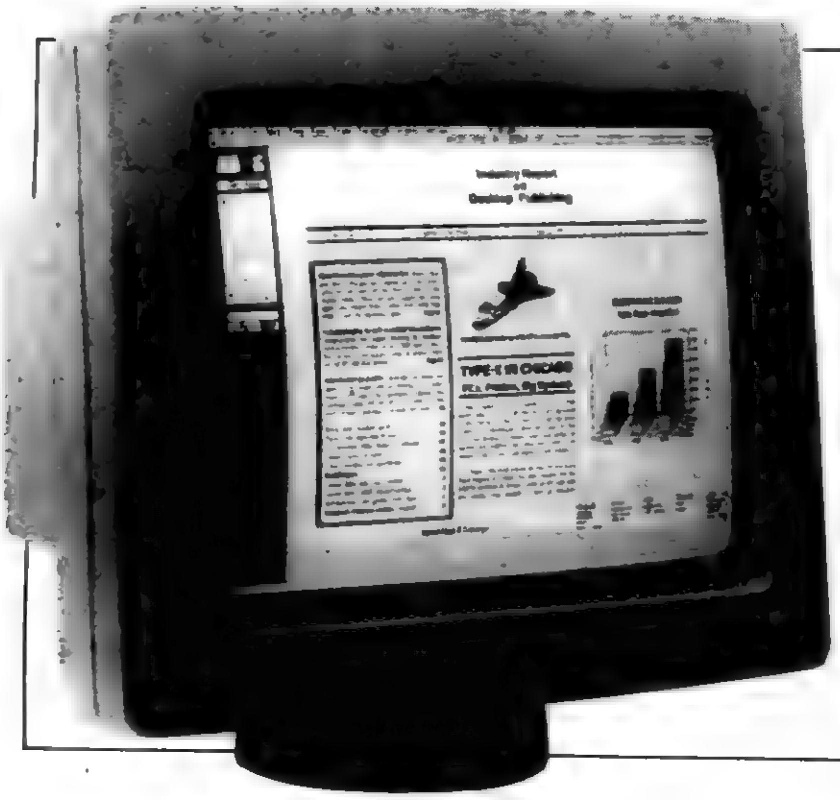

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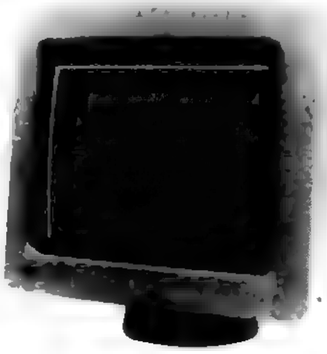

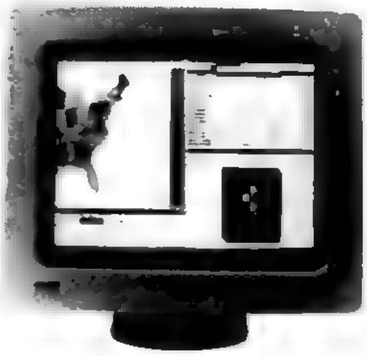

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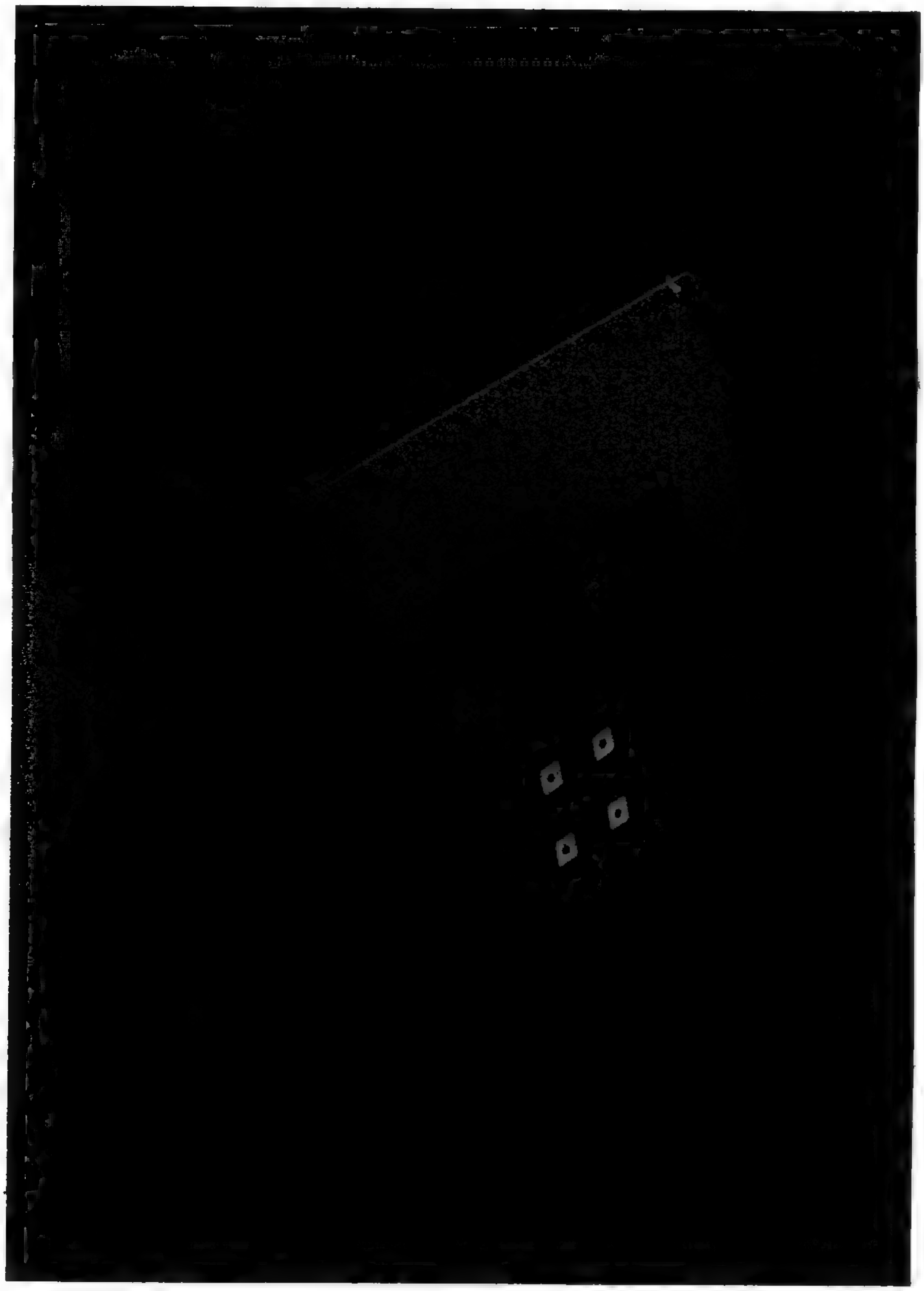
SPOTLIGHT

SMALL SYSTEMS



The second installment of CW's 1987 Hardware Roundup covers small systems. From "smallframes" to Silverlake, what has — and hasn't — happened in the last year.

SEPTEMBER 28, 1987 • SPOTLIGHT NO. 23

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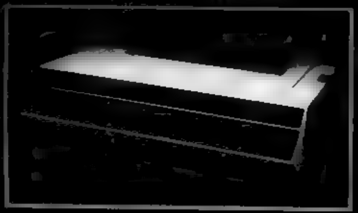

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INSIDE

Hardware Roundup

Buyer's guide chart for small systems. Pages S4-S12.

How It Was Done

What are small systems and where do they fit in? A description of how CW compiled this year's roundup of small systems. Page S2.

Vax Killer Hopefuls

Will the IBM 9370 be able to kill the VAX, or might the forthcoming Silverlake do the job? Or can VAX be overcome at all? Page S3.

Bigger boxes beware: Multiuser 386-based systems, Microvax 3000 bring up-and-down market to new heights.

MORE POWER TO SMALL MACHINES

BY STANLEY GIBSON

Major developments at a glance

The year in small systems since the last Hardware Roundup

- **November 1986:** DEC brought Microvax II and Vaxstations into Vaxcluster. HP announced 16-user Micro 3000 and 56-user Micro [illegible] to replace HP [illegible]
- **January:** IBM declared commitment to dual mid-range strategy consisting of its "System 3/X" and 9370 products.
- **February:** DEC announced Microvax 2000, which can handle four directly connected users; at a price less than $10,000, it became DEC's lowest cost multiuser system.
- **March to September:** Several 80386-based multiuser systems were introduced by Prime, Fujitsu Microsystems, Altos, Unisys, TI and AT&T.
- **July:** IBM "opened kimono" on future plans at meeting for consultants in Dallas; the "System 3/X follow-on," also known as "Silverlake," will appear in 1988, attendees were told at what was described as the most open meeting ever held by IBM. DEC announced duplexed version of Microvax II.
- **August:** DG introduced new versions of year-old MV/7800 processor that are 45% faster than the machines they replaced.
- **September:** Unisys unveiled "small-frames," Models A1, A4 and A6, intended to counter IBM's 9370 strategy. DEC rolled out Microvax 3500 and 3600 models, aimed at the middle to high end of IBM's 9370 line.

CW CHART

Small systems are continuing their inexorable march toward being ever smaller, ever more powerful, ever more threatening to vendors of larger systems — and ever a better deal for users. The progress of these systems in the past year was marked by two major announcements: Digital Equipment Corp.'s Microvax 3000 models and the multiuser systems based on the Intel Corp. 80386 chip that were introduced by a number of manufacturers.

On the IBM front, the dearth of announcements in the past year created a pregnant pause before the anticipated advent of the so-called "Silverlake" next year. Although it has not been formally announced, news of the product that will reportedly merge IBM's System/36 and 38 lines has been liberally distributed to users and consultants by IBM. IBM has also indicated that an enhancement to the System/36 line, possibly a low-end machine, can be expected before the end of the year.

With its Microvax 3500 and 3600, DEC has made its strategy clear: It will counter the IBM 9370 and Silverlake by building on the spectacular success of the 2-year-old Microvax II.

The models, introduced at Decworld '87 earlier this month, each offer processing power of about 3 million instructions per second (MIPS) — about three times the 0.9 MIPS rating of the Microvax II. Both models can support some 60 users for an All-In-1 implementation, about three times as many users as does the Microvax II.

The recently announced machines gain their power from a new CMOS microprocessor that boasts about four times the cycle speed of the Microvax II CPU. The 3500 is offered in a 16M-byte version, and the 3600 comes as a 32M-byte model.

However, in the hoopla surrounding the new Microvax models, it is important not to overlook other DEC small-system developments made in the past year. In November 1986, DEC brought its Microvax II and Vaxstations into the local-area Vaxcluster. In February, it introduced the Microvax 2000 — starting at less than $10,000 — which, according to DEC, can handle four directly connected users, up to 16 on a network. DEC's lowest cost multiuser system offers the same CPU performance as the Microvax II but at half the price.

In July, DEC introduced a duplex version of its Microvax II for applications requiring hardware redundancy. The product could remain a solution for a limited niche market, but it might also presage more fault-tolerant offerings from DEC.

While the Microvax II spurred offerings from competitors Data General Corp. and Wang Laboratories, Inc. in previous years, little of the Microvax's thunder has been stolen by these contenders. By upping the ante with the Microvax 2000 and 3000, DEC pointedly raises the question of whether DG and Wang will be able to keep abreast in the low end of the market.

However, DG pushed its small systems' performance forward, announcing faster versions of its year-old MV/7800 processor series. Both versions — the MV/7800 XP, which is rack-mounted, and the office environment MV/7800 DCX — are 45% faster than the machines they replace, according to DG.

Just this month, Unisys Corp. answered the challenge posed by the Microvax II and IBM's

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More power

FROM PREVIOUS PAGE

9370 by introducing its models A 1, A 4 and A 6. The minicomputers, which Unisys is calling "smallframes," offer significant improvement in price and performance over preceding Models A 2, A 3 and A 5 from Burroughs Corp.

Mirroring IBM's Solutionpac application software packages, Unisys announced Solution Partner packages, which contain vertical-market application software, a hardware configuration and support.

With a base CPU price of some $25,000 for an A 1 model, Unisys is offering fully configured turnkey systems in the neighborhood of $125,000. In a notable contrast to IBM's early 9370 announcement, Unisys did not unveil its new A series models until two of the three processors were set to ship.

What's up with IBM?

Trying to divine the obscurities of IBM's mid-range strategy has kept many analysts in business for the past several years. However, in January, IBM clarified matters when it declared its commitment to a two-architecture mid-range.

In a transparent reference to DEC, IBM Vice-President Larry Ford declared that two architectures were better than one. But on the heels of that pronouncement, IBM personnel demonstrated two office Solutionpacs, which make its System/36 and 9370 look and act alike, seemingly contradicting the proclaimed virtues of disparate hardware.

Indeed, cross-system consistency has long been a customer demand, and IBM is moving deliberately to address it. According to John Nack, president of IBM users group Guide International, Inc., such a function has, for the past decade, been at the top of Guide members' lists of requirements. The two office Solutionpacs were a response to this need, but many view them as merely the herald of the greater consistency that is promised by Systems Application Architecture (SAA).

With the announcement of SAA, IBM designated the languages Cobol, Fortran and C to be supported by the architecture. Absent at first were RPG-II and RPG-III, the languages used with the System/36 and 38, respectively. However, IBM has since let it be known that both would be part of SAA. This indication adds long-term credibility to the System/36 and 38 and depth to the looming Silverlake.

In order to keep System/36 and 38 customers in the fold, IBM has been entertaining them at its Rochester, Minn., plant, where several have reported being told of Silverlake, which IBM has been referring to as its System/36 and 38 follow-on product.

IBM told consultants at a July gathering in Dallas many of the same details, including the fact that the system would not appear until well into 1988. These disclosures have made the product's general

Continued on page S3

Round'em up: Part II

This week, *Computerworld* offers the second installment of the 1987 Hardware Roundup — a compilation of vendors, systems and the characteristics of each system. The information was compiled by mailing questionnaires to vendors of large, medium-scale and small systems, as well as to personal computer and workstation manufacturers. In this issue, we cover the small systems market.

Where possible, the parameters used to group small systems with their likely competitors come from definitions provided by the market research firm International Data Corp. (IDC). According to IDC, small systems usually support two to 16 users in a normal commercial environment and generally cost from $10,000 to $100,000.

Outside the commercial environment, small systems are used in automation and control capacities as well as in communications processing. In those cases, the number of users is often not a realistic measure of performance.

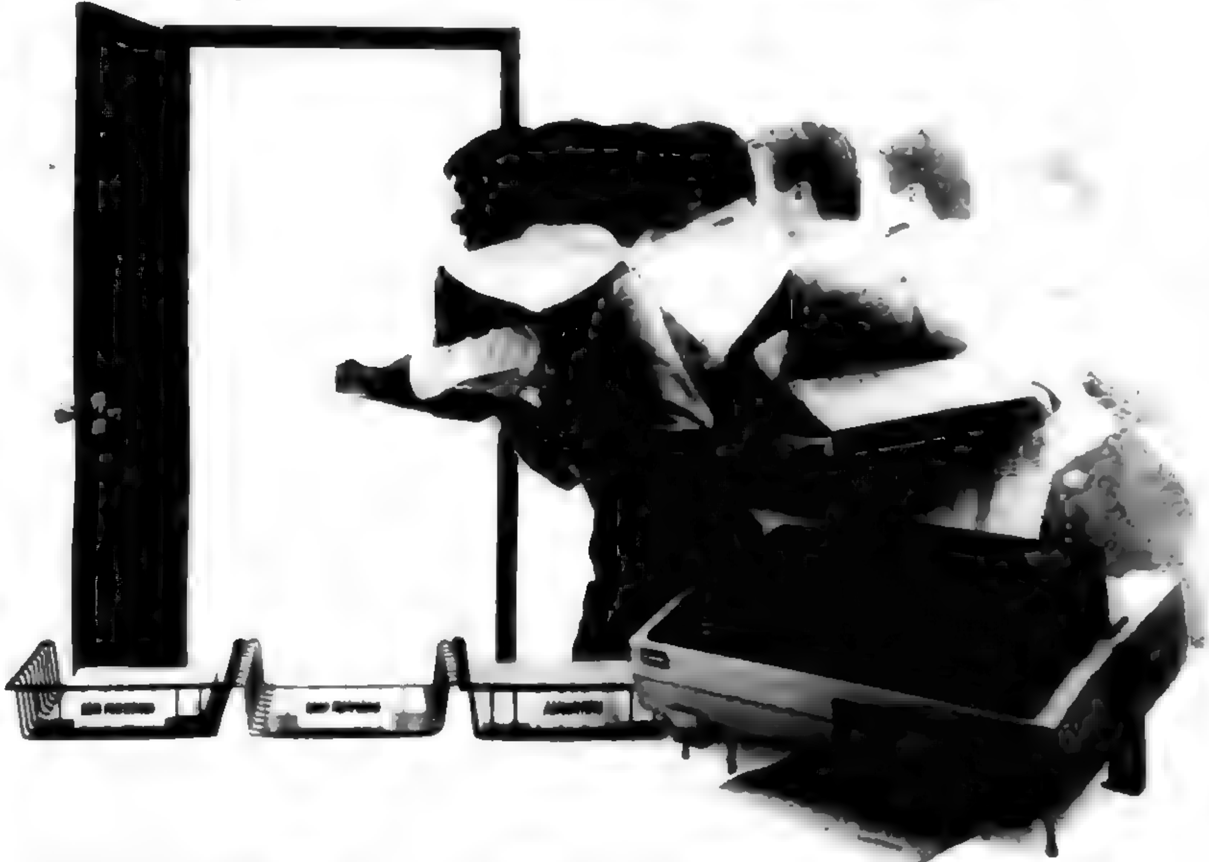
The small systems category includes machines termed 16-bit minicomputers, 16- and 32-bit supermicrocomputers and low-end versions of traditional 32-bit superminis and business systems.

We have been as comprehensive as possible in the presentation of the information in chart format (see pages S4-S12). When vendors did not respond, CW estimated the information if it was appropriate to do so, using the most recent vendor literature and press releases.

In some cases, for instance, CW estimated million instructions per second, or MIPS, figures. This was done with the intention that the ratings be used only as a guide for users to position a system within the proper category and with the understanding that not all vendors approve of their use as a basis for comparison.

In the roundup charts, "NA" can stand for "not applicable" as well as "not available."

The C-815 Supra 24-pin printer
My life in the fast lane



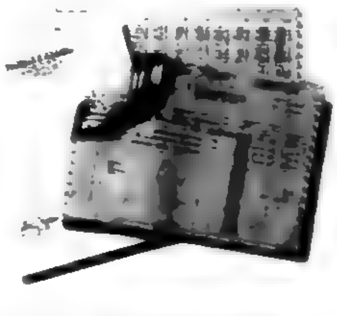
I used to spend a lot of my time waiting for our old printer to finish cranking out the paperwork for our busy corporation

But since we bought the C-815 Supra from C. Itoh Digital Products, I never have a moment to spare. I'm living life in the fast lane

Multi-applications solution
Our department managers love the C-815 Supra. It's like having two printers in one. It prints high volume data processing output, like invoices and spreadsheets, at speeds up to 570 characters per second (cps) And for word processing, the Supra prints sharp, clear, high-speed letter quality at 162 cps

What really sold our DP/MIS management on the Supra was *Byte Magazine* and *Infoworld* listing the C-815 as the fastest 24-wire printer in their independent tests. And they were right. The Supra's speed and versatility increased our productivity

Forms expert
Our executives are really impressed with the Supra's dependable, rugged paper handling. It manages continuous forms, labels, letterhead and up to 6-part invoices with its rear or bottom feed paper paths. In addition to its standard pull tractor, the C-815 also features a single-bin automatic sheet feeder that's upgradable to dual bin.



Whether it's high volume spreadsheets and multi-part invoices or letter quality business letters and presentations, the Supra is fast and reliable

Sound investment
The finance department says the Supra is a great investment since C. Itoh has a long-standing reputation for high quality, durable printers. And because it has built-in emulations for the IBM ProPrinter XL,™ Toshiba P351™ and Qume Sprint II,™ we don't have to invest in any new systems or software It works with our new IBM PS/2™ family and such popular software packages as Lotus 1-2-3,™ WordPerfect™ and Chartmaster.™

With its top-notch output, superior paper handling and extremely fast printing, all the departments in our company now know what life in the fast lane is all about. I know I do.

C.ITOH
C. Itoh Digital Products, Inc.
19300 South Hamilton Avenue, Suite 110
P.O. Box 9085 • Torrance, CA 90508
(213) 327-2110 or (800) 423-0300

More power

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shape nearly as clear as some products that have been formally announced.

IBM's virtual preannouncement of Silverlake has caused some users to hold off on purchasing decisions in anticipation of the product and has kept some, as was no doubt intended by IBM, in the firm's domain.

The Silverlake disclosures recall the early announcement of the 9370, made nine months before the shipment of the first systems and more than one year before shipment of all models.

Despite the long lead times, there is little doubt that IBM will do what it says: pursue both the 9370 and the System/36 and 38 follow-on. And while the computer community has fixed on the 9370 as a VAX killer, some analysts say that Silverlake is the knight that will slay the VAX dragon (see story this page).

Whichever is the VAX killer, one or both should have an impact, says George Colony, president of Cambridge, Mass.-based Forrester Research, Inc. "Both Silverlake and the 9370 aim a bullet at the VAX. Both will be deadly," he says.

The third prong

In the meantime, while the VAX faces a two-pronged threat from the 9370 and Silverlake, a third force is gathering that will be a strong contender for large market share, giving nonproprietary chip systems makers a role to play.

Multiuser 80386-based systems could rampage through the low end of the market and, in the process, force IBM to bring its own multiuser 386 system to market much earlier than it otherwise might have. On the other hand, lack of applications and support could cause this wild card to flop, and it could become known as the industry standard that never was.

Several multiuser 386 systems made their appearance in the past year. The new machines boast low prices, and several, with up to 6 MIPS in the 20-MHz 386 version, make strong bids to be the price/performance leader. Quite a few of these systems use Unix, under which value-added resellers (VAR) are putting together packages for vertical markets. Most of the systems also run Microsoft Corp. MS-DOS as a guest.

Compatibility with whatever standard IBM might introduce in a multiuser 386-based Personal System/2 could become an issue, but by the time IBM makes its offering, a number of multiuser 386 systems could be well established.

While some of the 386-based systems are being offered by small firms, Prime Computer, Inc. — by throwing its hat into the ring with its EXL 316 — lends credibility to the field and offers users a large, established vendor.

"Prime sort of bit the bullet and put out a machine that could wipe out some of its other low-end products," says Richard Mikita of International Data Corp. in Framingham, Mass. In addition to lending the name of an established company, Prime will offer remote diagnostics with the system, points out John Logan of The Yankee Group, based in Boston. The Prime 386 machine uses Merge 386, a Unix operating system that can also run MS-DOS.

Other big hats

Elsewhere, Texas Instruments, Inc.'s System 1300 fits into TI's existing line of multiuser configurations that the company sells through VARs. The System 1300 sits between the System 1100 and the System 1500, the latter of which can handle up to 125 users. Using the 20-MHz version of the 80386 chip, the system can bring 4 MIPS of processing power — after operating system overhead — to 32 users, according to TI.

> "THE sales leader appears to be Altos, which has shipped several hundred systems."
>
> JOHN LOGAN
> THE YANKEE GROUP

The company also says it is looking for the system to add to its installed base of health-care providers, banks and automotive dealerships.

In March, Fujitsu Microsystems of America, Inc. rolled out its System 2200 Model 50, part of its Pick-based Series 2000 line. The system has the benefit of the large library of business systems based on Pick Systems' operating system.

Also announced in March was the 16-MHz 80386-based Unisys B38, which runs BTOS, the former Burroughs multiuser, multitasking operating system. As an add-on feature, the B38 can run MS-DOS; a future version of the product is scheduled to be able to run both operating systems with no add-on necessary, according to Unisys.

The B38 fits into Unisys's B25 line of multiuser workstations. Clustershare, announced at the same time as the B38, allows personal computers running MS-DOS to operate in a BTOS cluster with any member of the B25 family. Originally offered to support 11 users, the B38 can now support up to 15, following the July release of BTOS 2.

The two B38 models, one of which includes an Intel 80287 math coprocessor, are manufactured by Convergent Technologies, Inc. Currently available, the Unisys system has the benefit of a large library of BTOS-based applications, particularly for state and local government, according to The Yankee Group's Logan.

Altos Computer Systems, Inc. announced in May its Altos 386 Series 2000, which runs Microsoft's Xenix System V operating system. Using the 16-MHz 80386 chip, the system is compatible with the company's current family of Intel 80286-based systems that run Xenix 3.0 and will reportedly run the same application software as the 80286-based systems. Stressing office automation applications, Altos hopes to sell its Altos Office Manager packages with the system, which will be distributed through Altos VARs, OEMs and systems integrators.

"The current sales leader appears to be Altos, which has shipped several hundred systems," Logan comments.

He points out that previous Altos systems, based on the Motorola, Inc. 68020 processor, were also multiuser offerings. He says Unix-based applications on the 68020 systems should translate readily to the 80386 systems.

Tandem Computers, Inc. and Allen-Bradley sell this computer under their own label, Logan adds, suggesting that it is highly probable that Tandem will resell the Altos 80386 product as well.

Reasons for success

Logan notes the similarities between the multiuser 386 systems — such as the fact that many support Ethernet, Unix and the small computer systems interface — asserting that this is a boon to developers. "If I were a software developer, I would write in C to be as portable as possible under Unix. If I were a VAR, I would take a vanilla-flavored machine and lead with it," he says.

For stand-alone applications in small businesses, Logan says a multiuser 386 system offers unexcelled price/performance. But to make the most of these systems, he says, the end user has to be creative and needs to understand his configuration and the application running on it. If he doesn't, "that could be an obstacle," Logan warns.

If the systems do well in the small business market, they could force IBM's hand in introducing a multiuser version of its PS/2 Model 80. However, Logan expresses doubt that IBM will introduce a multiuser 386 system soon — if ever. "IBM doesn't want a $25,000 box to compete with its other lines," he says.

In comparing the software libraries of various systems, Logan says the only vendor that does not already have a large library is Prime. The others have packages for their present systems that can be upgraded to run on the new 386 system.

Other side of the story

A pessimistic note about the future of 386-based multiuser systems is voiced by Brian Jeffery of International Technology Group in Los Altos, Calif.

"If you could port minicomputer small business applications to micros, you would do well. But there is not a large library in Unix," Jeffery says, adding that the small business market does not buy for performance alone. "The application is the most important thing. The multiuser micro market needs value added," he says.

Jeffery also adds that value-added resellers may balk at offering 386 systems. "A lot of people who sell minis don't want to sell multiuser micros. Their margin is too small," he says.

Jeffery adds that, despite its announced AIX for the PS/2 Model 80, IBM's multiuser PC will be a low-end 9370. He says IBM has indicated that it will provide a path from the PS/2 to the 9370, and this, he says, fuels his belief that the Model 80 will be the same thing as a 9370 Model 20. He also asserts the PS/2's Micro Channel will be used to cluster PS/2s.

"IBM will allow you to make the PS/2 Model 80 an SSP or VM machine before it introduces the multiuser version of OS/2 it is planning to develop with Microsoft," Jeffery predicts.

Looking ahead, more users will probably jump on the DEC bandwagon by moving to the Microvax 3000 in the next year. IBM may well recover its majority market share, having already frozen the sizable slice of the market pie that is inclined to buy from Big Blue.

The 386-based small business systems appear to be a sure bet to increase their own stake as well. The question of "who will be on first" a year from now should prove intriguing. •

Which IBM machine aims to kill the VAX?

Given the IBM 9370's high-profile publicity, which now includes the same former "M*A*S*H" television actors who appear in IBM's Personal System/2 advertisements, many observers have leapt to the conclusion that the mid-range processor is IBM's intended "VAX killer."

But, a few cognoscenti maintain that the product IBM publicly calls the "System/3X follow-on," which is also referred to as Silverlake, will be at least as important as the 9370 as a weapon in the arsenal against Digital Equipment Corp.'s VAX.

"There is no 'VAX killer' strategy; there is a 'VAX killers' strategy," says David Andrews, president of ADM, Inc. in Cheshire, Conn., a System/38 consulting firm.

He explains that the 9370 is aimed at departments of large customers that are already using IBM mainframes. As such, the 9370 represents only a defensive counterpunch against the inroads that VAXs, Wang Laboratories, Inc. VS processors, Hewlett-Packard Co. products and other minicomputers have made.

"If you don't already have a 370 structure in place, it is hideously expensive to put it in place. But if you have it in place, the cost of supporting one more 370 is relatively low," Andrews explains.

In contrast, Silverlake will be sold primarily to new users. Consequently, it will carry the ball in IBM's drive to put DEC on the defensive, Andrews maintains.

"Senior IBM managers have made it clear that Silverlake will be the preferred product," Andrews points out. Because Silverlake will combine the ease of use of the System/36 with the data base capabilities of the System/38, it will make a great deal of power available to new, relatively unsophisticated users.

Until now, the System/36 and 38 have been competing but, relative to DEC, have been weak in communications and office automation, according to Andrews. But a new generation of office automation software is also on the horizon, he adds. That, combined with the merged System/36 and 38, which will boast some of the strong points of each, will be a formidable offering.

"The relational data base that is part of the operating system of the System/38 is a huge advantage in the commercial marketplace. All others must add a relational capability as a layer of software. It's the commercial market that IBM wants DEC the hell out of. It's Silverlake they will use to get them out of it," Andrews states.

STANLEY GIBSON

Hardware Roundup: Small systems

COMPANY	PRODUCT	DATE FIRST INSTALLED	PRIMARY MARKET[1]	MOST COMPATIBLE IBM OR DEC SYSTEM	PERFORMANCE (MIPS)*	CPU SPEED	MEMORY (MBYTES)	DISK TRANSFER RATE (MBYTE/SEC.)	DISK CAPACITY (BYTES)	PORTS	OPERATING SYSTEM	MAXIMUM NUMBER OF USERS	TYPICAL NUMBER OF USERS[2]	WORD LENGTH (BITS)	BASE PRICE
AT&T Contact local sales office	6386 series	Oct. 1987	DP, OA	NA	NA	16-20 MHz	1-64	NA	270M	NA	Unix System V, MS-DOS	32	NA	32	$4,890
	3B2/310	First quarter 1984	DP, OA	System/36 Model 5362, Microvax II	0.6	138.9 nsec	1-4	5M bit/sec.	NA	18	Unix System V	18	6-10	32	$12,845 with 1M-byte memory
	3B2/400	Second quarter 1985	DP, OA	System/36 Model 5362, Microvax II	1.1	100 nsec	1-4	5M bit/sec.	NA	46	Unix System V	46	15-25	32	$20,845 with 1M-byte memory
	3B2/500	NA	DP, OA	NA	2.1	NA	4-8	NA	14.4G	80	Unix System V	80	25-40	32	$26,000 with 4M-byte memory, 10 ports, 147M-byte disk
	3B2/600	March 1987	OA	Microvax II, System/36	2.6	142.7 nsec	4-16	NA	720M	90	Unix System V	64	25-64	32	$46,500 with 4M-byte memory, 2 147M-byte hard disks, tape drive
Alpha Microsystems, Inc. (714) 641-6200	AM-1200	Jan. 1987	OA	Microvax	NA	100 nsec	1-4	5	20M-58M	6-13	AMOS	13	7-10	16	$4,795 with CPU, 1M-byte memory, 20M-byte disk, 6 ports
	AM-1500-06	Nov. 1985	OA	VAX	NA	100 nsec	1-16	5	70M-300M	6-30	AMOS	30	20	16	$15,050 with CPU, 1M-byte memory, 70M-byte disk, 6 ports
	AM-1500-10	Nov. 1985	OA	VAX	NA	100 nsec	1-16	12	70M-3.2G	6-120	AMOS	120	50	16	$31,485 with CPU, 2M-byte memory, 150M-byte disk, 6 ports
	AM-2000-06	May 1986	OA	VAX	NA	60 nsec	1-20	5	70M-300M	6-30	AMOS	30	25	32	$29,000 with CPU, 4M-byte memory, 70M-byte disk, 6 ports
	AM-2000-10	May 1986	OA	VAX	NA	60 nsec	1-36	12	70M-3.2G	6-240	AMOS	240	75	32	$54,940 with CPU, 4M-byte memory, 400M-byte disk, 6 ports
Altos Computer Systems, Inc. (800) 258-6787	Altos 1086	Oct. 1985	OA	Microvax II, System/36	1.5	800 nsec	2-8	5	20M-80M	10	Xenix 3.0	10	6-10	16	$11,995 with 256K-byte memory, terminal, 80M-byte disk, tape
	Altos 2086	June 1986	OA	Microvax II, System/36	1.5	600 nsec	4-8	5	80M-160M	20	Xenix 3.0	20	10-20	16	$17,985 with 4M-byte memory, terminal, 80M-byte disk, tape
Applied Digital Data Systems, Inc. (516) 231-5400	Mentor 6000 Model 2	Feb. 1987	DP	System/36	1	60 nsec	1-4	5M bit/sec.	85M-140M	8-32	Enhanced Pick	32	12	32	$24,000 with 85M-byte disk, 1 parallel printer, 8 ports, tape
	Mentor 6000 Model 4	Sept. 1986	DP	System/36, 38	2	60 nsec	2-8	5M bit/sec.	140M-280M	8-96	Enhanced Pick	96	24	32	$41,000 with 4M-byte memory, tape, 140M-byte disk, 2 parallel printers
	Mentor 6000 Model 6	Sept. 1986	DP	9370 Model 60, System/38	2	60 nsec	2-8	5M-10M bit/sec.	284M-968M	16-112	Enhanced Pick	112	40	32	$84,000 with 2M-byte memory, 48M-byte disk, 2 parallel printers, tape, 32 ports
	Mentor 6000 Model 8	Sept. 1986	SE	NA	2	60 nsec	4-16	5M-15M bit/sec.	655M-4.5G	16-160	Enhanced Pick	160	80	32	$152,000 with 8M-byte memory, 64 ports, 655M-byte disk, tape, 2 parallel printers
Arete Systems Corp. (800) 433-1200, ext. 477	Arete System 800 (1 or 2 CPUs)	May 1987	DP, OA	NA	2.5-5	125 nsec	4-16	240K	5.5G	40	Unix System V.2.2	40	24-40	32	$29,950 with CPU, 4M-byte memory, controller, 170M-byte disk
	Arete System 1200 (1-4 CPUs)	Dec. 1983	DP, OA	NA	2.5-10	125 nsec	2-16	240K	10G	80	Unix System V.2.2	80	40-64	32	$52,950 with CPU, 4M-byte memory, controller, 168M-byte drive, tape
AT&T Contact local sales office	AT&T 3B2/310	First quarter 1984	DP, OA	System/36 Model 5362, Microvax II	0.6	138.9 nsec	1-4	5M bit/sec.	NA	18	Unix System V	18	6-10	32	$9,500 with 1M byte memory
Bytronix Corp. (714) 634-4940	Mikron 600	1982	OA	NA	1.7	600 nsec	Up to 2	10	300M	20	Bls, Cobol, Iris, Bits	18	8	16	$10,000 with 128K-byte memory, operating system
	Mikron 400	1982	OA	NA	2.5	400 nsec	Up to 2	10	300M	20	Bls, Cobol, Iris, Bits	18	8	16	$10,000 with 128K-byte memory, disk drive
Celerity Computing (800) 443-9940, (800) 433-4481 (Calif.)	C1200	Nov. 1984	SE	VAX 8300	8	125 nsec	2-24	2.3	1G	64	Unix 4.3	64	40	32	$50,000 with CPU, 4M-byte memory, disk, operating system

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*Computerworld estimates based on vendor-supplied information.
[1] Commercial data processing (DP); scientific/engineering (SE); office automation (OA); on-line transaction processing (TP).
[2] Unisys uses data link processors in place of conventional ports on this system.

The companies included in this chart responded to a recent written survey conducted by *Computerworld*. Further product information is available from the vendors.

COMPANY	PRODUCT	DATE FIRST INSTALLED	PRIMARY MARKET*	MOST COMPATIBLE IBM OR DEC SYSTEM	PERFORMANCE (MIPS)	CPU SPEED	MEMORY (MBYTES)	DISK TRANSFER RATE (MBYTE/SEC.)	DISK CAPACITY (BYTES)	PORTS	OPERATING SYSTEM	MAXIMUM NUMBER OF USERS	TYPICAL NUMBER OF USERS	WORD LENGTH (BITS)	BASE PRICE
Charles River Data Systems (617) 626-1000	Universe/200 (1-4 CPUs)	June 1986	SE, TP	NA	2-12	10 MHz	1-2	12	3.2G	4-32	UNOS	32	12-16	32	$7,995 with CPU, 1M-byte memory, 20M-byte drive, 1.2M-byte floppy
	Universe/400 (1-4 CPUs)	June 1986	SE, TP	NA	2-12	12.5 MHz (68000), 16.7 MHz (68020)	1-16	15	3.2G	4-64	UNOS	64	16-32	32	$12,900 with CPU, 1M-byte memory, 20M-byte disk, 1.2M-byte floppy
	Universe/800 (1-4 CPUs)	June 1986	SE, TP	NA	3-12	12.5 MHz (68000), 16.7 MHz (68020)	1-16	15	3.2G	4-96	UNOS	96	16-32	32	$26,400 with CPU, 1M-byte memory, 2M-byte disk, 1.2M-byte floppy
	Universe 68 (1-4 CPUs)	1984	SE, TP	NA	3-12	12.5 MHz	1-12	15	400M	4-64	UNOS	64	16-32	32	$16,700 with CPU, 1M-byte memory, 40M-byte disk
	Universe 32 (1-4 CPUs)	1984	SE, TP	NA	3-12	12.5 MHz	1-16	15	1G	4-64	UNOS	64	32	32	$22,300 with CPU, 1M-byte memory, 40M-byte disk
CIE Systems, Inc. (714) 660-1800	680/50	July 1987	DP	NA	2	16 MHz	1-8	600K	53M	3-16	Pick, RM COS, Unix	32	8	32	$10,130 with operating system
	680/250	June 1986	DP	NA	NA	16 MHz	1-8	2.5	168M-1.7G	16-128	Pick, RM COS	128	50	32	$36,615 with operating system
	680/550	July 1987	DP	NA	5	25 MHz	4-8	2.5	690M-2.7G	32-250	Pick, RM/COS	250	90	32	$128,995 with operating system
Computer Consoles, Inc. (800) 345-1942, (800) 237-4688 (Calif.)	Power 6/32	Jan. 1986	OA	Microvax II	1.5	80 nsec	2-4	5M bit/sec.	300M	20	CCI System V	16	12	32	$34,900 with CPU, 4M-byte memory, 150M-byte disk, 10-user Unix license
	Power 6/32X	Fourth quarter 1987	OA	Microvax II	2.5	80 nsec	4-16	10M bit/sec.	600M	48	CCI System V	32	24	32	$36,000 with 3 CPUs, 4M-byte memory, 140M-byte disk, 16-user Unix license
Computer Designed Systems, Inc. (612) 545-2855	Adviser 25 series	1977	DP	System/36, 38, Microvax, VAX	1.2-14.6	25-75 nsec	1-128	9-120	40M-19.2G	4-256	AVOS/Unix, DOS	256	35-80	16-64	$13,600 with 1M-byte memory, 40M-byte disk, power supply
Concurrent Computer Corp. (800) 631-2154	3205	1984	DP, SE, TP	Microvax	0.4	400 nsec	256K-4M	1.2	1G	1	OS/32, Xelos	24	16	32	$19,800 with 2M-byte memory
	3203	1985	DP, SE, TP	Microvax	0.4	400 nsec	512K-4M	1.2	384M	1	OS/32, Xelos	16	8	32	$27,500 with 2M-byte memory, 182M-byte disk
	3212	1986	DP, SE, TP	VAX 8250	1	300 nsec	4-16	3	3.0G	8	OS/32, Xelos	64	32	32	$42,000 with 4M-byte memory
Convergent Technologies, Inc. (408) 434-2848	S/120	April 1987	DP	Micro PDP-11/83	2	320 nsec	1-5	5M bit/sec.	50M-380M	12	Unix V.2, V.3	12	6-12	32	$12,000 with 1M-byte memory, 50M-byte disk, power supply, operating system
	S/221	June 1987	DP	Microvax II	2	320 nsec	1-5	5M bit/sec.	50M-570M	22	Unix V.2, V.3	32	12-22	32	$14,000 with 1M-byte memory, 50M-byte disk, power supply, operating system
	S/222	June 1987	DP	VAX 8250	2	320 nsec	1-5	5M bit/sec.	50M-1.4G	22	Unix V.2, V.3	32	12-22	32	$15,500 with 1M-byte memory, 150M-byte disk, power supply, operating system
	S/320	Oct. 1985	DP	VAX 8350	2	320 nsec	1-16	5M-24M bit/sec.	50M-1G	42	Unix V.2, V.3	32	16	32	$16,500 with 1M-byte memory, 50M-byte disk, power supply, operating system
	S/640	Aug. 1987	DP	VAX 8530	4.25	200 nsec	2-64	Up to 3	85M-4G	42	Unix V.2, V.3	64	32	32	$36,500 with 2M-byte memory, 85M-byte disk, power supply, operating system
Counterpoint Computers, Inc. (408) 434-0190	System 19K (1-8 CPUs)	Sept. 1986	DP, OA, TP	VAX	2-16	180-420 nsec	2-8	1.25	2G	96	Unix V.3	96	8-64	32	$14,850 with CPU, 2M-byte memory, 80M-byte disk, power supply, operating system
Cromemco, Inc. (415) 964-7400	CS120/150 Desktop	July 1986	SE	Microvax II	4	180 nsec	2-8	15M bit/sec.	750M	17	Unix V.2, CromixIX Plus	16	8	32	$16,995 with 2M-byte memory, 57M-byte disk, 2 390K-byte floppy disks
	CS220/250	Oct. 1986	SE	Microvax II	4	180 nsec	2-16	15M bit/sec.	750M	65	Unix V.2, Cromix Plus	64	32	32	$26,995 with 2M-byte memory, 57M-byte disk, 2 390K-byte floppy disks
	CS420/450 Tower	June 1986	SE	Microvax II	4	180 nsec	2-16	15M bit/sec.	1.5G	9-65	Unix V.2, Cromix Plus	64	32	32	$27,995 with 2M-byte memory, 50M-byte disk, 1.4M-byte floppy disk, tape
Data General Corp. (617) 366-8911	MV/1400 DC	1987	DP, SE, OA, TP	Microvax 2000	1	140 nsec	4-8	5M bit/sec.	300M	10	AOS/VS, DG/UX	8	2-6	32	$9,995 with 4M-byte memory, 38M-byte hard disk, 737K-byte floppy, operating system
	MV/2000 DC	Nov. 1986	DP, SE, OA	Microvax II	1	140 nsec	4-12	5M bit/sec.	338M	24	AOS/VS, DG/UX	24	8-20	32	$19,150 with 4M-byte memory, 38M-byte hard disk, 737K-byte floppy disk, operating system
	MV/7800	1986	DP, SE, OA, TP	VAX 8250, Microvax II	1.06	220 nsec	Up to 14	2.2M	NA	128	AOS/VS, AOS/RT 32, DG/UX	64	20-50	32	$19,050 with 2M-byte memory, power supply, operating system
	MV/7800 XP	1987	DP, SE, OA, TP	VAX 8200, 8375	1.6	220 nsec	2-14	5M bit/sec.	8.4G	80	AOS/VS, DG/UX	80	20-44	32	$23,600 with 2M-byte memory, operating system
	MV/7800 DC	1986	DP, SE, OA, TP	Microvax II	1	220 nsec	2-14	5M bit/sec.	2.7G	48	AOS/VS, DG/UX	40	20-35	32	$28,400 with 2M-byte memory, 70M-byte disk, 737K-byte floppy disk, power supply
	MV/7800 DCX	Aug. 1987	DP	VAX 8250, 8375 Model 40	1.6	220 nsec	2-14	5M bit/sec.	2.7G	48	AOS/VS, DG/UX	40	20-35	32	$33,300 with 2M-byte memory, 70M-byte disk, operating system

COMPANY	PRODUCT	DATE FIRST INSTALLED	PRIMARY MARKET*	MOST COMPATIBLE IBM OR DEC SYSTEM	PERFORMANCE (MIPS)	CPU SPEED	MEMORY (MBYTES)	DISK TRANSFER RATE (MBYTE/SEC.)	DISK CAPACITY (BYTES)	PORTS	OPERATING SYSTEM	MAXIMUM NUMBER OF USERS	TYPICAL NUMBER OF USERS	WORD LENGTH (BITS)	BASE PRICE
Datamedia Corp. (800) 696-1570	DMC/932 Model 1020	NA	OA	Microvax	NA	150 nsec	1-12	5	65M-380M	6-32	Unix V.2	32	8	32	$11,500 with CPU, 1M-byte memory, 65M-byte disk, operating system
	DMC/932 Model 2010	NA	OA	Microvax	NA	120 nsec	2-16	20	65M-380M	6-32	Unix V.2	32	16	32	$15,500 with 1M-byte memory, 65M-byte disk, operating system
	DMC/932 Model 2020	NA	OA	Microvax	NA	120 nsec	2-16	20	380M	6-32	Unix V.2	32	24	32	$21,000 with CPU, 2M-byte memory, 170M-byte disk, operating system
	DMC/932 Model 2080	NA	OA	Microvax	NA	120 nsec	4-16	20	380M	6-32	Unix V.2	32	32	32	$29,000 with CPU, 4M-byte memory, 380M-byte disk, operating system
Datapoint Corp. (512) 699-7000	Model 7600	May 1986	DP, OA, TP	VAX 11/730	3.1	160 nsec	2-4	NA	NA	1	DOS, RMS	7	1-3	16	$3,995 with 2M-byte memory, 1 port
	8665 (turbo) processor system	July 1987	DP, OA, TP	VAX 11/750	2.67	125 nsec	1-4	750K	780M	24	DOS, RMS	24	4-12	8	$13,500 with 65M-byte disk, tape, 1M-byte memory
Digital Equipment Corp. Contact local sales office	Micro PDP-11 series	1983	DP	NA	NA	15 MHz	1.5-4	1.2	NA	NA	RT-11, RSTS/E, RSX-11M, RSX-11M+, Ultrix, RSX-11, RSX-11S	NA	NA	16	$14,000
	PDP-11 series	1970	DP	NA	NA	18 MHz	Up to 4	1.2	NA	NA	RT-11, RSTS/E, RSX-11M, RSX-11M+, Ultrix, RSX-11, RSX-11S	NA	Up to 48	16	$16,000
	Microvax 2000	1987	DP	NA	0.9*	NA	4-6	NA	142M	NA	VMS, Ultrix	20	4	32	$14,800 with 4M-byte memory, 30M-byte disk
	Microvax II	1985	DP	NA	0.9*	NA	1-6	625K	NA	NA	VMS, Ultrix	33	NA	32	$18,400 with 2M-byte memory
	Microvax 3500	NA	DP	9370 Model 60	3*	90	16-32	1.4	560M	NA	VMS, Ultrix-32	NA	NA	32	$74,800 with 16M-byte memory, Ethernet, 280M-byte disk, tape, operating system
	Microvax 3600	NA	DP	9370 Model 60	3*	90	32	2.2	1.0G	NA	VMS, Ultrix-32	NA	60	32	$99,800 with 32M-byte memory, Ethernet, 622M-byte disk, tape, operating system
	VAX 8250	1987	DP	NA	1.2*	NA	16-128	1	NA	NA	VMS, Ultrix	64	32	32	$82,000 with 16M-byte memory, operating system
Fortune Systems/SCI Technology, Inc. (415) 593-9000	Fortune Formula 4000	June 1987	DP, OA, TP	Microvax II	2	NA	1-4	1M-10M bit/sec.	40M-145M	4	Unix System V, For:Pro	20	10	32	$9,900 with 1M-byte memory, 40M-byte disk, 800K-byte floppy, operating system
	Fortune Formula 8000	Oct. 1986	DP, SE, OA, TP	Microvax II	2	NA	1-64	5M-10M bit/sec.	85M-145M	4	Unix System V, For:Pro	28	16	32	$21,900 with 1M-byte memory, 85M-byte disk, 800K-byte floppy, operating system
Fujitsu Microsystems of America, Inc. (408) 434-1100	System 2000	Oct. 1986	DP, SE, OA	NA	NA	NA	128K-1M	NA	20-86	1-8	Pick	8	4	NA	$8,250 with 128K-byte memory, 86M-byte disk, 2 ports, operating system
	System 2020	March 1986	DP, SE, OA	NA	NA	NA	512K-1M	NA	54-86	1-30	Pick	30	8-16	NA	$9,740 with 512K-byte memory, 86M-byte disk, 2 ports, operating system
	System 2200 Model 80	June 1987	DP, SE, OA	NA	NA	NA	2-4	NA	171-613	8-32	Pick	32	16-24	NA	$19,750 with CPU, 2M-byte memory, 171M-byte disk, 8 ports, tape, operating system
	System 2400 Model 60	Sept. 1987	DP, SE, OA	NA	NA	NA	2-8	NA	171M-1G	16-64	Pick	64	24-48	NA	$35,000 with CPU, 2M-byte memory, 171M-byte disk, 16 ports, tape, power supply, operating system
General Automation, Inc. (714) 778-4800	Zebra 1350	Feb. 1986	TP	NA	NA	10 MHz	512K-1M	5	67M	6-12	Pick with Zebra enhancements	12	4	16-32	$8,300 with 512K-byte memory, 20M-byte disk, tape, 6 ports, power supply
	Zebra 1750	March 1985	TP	NA	NA	12.5 MHz	1-2	5	420M	6-30	Pick with Zebra enhancements	30	12	16-32	$16,600 with 1M-byte memory, 47M-byte disk, tape, 6 ports, power supply
	Parallel Model 300XR	June 1984	DP	NA	0.7	100 nsec	1-8	900K	10.6G	8-32	Unix	32	5-25	16	$59,900 with 2 CPUs, 2M-byte memory, controller, 187M-byte disk, power supply, tape, 8 ports
	Parallel Model 500XR	Dec. 1986	DP	NA	2	60 nsec	2-4	1.25	10.6G	8-256	Unix	256	30-100	32	$77,300 with 2 CPUs, 2M-byte memory, 187M-byte disk, power supply, tape drive, 8 ports
Harris Corp. Computer Systems Division (800) 4HARRIS	MCX-3 Model 40	March 1986	SE	Microvax II	4.1	60 nsec	2-10	650K-1.2M	340M	4-12	Unix System V	32	2-12	32	$18,725 with CPU, 2M-byte memory, 650K-byte floppy, power supply, 4 ports
	MCX-3 Model 50	Feb. 1987	SE	Microvax II	4.1	60 nsec	2-10	650K-2.4M	690M	10	Unix System V	32	2-16	32	$24,500 with CPU, 2M-byte memory, 650K-byte floppy, power supply, 3 ports

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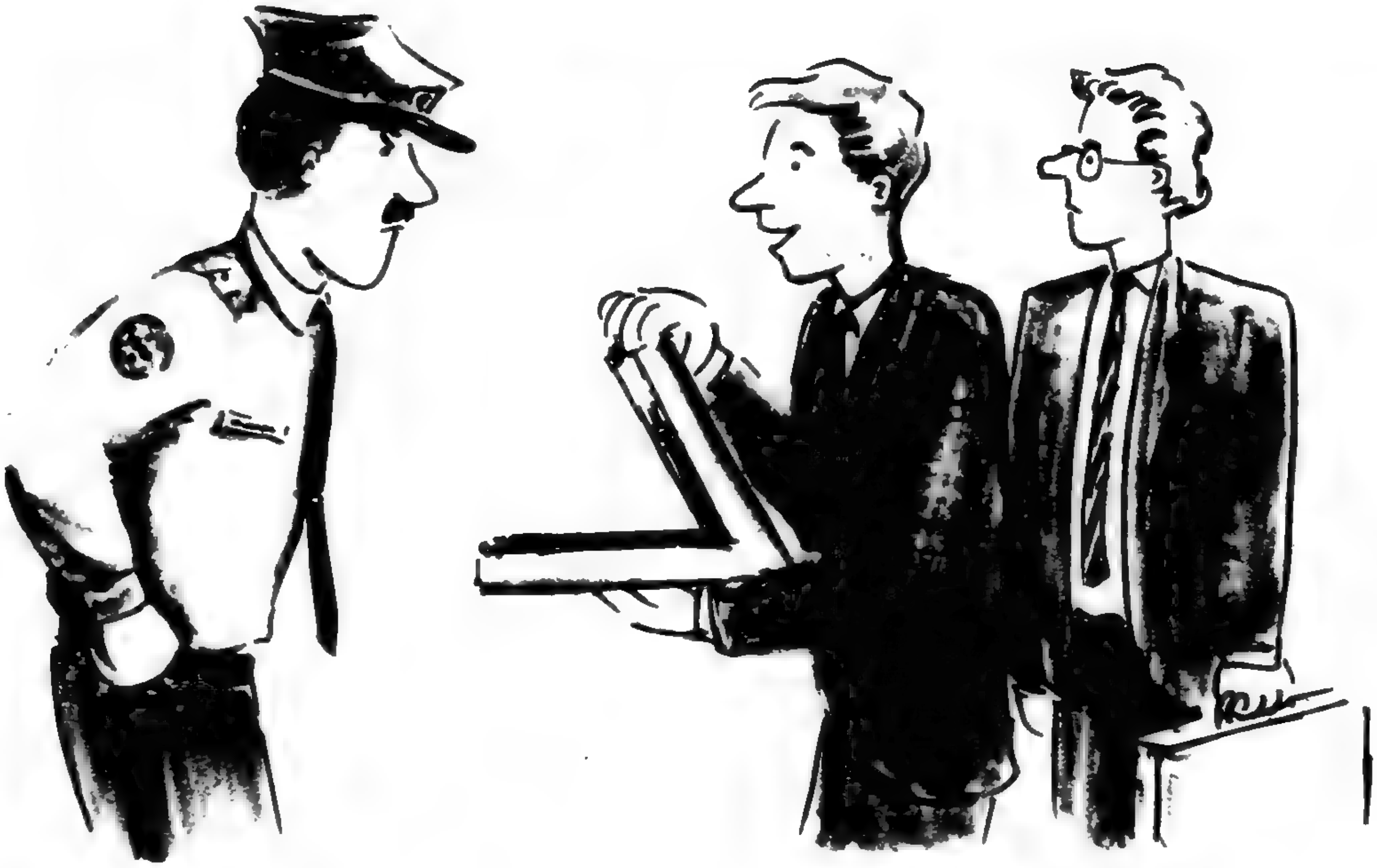
Hewlett-Packard Co. Contact local sales office	HP Micro 3000	1986	DP	NA	0.32*	NA	2-4	NA	2.2G	NA	MPE V	NA	4-16	16	$25,730 with 2M-byte memory, 81M-byte disk, operating system
	HP Micro 3000XE	1986	DP	Microvax II	0.42*	NA	2-8	NA	4.8G	NA	MPE V	NA	8-60	16	$57,500 with 2M-byte memory, 130M-byte disk, operating system
	HP 3000 Series 52	1986	DP	System/38	0.53*	NA	4-8	1	3.2G	92	MPE V/E	92	32-48	16	$45,000 with 4M-byte memory, 2 channels, operating system
Honeywell Bull, Inc. (800) 328-5111, ext. 9712	DPS 6 Plus 400 series	May 1987	DP, OA, TP	System/38; VAX 8250, 8350, 8550	0.95-1.8	NA	2-16	1.82	Up to 3.3G	Up to 64	HVS 6 Plus	48	12-36	32	$33,000 with CPU, 2M-byte memory, 4 ports
	DPS 6 Plus 410 series	July 1986	DP, OA, TP	System/38; VAX 8250, 8350, 8550	0.95-3.5	NA	4-16	1.82	3.3G	Up to 80	HVS 6 Plus	64	24-48	32	$57,000 with CPU, 4M-byte memory, 4 ports
	DPS 6 Plus 420 series	July 1986	DP, OA, TP	System/38; VAX 8250, 8350, 8550	0.95-3.5	NA	8-64	1.82	6.6G	Up to 96	HVS 6 Plus	160	40-120	32	$93,000 with CPU, 8M-byte memory, 4 ports
Icon International, Inc. (801) 225-6888	Icon 2000	Jan. 1986	DP, TP	VAX-11/780 series	1.5	60 nsec	2-10	10M bit/sec.	300M	8-16	Unix 4.2, Unix V.2, MS-DOS 3.2, Pick R83	16	8	32	$14,000 with 2.75M-byte memory, 80M-byte disk, tape, 8 ports, power supply
	Icon 3000	June 1987	DP, OA, TP	VAX 8600	4	50 nsec	6-68	10M bit/sec.	3000M	16-64	Unix 4.2, Unix V.2, MS-DOS 3.2, Pick Release 83	64	20	32	$31,900 with 6M-byte memory, 160M-byte disk, tape, 16 ports, power supply
	Icon 4000	Dec. 1987	DP, OA, TP	VAX 8800	4	50 nsec	6-200	20M bit/sec.	3G	32-128	Unix 4.2, Unix V.2, MS-DOS 3.2, Pick Release 83	128	64	32	$55,000 with 1M-byte memory, 160M-byte disk, tape, 32 ports, power supply
IBM Contact local sales office	System/36 Model 5364	Aug. 1985	DP, OA	NA	0.05*	NA	512K-1M	625K-1.25M	130M	2	IBM System Support Program (SSP)	64	NA	16	$5,995
	System/36 Model 5362	Jan. 1984	DP, OA	NA	0.20*	NA	256K-2M	1.25-2.5	720M	4	SSP	64	NA	16	$15,000-$25,000
	System/36 Model 5360	Aug. 1983	DP, OA	NA	0.35*	NA	256K-7M	1.5	1.4G	16	SSP	72	NA	16	$40,000-$100,000
Intel Corp. (503) 681-8080	System 310	Nov. 1983	SE, OA, TP	Microvax II	1.5	8 MHz	1-8	5M bit/sec.	20M-140M	2-16	iRMX 86, iRMX 286, Xenix 286	16	8	16	$25,045 with 2M-byte memory, 140M-byte disk, power supply, tape
	System 320	1987	SE, OA, TP	VAX	4	20 MHz	1-16	5M bit/sec.	40M-300M	16	iRMX 286, Xenix 386	16	8	32	$12,900 with 1M-byte memory, CPU, controller, floppy
LF Technologies (702) 883-7611	Cubix 2	Feb. 1987	DP, OA	PC AT, Microvax	1	250 nsec	2-8	7.5M bit/sec.	220M	8	Unix V.2	8	6	16	$9,995 with 50M-byte disk, tape, floppy, 2M-byte memory
	Cubix 3	Feb. 1987	DP, OA	PC AT, Microvax	1	250 nsec	2-8	7.5M bit/sec.	660M	16	Unix V.2	16	14	16	$12,995 with 50M-byte disk, tape, floppy, CPU, 2M-byte memory
MAI Basic Four, Inc. (714) 731-5100	MAI 2000	Feb. 1985	DP	NA	1	500 nsec	768K-1.5M	4	240M	16	BOSS/IX	18	6	16	$10,250 with 768K-byte memory, 44M-byte disk, 7 ports
	MAI 3000	Dec. 1986	DP	NA	2	187.5 nsec	1-6	NA	480M	34	BOSS/IX	34	20	32	$18,835 with 1M-byte memory, 64M-byte disk, 7 ports
	MPx 7100 series (1 or 2 CPUs)	Aug. 1986	DP, OA, TP	Microvax II, VAX 8250; System/36	NA	NA	2-6	630	NA	32	BOSS/VS	32	20	16-32	$26,999 with CPU, 2M-byte memory, 4 ports, 160M-byte disk, tape
MDS Qantel, Inc. (415) 887-7777	System 42/45	1987	TP	NA	NA	77 nsec	512K-1M	NA	NA	4	BEST/AOS	32	8	8	$13,450 with CPU, 512K-byte memory, 45M-byte disk, operating system
	System 45XP/75	1987	TP	System/36	NA	77 nsec	512K-1M	NA	NA	8	BEST/AOS	32	8-10	8	$20,950 with CPU, 512K-byte memory, 75M-byte disk, operating system
	System 55/160	Feb. 1986	TP	System/36	NA	71.4 nsec	2-4	NA	NA	8	BEST/AOS	64	20	8	$25,950 with CPU, 2M-byte memory, 160M-byte disk
	System 60	Feb. 1986	TP	System/36	NA	71.4 nsec	2-16	NA	NA	14	BEST/AOS	64	20	8	$34,950 with CPU, 2M-byte memory
	System 70	March 1986	TP	System/36	NA	50 nsec	2-16	NA	NA	16	BEST/AOS	150	40-60	8	$59,950 with CPU, 2M-byte memory
MIPS Computer Systems, Inc. (415) 720-1700	M/500 System	June 1986	SE	VAX 8600	5	125 nsec	4-20	2.4	170M-689M	8-32	UMIPS/V, UMIPS/BSD	32	1-32	32	$20,900 with 4M-byte memory
	M/800 System	March 1987	SE	VAX 8700	8	80 nsec	4-20	2.4	170M-689M	8-32	UMIPS/V, UMIPS/BSD	32	1-32	32	$25,900 with 4M-byte memory
	M/1000 System	July 1987	SE	VAX 8800	10	66.7 nsec	4-80	2.4	170M-689M	8-32	UMIPS/V, UMIPS/-BSD	32	1-32	32	$35,900 with 4M-byte memory
McDonnell Douglas Computer Systems Co. (714) 250-1000	10000 series	1985	DP, OA	System/36, Microvax II	NA	300 nsec	512K-6M	12M bit/sec.	47M-405M	8-64	Reality	64	16-32	16	$23,500 with 512K-byte memory, 47M-byte disk, 8 ports, tape



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COMPANY	PRODUCT	DATE FIRST INSTALLED	PRIMARY MARKET*	MOST COMPATIBLE IBM OR DEC SYSTEM	PERFORMANCE (MIPS)	CPU SPEED	MEMORY (MBYTES)	DISK TRANSFER RATE (MBYTE/SEC.)	DISK CAPACITY (BYTES)	PORTS	OPERATING SYSTEM	MAXIMUM NUMBER OF USERS	TYPICAL NUMBER OF USERS	WORD LENGTH (BITS)	BASE PRICE
Modular Computer Systems, Inc. (305) 974-1380	Classic II/15	1984	SS	NA	0.2	400 nsec	Up to 2	NA	NA	NA	MAX IV	16	NA	NA	$13,500 with 512K-byte memory
	Classic II/25	1982	SS	NA	0.3	300 nsec	128K-1M	NA	NA	NA	MAX IV	64	NA	16	$27,300 with 512K-byte memory
	Classic II/65	1983	SS	NA	0.7	250 nsec	Up to 2	NA	NA	NA	MAX IV	128	NA	16	$40,000 with 1M-byte memory
	Power 45	1987	SS	NA	0.7	250 nsec	Up to 2	5	NA	NA	MAX IV	128	NA	16	$72,000 with 2M-byte memory, 160M-byte disk, tape
Motorola Computer Systems, Inc. Contact local sales office	System 8000 Model 100	NA	OA	Microvax 2000, PS/2 series	2.5	66 nsec	2-4	10M bit/sec.	161M	2-10	Unix V680S	8	1-8	32	$23,000
NCR Corp. Contact local sales office	Minitower	1985	DP	NA	0.5	10 MHz	1-3	NA	140M	8	Unix V.2, RM/COS	8	NA	16	$5,995 with 1M-byte memory, 25M-byte disk, floppy drive
	Tower XP	1984	DP	Microvax II, System/36	0.8	10 MHz	1-8	NA	280M	18	Unix V.2, RM/COS	16	2 to 16	16	$8,525 with 25M-byte disk, 1M-byte memory, floppy drive, operating system
	Tower 32/400	1986	DP	NA	2.1	16.7 MHz	1-8	NA	140M	18	Unix V.2	16	NA	32	$14,995 with 1M-byte memory, 46M-byte disk, tape, operating system
	Tower 32/600	1986	DP	NA	1	16.7 MHz	1-16	NA	5.5G	54	Unix V.2, RM/COS	48	NA	32	$31,175 with 1M-byte memory, 46M-byte disk, tape
NEC Information Systems, Inc. (617) 264-8000	Astra XL/32	Feb. 1986	DP	System/36, Microvax II with Ultrix	NA	16.7 MHz	2-16	1.2	1G	32	Unix V.2	32	20	32	$25,500 with 125M-byte disk, 2M-byte memory, 8 ports
	Astra 300 VS series	June 1984	DP	System/36, PDPs, Microvax II	NA	10 MHz	1-6	1.2	1G	34	Unix V.2	32	16	32	$26,000 with 125M-byte disk, 2M-byte memory
Norsk Data NA, Inc. (617) 366-4062	ND 110	NA	DP	Microvax	0.55	120 nsec	0.5-128	2.1	1.2M-8G	15	Sintran	128	NA	32	$87,150 with 1M-byte memory, 1.2M-byte disk, power supply, operating system
Onyx Technologies, Inc. (415) 651-0676	5010	1979	OA	NA	NA	NA	20-100	NA	160M	11	Oasis	8	5	16	$4,295 with 20M-byte disk, 384K-byte memory, tape, operating system, 5 ports
	5012	1979	OA	NA	NA	NA	50-170	NA	170M	11	Unix	8	5	16	$4,995 with 512K-byte memory, 5 ports, operating system
Plexus Computers, Inc. (408) 943-2248	Plexus P/60	June 1987	DP	VAX	4	25 MHz	2-16	2	3.5G	8-64	Unix System V	64	24	32	$29,500 with 2M-byte memory, 67M-byte disk, tape, power supply
	Plexus P/95	May 1987	DP	VAX 8600	4	25 MHz	4-48	3	6.7G	128	Unix System V	128	60	32	$55,000 with 4M-byte memory, 142M-byte disk, tape, power supply
Point 4 Data Corp. (714) 259-0777	Mark 2E	Jan. 1987	DP	System/36	3.6	280 nsec	Up to 2	0.625	27M-143M	17	Iris	19	12	16	$11,395 with 256K-byte memory, 4 ports, 27M-byte disk, 60M-byte tape, operating system
	Mark 4E	May 1987	DP	System/36	3.6	280 nsec	Up to 2	0.625	86M-429M	33	Iris	32	24	16	$21,995 with 1M-byte memory, 16 ports, 86M-byte disk, 60M-byte tape, operating system
Prime Computer, Inc. (800) 343-2540, (800) 322-2450 (Mass.)	EXL 316	June 1987	DP	Microvax II	3.2	16 MHz	2-8	1.25	1G	58	Prime SVID	32	NA	NA	$23,900 with 2M-byte memory, 60M-byte tape, 90M-byte disk, power supply, operating system
	2350	Feb. 1986	DP, SE, OA, TP	Microvax II, 9370 Model 20	0.85	160 nsec	2-6	1.5	516M	1	Primos	32	NA	32	$19,900 with 60M-byte tape, controller, power supply, operating system
	2450	Feb. 1986	DP, SE, OA, TP	Microvax II, 9370 Model 40	1.3	160 nsec	4-8	1.5	516M	1	Primos	40	NA	32	$43,560 with 60M-byte tape, controller, power supply, operating system
	2455	1987	DP	Microvax II	1.6	NA	4-12	NA	774M	40	Primos	48	NA	32	$62,810 with 4M-byte memory, 258M-byte disk, tape, operating system
Rexon Business Machines Corp. (800) 421-5184	Summit 1000	Dec. 1986	DP	PC AT	NA	100 nsec	640K-15M	5M bit/sec.	25M-191M	Up to 16	Pick Open Architecture, Xenix System V, Thoroughbred	16	8	16	$2,850 with 640K-byte memory, 25M-byte disk, 60M-byte tape
	Summit 2000	Aug. 1987	DP, OA	PS/2 Model 80	NA	62.5 nsec	1-24	5M bit/sec.	50M-191M	Up to 32	Pick Open Architecture, Xenix System V, Thoroughbred	32	16	32	$4,400 with 1M-byte memory, 50M-byte disk, 60M-byte tape
SCI Technology, Inc. (205) 882-4773	SCI 1000	Sept. 1983	OA	VAX-11/750	0.75	500 nsec	1	5M bit/sec.	172M	8	IN/ix 2.0	8	6	16	$11,900 with 1M-byte memory, 86M-byte disk, 500K-byte floppy
	SCI 2000	Oct. 1985	OA	VAX-11/785	2	250 nsec	2-6	5M bit/sec.	172M	24	IN/ix 2.0	24	12	16	$12,910 with 2M-byte memory, 86M-byte disk, 500K-byte floppy
	SCI 3000	June 1987	OA	VAX 8600	3.5	125 nsec	4-8	1.5M bit/sec.	344M	64	Unix V.3	64	34	32	$19,850 with 4M-byte memory, 86M-byte disk, 1.2M-byte floppy

COMPANY	PRODUCT	DATE FIRST INSTALLED	PRIMARY MARKET[1]	MOST COMPATIBLE IBM OR DEC SYSTEM	PERFORMANCE (MIPS)	CPU SPEED	MEMORY (MBYTES)	DISK TRANSFER RATE (MBYTE/SEC.)	DISK CAPACITY (BYTES)	PORTS	OPERATING SYSTEM	MAXIMUM NUMBER OF USERS	TYPICAL NUMBER OF USERS	WORD LENGTH (BITS)	BASE PRICE
Tandem Computers, Inc. (408) 725-6000	Tandem LXN	Jan. 1987	TP	System/36	NA	16.7 MHz	2-16	10M bit/sec.	1.02G	16	Unix V.2.2	32	12-24	32	$23,700 with 2M-byte memory, controllers, 60M-byte tape, 60M-byte hard disk, 16 ports
	Nonstop CLX series (1-6 CPUs)	Fourth quarter 1987	TP	VAX 8350, 8370	1-6	133 nsec	12-72	1.2	8.8G	37-612	Guardian 90	37-612	30-300	32	$57,000 with CPU, 4M-byte memory, 2 145M-byte disk drives, tape, power supply
	Nonstop EXT10 (1-4 CPUs)	Aug. 1986	TP	System/36, 38	1.7-3.4	100 nsec	2-32	1.2	30G	144-308	Guardian 90	512	150	16	$74,900 with 2 CPUs, 4M-byte memory, 250M-byte disk, tape, power supplies
Texas Instruments, Inc. (800) 527-3500	System 1100	April 1987	DP	PS/2, Model 60	1.4	83 nsec	1-15	5M bit/sec.	48M-280M	8-24	TI System V	16	10-12	16	$13,895 with 1.15M-byte memory, 48M-byte disk, 60M-byte tape
	System 1300	Fourth quarter 1987	DP	PS/2 Model 80, Microvax II	4	50 nsec	4-64	10M bit/sec.	1.8G	16-32	TI System V	32	16-20	32	$27,495 with 4M-byte memory, 182M-byte hard disk, 60M-byte tape
Third Coast Technologies, Inc. (312) 690-4641	Tribe 386	June 1987	DP	PC AT	3.5-4.2	20-32.5 MHz	2-16	400K	380M	17-35	Xenix, Unix V.3, Theos 286/386, MS-DOS	34	25	32	$8,895 with 17 ports, 2M-byte memory, 1.2M-byte floppy
	386V	Jan. 1986	DP	NA	3.5-4.2	20-32.5 MHz	2-16	800K	1.2G	33-64	Xenix V, Theos 286/386	64	25	32	$16,995 with 32 ports, 2M-byte memory
The Ultimate Corp. (201) 887-9222	Honeywell Model 1410	NA	OA	NA	NA	NA	2	NA	NA	8	Ultimate Operating System	NA	NA	32	$18,500 with 2M-byte memory, 8 ports, 86M-byte disk, power, operating system
	Honeywell Model 1420	NA	NA	DP	NA	NA	12	NA	NA	16	Ultimate Operating System	NA	NA	32	$31,000 with 2M-byte memory, 182M-byte disk, 16 ports, power, operating system
	Honeywell Model 1430	NA	NA	DP	NA	NA	2	NA	NA	32-64	Ultimate Operating System	NA	NA	32	$39,900 with 2M-byte memory, 182M-byte disk, 32 ports, power, operating system
Unisys Corp. (312) 972-7000	B38	March 1987	DP, OA, TP	System/36, Microvax II	NA	22.5	2-4	5	270M	3-20	BTOS, PC-DOS	34	12	16	$5,035 with 1M-byte memory, power, 4 ports
	5000/50	Oct. 1985	DP	System/36	NA	16.67 MHz	2-6	0.67	Up to 670M	3-16	Unix V.2	16	8	32	$14,900 with 2M-byte memory, 38M-byte disk, 8 ports, power supply, 45M-byte tape
	5000/60	May 1986	DP	System/36, Microvax II	NA	16.67 MHz	2-16	0.15	Up to 1.38G	3-32	Unix V.2	32	16	32	$22,135 with 2M-byte memory, 8 ports, 71M-byte disk, 45M-byte tape drive
	5000/70	Dec. 1984	DP	System/36, Microvax II	NA	16.67 MHz	1-36	1.2	Up to 3.5G	Up to 128	Centix	128	16-64	32	$37,000 with 5M-byte memory, 16 ports, 71M-byte disk, 45M-byte tape, power supply
	5000/90	June 1986	DP	System/36, 38; VAX 8200	NA	12.5 MHz	2-16	1.2	Up to 7G	Up to 128	Unix V.2	128	32-64	32	$58,300 with 2M-byte memory, 8 ports, 140M-byte disk, 45M-byte tape, power supply
	A 1	Sept. 1987	DP	9375 Model 40	0.5	NA	12-48	0.4	256K-1M	NA	MCP/AS	NA	10-25	48	$25,000 with CPU, 12M-byte memory
	A 2	April 1986	DP	System/38	0.36	NA	3-9	3	NA	9	MCP/AS	NA	NA	48	$60,000 with 6M-byte memory, 125M-byte disk, tape, 2 data link processors
Wang Laboratories, Inc. (617) 459-5000	VS 5	April 1986	DP	NA	0.4*	480 nsec	1-2	1.2	1.7G	32	VS/OS	16	4-8	32	$13,000 with 1M-byte memory, 67M-byte disk, 16 ports
	VS 6	Apr. 1986	DP	NA	0.7*	200 nsec	1-4	1.2	1.7G	48	VS/OS	32	8-24	32	$22,000 with 1M-byte memory, 67M-byte disk, 16 ports
	VS 65	Feb. 1985	DP	NA	0.7*	200 nsec	1-4	1.2	2.6G	64	VS/OS	40	25-40	32	$30,000 with 2M-byte memory, 32 ports
Wicat Systems, Inc. (801) 224-6400	Wicat 2250	Sept. 1984	DP	VAX-11/780	1.25	NA	1-6	NA	142M	16	WMCS, Unix	16	8	16	$30,000 with 3M-byte memory, 86M-byte disk, 60M-byte tape, 8 ports, operating system
	Wicat 3220	Jan. 1987	DP	VAX-11/780	5	NA	4-12	NA	500M	34	WMCS, Unix	34	32	32	$80,000 with 4M-byte memory, 500M-byte disk, 32 ports, operating system
Zilog, Inc. (408) 370-8000	System 8000/32 Model 110	1986	DP	NA	4	56 nsec	2-8	10M bit/sec.	85M	Up to 26	Unix V.2.1	26	16	32	$17,450 with operating system, 10 ports, 2M-byte memory, 60M-byte tape, 85M-byte disk
	System 8000/32 Model 130	1986	DP	NA	4	56 nsec	2-16	20M bit/sec.	337M	Up to 58	Unix V.2.1	58	32	32	$37,900 with 4M-byte memory, operating system, 60M-byte tape

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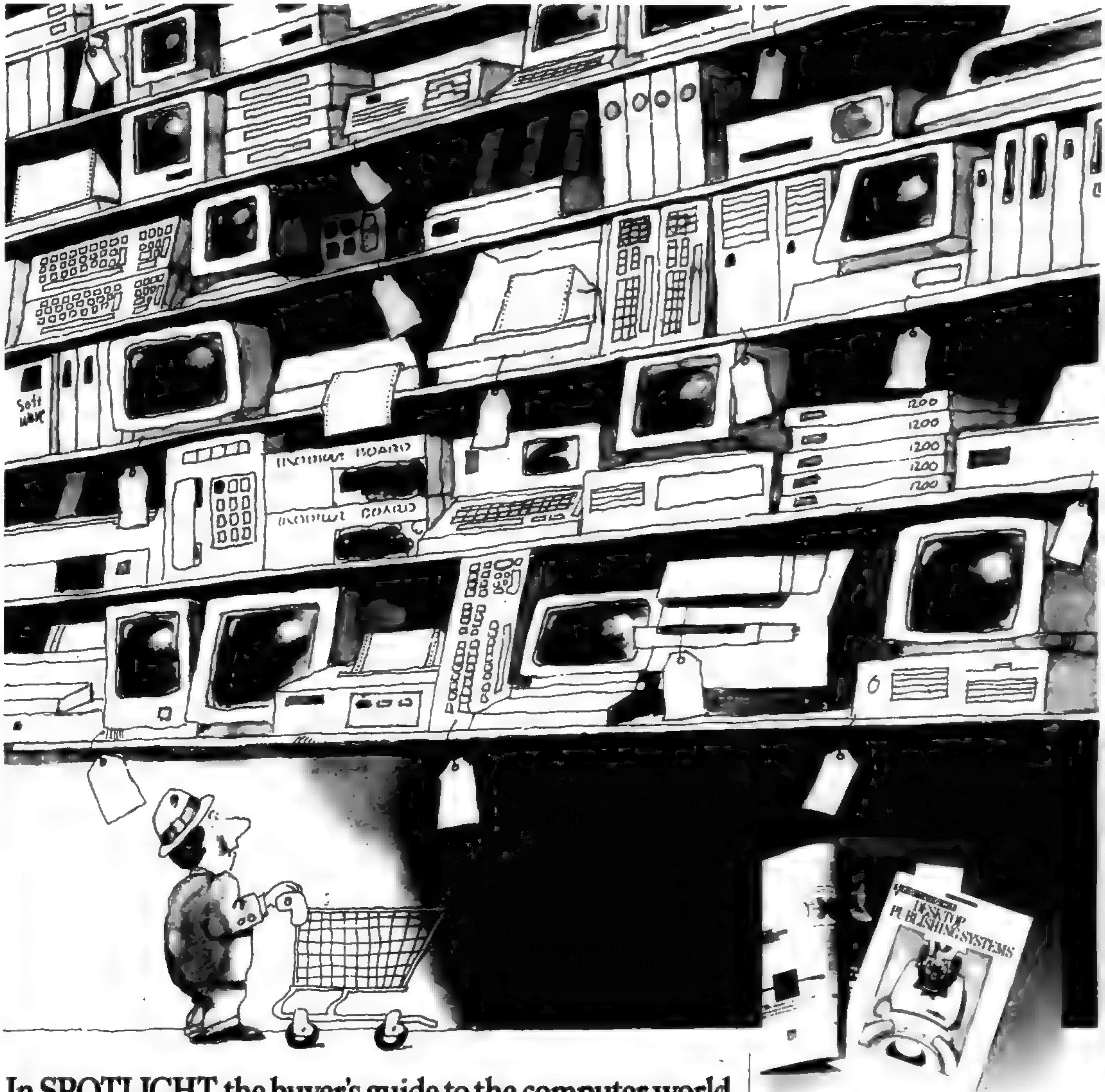

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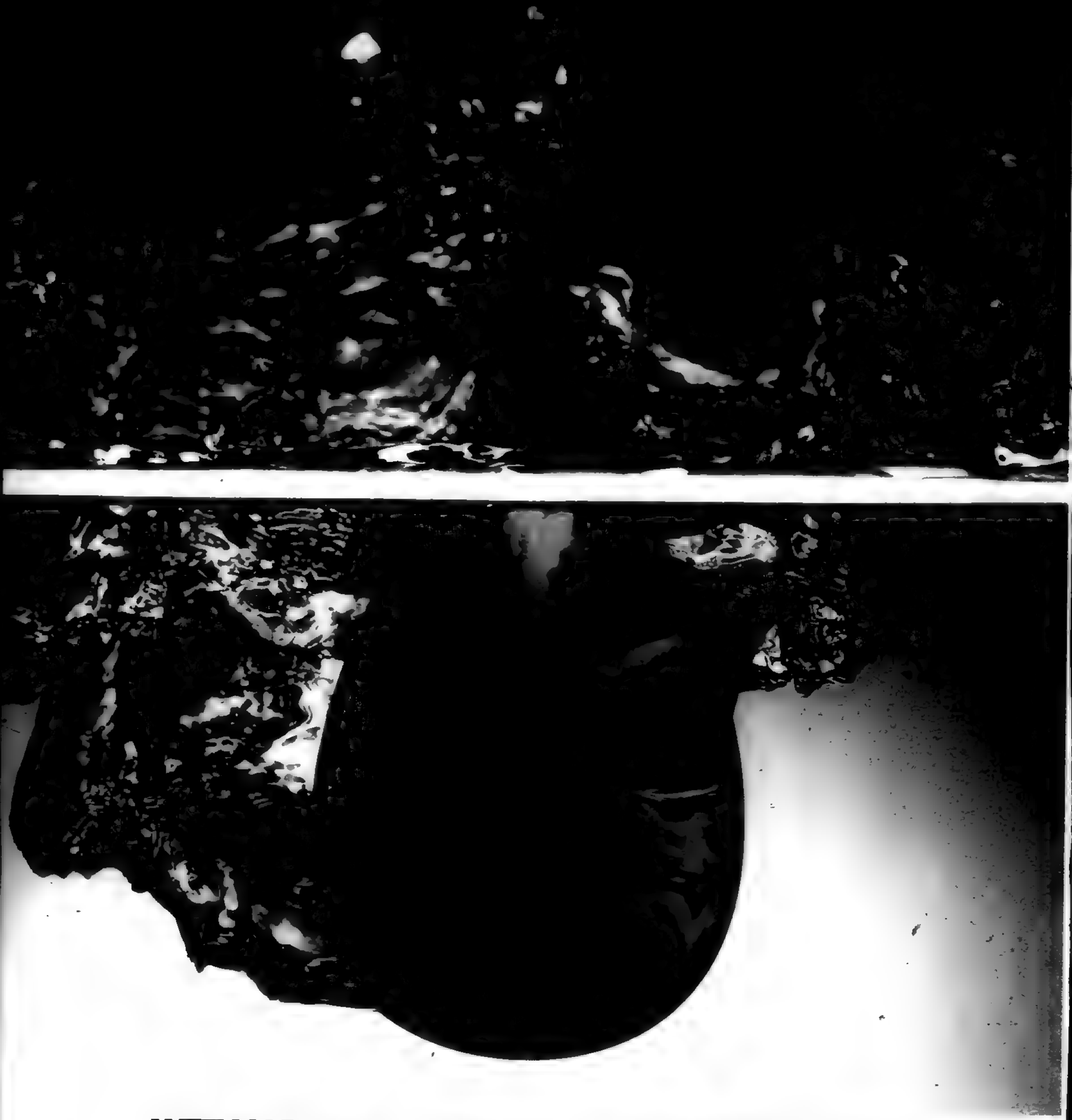

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IN DEPTH

Will China be the next Japan?

People's Republic finds U.S. technology transfer policy slows its push into an information economy

BY JOHN MAIER

First in a two-part series

While on a recent visit to China, a Westerner observed a Chinese store clerk using an abacus to total customers' bills rather than the electronic calculator that was also available to him. When asked why, the clerk replied that it was easier.

The point is that technology cannot merely be injected into a culture. Bringing more than one billion people into the electronic age must be a value-sensitive process — one that retains the culture's treasures.

This article discusses the convergence of the global information technology revolution with the emerging identity of the dynamic new China. In particular, I will examine the U.S. policy of computer technology transfer to China and the implications of that policy as it affects China's modernization drive. I will also share some of my experiences in China and my observations about the way computer technology is being diffused in Chinese economy and society.

The substance of this article results from a decade and a half of personal and professional involvement with China, including several years of living in Taiwan and mainland China and also five years of working in Washington, D.C., where I was often called in on matters relating to China.

Maier is a computer scientist in Fort Worth, Texas. He is presently organizing the extension of a wide-area network with China. He recently founded the Systemic Threshold Advanced Research (STAR) Institute, a nonprofit international venue for research at disciplinary boundaries and thresholds.

In June I participated in the Second International Conference on Computers and Applications in Beijing, hosted by the Chinese Academy of Sciences Institute of Computing Technology and cosponsored by the China Computer Federation and the U.S. Institute of Electrical and Electronics Engineers.

I could not possibly encapsulate all of my experiences from trips to a country as complex as China, especially at a time when profound and widespread changes are occurring there, making it feel like spring all year round. While I appreciate my Chinese friends for what they taught and showed me, I saw some computer implementations that amazed me, some that confounded me and some that dismayed me.

There is always some level of tension in cross-cultural encounters. This is a serious issue, for we are talking about the technological impact on options for the future of a population almost twice as large as the combined populations of the U.S., Japan and the 10 countries of the European Economic Community.

Whereas the first internal-memory, stored-program computer was produced as a working model at Harvard University in 1944, it was more than a decade later — in 1958 — that China's first working computer prototype was announced by the Chinese Academy of Sciences Institute of Computing Technology.

In that decade or so, the U.S. and some other Western countries had progressed from first-generation (tubes) to second-generation (transistors) technology and were about to produce a third (integrated circuits). The U.S. computer industry had emerged, and corporate giants — IBM, Honeywell, Inc., Sperry Univac and Burroughs Corp. — were vying for a growing domestic and international market, competing to produce the most current technologies to meet rapidly expanding demands. In 1958, as an embargoed country, China was excluded from that marketplace.

Behind from the first

China's first computer was a rather limited, first-generation machine. Its 32-bit processor, 4K bytes of internal memory and 180 operations per second speed reflected a traditional von Neumann architecture and stood two generations behind the technology then prevailing in the West. That machine and others were not put into serial production.

Although China progressed technologically through two more computer generations in the next two decades, it did not demonstrate large-scale production capabilities or diffuse, to any significant degree, computer technology into its economy or society. Computer activity in China was almost totally centered on the laboratory.

In the earlier years, from 1949 on, China was under a complete trade embargo imposed by Western countries, which

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organized the Coordinating Committee for Multilateral Export Controls (Cocom). This committee included Japan and countries associated with the North Atlantic Treaty Organization, except for Iceland and Spain. This made any significant or legal transfer of technology into China impossible.

From the Western viewpoint (including Japan's) during the 1950s, '60s and most of the '70s, everything west of Japan and north of Hong Kong was essentially a vast, forbidden territory.

> IN A modern world in which no part of the globe was unreachable, China during this period was less accessible than the moon.

Although advisors from the Soviet Union (numbering around 10,000 at their maximum) did enter China in the early 1950s, they departed en masse in 1960 when the Sino-Soviet ideological split occurred.

Moreover, the first successful computer models in the Soviet Union lagged considerably behind those in the U.S., so whatever assistance the Soviet Union provided China in those brief years of cooperation was not really state of the art.

A technological island

All Chinese computer activity that did occur at that time, such as it was, was endogenous to China. Oddly enough, for example, machines with 21-, 32-, 36-, 39-, 42-, 44- and 48-bit architectures were developed during this period. This, perhaps, showed China's willingness to experiment — as well as its lack of commitment to standardization and large-scale production.

We can also speculate that, since Western alphanumerics require only 2^7-bit representation (plus one bit for parity), then eight bits and multiples thereof were natural for Western machines. Chinese designers, on the other hand, were facing the 40,000 ideographs of their language and finding no easy, natural word length on which to settle.

In a modern world in which no part of the globe was unreachable, China during this period was less accessible than the moon. Any technology transfer activity to China thereafter would involve a relatively untouched environment. The country would serve as an excellent, almost pristine, laboratory for both the theory and the practice of technology transfer.

Post-1949 China, seeking to right previous societal and economic inequities, was rapidly communalized and centralized. It was not market driven. After almost three decades of this climate it became apparent to China's leaders that the economy and society suffered from inefficiencies that included a sluggish ability to innovate or absorb and diffuse new technology.

As a result, post-Mao, post-1978 leadership in China dismantled the entire countryside commune system (about 70% of the one billion-plus population), changed the centralized State Plan from mandatory to guidance only, made urban collective enterprises — including computer factories — function on a nonsubsidized profit-and-loss basis, deregulated numerous commodities, encouraged market mechanisms in the national economy and is now protecting a small but growing private sector, including domestic computer consulting firms.

Post-1978 China, orchestrated by Deng Xiaoping, Premier Zhao Zhiyang and others, is now officially described as a "socialist commodity economy" with Chinese characteristics. Pre-1978 China was an ideology-driven society with politics in command; post-1978 China is a performance-driven society with economics in command.

Computer scientists in China can now function in almost the same way as computer scientists in the U.S. — with some job mobility, a fair amount of professional prestige and satisfaction and with rewards for their accomplishments, including material incentives.

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Inside China

China now seeks — by the year 2000 — to quadruple its performance indicators of 1980; by the year 2050, it hopes to achieve full technological and standard-of-living parity with the world's most advanced economies.

With this policy it seems apparent that China aims to become a significant economic competitor and trading partner, and it should also be clear why U.S. computer export control policy is important to China's modernization.

> CHINA seeks by 2000 to quadruple its 1980 performance indicators; by 2050, it hopes to achieve full parity with the world's most advanced economies.

China's reversal in its official policy — which severs all government ties to domestic enterprises — is an astounding departure from pre-1978 China. If realized, this policy could transform the country into a vibrant market economy on a socialist base. (All land is still state owned.)

China's domestic economy in 1983 was the seventh largest in the world after the U.S., Japan, West Germany, France, the UK and Italy. (Figures are not available for the USSR.) In 1986, China's gross national product was $500 billion. There is good reason to believe that with a dynamic growth economy, China can replicate the experiences of the "Four Tigers of Asia" — Singapore, Hong Kong, South Korea and Taiwan — on a vastly larger scale. In this scenario, China would emerge Japan-like as the dominant economic presence in Asia early in the next century, perhaps eclipsing the much smaller island nation.

It was, therefore, not surprising, when I traveled through various Chinese provinces, to see a large number of Japanese businesses. I noted that while Western multinationals and large international banks have offices in major Chinese cities such as Beijing, Shanghai, Guangzhou and Shenyang, the Japanese have extended their presence to the provincial capital levels.

There is a growing, though not yet dependent, symbiotic relationship between Japan and China, accounted for by Japan's need for nearby raw resources and China's need for capital and technology. When American computer vendors complain about the U.S. export control process, it is in part because they see their market opportunities in China being preempted by the Japanese.

As an environment for technology diffusion, China has recently experienced great improvements. But Chinese society is still distant from the consumerism and planned obsolescence of the American economy, where the shortened half-lives of new technologies, even in computer products, keep millions employed in developing successor technologies.

Advertising infrastructure

For a start, though, televisions are now commonly found in households in China, and advertising is now allowed.

This gives rise to a new industry in China — an advertising infrastructure — and encourages the sophisticated use of demographics to promote consumer products as well as the values that lie in commercial success and competition.

Brand awareness is growing in China, be it Coca-Cola, IBM Personal Computers or Panda tractors, and the population of China is being subtly educated to perceive the benefits of change. Further, previously isolated local markets (fostered by the ideology of self-reliance in pre-1978 China) are being integrated into the regional and national economies, which in turn are now being linked to the international economy.

The point is that broad and

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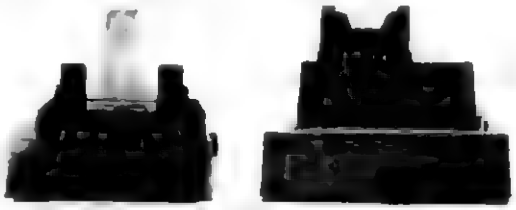

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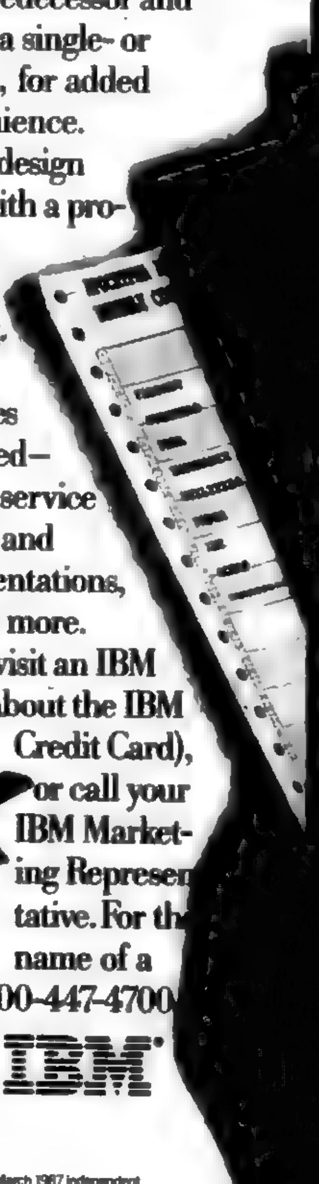

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self-sustaining technological diffusion in China now appears to be well into the start-up phase of, first, building a strong foundation of national receptivity and of building new norms and attitudes that will enable the successful transfer of technology when it does occur.

We must remember, however, and reemphasize the status in which China now finds itself, as a developing country. Diffusion of technology in China can be very difficult in a still resource-poor environment.

No loans, no lights

For example, the scarce foreign currency reserves with which to invest in technology from abroad must be carefully rationed. China's foreign exchange reserves during the past decade have ranged from about $16 billion to about $11 billion. China prefers a pay-as-you-go policy, only very carefully accepting loan financing. Investment, however, is encouraged.

Energy resource shortages result in an electrical power matrix that cannot provide enough electricity, depriving more than 100 million Chinese of even electric light, not to mention power for computers.

For example, at Sun Yatsen University in Guangzhou, where I spent much of a year, we had no electricity for a period of one day each week. At the campus computer center, a Fujitsu Ltd. Facom 340-S and a Digital Equipment Corp. VAX-11/85 were installed while I was there, but for some of the Chinese, no electricity meant only a day off, a day to catch up on shopping.

China is a unique socio-technological environment, and that environment affects the role of computer technology in China. Rod Macleod, whose corporation opened an office in Shanghai, perhaps described it best in a letter to the World Bank:

"In developed countries, commercial computer technology developed over 30 years in an environment fueled and enriched by 40 years of government and military technology and 50 years of pure and applied research in cybernetics, industrial engineering, management and organization. The computer scientists [in those countries] are embedded in a very complex network of related technologies which both use and sustain them. Probably only a few understand the whole network, and those who do are probably not interested in or able to implement change, especially in China.

"Thus, bringing computer technology to bear on China's modernization is not as simple as many believed."

> ENERGY resource shortages deprive more than 100 million Chinese of even electric light, not to mention power for computers.

Get involved

Crossing into a climate in which organizations, once automated, are unable to function without technological supports requires a change in the "day off" attitude and a realization by China's computer scientists that they and their skills are becoming embedded in the infrastructural needs of their nation. China's computer scientists of pre- and post-1970s must now come out of their laboratories and become involved in the practical application needs of their economy and society.

In the 1960s in the U.S., we learned the difficulties of human/machine interfaces in automating large organizational activities. There is every reason to believe that in China, which has a reputation for bureaucratic inertia, the automation task will be even more difficult. Diffusion of computer technology will occur at an effective rate only through a persistent, proactive effort by China's computer scientists with the well-articulated support of top leadership and middle managers.

On my travels in China, I frequently encountered underutilized machines, and I began to realize that the managers responsible for them were quite happy, thinking that possession

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of a computer ipso facto meant that their organizations had become modernized. They gave little thought to implementing automation and seemed not to have any incentive to do so. The situation was so widespread that I compared notes with others in China, and we came to suspect that as much as 50% of all computer capacity in China is not being used. Enlightened management and leadership are, therefore, needed resources in China. Solely by reason of the country's domestic resource constraints, computer technology transfer to China will, for now, have to be incremental.

Ongoing relationship

When an organization in China procures an American computer system, the contract package typically involves training for several people in the U.S. — the systems engineer, operations people and others — at the factory where the system is being assembled and may also include an ongoing service relationship after installation. Hence a fair amount of know-how is also being transferred.

However, China has become adamant that, while it does need the packaged computer systems in the short run, it intends to develop a domestic computer industry in the long run; therefore, it seeks transfer of computer manufacturing know-how.

Premier Zhao Zhiyang's sees the world very much in business terms. According to one American who lives in Shanghai, he said, "China will not become IBM's little brother" — or "*xiaodi*," a term that conveys affection but also clearly confers a status of lesser maturity and lesser independent capability.

Accordingly, China's congress recently enacted legislation establishing incentives and rules for multinationals to join with China's domestic industries in joint ventures, coproduction and investment.

China's preference is that the multinationals share more advanced technological capabilities in manufacturing, design, development, servicing and management with China's enterprises. Electronics is identified as one of the key industries for these joint ventures.

> AT BEST, joint ventures formed to date between Chinese enterprises and multinationals are still exploratory. Many have been fraught with difficulties.

In fact, China recently began to enact protectionist import taxation to shelter some portions of its fledgling domestic computer industry — microcomputers, for example, which have developed very rapidly as a domestic capability in China.

This stands as evidence of the velocity of technology diffusion from the shores of California to the suburbs of Shanghai. At the same time, China encourages the import of advanced and large-scale machines when need cannot be met by domestic products — which is usually the case.

Still new

At best, joint ventures formed to date between Chinese enterprises and multinationals — such as IBM, Intel Corp., Burroughs, Hitachi Ltd. and others — are still exploratory. Many have been fraught with difficulties, such as repatriation of profits, lack of access to local markets and strained management relations with local labor.

A good reason the verdict is not in yet on electronics joint ventures with China is that many of them are fairly long-range (10 to 15 years or more) and have been only recently formed.

Another difficulty, as Steven R. Hendryx describes it, is "*Tong zhuang, buyi meng*," or "sleeping in the same bed, but dreaming different dreams" (*The Columbia Journal of World Business*, Spring 1986).

Hendryx negotiated, organized and launched the China-Tianjin Otis Elevator Co. venture. Otis is a 130-year-old, multibillion-dollar subsidiary of United Technologies Corp.

Although one of the earlier

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and more successful joint ventures formed in China to date, China-Tianjin Otis was often hampered by sharp differences in attitude.

"In general, most industries in China are currently driven by technology rather than marketing," Hendryx says. "That is, products are largely conceived and designed by engineering, usually striving to be as advanced as capabilities allow. The notion of first doing a survey of market needs and preferences and designing products to meet those needs is alien."

> "MOST industries in China are driven by technology rather than marketing."
>
> STEVEN R. HENDRYX
> CHINA-TIANJIN OTIS
> ELEVATOR CO.

When making agreements with the Chinese, it is important not to make culturally inappropriate assumptions. Extensive preagreement negotiations help clarify the expectations of all parties involved and build a relationship of trust.

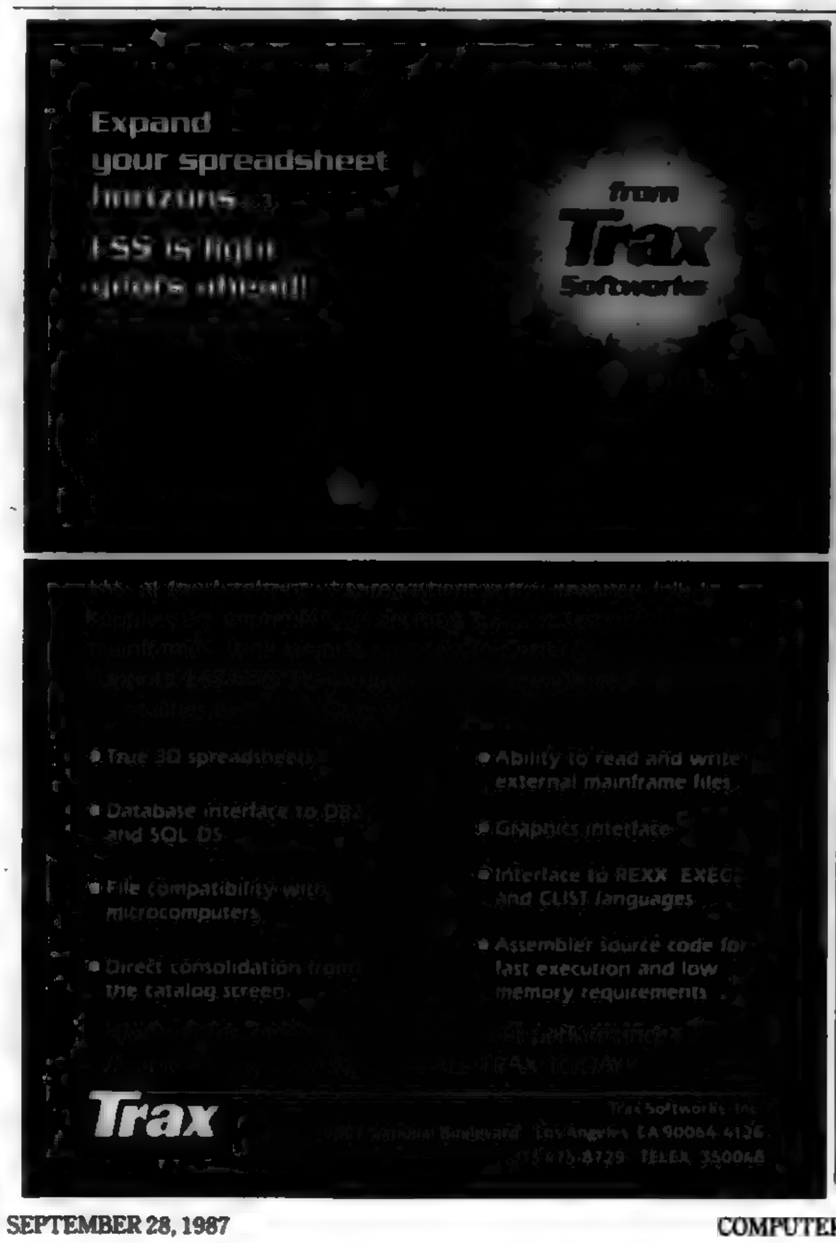
Another attitudinal difficulty Hendryx describes is compartmentalism, or the tendency to organize along vertical functional lines with minimal horizontal communications. This is a result of the old State Plan called "*danwei sixiang*," or the "my unit" mentality. This mentality is sometimes referred to in China as "*shantou zhuyi*," or "mountain peakism"; that is, "this mountain peak is my territory, and the others are not my concern."

I do not mean to imply any inherent deficiency in the abilities of the Chinese, but there are real conceptual difficulties resulting from a different, if now changing, systemic environment.

Hendryx reports that after a year and a half of operations, the China-Tianjin Otis venture is highly profitable, and, despite snags, advancement is being made in the transfer of new-product technology and in the introduction of the new product to the market. However, elevators have never, to my knowledge, become a U.S. national security concern, and, therefore, Hendryx never had to deal with the labyrinthine U.S. export controls system.

One of the early attempts by the Chinese to bring in their own advanced electronics production know-how is the Jiangnan Semiconductor Device Factory in Wuxi, located just west of Shanghai. The factory, which is intended as a Ministry of Electronics showcase, has been visited by several American delegations and reported on extensively by Jonathan Pollack, a Rand Corp. China specialist who visited China during part of the year I was there.

The Jiangnan factory, according to Pollack, is part of the Ministry of Electronics' attempt to make the important move from traditional electronics to microelectronics during the crucial seventh five-year plan (1986-1990). It is the result of a Ministry of Electronics contract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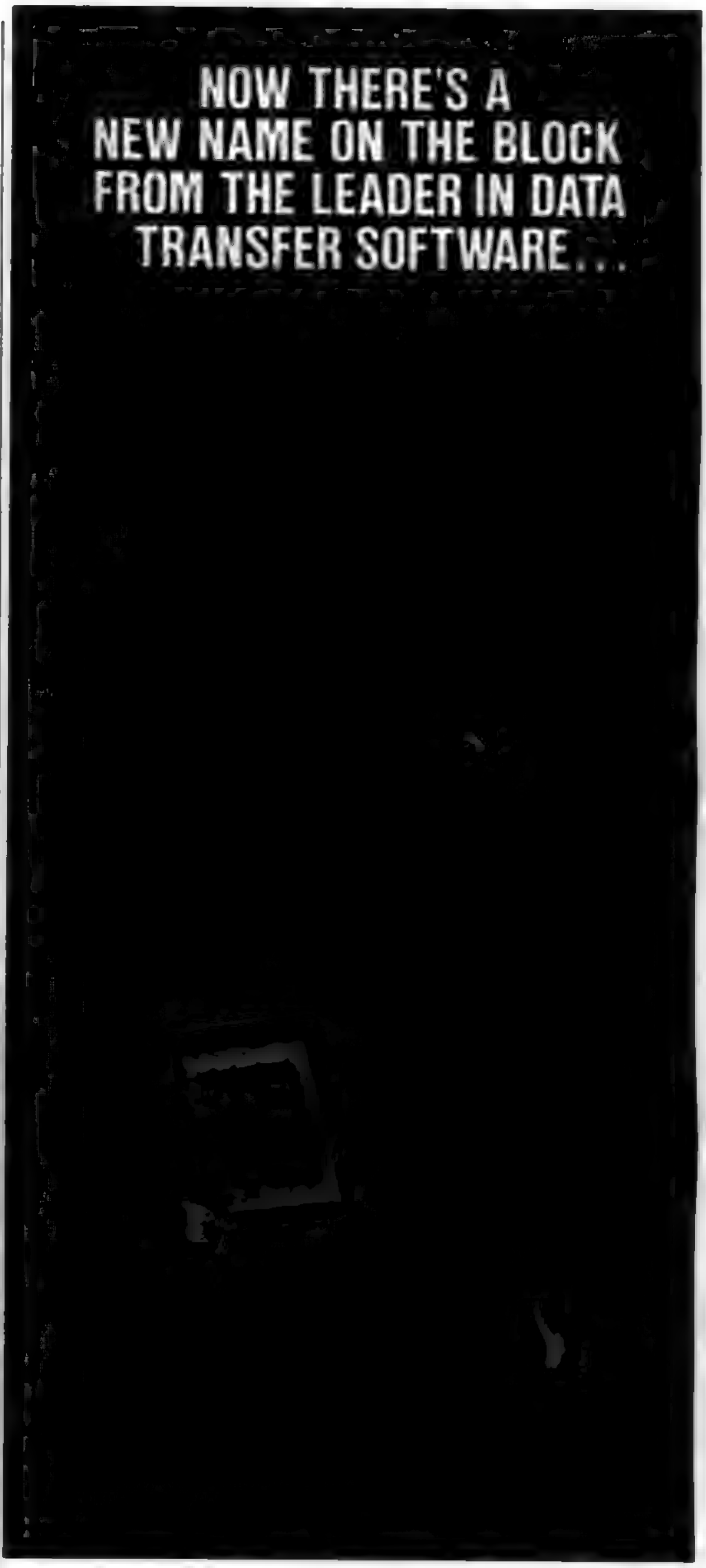
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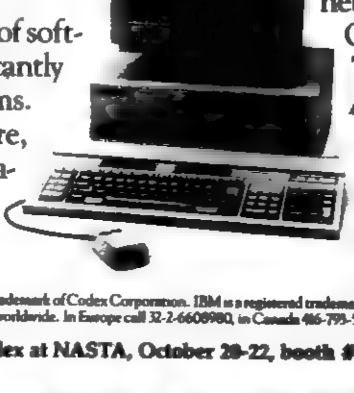

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with a consortium of foreign firms (including 42 U.S. suppliers) to provide production and testing equipment for a modern semiconductor plant to produce 24 million linear integrated circuits for use in Chinese televisions. One delegation commented that the plant will "compare favorably to modern semiconductor facilities now in operation in the U.S."

Some Chinese managers at Wuxi complained about delays in U.S. export licenses, but all in all, visits showed the plant to be a success, with all ordered equipment in place by mid-1984 and managers claiming that 86% of the televisions manufactured in Chinese plants used chips produced at Wuxi.

Open doors and minds

Pollack comments, "Many U.S. suppliers exhibit considerable hesitancy in the transfer of production technologies . . . in the belief that it will remain easier and more profitable to sell items and to provide services and training in the use of such equipment."

Sadly, such a strategy manifests a deep misunderstanding of China and a failure to perceive the benefits of establishing long-term, mutually beneficial relationships, such as the China-Tianjin Otis venture.

Corporate strategists need to plan for China's development into the 1990s and well beyond.

The China representative for a large multinational firm who installed 100 units of his product in China this year and then claimed success in the China market because 100 units is 25% more than last year is short-sighted. I want to know what commitments he has for the years 1997 and 2007.

President's-eye view

Fortunately, our own national leadership has a larger vision about China. For example, in April 1984, a few months after Premier Zhao Zhiyang's visit to the U.S., President Ronald Reagan addressed an audience of Chinese faculty and students assembled at a university in Shanghai.

"New satellites can be launched for use in . . . computer technology. . . . We hope to see the day when a Chinese scientist working out an engineering problem in Fudan University will be able to hook into the help of a scientist at a computer at MIT. And the scientist in Boston will be able to call on the expertise of the scientist in Shanghai, and all of it in a matter of seconds. My young friends, this is the way of the future," Reagan said.

Following that, in October 1985, Vice-President George Bush addressed a similar assembly at a Chinese university in Chengdu, Sichuan. Bush said, "We are also ready to help China. . . . One way is that we will soon be funding a study of the feasibility of a national communications satellite for China."

These White House statements to Chinese audiences add up to an American endorsement of extending capabilities in wide-area networking to China. It will be an important step, one that will build the connectivities that will service the trans-Pacific needs of the next century.

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technology transfer to China is still largely a transfer of products — at least 70% of the total business activity — with only a few representative and seminal commitments to transfer manufacturing know-how.

It is not impossible, though, for China to blossom in the next five to 10 years as the huge offshore manufacturing haven of the 1990s. Such a development could affect the entire organization of the global electronics industry.

Ramping up at home

Meanwhile, China is ramping up its own domestic computer technology capabilities. By 1971, the country had announced its first prototype of an integrated-circuit, or third-generation, machine.

By around 1980, China's Institute of Computing Technology was able to produce a prototype integrated-circuit-based machine that was capable of 1.4 million operations per second and housed 72K bytes of internal memory, disk storage, a fairly sophisticated operating system and a full range of language compilers.

Soon thereafter, the institute announced a vector-array machine with similar characteristics but with a larger internal memory of 4M bytes. Both of these machines probably had multitasking capabilities to some degree.

These machines are clearly strong third-generation computers developed by the Chinese, possibly equal in technology to what was widely available on the market in the U.S. in about 1970; that is, about equal to a mid-range IBM 360.

However, China's machines did not go into full-scale production. At best, it seems that not more than 100 copies of the models have been produced, so there was no wide diffusion of the technology. At that time, China had a national total of approximately 1,000 installed large and medium-scale machines for a saturation ratio of about one machine per one million people.

> IN 1970, China had a total of approximately 1,000 installed large and medium-scale machines for a saturation ratio of about one machine per one million people.

By contrast, in the U.S. the number of installations in 1980 numbered about 400,000, for a saturation ratio of about 2,000 machines per million people, and that did not include microcomputers.

In addition, the technology installed in the U.S. in 1980 was moving toward the early fourth generation, about a generation ahead of China. More importantly, penetration of the technology into the fabric of the American economy and society was far greater.

Of course, the situation is always dynamic, but taking a snapshot of China in 1979 and again in 1986, it appears that U.S. export control policy has functioned effectively to maintain China's computer capabilities at a significant distance behind the U.S.'s state of the art.

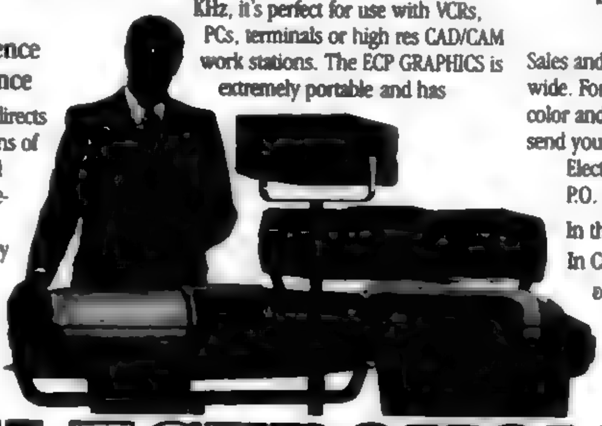
Evolving, but slowly

While in China recently, I saw fourth-generation U.S. technology products (VAXs and high-end IBM 4300s, for example), but I did not see any transfer of fourth-generation technology processes. And, of course, the U.S. is now moving into fifth-generation technology.

So yes, China has been enhanced, but only incrementally. This seems to be the obvious effect of U.S. export constraints vis-a-vis China and computer technology. It is, for now, only a matter of speculation about whether U.S. industry would self-impose similar constraints were government deregulation to occur.

For now, technology transfer to China is evolutionary, and it is clear that the cornucopia of U.S. computer technologies is really not open for China to simply buy anything it can pay for. ●

Next week: How the U.S. shares its computer manufacturing know-how with China.



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"The CIOs are coming! The CIOs are coming!" Latter-day Paul Reveres ride over the land to warn MIS execs of their impending doom. The DP shop will disappear by 1992 or 1997. Data processing is out. Information is in.

Woe to those who merely keep machines humming, getting reports out on time and keeping inventory under control. The future belongs to strategic information systems. Adapt or join buggy-whip makers and Hula Hoop distributors on the breadline.

Sounds easy. "Yesterday I had to worry about machines," the MIS chief says. "So I did. Today I have to think about information, so I'll do that." Right? Wrong.

The MIS executive who is worried about the future value of his skills should do two things.

First, keep doomsayers in perspective. The mainframes tracking Aetna policies and TWA flights will not soon disappear. Massive data bases will not migrate to departmental minis or PC local-area networks during the next decade. Traditional data processing will continue to be right for many vital applications. Some of these fit today's fashionable "mission-critical" category.

Large systems won't get the

Continued on page 86

Black DP group urged to stay in corporations

BY DAVID A. LUDLUM
CW STAFF

NEW ORLEANS — Layoffs prompted by global economic competition could unravel advances in corporate life made by blacks in recent years, the leader of the Black Data Processing Associates (BDPA) said recently at the group's ninth annual conference.

Black DP professionals should focus their attention on mainstream initiatives aimed at strengthening American economic competitiveness in order to maintain the advances they have made, said the group's president, Gerard Anderson, a systems engineer at IBM's sales office in East Orange, N.J.

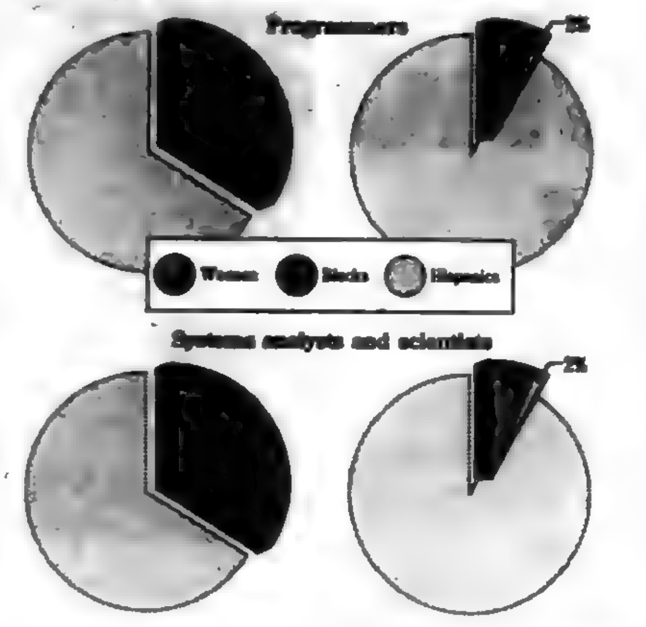
"We stand to lose two generations of work if the [civil rights] movement does not address the black professional," Anderson said at the conference, which ran Sept. 18-20.

In an interview, Anderson noted that despite the challenges he cited, his position underlines a growing confidence on the part of blacks that they can succeed in corporate America. Traditionally, the BDPA has emphasized entrepreneurship as a means for black DP professionals to suc-

Continued on page 81

Women and minorities

Women and minorities in computer occupations as percentages of the totals for 1986



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CW CHART

Hacker makes good

Former budgeteer takes on systems development

BY PATRICIA KEEFE
CW STAFF

LOS ANGELES — It all started innocently enough. Little did Chuck Winckler know that when he started hacking around with a computer at home in 1983 he was onto something big — both in the way his department would work and in the detour his career was about to take.

As Winckler tells it, his interest in computers was piqued that February by a request from his youngest son to take a course in using an Apple Computer, Inc. computer after school.

"I said, 'Gee, I'd better learn this,' so I bought an Atari and got interested in being a hacker at home," Winckler says.

In June of that year, Winckler, then in charge of budgeting and strategic planning for the External Affairs office of the Pacific Telesis Group, attended a seminar on office automation with his boss, Gerald Foster. "The professor talked about access to information, and we got all excited," he recounts.

Knowing that Winckler dabbled in electronics, Foster offered him what is turning out to be the assignment of his career: Automate. Back then, the assignment was simple. " 'Learn all you can, and then let's automate.' Little did I know what that meant. I'm still doing it," Winckler jokes.

Four years later, the 44-year-old manager, now director of support systems development for Pacific Telesis Southern Region External Affairs, is still at it.

A good understanding of the political environment, coupled with knowledge of what technology can do within that framework, has served Winckler well in his quest to automate where possible.

PROFILE

Chuck Winckler

Position: *Director of support systems development, Pacific Telesis Southern Region External Affairs.*

Mission: *To provide users with the services they want and 10% more time to do their jobs.*

JAMES [illegible]/GAMMA LIAISON

His philosophy is to approach automation from the standpoint of giving everyone, not just clerical workers, 10% more time to do their job. "If you can explain that automation is a management tool, just like budgeting, you have a better chance of selling it," Winckler says.

Foster set the stage, but it was Winckler and Lydia Arzate, then his assistant and now the office manager, who rolled up their sleeves and waded through the sea of applicable technology en route to implementing cost-saving programs cooked up by Foster and Winckler.

Winckler estimates that the initial foray into automation cost

Continued on page 85

MANAGEMENT MEMO

MIS eyes Chinese workers; execs face more info

The search for affordable programming talent is pushed further afield as a San Francisco firm aims to supply American corporations with programmers from the People's Republic of China.

The China Professional Resources Consortium (CPRC) has recently reached agreements with China's State Science and Technology Commission and other government authorities to provide the programmers, according to CPRC President John R. Cavalli.

The CPRC would provide American clients with English-speaking contract programmers on-site in the U.S. or in Chinese development shops, according to Cavalli.

The programmers typically earn about $33 a month, Cavilli added.

Cavalli says he hopes to sign contracts with the Chinese authorities in about a month, at which time he may have deals with a large insurance company and a large financial services concern — one on the East Coast and the other on the West Coast.

China has established four software technology development centers, and major universities there offer computer science programs, the CPRC says.

Most Chinese developers work with IBM 4300 mainframes running IBM's MVS/SP or DOS/VSE, "all kinds of minis and one hell of a lot of PCs," Cavalli says.

Chinese programmers have developed operating systems and applications for banking, hotel management, satellite communications, cargo tracking and manufacturing, he says.

The chief information officer, or CIO, charged with managing his organization's abundance of data, faces two new sources of information aimed directly at him.

This month, IDG Communications, Inc. in Framingham, Mass., publisher of *Computerworld*, launches *CIO* magazine, and market research firm Dataquest, Inc. in San Jose, Calif., unveils its CIO Adviser service.

CIO, a monthly to be distributed by controlled circulation, is positioned between general business periodicals and MIS trade journals, Editor Marcia Blumenthal said. It will address issues such as dealing with vendors; vertical market strategies and implementing technologies.

The CIO Adviser service is Dataquest's first product specifically designed for computer users, according to Linda O'Keeffe, a vice-president.

It is intended to provide "a window into Dataquest" through an account manager who provides a client with appropriate portions of the firm's research, contacts with analysts and periodic on-site briefings.

At $15,000 a year, it is targeted at Fortune 1,000-sized firms worldwide.

DAVID LUDLUM

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C&C Computers and Communications

Black DP pros

CONTINUED FROM PAGE 79

ceed in the face of discrimination. Anderson emphasized that Section 1706 of last year's federal income tax reform law has hindered many black independent DP consultants and professionals because of the limitations it imposes on their ability to work independently.

Elsewhere at the conference, which was attended by roughly half of the BDPA's 800 members, a discussion of working relationships between male and female black DP professionals generated considerable interest.

Black female professionals face a marked lack of respect from their black male colleagues, said Sam Hayes, a project supervisor with Middle South Utilities Systems Services, Inc., to the general concurrence of those attending a discussion of the issue that he led.

The situation is compounded by the growing predominance of women among black DP professionals. Despite the general predominance of males in the field [see chart], roughly 60% of the members of the BDPA are women. This reflects a general pattern among black DP professionals, according to association officials.

> "WE STAND to lose two generations of work if the [civil rights] movement does not address the black professional."
>
> GERARD ANDERSON
> BLACK DATA PROCESSING ASSOCIATES

There is an even greater predominance of women among blacks enrolled in college, suggesting that the imbalance will grow, the officials said.

In keeping with a goal of outreach to the black community, the conference included a competition in which teams of high school students from New Orleans and Atlanta competed in an examination on DP topics and in developing a program to generate reports showing fees incurred for use of a campsite. The students used IBM PC ATs donated by IBM.

The conference also included a presentation on an artificial intelligence model of a black teenager that was developed by a group of teenagers in the Washington, D.C., area using the AI programming language Turbo Prolog.

The project was aimed at introducing black students to a new technology before it became outdated, said Jesse L. Bemley, information manager for the U.S. Army's Cost and Economic Analysis Center and founder of Joint Educational Facilities, Inc., which organized the project.

The conference included an exhibition area staffed by DP recruiters for about a dozen companies, including 3M Co., Digital Equipment Corp. and PARS Service, Inc., operator of the reservation system serving Trans World Airlines and Northwest Airlines.

Representatives of several of the companies said they try to help meet goals or guidelines — but not rigid quotas — for hiring blacks, other minorities and the physically handicapped.

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**Computerworld*, June 15, 1987, survey by Datapro Research Corporation.

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Since all three are built for the same size cabinet, the A1 itself is field upgradeable to A4 and A6 levels—a better than 3 times increase in computing power.

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Grandpa's eyes.

All in all, the best thing about the Smallframe is that it sees the world the same way the powerful A15 and the whole A Series does. You might even call it a "chip off the ol' box." It's got the same operating system. Same interfaces. And it will even communicate with IBM machines.

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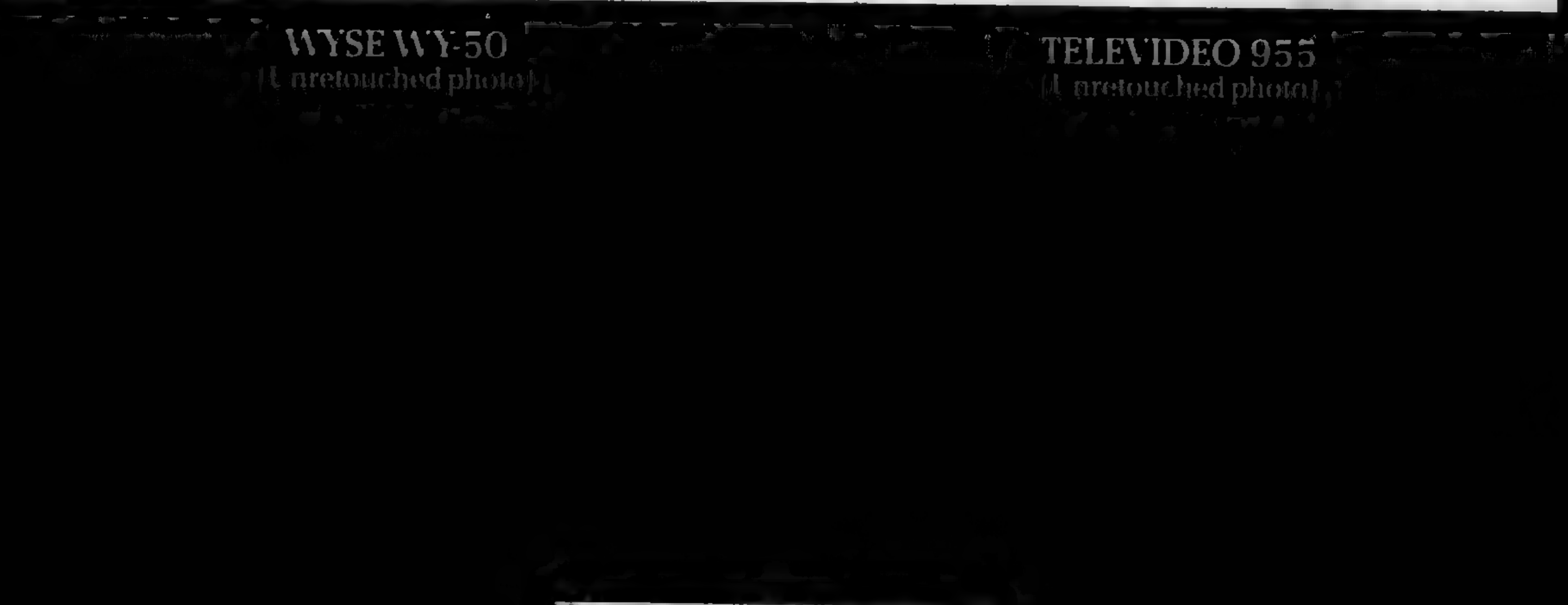

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Hacker

CONTINUED FROM PAGE 79

him and Arzate two years of 12-hour days, six days a week. In 1983, there was no MIS support for PCs, so the duo handled the installation and training themselves.

But for someone who's done everything the hard way, Winckler today is described by his coworkers and business associates as a "forward thinker." With neither an MBA nor a bachelor's degree, Winckler is responsible for designing systems that will enable External Affairs to communicate better.

The 25-year Pacific Telesis veteran started with the company at the bottom as a frame man. He later joined the Navy, working as an electronic technician, where he installed and ran the first closed-circuit television station on board a ship. When he got out of the service, he went back to his former employer part-time and got an associate's degree in business administration from Los Angeles Valley College.

Winckler then went to work in the switch room, a job that has since been computerized, and later moved into managerial positions, joining Community Relations in 1979, which became External Affairs a year later.

Along the way, he figures he has accrued about 100 hours in college-level courses, with a mix of management and technical subjects.

Not a stereotypical executive

Winckler may not fit the caricature of a pin-striped, yellow-tied MBA, but he brings to his position a combination of good judgment, flexibility and a willingness to learn — all keys to his success as a manager.

"Once he has developed respect for your capabilities, he is willing to work with you and not sit back and question everything you do. He admits what he doesn't know and lets you run with the ball," says Mark Freund, vice-president of marketing for Interconnect Network Consulting Group, Inc. in Pasadena, Calif.

"He really knows how to handle a budget," says coworker John Donner, director of corporate communications. Donner notes that Winckler invariably has the documentation to prove cost savings attributable to automation.

Presentation creation is one area Winckler jumped into early, saving the Administrative Services department $120,000 from one year to the next.

Sees himself as a manager

Even if others on the staff today see Winckler as a "techie," he sees himself, above all, as a manager. "If you're to survive in a management job, you've got to make the equipment work," he says.

He readily admits that his own style of management is borrowed lock, stock and barrel from his immediate superior, Gerry Foster.

"I think it's very important when you give an assignment that you tell them your expectations and then let them do it. I trust people. I like to have people around me who are willing to tell me if I have a dumb idea. I don't get mad. I say 'Thanks,'" Winckler says.

"He's a good example of being self-managed," coworker Donner says. "He's not sitting around waiting for someone to give him direction. He's out there looking and studying and hiring consultants to accomplish his goals."

Donner also credits Winckler with making sure — to the point of distraction at times — that equipment meets the needs of his users. "He has done extensive user surveys, to the point where we'd have liked to have thrown him and his consultant out of our office, they kept bugging us so much."

Winckler obviously cannot be everywhere or do everything, so he relies on technology-oriented individuals, one of whom can be found in just about every department — people not unlike himself.

"Those people keep an operation running, and there's always one in every group," he says. "If you take a new person and throw him in front of a terminal,

Continued on page 90

Check's in the mail

Over the years, the Pacific Telesis Group's Chuck Winckler has done his share of product research, testing and contracting and has had his share of hassles with suppliers.

In the early days, forced to do a lot of legwork looking for information, he quickly learned two axioms: Things are not always what they appear to be, and seeing is believing.

"I'm a true believer in 'Show me, don't tell me,' in my operation," Winckler says. There is not much point in seeing a product demonstrated at the vendor's site, he adds. There, it will probably work under any circumstances. Instead, Winckler insists on live testing in his shop. "You'll find out real quick at your place whether it works."

A skeptic, Winckler rattles off a handful of phrases guaranteed to set off his internal "oh-oh" alarm:

- User-friendly — "I've yet to find a manual that was user-friendly; They always just happen to leave something out."
- Artificial intelligence — "That whole issue is still out for debate."
- "Relational" data bases — He says he has yet to encounter one that is.
- "We forgot to tell you, but it'll only cost ya . . . ." Managers have to be very careful of that, he warns.
- Newer, faster — "I don't think I should put in new computers just because they are new. The old ones are fast enough; Most people don't use their computers to their full capacity today."
- Vaporware — " 'It'll be out next month.' That's another good one."

"There're a lot of people out there trying to convince a lot of others that they know what they are talking about. It only takes once to be told to do something and then get taken for $10,000," he says.

To avoid these kinds of mistakes, he says, it is incumbent on managers to make sure they know what they are talking about before they recommend a system.

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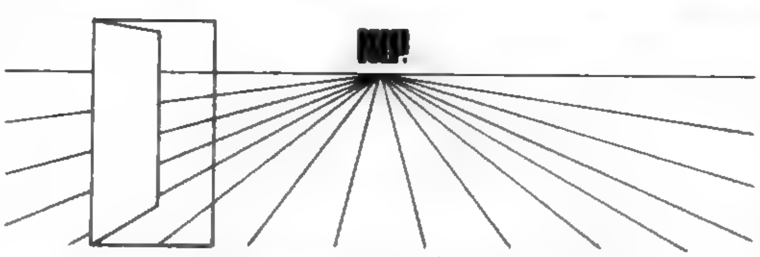

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Education

CONTINUED FROM PAGE 79

> PEOPLE can adapt. Old dogs can learn new tricks. . . . People who want to adapt must recognize the new skills they need and proceed to get them.

lion's share of new spending. Their slice of the pie will shrink. But they won't go away.

Consider railroads. Their share of the transportation market has dropped. Most of us no longer travel cross-country by train. But despite the availability of air transportation, interstate highways and teleconferencing, there are still needs best met by railroads.

Railroading may not have the glamour it did in 1887 or 1937. But, a quarter of a century into the jet age, a lot of people are doing quite nicely managing railroad operations and introducing new technology. There will still be a lot of them 25 or 50 years from now.

Second, remember that people can adapt. Old dogs can learn new tricks. Not all blacksmiths became automobile mechanics, but many became good ones. People who want to adapt must recognize the new skills they need and proceed to get them.

What are these skills? Business skills. Aligning information processing with business requires an understanding of both fields. The MIS executive must know what a balance sheet is, what goes into it and why. "Cost of capital" and "cash flow from depreciation" must make sense. Marketing concepts, both generic ones like positioning and specialized ones that apply to a specific industry, must be familiar.

Basic economics is essential. Michael Porter's five sources of competitive impact should be second nature. In a manufacturing firm, the ideas of just-in-time manufacturing and quality-control theory are basic. (Who was Edward Deming? What did he do? Where did he do it? Why did he do it there?) The list goes on.

Learning without business school

These can be learned. The traditional approach is to go to business school for an MBA. Part-time programs fit many people's schedules. Employers often subsidize the tuition. But getting an MBA isn't right for everyone. People who want to learn can also do the following:

- Talk. The MIS manager should talk to managers of other functions about what they do, why they do it and what they have to know to do it well. Most will be delighted to be asked, as long as the visitor doesn't demand 200 hours at the year-end crunch. Talking won't do the job by itself since managers don't have time to teach every DP type who walks into their office bearing gifts of doughnuts. But it's part of the answer.
- Read books. Good books about business are available in local libraries, corporate libraries and business sections of well-stocked commercial and college bookstores. Colleagues can help with rough spots.
- Take short courses and attend seminars. Topics such as "Accounting for the Nonfinancial Executive" are a staple of most adult education and management training programs. These courses are geared for people who don't have the time for a full MBA program but do want to learn about a topic. Where they fit a person's schedule and cover a useful subject, these courses should be considered.
- Read trade periodicals. Every industry and functional specialty has newspapers and magazines, just as MIS does. Reading them will familiarize an executive with the key issues of an industry or profession. Many magazines and newspapers cover new developments in depth. The MIS executive who takes the time to understand the articles can discuss their implications on a peer-to-peer basis with other managers in the firm.
- Think and question. There is no magic about the intelligent use of information. Think of the business purpose behind every application and what might accomplish this purpose more effectively. Look at the information in a data base and ask what other purposes it could serve. Use words and phrases such as "why," "why not," "what else" and "what if."
- Realign. Many MIS executives have primary loyalty to the information systems profession. Their firm or industry is a distant second. It's fine for an MIS director to recognize that his next position is unlikely to be marketing vice-president. That's reality. But business thinking means putting the business first. This is no more and no less than employers expect of other executives.

The product of this effort will be a new person. Instead of an MIS executive who happens to work in industry X, there will be an industry X executive who happens to specialize in information systems. That is the key to dealing with the information systems of the future, to helping a firm use information, to becoming a chief information officer. Those who make this transition successfully will be the information systems leaders of the 21st century.

Mallach teaches at the Boston College School of Management and is a consultant to user and vendor executives.

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choice.

Hacker

CONTINUED FROM PAGE 85

he's scared to death. But if there's someone out there willing to show that person, it really makes a difference on the learning curve."

For those users who want to take a more formal approach to learning, he suggests that they spend 10% of their time educating themselves.

Winckler has lived out this philosophy. He figures he spends eight hours a week working with Foster on the California Education Technology Committee, which is putting together a five-year plan on how technology can be used in the state's schools.

Also, he works on the technology committee of the Central City Association of Los Angeles, which examines how technology — telecommuting, for example — can be used to solve the city's problems.

International recognition

In addition, a team that included Winckler took second place last year in an international competition to design a city of the future. The yearlong project involved designing Kawasaki, Japan, for the year 2000.

Donner, who contributed to the Japanese project, sees Winckler's extracurricular activities as being beneficial to the corporation. Committee work also gives Winckler an avenue through which he can share with others the role that communications can play and some of the problems Pacific Telesis can address, Donner says.

Blue-sky brainstorming over high-level strategic issues on these outside committees also serves to provide added perspective when Winckler comes back down to earth and attempts to deal with problems in his own environment, says Freund, who worked as a consultant with Winckler on a project to network External Affairs.

But Winckler emphasizes that MIS managers also have to understand the department manager's job, which too often they do not.

"When they don't, users go out and get what they need another way," he says. "People are too creative these days. Hell, that's what I did."

CALENDAR

[illegible]

Financial Networks Workshop. Chicago, Oct. 4-6 — Contact: Ed Alwood, American Bankers Association, 1120 Connecticut Ave. N.W., Washington, D.C. 20036.

North American Ramis User Group's 1987 Roundtable. Orlando, Fla., Oct. 4-7 — Contact: Robert Forbetz, Forum Central Users Group, Monsanto Co., St. Louis, Mo.

CADRE '87: Annual Complete ADR Environment User Group Meeting. Las Vegas, Oct. 4-8 — Contact: Allen Haggar, Applied Data Research, Inc., Rt. 206 and Orchard Road, Princeton, N.J. 08543.

Second Annual Conference on Object-Oriented Programming Systems, Languages and Applications. Kissimmee, Fla., Oct. 4-8 — Contact: OOPSLA '87, P.O. Box 3845, Portland, Ore. 97208.

AUUA, Inc. (Sperry users) Fall Conference. Seattle, Oct. 4-9 — Contact: Randal L. Leonard, Gay & Taylor, Inc., P.O. Box 1410, Winston-Salem, N.C. 27102.

Software Contracts. Chicago, Oct. 5-6 — Contact: Registrar, Batelle Seminars Program, P.O. Box C-5395, 4000 N.E. 41st St., Seattle, Wash. 98105.

Third Party Maintenance. San Francisco, Oct. 5-6 — Contact: Carol Every, Frost & Sullivan, Inc., 106 Fulton St., New York, N.Y. 10038.

Strategic Issues in Managing Information Technology. Boston, Oct. 5-7 — Contact: Decision Support Technology, Inc., Conference Registration Office, 51 Church St., Boston, Mass. 02116.

Comten Users' Exchange Fall Conference. Seattle, Oct. 5-9 — Contact: Dave Beran, CUE Coordinator, NCR Comten, 2700 Snelling Ave. N., St. Paul, Minn. 55113.

Third Annual PDOS Interest Group Conference. Boston, Oct. 5-9 — Contact: Eyring Research Institute, Inc., 1455 W. 820 St. N., Provo, Utah 84601.

Feedback '87, 12th Annual DSSD User's Conference. Kansas City, Mo., Oct. 6-8 — Contact: Data Systems Structured Development, Ken Orr & Associates, Inc., 1725 Gage Blvd., Topeka, Kan. 66604.

AVIOS '87 Conference. Alexandria, Va., Oct. 6-8 — Contact: Leon Lerman, American Voice Input/Output Society, P.O. Box 60940, Palo Alto, Calif. 94036.

Fall Meeting of the Life Insurance Systems Association. Indianapolis, Oct. 6-9 — Contact: Valerie K. Tamblyn, Life Insurance Systems Association, Indianapolis Life Insurance, P.O. Box 1230, Indianapolis, Ind. 46206.

Banyan User Group Meeting. Newport, R.I., Oct. 7-9 — Contact: Banyan Systems, Inc., 115 Flanders Road, Westboro, Mass. 01581.

Electronic Messaging '87. San Francisco, Oct. 8-9 — Contact: Electronic Mail Association, Suite 300, 1919 Pennsylvania Ave. N.W., Washington, D.C. 20006.

Fourth Annual Computer Graphics Workshop. Cambridge, Mass., Oct. 8-9 — Contact: Judy DesHarnais, Usenix Conference Office, P.O. Box 385, 16951 Pacific Coast Highway, Sunset Beach, Calif. 90742.

Ami Expo. New York, Oct. 10-12 — Contact: Ami Expo Headquarters, Suite 301, 211 E. 43rd St., New York, N.Y. 10017.

[illegible]

Software Publishers Association's Third Annual Conference: Exploring New Frontiers in Software. Cambridge, Mass., Oct. 11-14 — Contact: SPA, Suite 901, 1101 Connecticut Ave. N.W., Washington, D.C. [illegible]

Society for Information Management's 19th Annual Conference. Seattle, Oct. 11-15 — Contact: Kathleen Niles, SIM Headquarters, Suite 600, 111 E. Wacker Drive, Chicago, Ill. 60601.

Smart Card Applications and Technologies Conference. Atlantic City, Oct. 12-14 — Contact: The Information Exchange, Suite B, 15269 Mimosa, Dumfries, Va. 22026.

FMS '87: Flexible Manufacturing Systems. Long Beach, Calif., Oct. 12-15 — Contact: Special Programs Division, Computer and Automated Systems Association/Society of Manufacturing Engineers, P.O. Box 930, One SME Drive, Dearborn, Mich. 48121.

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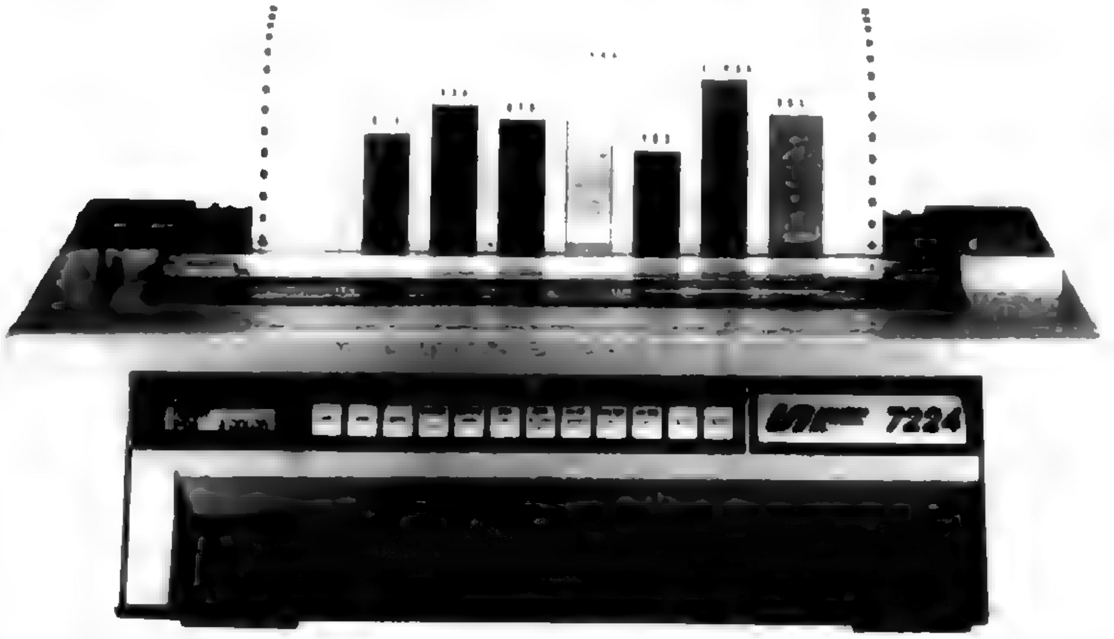

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[illegible] PLANNING INTEGRATED CORPORATE NETWORKS

Leader: Dr. John McQuillan, President, McQuillan Consulting

This intensive, one-day seminar instructs you on planning issues for integrating packet, circuit, and channel switching; SNA and X.25, and voice and data in a corporate network strategy. You will address the role ISDN will play, as well as enterprise-wide networking and bandwidth-intensive applications.
Level: Intermediate.

[illegible]

Leader: Dr. Kenneth Thurber, President, Architecture Technology

Attend this tutorial for a comprehensive overview of today's LAN environments. Discussion will include how to tie diverse and often incompatible network elements together in a manageable, logical way, as well as alternatives to LANs.
Level: Advanced.

[illegible]

Leader: James G. Herman, Independent Consultant, formerly with the Telecommunications Consulting Group at BBN

ISDN is fast approaching. Some say with too little agreement on fundamental standards and applications. Attend this highly focused, intensive session to anticipate the emerging standards, vendor trials, conflicts, successes, products and service offerings that will emerge over the next several years.
Level: Intermediate.

[illegible]

Leader: Jerry McDowell, Vice President, Vanguard Telecommunications Inc.

Enroll in this intensive tutorial for skills in managing a network which links multiple carriers, including those on the same circuit, and a variety of hardware and software vendors in one corporate network. You will learn how to take control into your own hands and avoid finger pointing, acrimony and poor service.
Level: Intermediate.

[illegible]

Leader: Gerald P. Ryan, President, Connections Telecommunications Inc.

Today's network manager must understand not only new technologies and standards, but must play many roles in the company. Attend this instructive tutorial for an entertaining and thought-provoking look at what you need to know to be a successful network manager, plus the tools, processes, and organization that will maximize your efficiency.
Level: Intermediate.

[illegible] THE LATEST LOOK AT NETWORK STANDARDS

Leader: Richard desJardins, Director of Technology R&D, Computer Technology Associates Inc.

As OSI and the older standards are reaching maturity, numerous new standards are in the works. Attend this intensive session for a look at the new generation of standards — including their purpose, significance, applications, and technical elements.
Level: Introductory

[illegible] MODELING AND DESIGNING VOICE AND DATA NETWORKS

Leader: Dr. Wushow Chou, Professor of Computer Science and Electrical and Computer Engineering, North Carolina State University

Enroll in this tutorial for detailed instructions on how to design integrated networks. You'll learn about combining voice and data on a single architecture to maximize the efficiencies of wideband services, the migration from classical multipoint to distributed systems plus cost-efficiency issues and other practical considerations.
Level: Advanced

[illegible]

Leader: Atul Kapoor, Vice President, Kaptronix Inc.

This tutorial gives you a thorough and comprehensive introduction to IBM's NetView and NetView/PC — their operation, technical specs, dependences and functional interactions, plus an analysis of their impact on the industry, significance for users and practical suggestions for implementation.
Level: Intermediate.

[illegible]

Leader: Irene Gaffney, President, LINK Resources Corp.

The FCC has ordered AT&T and the RBOCs to adopt ONA to stimulate competition in enhanced data processing services over public switched networks. Enroll in this tutorial to learn the details of the ruling, its implications for service offerings and an overview of who the players will be.
Level: Intermediate.

[illegible]

Leader: Len Ellenbein, President, Telcom Systems Group

Attend this tutorial if your company is expanding its network outside the U.S. You'll receive immediately useful information on tariffs, rules, how to handle ordering and service delays, the role of the PTTs, how to deal with the lack of consistency from country to country, and many more issues you must confront to succeed.
Level: Intermediate.

[illegible] BUILDING THE NETWORK CONTROL CENTER

Leader: Gabe Kasperek, President, Kazcom Inc.

This one-day course will help you successfully operate a network control center on a day-to-day level. You will focus on the practical requirements, functions to be performed, systems and tools available and how to put them all together to gain control over your network.
Level: Introductory

[illegible] REGULATORY ISSUES AND ANSWERS

Leader: Richard E. Wiley, Senior Partner, Wiley, Rein & Fielding

Take this comprehensive seminar to make sense of the increasingly complex regulatory environment. You will receive a thorough briefing on the legal, social and regulatory issues, the evolution of vendor technology and industry standards and significant developments affecting the coming regulatory year.
Level: Intermediate.

[illegible] INTRODUCTION TO DATA COMMUNICATIONS

Leader: Gary Audin, President, Delphi Inc.

This perennially popular tutorial provides exactly the right mix of concept, technology, and application for the beginner to get a good foundation in data communications. The course notes are excellent reference material and the instructor is one of the most highly regarded professionals in the industry.
Level: Introductory

[illegible]

Leader: James Morgan, Principal, J.H. Morgan Consultants

Enroll in this full-day tutorial for a comprehensive foundation in the basics of voice communications — technology, PBX characteristics, switched networks, tariffs, and services, as well as an overview of traffic engineering.
Level: Introductory

[illegible]

Leader: Robert L. Ellis, President, The Arles Group

In this intensive tutorial you will learn the structure of the post-divestiture tariffs, the latest January 1988 changes to these tariffs, how to price interstate private lines, how to configure and price interstate FX services, the new economics in configuring data networks, the LATA-pure strategy and federal access tariffs and how [illegible] them.
Level: Intermediate

Choose one and indicate tutorial number:

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Return Registration Form to: CN '88, P.O. Box 9171, Framingham, MA 01701-9171. Or call TOLL FREE 800-225-4698

LOCAL HAPPENINGS

NORTHEAST

Newton, Mass., Oct. 6. EDP Auditors Association, Inc., New England Chapter. Disaster Recovery, with Gerald Isaacson of Information Security Services, and The Information Processing World, with Bill Laberis of *Computerworld*. Days Inn, 399 Grove St. 2:30 p.m. and 5 p.m. Contact: EDPAA, P.O. Box 516, Boston, Mass. 02102.

Northport, N.Y., Oct. 13. Suffolk County Chapter of the Data Processing Management Association (DPMA). Performance Monitoring and Systems Capacity Planning. Windjammer Restaurant, Rt. 25A. 6 p.m. Contact: Monika MacLean, 257 Depot Road, Huntington Station, N.Y. 11746.

Newton, Mass., Oct. 14. Society for Information Management, Boston Chapter. Monthly meeting. Newton Marriott. Contact: SIM, P.O. Box 116, Newton Lower Falls, Mass. 02162.

New York, Oct. 14. DPMA Financial Industries Chapter. Principles of Project Management, with Thomas E. Conlon of Sherwood Securities Corp. Harry's of the American Exchange, 113 Greenwich St. 6:30 p.m. Contact: Dick Lefkon, DPMA, P.O. Box 894, Wall Street Station, New York, N.Y. 10005.

New York, Oct. 14. Association for Women in Computing, New York Chapter. Annual Fall Reception.Contact: AWC, P.O. Box 2293, Grand Central Station, New York, N.Y. 10163.

Harrisburg, Pa., Oct. 14. Association for Systems Management (ASM), Central Pennsylvania Chapter. Tour of Harrisburg DP center. City Hall. 7 p.m. Contact: Mark Anderson, 809 Acri Road, Mechanicsburg, Pa. 17055.

West Hartford, Conn., Oct. 15. Black Data Processing Associates, Hartford Chapter. Voice and Data Integration. Hartford Insurance Group, 235 Fern St. 5:30 p.m. Contact: BDPA, P.O. Box 2522, Hartford, Conn. 06146.

Boston, Oct. 16. Society for the Management of Professional Computing. Monthly meeting. Anthony's Pier 4 Restaurant. 11:30 a.m. Contact: SMPC, 715 Boylston St., Boston, Mass. 02116.

Boston, Oct. 21. DPMA, Boston Chapter. Facilitator-based Information Gathering, with Jerry Erwin of Technology Information Products Corp. Anthony's Pier 4 Restaurant. 5:30 p.m. Contact: DPMA, P.O. Box 1806, Boston, Mass. 02105.

Augusta, Maine, Oct. 21. Maine Pine Tree Chapter of the DPMA. People Skills, with Sally Harwood of the University of Maine. The Senator Inn. 5 p.m. Contact: J. Fieweger, Delta Chemicals, Inc., Searsport, Maine 04974.

SOUTHEAST

Chamblee, Ga., Oct. 13. ASM, Atlanta Chapter. Robotics: Today and Tomorrow, with Les Ottinger of Advanced Manufacturing Systems, Inc. Holiday Inn Chamblee-Dunwoody, 4386 Chamblee-Dunwoody Road. Contact: Jane Roberts, HBO & Co., 1 Ravinia Drive, Atlanta, Ga. 30346.

Charlotte, N.C., Oct. 15. ASM, Queen City Chapter. Productivity in Systems Development, with Olin Broadway of Broadway & Seymour. Cosmos Steak House, 5100 E. Independence Blvd. 6 p.m. Contact: Robert Yearwood, Metro Information Services, Suite 140, 7 Parkway Plaza, Charlotte, N.C. 28217.

Macon, Ga., Oct. 20. DPMA, Middle Georgia Chapter. Stress Management, with Nancy Ridley of Charter Northside. Holiday Inn, Interstate 75. Contact: L. L. Purcell, P.O. Box 4, Macon, Ga. 31202.

Lafayette, La., Oct. 22. The Acadiana Chapter of the DPMA. Monthly meeting. Evangeline Steak House, Highway 167 S. 6:30 p.m. Contact: Debra Billeaud, Guaranty Bank and Trust Co., Fourth Floor, 200 W. Congress St., Lafayette, La. 70502.

Myrtle Beach, S.C., Oct. 22-23. Hewlett-Packard Middle Atlantic Regional Users Group. Fall quarterly meeting: MIS and Financial Management Systems. Ocean Dunes Hotel. Contact: Stephen Day, Union Camp Corp., Box 178, Franklin, Va. 23851.

MIDWEST

Lafayette, Ind., Oct. 8. DPMA, Sagamore Chapter. Career Planning for a Lifetime, with Terry Phillips. Judith Painter Catering, 101 Plaza Lane. 5:30 p.m. Contact: Joan Vaughan, MIS Department, Aluminum Co. of America, Box 7500, Lafayette, Ind. 47902.

Minneapolis, Oct. 8. The Minnesota Intellectual Property Law Association. Software Copyright Infringement: The Emerging Standard. Whitney Hotel, 150 Portland Ave. 1 p.m. Contact: Walter Linder, Suite 1500, 625 4th Ave. S., Minneapolis, Minn. 55415.

Des Moines, Iowa, Oct. 12. Des Moines Chapter of the ASM. (Bosses' night). Constructive Methods of Conflict Resolution and Motivation of DP Professionals, with Roy Park, management consultant. The Howard Johnson Inn, Merle Hay Road. 5 p.m. Contact: Joleen Montag, Integrated Resources Life Insurance Co., 3737 Westown Pkwy., West Des Moines, Iowa 50265.

Kalamazoo, Mich., Oct. 14. Southwestern Michigan Chapter of DPMA. Taking the Disaster Out of Disaster Recovery, with Scott Serison of Corporate Contingency Services. The Black Swan Restaurant. 6:30 p.m. Contact: William Houken, The Upjohn Co., 7171 Portage Road, Kalamazoo, Mich. 49001.

Toledo, Ohio, Oct. 14. ASM, Toledo Chapter. Selling Ideas and Change to Management, with Ken J. Shoa of Executive Support Systems. Heatherdowns Country Club. 5:30 p.m. Contact: Dale R. Briggs, Computer Services, Marathon Oil Co., 539 S. Main St., Findlay, Ohio 45840.

Indianapolis, Oct. 15. Central Indiana Chapter of the Association for Computing Machinery. Artificial Intelligence in the Real World, with Jim Crosby of GTE MTO, Inc. Howard Johnson Downtown, 501 W. Washington St. 6 p.m. Contact: Don Boner, 957 West Drive, Woodruff Place, Indianapolis, Ind. 46201.

Dayton, Ohio, Oct. 20. Megacity Chapter of the ASM. Computer Security and Business Concerns. Dayton Marriott, 1414 S. Patterson Blvd. 5:30 p.m. Contact: S. Beebe-Owen, Western Ohio Pizza, Inc., 2324 Stanley Ave., Dayton, Ohio 45404.

Fort Wayne, Ind., Oct. 20. Fort Wayne Chapter of ASM. A View from the Top, CEO, CPO, with Walter S. Ainsworth of Phelps Dodge and Randolph Straka of Tokheim. Goeglein's, 7311 Maysville Road. Contact: ASM, Suite 103, 10427 Leo Road, Fort Wayne, Ind. 46825.

Des Moines, Iowa, Oct. 26-28. Iowa Computer Using Educators. ICUE Conference '87: Networking, Technology and Education. Howard Johnson's North. Contact: Barry Pitsch, Heartland Education Agency, 6500 Corporate Drive, Johnston, Iowa 50131.

Bloomington, Minn., Oct. 29. Minnesota Intellectual Property Law Association. International Patenting Strategy. Hotel Sofitel, 5601 W. 78th St. 9 a.m. Contact: Dianne Plunkett, 1919 University Ave., St. Paul, Minn. 55107.

WEST

Portland, Ore., Oct. 19-20. Effective Software Practices: The Fifth Annual Pacific Northwest Software Quality Conference. Sheraton Inn, Airport. Contact: Lawrence & Craig, Inc., P.O. Box 40244, Portland, Ore. 97240.

Walnut Creek, Calif., Oct. 21. ASM East Bay Chapter. Monthly meeting. Contact: ASM, 32 Robert Road, Orinda, Calif. 94563.

El Paso, Texas, Oct. 22. DPMA, El Paso Chapter. Disaster Recovery (Bosses Night). International Club, Mbank Tower. 5:30 p.m. Contact: Steve Tarro, Las Cruces, N.M.

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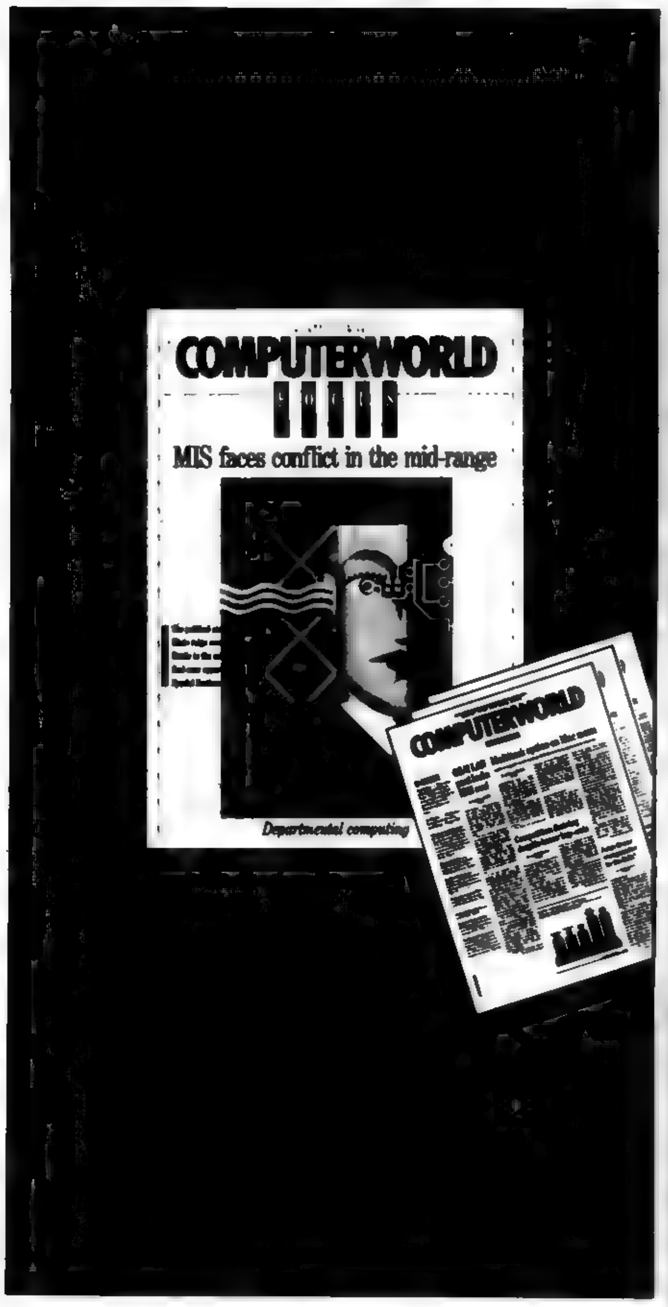
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Continued from page 90

USE, Inc. Fall Conference (for Unisys Corp. Series 1100 users). Montreal, Oct. 12-16 — Contact: USE, Inc., Box 461, Bladensburg, Md. 20710.

Systems for Manufacturing Excellence '87. Long Beach, Calif., Oct. 12-16 — Contact: Society of Manufacturing Engineers, P.O. Box 930, One SME Drive, Dearborn, Mich. 48121.

Vax Users Show, Exposition and Conference. Dallas, Oct. 13-14 — Contact: The Producers, 360 Merrimack St., Lawrence, Mass. 01843.

Scan-Tech 87. Kansas City, Mo., Oct. 13-15 — Contact: Automatic Identification Manufacturers, Inc., 1326 Freeport Road, Pittsburgh, Pa. 15238.

Chem Com '87. New Orleans, Oct. 13-16 — Contact: Devon Buckler, The Synthetic Organic Chemical Manufacturers Association, Suite 300, 1330 Connecticut Ave. N.W., Washington, D.C. 20036.

System 3X Users Exposition and Conference. Atlanta, Oct. 14-15 — Contact: Systems 3X Users Show, The Producers, 360 Merrimack St., Lawrence, Mass. 01843.

Second National Conference on Building and Operating Defect-Free Software. San Francisco, Oct. 14-16 — Contact: Quality Assurance Institute, 9222 Bay Point Drive, Orlando, Fla. 32819.

Fifth Biennial IEEE Careers Conference: The Engineer's Life and Career in Today's World. San Diego, Oct. 14-16 — Contact: William R. Anderson, Institute of Electrical and Electronics Engineers, Suite 608, 1111 19th St. N.W., Washington, D.C. 20036.

Solutions for Today: TOP and GOSIP Profiles. Washington, D.C., Oct. 15-16 — Contact: Rebecca L. Alsup, Technical Activities Division, Society of Manufacturing Engineers, P.O. Box 930, One SME Drive, Dearborn, Mich. 48121.

Northeast Computer Faire. Boston, Oct. 15-17 — Contact: The Interface Group, Inc., 300 First Ave., Needham, Mass. 02194.

Printcom. Boston. Oct. 16-18 — Contact: Key Productions, Inc., 234 Murphy Road, Hartford, Conn. 06114.

OCT. 18-24

Techskills. Cincinnati, Oct. 18-21 — Contact: American Society for Training and Development, Box 1443, 1630 Duke St., Alexandria, Va. 22313.

Eastern Prime Users Group Conference. Philadelphia, Oct. 18-21 — Contact: Michael Muraca, c/o Eastern Prime Users Group, P.O. Box 3231, Boston, Mass. 02101.

International Data Corp. Fall Executive Conference — Systems Integration: The Business Challenge. Scottsdale, Ariz., Oct. 18-21 — Contact: IDC, 5 Speen St., Framingham, Mass. 01701.

Fourth Annual Nomad Users Conference. New Orleans, Oct. 18-22 — Contact: Must Software International, 187 Danbury Road, Wilton, Conn. 06897.

International Tandem Users' Group 1987 Fall Conference. New Orleans, Oct. 18-22 — Contact: ITUG, Suite 600, 111 E. Wacker Drive, Chicago, Ill. 60601.

Financial Times Annual Electronic Financial Services Conference. London, Oct. 19-20 — Contact: International Business Conferences and Seminars, Minster House, Arthur St., London, England EC4R 9AX.

Hammer Forum 87 — Strategic Information Systems: The Technological Dimension. Cambridge, Mass., Oct. 19-21 — Contact: Hammer Forum 87, Hammer and Co., 5 Cambridge Center, Cambridge, Mass. 02142.

Techconnect, The Wang Compatible Trade Show. Boston, Oct. 19-21 — Contact: Sandy Hoffman, Data Base Publications, Suite 385, 8310 Capital of Texas Highway, Austin, Texas 78731.

American Production and Inventory Control Society's 30th Annual Technical Exhibit. St. Louis, Oct. 19-22 — Contact: Stephanie Becker, APICS Technical Exhibit, P.O. Box 11480, Alexandria, Va. 22312.

CASExpo, The National Computer Aided Software Engineering Conference and Exposition. Washington, D.C., Oct. 19-22 — Contact: Hank Bowman, CASExpo, 3825-I S. George Mason Drive, Falls Church, Va. 22041.

The Seventh National Symposium on EDP Quality Assurance. Washington, D.C., Oct. 19-22 — Contact: U.S. Professional Development Institute, EDP Quality Assurance Conference, Suite 121, 1734 Elton Road, Silver Spring, Md. 20903.

14th Annual Conference of the North American Data General Users Group. Las Vegas, Oct. 19-22 — Contact: NADGUG, MS C-228, 4400 Computer Drive, Westboro, Mass. 01580.

The Third Annual Expert Systems in Government Conference. Washington, D.C., Oct. 19-23 — Contact: The Computer Society of the Institute of Electrical and Electronics Engineers, 1730 Massachusetts Ave. N.W., Washington, D.C. 20036.

Workshop for Posix. Rockville, Md., Oct. 20-21 — Contact: Posix Workshop, Attn: Debbie Jackson, National Bureau of Standards, Room B-252, Building 225, Gaithersburg, Md. 20899.

Protext IV: The Fourth International Conference on Text Processing Systems. Boston, Oct. 20-22 — Contact: Pauline McKeever, Conference Management Services, P.O. Box 5, 51 Sandycove Road, Dun Laoghaire, Co. Dublin, Ireland.

Conference on Computers and Law. Santa Monica, Calif., Oct. 21-23 — Contact: Michael M. Krieger, P.O. Box 24619, Los Angeles, Calif. 90024.

CIM in the Process Industries. Oak Brook, Ill., Oct. 22-23 — Contact: The Yankee Group, 200 Portland St., Boston, Mass. 02114.

Independent Computer Consultants Association National Fall Conference. Stamford, Conn., Oct. 23-25 — Contact: Tretter-Gorman, Inc., 711 N. 11th St., St. Louis, Mo. 63101.

Workshop on Computer-Assisted Map Analysis. Berkeley, Calif., Oct. 24-25 — Contact: Joseph K. Berry, School of Forestry and Environmental Studies, Yale University, 205 Prospect St., New Haven, Conn. 06511.

OCT. 25-31

Annual International Conference of the iRMX Operating System User's Group. Dallas, Oct. 25-27 — Contact: Intel Corp., 5200 N.E. Elam Young Pkwy., Hillsboro, Ore. 97124.

24th Joint National Meeting of The Institute of Management Sciences. St. Louis, Oct. 25-27 — Contact: The Institute of Management Sciences, 290 Westminster St., Providence, R.I. 02903.

National-American Wholesale Grocers' Association's 1987 Productivity Conference. Chicago, Oct. 25-28 — Contact: NAWGA, 201 Park Washington Court, Falls Church, Va. 22046.

Sixth Annual System 1022/1032 Users Conference. Cambridge, Mass., Oct. 25-28 — Contact: Compuserve, Data Technologies, 1000 Massachusetts Ave., Cambridge, Mass. 02138.

International UFO-Cobol/XE User Group's Annual Conference. Orlando, Fla., Oct. 25-28 — Contact: On-Line Software International, Inc., Fort Lee Executive Drive, Fort Lee, N.J. 07024.

Operations Exchange 87. San Diego, Oct. 25-28 — Contact: Lynn Ridgway, American Financial Services Association, 1101 Fourteenth St. N.W., Washington, D.C. 20005.

Microbanker Expo '87. Dallas, Oct. 25-28 — Contact: Jayne Shapro, Microbanker, Inc., P.O. Box 1508, York, Pa. 17405.

1987 Fall Joint Computer Conference. Dallas, Oct. 25-29 — Contact: The Computer Society of The Institute of Electrical and Electronics Engineers, Inc., 1730 Massachusetts Ave. N.W., Washington, D.C. 20036.

VAX Business User Forum. New York, Oct. 26-28 — Contact: IDG Conference Management Group, P.O. Box 9171, Framingham, Mass. 01701.

Corporate Electronic Publishing Systems Show and Conference. Boston, Oct. 26-29 — Contact: Cahners Exposition Group, P.O. Box 3833, 999 Summer St., Stamford, Conn. 06905.

Data Entry Management Association Conference & Equipment Exposition. Boston, Oct. 26-28 — Contact: DEMA, 750 Summer St., Stamford, Conn. 06901.

CAM-I's 16th Annual Technical Conference and Member's Meeting: Computer Integrated Enterprise. Tarpon Springs, Fla., Oct. 26-28 — Contact: CAM-I Conference Services, Suite 1107, 611 Ryan Plaza, Arlington, Texas 76011.

Expert Systems: Getting Business Results From Applied AI. New York, Oct. 26-28 — Contact: Conference Registration Office, Decision Support Technology, 51 Church St., Boston, Mass. 02116.

Fourth Annual I-DEAS Users' Conference. Cincinnati, Oct. 26-29 — Contact: Structural Dynamics Research Corp., CAE International, 2000 Eastman Drive, Milford, Ohio 45150.

The Eleventh International Fiber Optic Communications and Local Area Networks Exposition. Anaheim, Calif., Oct. 26-30 — Contact: Information Gatekeepers, Inc., 214 Harvard Ave., Boston, Mass. 02134.

The Fourth Annual Flat Information Display Conference. San Jose, Calif., Oct. 27-28 — Contact: International Planning Information, Inc., #1, 465 Convention Way, Redwood City, Calif. 94063.

The Fifth Professional Personal Computer Conference. London, Oct. 27-28 — Contact: Financial Times Conference Organisation, International Business Conferences and Seminars, 2nd Floor, 126 Jermyn St., London, England SW1Y 4UJ.

Unix Expo. New York, Oct. 27-29 — Contact: National Expositions Co., Suite 12A, 49 W. 38 St., New York, N.Y. 10018.

Educom '87. Los Angeles, Oct. 27-30 — Contact: Educom '87, P.O. Box 364, Princeton, N.J. 08540.

International Biometric Association Seminar. San Francisco, Oct. 28 — Contact: International Biometric Association, Suite 400, 1001 Connecticut Ave. N.W., Washington, D.C. 20036.

Artificial Intelligence and Advanced Computer Technology Conference and Exhibition. Atlantic City, Oct. 28-30 — Contact: Tower Conference Management Co., 331 W. Wesley St., Wheaton, Ill. 60187.

Rothchild Consultants' TOC Conference on Optical Storage for Small Systems. Millbrae, Calif., Oct. 28-30 — Contact: Rothchild Consultants, 256 Laguna Honda Blvd., San Francisco, Calif. 94116.

Computer Dealers and Lessors Association Joint Meeting with the European Computer Dealers and Lessors. Bermuda, Oct. 28-31 — Contact: CDLA, Inc., 1212 Potomac St. N.W., Washington, D.C. 20007.

Bureautec '87. Luxembourg, Oct. 28-29 — Contact: Societe des Foires Internationales de Luxembourg, Rue Alphonse Weicker, 2721 Luxembourg-Kirchberg, Adresse postale: L-2086 Luxembourg.

Mumps Users' Group. Washington, D.C., Oct. 29-31 — Contact: Mumps Users' Group, Suite 510, 4321 Hartwick Road, College Park, Md. 20740.

Ninth Annual Computer Law Institute. Washington, D.C., Oct. 29-31 — Contact: Practicing Law Institute, 810 Seventh Ave., New York, N.Y. 10019

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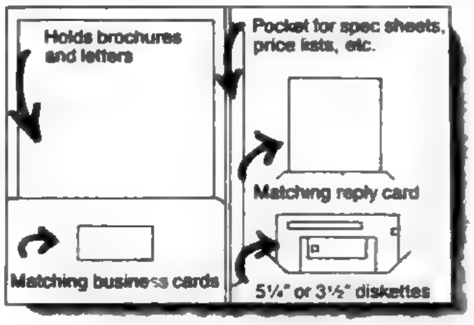
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COMPUTER INDUSTRY

INDUSTRY INSIGHT

James A. Martin

Speaking in tongues

Not long ago, this column focused on the top 10 industry cliches that are used (and definitely overused) by those who design, make and sell computer systems.

The time has come to look at acronyms, those shorthand expressions designed to abbreviate several words into one catchy term: MS-DOS, PC, CICS, ASCII, CCITT, IBM, MVS and so on.

The computer and scientific industries love acronyms — always have. In the past, acronyms served an important purpose for computer scientists and their like: saving time. A pleasant side effect was that acronyms gave technical people their own language, thus separating the scientists, programmers and engineers from the likes of everyday citizens.

As language history and American culture go, acronyms — and computer technology — are practically brand new. One of the first to be widely used was radar (radio detecting and ranging, dating to 1941), which became so widely accepted that it eventually evolved into an actual word itself.

American society began using acronyms not so much to save time but to prevent embarrassment. AA, for example, was much easier to say than Alcoholics Anonymous.

They're everywhere

But with everyday Americans becoming intimately involved with technology at home (TV, VCR, CD) and at work (MIS, PC, CIO), as well as the proliferation of special interest groups like Mothers Against Drunk Driving (MADD), acronyms are clearly getting out of hand.

Consider the following acronyms, culled from computer industry trade newspapers, the *Computer Acronyms, Abbreviations, Etc.* dictionary and various trade shows:

- AQUARIUS: A query and retrieval interactive utility system. See also "harmonic convergence."
- HAG: Home address gap. A

Continued on page 98

Hogan-IBM pact fails to deliver

Sixteen months after signing deal, firm has yet to see sustained growth

BY CLINTON WILDER
CW STAFF

DALLAS — In May 1986, IBM shocked the mainframe software industry when it announced an unprecedented, 20-year OEM agreement with bank applications developer Hogan Systems, Inc. Although the deal was widely criticized by Hogan competitors and ADAPSO officials because of IBM's vaunted marketing muscle, Hogan analysts hailed it as an instant success formula for the struggling company.

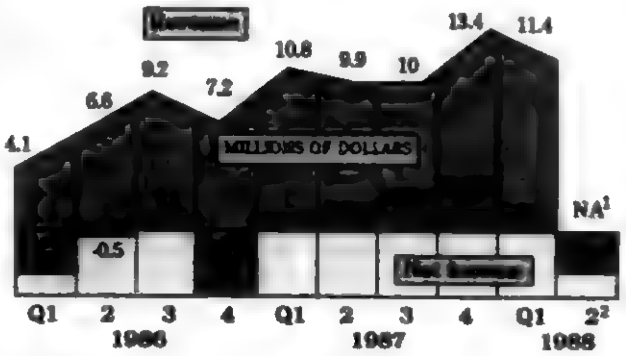
Sixteen months later, Hogan's growth prospects remain an enigma. IBM's exclusive North American sales rights to the Hogan product line have not borne the fruit originally expected, observers say. Hogan predicts it will report a loss of between $2.5 million and $3 million in the quarter ending this week, compared with a $1.9 million profit a year ago.

Although the loss is inflated by Hogan's decision to include several negative accounting items in this quarter's figures, the firm also says it will not meet its revenue expectations for software licenses and maintenance and customer service fees. The loss will deliver a blow to Hogan's recovery that began in the fiscal year ended March 31, in which the company increased revenue 63% and turned a $6.8 million loss into a $9.5 million profit.

Continued on page 99

Hogan's roller coaster

After five profitable quarters, the company projects a return to losses in current quarter



[1] Not available; company declined to project revenue

[2] Projected; fiscal year ends March 31

INFORMATION PROVIDED BY HOGAN SYSTEMS, INC.
CW CHART

On-Line acquires DB2 firm

BY ALAN ALPER
CW STAFF

FORT LEE, N.J. — Moving to increase its expertise in the IBM DB2 world, On-Line Software International, Inc. last week acquired X-Tended Computing, Inc., a Denver software consulting and development firm, for $450,000 in cash.

The acquisition should help On-Line broaden its involvement with the IBM relational data base management system by providing end-user training and product development capabilities, analysts said.

On-Line, which does not market a competing relational DBMS, is known for having expertise in CICS, for marketing productivity tools and for offering customer training. Just one month ago, On-Line increased its presence in the DB2 arena by unveiling Casepac, a computer-aided software engineering tool for developing applications to run against DB2 [CW, Aug. 24].

"With DB2 so important to IBM, it's becoming a strategic product for On-Line," said Alice Kessler, On-Line's senior vice-

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Inside

- CDC relinquishes last stake in financial services unit. Page 96.
- Apollo to provide hardware platform for trader workstations. Page 99.
- MCI's McGowan back after heart transplant. Page 98.

Foreign exchange trader costs Apollo $5.7 million

BY ROSEMARY HAMILTON
CW STAFF

CHELMSFORD, Mass. — Apollo Computer, Inc. plans to shave $5.7 million off its third-quarter profits because of losses incurred from an employee's unauthorized activity in the foreign exchange market.

With an internal investigation under way, officials provided few details on what caused this loss, which they said will cost shareholders 16 cents per share in the third quarter.

After the announcement last Monday, Apollo's stock fell 1¼ points to 19⅞.

Based on preliminary findings, company officials said they believe an employee, whom they would not identify, engaged in unauthorized foreign exchange contracts during the past year in an attempt to cover up an earlier error made in an authorized contract.

Officials declined to say if the employee's dealings were illegal, nor would they say if the employee had been fired. The employee was hired two years ago as Apollo's foreign exchange trader and worked at the company's headquarters.

It is common practice among companies doing business overseas to work the foreign ex-

Continued on page 99

George Morrow looks to the future, examines the past

"For me, creating products is like a woman having children," exclaims George Morrow, the colorful former president of Morrow Designs, Inc., a 9-year-old microcomputer company that folded last year.

"I have an idea for a product — getting pregnant; I make something and bring it to market and get it out the door. [Similarly,] the child is born, and the child grows up. That's the way I view a product."

George Morrow

As a former maker of CP/M-based 8-bit micros, Morrow is considered an industry legend; he often makes the trade show rounds, speaking on both industry and technology issues. Despite some 25 product offspring, Morrow cannot stop producing.

He is back in the saddle as chief technologist at Nestar, Inc., a Mountain View, Calif., local-area network company. While at Nestar, he has developed Co-Star, an intelligent hard-disk controller that is purported to run 3.6 times faster than other products on the market.

From his home in Hillsborough, Calif., Morrow spoke with *Computerworld* West Coast Bureau Chief Kathy Chin Leong about the demise of Morrow Designs, his plans for the future and his view of the computer industry.

What happened at Morrow Designs?

We didn't keep up, borrowed money when we shouldn't have and didn't move over from eight to 16 bits successfully.

But didn't you have a 16-bit microcomputer?

Yes, we did, but not until the end. We should have had it a year before that. The machine we did have is still selling into the Internal Revenue Service through Zenith. After Morrow went bankrupt, Zenith got rights to the machine from the bank, and they

Continued on page 104

MCI welcomes back McGowan

Returns from lengthy absence after heart transplant

WASHINGTON, D.C. — MCI Communications Corp. Chairman William G. McGowan returned to an active role in the company last week after being in temporary retirement because of heart transplant surgery performed last April.

McGowan and MCI Vice-Chairman V. Orville Wright, who served as acting chief executive officer during McGowan's absence, will together make up the newly created chief executive office, MCI announced last week.

The two officers will share responsibility for MCI's strategic direction and policy development, an MCI spokeswoman said. McGowan and Wright "have worked together as a team for 12 years, so their sharing the office ensures stability and continuity" within the firm, she added. Wright was president and chief operating officer at MCI until October 1985, when Bert C. Roberts Jr. assumed the role.

CDC sells final stake in unit

MINNEAPOLIS — Marking another phase in its corporate restructuring and move toward recovery, Control Data Corp. last week announced the sale of its remaining 18.3% stake in its former financial services subsidiary, Commercial Credit Co.

CDC said it will receive $313.5 million from Commercial Credit and plans to reduce its debt-to-equity ratio with the proceeds.

CDC has issued a substantial amount of debt as it weathered a severe fiscal crisis in the past two years.

Some of the gain from the sale, according to CDC, may be offset by costs associated with its recently announced replacement program for components in its FSD II disk drives. That progam will cost the company some $40 million, according to analysts.

Last year, CDC sold 70% of the subsidiary through a public offering and another 10% to former American Express Co. President Sanford I. Weill and his management team [CW, Sept. 22, 1986].

CDC acquired Commercial Credit in 1968.

The financial firm was one of CDC's few profitable operations when its computer and peripherals businesses sustained massive losses in 1985 and 1986.

Maxtor taps PCI to quench thirst for film heads

BY JAMES A. MARTIN
CW STAFF

MINNEAPOLIS — Peripheral Components International (PCI), the storage components marketing division of Control Data Corp., has agreed to supply Maxtor Corp. with the thin-film read/write heads that Maxtor had significant difficulty obtaining this summer.

The one-year, $35 million contract is expected to help Maxtor, the San Jose, Calif.-based hard disk drive maker, resume its growth plans and shipment schedules this fall for its 5¼-in. 380M-byte hard disk drive.

As a result of thin-film read/write head shortages from its single supplier, Read-Rite Corp. in Milpitas, Calif., Maxtor's expected revenue dipped during the summer quarter by about $15 million, according to Bob Teal, senior vice-president of marketing and product assurance.

Delays for vendors using drives

Maxtor's problems in shipping enough 380M-byte hard disks to meet consumers' demands have caused shipment delays among the workstation and office automation system vendors that build with the drive. Among those Maxtor customers affected are Apollo Computer, Inc., Digital Equipment Corp., Data General Corp., Unisys Corp. and Texas Instruments, Inc.

Read-Rite had problems obtaining materials from one of its own suppliers, forcing production to drop from 4,000 to 2,000 heads per day. Read-Rite recently laid off some 100 employees and is attempting to get back on its feet with new management.

Maxtor will retain its contract with Read-Rite as a supplier and is negotiating second-source deals with other suppliers as well, Teal said. However, analysts said they expect PCI will supply Maxtor with the bulk of its thin-film media needs for Maxtor's 380M- and 760M-byte hard disk drives.

Maxtor was left in an awkward position after its two thin-film component sources, Read-Rite and Cybernex, Inc., merged last year and later stumbled. At the time, there were few viable alternatives to Read-Rite for those components.

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Says Dennis O'Brien, project manager/marketing services for UOP Inc., a unit of Allied-Signal.

UOP develops refinery technology, sells catalysts, and provides services to refineries and petrochemical plants throughout the world. With the center of the company in Des Plaines, Illinois, communications to the home office is vital for remote offices and field engineers. Responses to sales proposals with technical analyses flow to these remote sites from Des Plaines.

Under Pressure For Quick Data.

"We used to have a problem exchanging data with the field offices. The number of steps we went through to provide accurate data was unacceptable; it seemed to take forever to communicate the data back and forth. Our specialists were always under a lot of pressure to get the information back quickly.

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New Yorker pounces on conversion opportunity

BY ALAN ALPER
CW STAFF

NEW YORK — It may not be as sexy as slick spreadsheet software or as technologically demanding as designing relational data base management systems, but converting data from obsolete systems into current formats is quickly becoming an attractive business for budding computer industry entrepreneurs.

One young New York company, Data Conversion Laboratory, is gaining a reputation among the area's Fortune 1,000 users for translating old file structures on disk or tape into formats compatible with current word processing and data processing systems.

Data Conversion already counts AT&T, American Express Co., Coopers & Lybrand, Inc. and Chubb Corp. subsidiary Chubb & Son, Inc. among its clients.

Optical scanning

The 3-year-old company is also attempting to cash in on technological improvements and cost reductions made in optical scanning. Operating as a service bureau, the firm is digitizing printed documents for permanent storage on high-capacity optical media.

Observers say the data conversion business is flourishing for a variety of reasons:

- Rapid shifts in technology during the last decade have left many corporations with files stored on antiquated word processing and data processing storage formats. Some manufacturers no longer support their older equipment or have gone out of business, and there are few off-the-shelf conversion packages suited for many out-of-date systems.
- The new generation of microcomputers uses 3½-in. media, in contrast to the 5¼-in. diskettes used with older machines. Businesses that adopt newer technology also need a way to access old files. Rekeying data is too time-consuming, costly and prone to error. Automated data conversion costs are about 25% of that of manual rekeying and are more accurate and consistent.
- The long-awaited "paperless office" has been very slow to materialize, as 95% of most documents are still stored the old-fashioned way — on paper.

Mark Gross

Many organizations, particularly in the insurance industry and the government, have begun using write-once optical disks to store high volumes of vital information.

Data Conversion co-founder and President Mark Gross, a former management consultant at Arthur Young & Co. in New York, noticed these trends about three years ago after starting his own general-purpose DP and office automation consulting firm.

"Rather than just doing consulting, I thought it might be good to build the tools to do document conversion," he recalls.

Working out of the basement of his home, Gross assembled a technical staff to provide customized conversion solutions and began reselling off-the-shelf packages for less complex tasks. He has since moved his company to a small warehouse in the borough of Queens — within easy commuting distance of New York's great concentration of Fortune 1,000 firms.

The company's revenue has doubled annually, putting it on a $1 million track for this year.

Data Conversion uses standard pattern-recognition to resolve tough data-translation problems. In some cases, however, data must be coaxed out of older formats in order to be interpreted and translated into new forms.

For more difficult jobs, the firm calls on its "data buster" device to fake out the incorrigible system. Data is transferred to a hard disk drive that, to the system, looks like a printer. The data is then translated into usable form, Gross notes.

Data Conversion has won customers by providing fast and efficient services, according to a cross-section of its current users. Chubb & Son, an insurance underwriting firm in Warren, N.J., uses Data Conversion to reformat a variety of word processing files from Wang Laboratories, Inc. and other systems into Compugraphic Corp. typesetting files.

"They do quick turnaround," says Donald Stiles, Chubb's graphics supervisor. "It's something we don't have the resources to do here, and even if we did, it might not be cost-effective because of the work flow we have."

Book transfer

Garland Publishing, Inc. in New York uses Data Conversion to transfer books written on a variety of word processors into formats that its systems can read. Data Conversion also transfers some typed manuscripts into digital form.

"If we can send the manuscript to a printer and not have to have it retypeset, we can save a lot of money," says Marine Buja, director of computer resources at Garland.

Optical scanning and storage, Gross says, will be the key to the firm's continued growth. "CD-ROM and write-once optical technology makes more sense than storing documents on microfiche because it's much cheaper," Gross says. "Somebody has to get the information onto optical media, and we're poised to do it."

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Speaking

CONTINUED FROM PAGE 95

computer hag, like a system crash, is not a pretty sight.

- HAM: Hierarchical access method. Sometimes confused with CEO, especially at trade show keynote speeches.
- MAGIC: Machine-Aided Graphics for Illustration and Composition (per AT&T) or Media Analysis, Grouping, Inventory Control (per NCR Corp.). See also "solution."
- MOUTH: Modular output unit for talking to humans. This one is listed in the computer acronyms dictionary. Missing from the dictionary, however, was TEETH (tedious everyday electronic telecommunications holes), which some less advanced communications directors also refer to as "busy signals."
- MUD: Master user directory. Also stands for much uncertainty and doubt.
- SCSI: Small computer systems interface. Pronounced "scuzzy," which sounds suspiciously like — well, never mind.
- SODA: System optimization and design algorithm. If a SODA isn't enough, you can opt for TEA (Tychron Editor/Assembler) and pick up TACOS (tool for automatic conversion of operational software) to go.
- TOADS: Terminal-oriented administrative data system. See also NERDS.
- WORM: Write-once read-many. Refers to that limited optical-disk technology. A perfect complement to scuzzy.
- WYSIWYG: What you see is what you get. A brilliant marketing and public relations acronym with little basis in reality. Since when do you actually see what you'll ultimately get when it comes to computers?

Take one home to use

Engineers and scientists initially perpetuated acronyms, and computer and communications products vendors pass them on in abundance to MIS directors and end users. To instill confidence in their employers, the end users toss acronyms about with a knowing air and take them home to use in front of house guests, spouses, children and pets.

Acronyms are highly effective in describing a complex technology with a simple term. But with the advent of WYSIWYG and the increasingly constant use of FYI, ASAP and PDQ, often the value of the acronym is seriously compromised.

Clearly, a line needs to be drawn between effective and excessive acronym usage. There's nothing wrong with a data communications director who talks to his staff about TCP/IP, OSI, CCITT, SNA and the like. But when that director goes home and finds himself scolding his telephone-obsessed teen with "FYI, Cynthia, if you don't get off that node ASAP, I'll deep-six your cash flow," he's reached the point of no return.

And that, as they say, is the bottom line (TBL).

Martin is a *Computerworld* West Coast correspondent.

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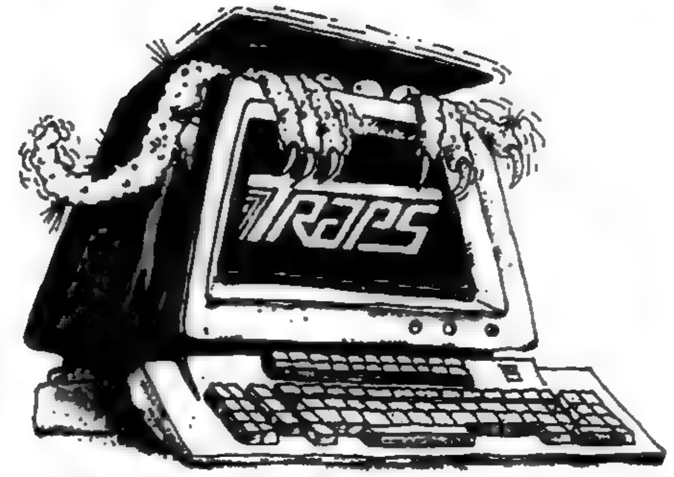

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Foreign

FROM PAGE 95

change market in order to protect themselves from fluctuating currency rates. The practice is known as hedging.

A foreign exchange trader, working with information on sales and payments in various countries, will negotiate with financial institutions and execute contracts that transfer this risk of fluctuating currency rates to the financial institution.

There are a number of phases in the hedging process. In its most simple terms, the vendor negotiates with the financial institution to lock in an exchange rate when order shipments are recorded on the vendor's books.

Apollo's foreign exchange trader was apparently engaged in some hedging activity without keeping a record of it, officials said. "It was done very cleverly to circumvent our system of checks and balances," said John Newton, vice-president and treasurer of Apollo.

Nearly half of Apollo's revenue is generated overseas. The company said the employee in question has been suspended from conducting business on the foreign exchange market under Apollo's name.

Apollo, Programit team up; financial services targeted

BY ALAN ALPER
CW STAFF

NEW YORK — As part of a continuing effort to penetrate the financial services market, Apollo Computer, Inc. last week announced an OEM agreement with a leading consulting firm here that will use Apollo's Domain workstation as the hardware platform for its financial trader workstation.

The open-ended agreement with consulting firm Programit calls for Apollo to supply its workstations during the next 18 months. Financial terms were not disclosed.

The agreement with Programit is part of Apollo's recent effort to expand its presence in the financial services market through strategic alliances [CW, Aug. 24]. During the last few months, Apollo has signed agreements with Prophecy Development Corp., Palladian Software, Inc. and Inference Corp.

"The agreement with Programit will improve our time to market with our products," noted William Kelly, Apollo's director of market development.

Apollo's Unix-based workstations are an attractive hardware platform because of their built-in multitasking and networking capabilities and IBM Personal Computer AT compatibility, provided via a coprocessor, noted Marshall Caro, Programit's chief executive officer.

Programit has developed software to download live market data from feeds such as Quotron Systems, Inc. and Reuters, Ltd. into PC-based applications for analysis. Programit's system lets data from up to four feeds be displayed simultaneously on an IBM plasma display or high-resolution Apollo monitor.

In a related announcement, Programit said it has signed a joint marketing agreement with Quotron to market the Domain-based system to the Los Angeles financial information services firm's customers.

George Levine, Quotron's marketing vice-president, said the Domain-based system will be one of the display options it offers with its Model 1000 financial information system.

Hogan-IBM

FROM PAGE 95

"After the IBM deal, there was strong, pent-up demand when customers saw that Hogan wasn't going under," says M. Arthur Gillis, president of Computer-Based Solutions, Inc., a banking MIS consultancy in New Orleans. "Now, they're faced with selling to the new guys."

Changes resulting from the IBM relationship have not been apparent to Hogan users, according to Fred Cisewski, MIS director of Bank South NA, a $3.7 billion bank in Atlanta. A Hogan customer since 1984, Bank South runs Hogan's deposits and customer information system packages.

'The black cloud'

"The biggest thing about the IBM agreement was removing the black cloud from the company," Cisewski says. "But we haven't seen much change on the service end. When you call, the person may know the applications code but not how it interfaces with the operating system. We would think they would get some help from IBM on that."

In the current quarter, Hogan reportedly will account for several one-time expense items, including increased allowances for doubtful accounts receivable and customer claims. E. F. Hutton & Co. software analyst Terence Quinn estimates the latter two charges at $1 million each.

The allowances relate to past products with which customers had problems and at which they balked at paying full license fees. Jim Dunn, Hogan's vice-president of finance and controller, confirmed that part of the allowances are for customers of the international banking software originally developed by New York-based Henco Research, Inc., acquired by Hogan in 1983.

But observers say the sales challenges facing Hogan are not limited to the current quarter. "If they were selling at a rapid clip, they would be able to cover those expenses," Gillis says. While no one is writing off the company, it is clear that IBM's sales force has not been the panacea for Hogan in the highly specialized world of large-bank software. Hogan users are generally loyal, but IBM has yet to show it can significantly expand Hogan's customer base.

"IBM has not been in as many bid situations (for Hogan) as one would have thought, notes analyst Jim Poyner of Dallas-based investment firm Rauscher Pierce Refsnes, Inc.

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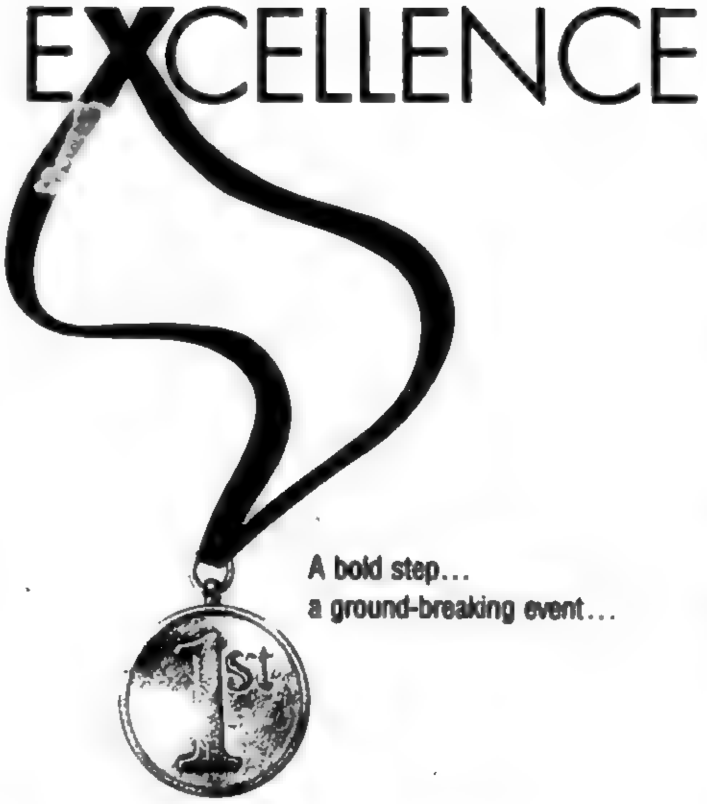
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NICKELS & DIMES

Duquesne Systems, Inc. announced revenue for the third quarter ended June 30 of $9.1 million, compared with $7.4 million last year. Profits were $1.9 million, or 17 cents per share, compared with $1.5 million, or 15 cents per share, in the like period a year ago.

Chips and Technologies, Inc. announced revenue for the fourth quarter ended June 30 of $27.6 million and net income of $4 million, or 30 cents per share. This compares with revenue of $7.1 million and net income of $1.4 million, or 10 cents per share, reported in the year-earlier quarter.

For the year, revenue was $80.2 million, compared with $12.7 million in the previous year. Profits were $12.9 million, or $1.01 per share, compared with $1.5 million, or 10 cents per share, in the comparable period a year ago.

Genicom Corp. reported revenue for the second quarter ended June 28 of $81.6 million, compared with $38.9 million a year earlier. Profits were $2.7 million, or 24 cents per share, compared with $2 million, or 22 cents per share, in the previous year.

Iomega Corp. announced revenue of $21.5 million and a net loss of $19.4 million, or $1.28 per share, for the second quarter ended June 28. This compares with revenue of $29 million and net income of $116,000, or 1 cent per share, in the like period a year ago.

Boole & Babbage, Inc. announced revenue for the third quarter ended June 30 of $10.3 million, compared with $8.7 million one year ago. Profits were $532,000, or 16 cents per share, compared with $244,000, or 7 cents per share, in the previous year.

EMC Corp. reported revenue for the second quarter ended June 30 of $28.8 million, an increase of 78% over the $16.2 million reported in the comparable quarter last year. Profits were $6.8 million, or 43 cents per share, compared with $5 million, or 32 cents per share, in the like period a year ago.

Aldus Corp. announced revenue for the second quarter ended July 3 of $9.3 million, compared with revenue of $2.4 million a year ago. Profits were $1.9 million, or 17 cents per share, compared with $668,000, or 6 cents per share, in the like period one year ago.

Interleaf, Inc. reported revenue for the second quarter ended June 30 of $10.5 million, compared with $6.4 million in the previous year. Net income was $723,000, or 6 cents per share, compared with a net loss of $1.2 million, or 13 cents per share, in the comparable period a year ago.

Gateway Communications, Inc. announced revenue for the second quarter ended June 30 of $3.4 million, compared with $2.7 million in the like period in 1986. Net profits were $203,248, or 4 cents per share, down from $321,575, or 7 cents per share, reported in the second quarter of 1986.

Paradyne Corp. announced revenue for its second quarter ended June 30 of $58 million, down from $67.1 million in the like quarter of 1986. Its net loss was $1.5 million, or 7 cents per share, vs. a loss of $1.9 million, or 8 cents per share, reported in the like quarter last year.

On-Line

FROM PAGE 95

president of marketing. "As many CICS experts as we have in the company today, we expect in the future to have DB2 experts."

Peter Burris, a software analyst with International Data Corp. in Framingham, Mass., said On-Line's acquisition of X-Tended demonstrates the firm's recognition of the large sums end users must spend in consulting and training after DB2 is installed.

"A company spends a couple of hundred thousand dollars on a data base and applications to put on it. They will spend 10 or 15 times that on getting that data base up to speed," Burris said.

X marks the tools

In addition to consulting and training, X-Tended markets a line of programmer productivity products, called X-Tools. On-Line intends to continue marketing X-Tools, Kessler said. The company has not decided whether to meld the products into Casepac or keep them independent, she added.

Shaku Atre, a DB2 consultant in Rye, N.Y., said she believes X-Tended will provide On-Line with DB2 software development capabilities that it did not have before. On-Line holds North American marketing rights for Casepac, which was developed by Tata Consultancy Services in Bombay, India.

"I think the acquisition will get them into developing more tools for DB2," Atre said. "They may be interested in the training aspect of the company, but I think software development was what they were after."

X-Tended was formed by five former IBM employees shortly after DB2's introduction in January 1984. The company was expected to generate $450,000 in revenue this year, Kessler said.

On-Line reportedly intends to keep X-Tended's personnel in Denver and operate the company as a regional office. All of X-Tended's employees have been given three-year minimum employment contracts, according to Kessler.

Separately, On-Line last week announced that profits in its first quarter, ended Aug. 31, rose 39% from year-earlier levels to $1 million, or 15 cents per share. Revenue nearly doubled from $9.7 million a year ago to $18.5 million. These results marked On-Line's 11th consecutive quarter of year-to-year sales and earnings gains.

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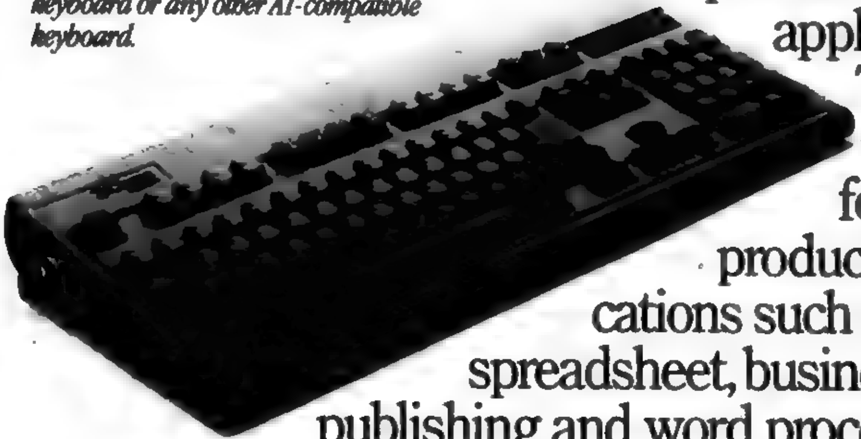

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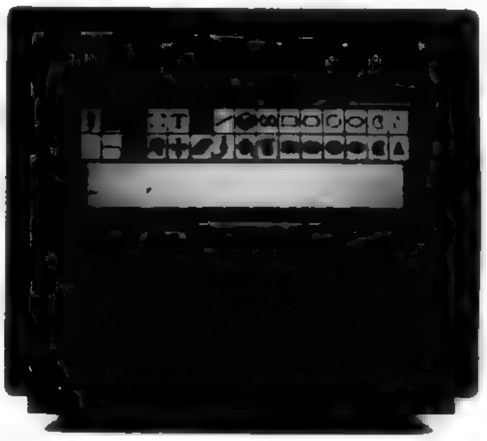

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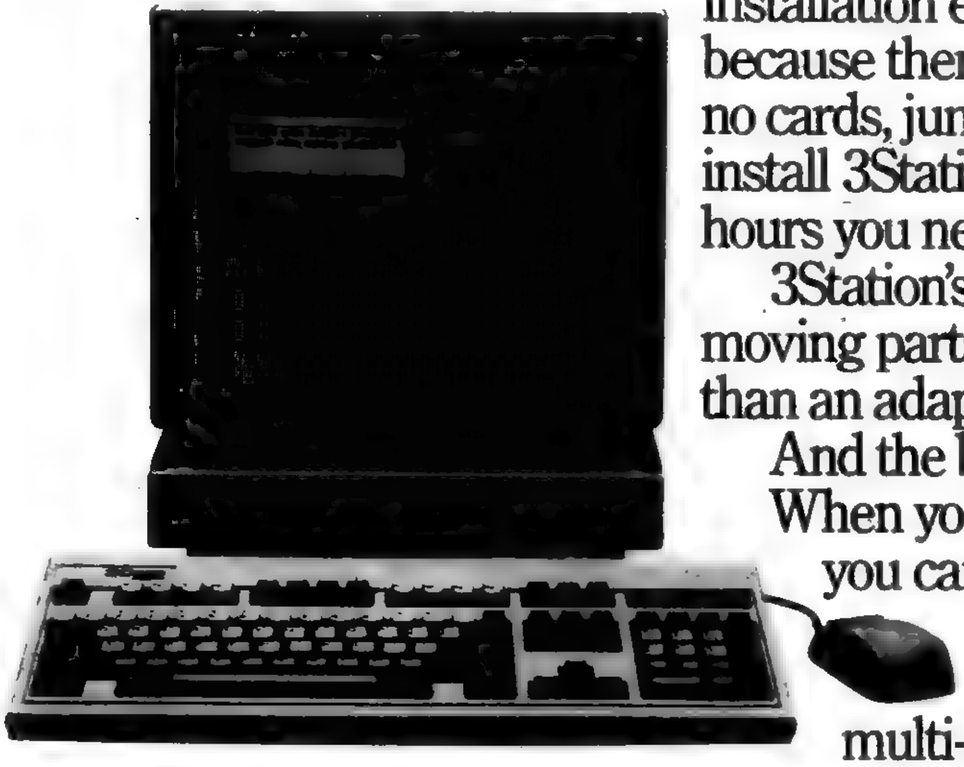

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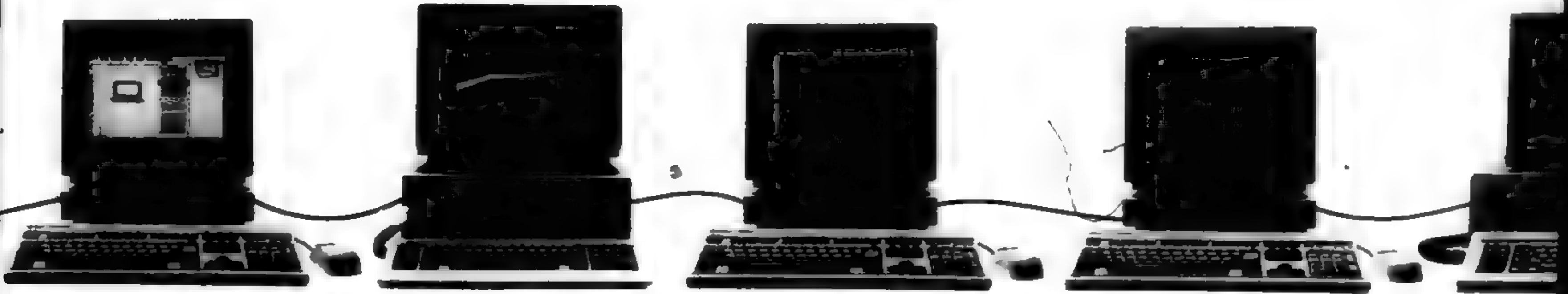

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Morrow

CONTINUED FROM PAGE 104

did wind up with an exclusive license.

It must have been hard to file for Chapter 11 protection. Did you see it coming?
No one ever promised me a rose garden. I think that I have to blame myself more than anyone else for it. I did see it coming. We were positioning ourselves to go to the public market. Our offering was to be made the day after Osborne Computer went bankrupt.

Instead of working on the transition from eight to 16 bits, we devoted all our energies to going public.

How did you get into the micro business in the first place?
I was going to be a research mathematician, but I didn't like the politics in universities. I invested seven years in putting myself through a Ph.D. Then I looked around and thought, "What can I do with my background?"

Computers were a natural. The micro had just arrived, and I kind of stumbled into it. I started the company and went from product to product. That's not a business. It's just an opportunity. We moved up to $12 million, and it was at $25 million that I realized that you can't run a business going from product to product.

Then why didn't you hire someone to provide that anchor, that grand design, for your business?
We did. We brought in Norm Townsend, who provided a better way of defining products, and he got us up to $10 million in sales when we were at $3 million. Then I ran into Bob Dilworth, who went on to Zenith. Dilworth was brought on to help position us.

But you need more than a plan. You have to monitor the plan and constantly question the appropriateness of that plan. It wasn't easy for those of us in the 8-bit world to move to 16 bits. And we shouldn't have gotten so deeply mired in a product line that wouldn't have market acceptance.

Why was it so hard to move to 16 bits? Was it technically difficult?
No, not at all. It was an emotional issue. The original group [of entrepreneurs] was used to bringing better bang for the buck. We wanted to do something better than the other guy.

But that wasn't feasible with IBM, because if you didn't copy them exactly, you didn't survive. Then why make a product with no real performance or price advantage? Compaq was able to be very "me-too," but they had a portable. They took Osborne's idea and made it an MS-DOS machine. I later took that same idea and made mine battery-powered.

For people who were used to figuring out how to do things better, it was hard psychologically. We should have just copied IBM exactly.

After the company folded, why didn't you start another or go to another PC company? What led you to Nestar?
After the company went kaput — in February 1986 — I started a small company called Intelligent Systems with Darrell Ticehurst in May to make a high-performance disk controller.

We were looking for financing. Nestar saw that what could make a disk controller run faster would make a file server run faster. I ended up riding one horse to death. . . . I wasn't about to ride another one to death, even though what I had was just a colt.

What is your role at Nestar?
I am here to make sure this technology is transferred into their products. I have product responsibility as part of the sale. I'm the chief scientist.

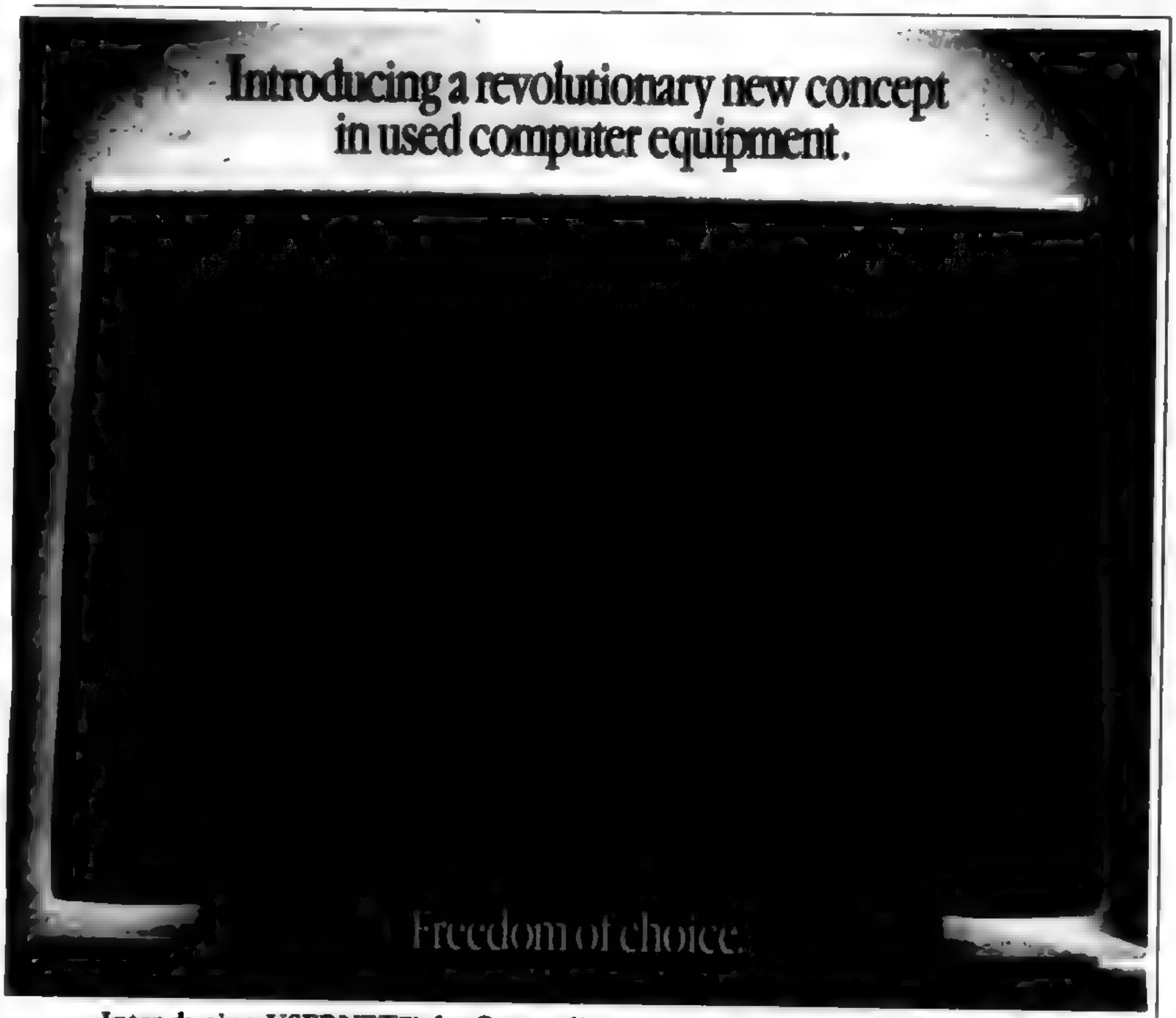
Describe those first products.
They are intelligent disk-manager products. One is a product that hooks into the SCSI bus, another hooks into a LAN, the third hooks up to a Seagate SD506.

How long do you intend to stay at Nestar?
Probably until the first part of next year. Until the products are all out the door.

What other projects do you have going?
Consulting, writing, some product work. I'm acting as an expert witness. You see, there are a lot of lawsuits going on. People are suing, and they are technical in nature. Lawyers and judges have to hire expert witnesses — people who speak English and understand the technical.

What is your impression of the PC industry right now?
We are going through another transition with the PS/2 similiar to the time when IBM first introduced the PC. There will be healthy companies and those that cannot make the transition.

What area would you want to get into again?
I just love to develop products. Any product. I like to see fast cycles. I interviewed this guy at Stanford, and he worked on a superconductor for 23 years. I don't have that patience. I want to see things start and finish and get all the satisfaction out of it. I concentrate on taking things that exist and figuring out how the technology can be applied. If an emerging technology is going to be mainstream, I want to get on that train just as it's pulling out of the station. I want to use technologies in ways they haven't been used before.



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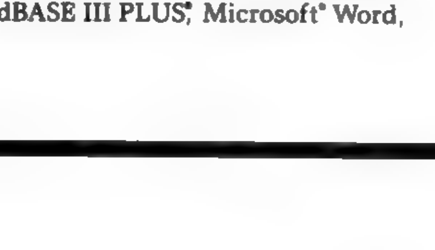

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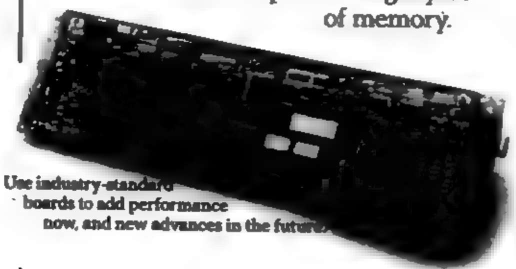

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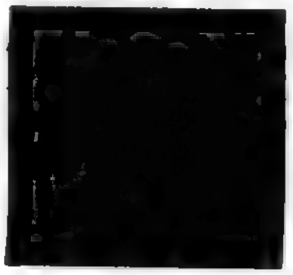

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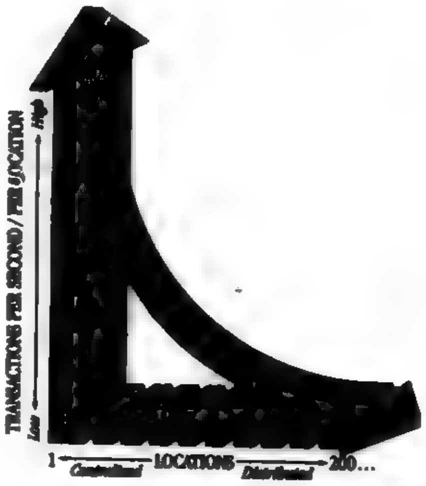

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An IDG Communications Publication

COMPUTER CAREERS

Planning your way to the top

Today's career paths require a structured approach if they are to succeed

BY DALE F. FARMER
SPECIAL TO CW

In the days before data processing was elevated to a vital tool of corporate strategy, career path planning for computer professionals was easy — you could remain a programmer for one company for years and years, or you could bounce from job to job every two years, seeking higher positions each time.

Today, however, MIS is a more structured profession. Many new jobs are being created within the discipline — from chief information officer to knowledge engineer — offering a wider variety of growth opportunities for professionals.

The careers of MIS professionals require more careful planning than those of other employees because of the rapid pace of technology. As computers continue to expand in speed and capacity, job opportunities will continue to grow.

Many still easygoing

Despite the changes, many professionals still cling to the traditional, casual approach to career planning. In a recent *Computerworld* job satisfaction survey of 600 MIS professionals, 45% of the respondents said they do not set definitive career goals. "Most people don't plan. Their careers develop by chance," says Steven Comstock, a DP training consultant in Denver.

Without a clear strategy for future growth, professionals will miss many of the new opportunities of today's dynamic MIS environment. "A structured approach to career planning is more likely to be successful than an unstructured one," says Judith Larkin, professor of psychology at Canisius College in Buffalo N.Y. "If people take more time to plan, they will achieve more. To be successful, a person must first know what his goals are."

Goal analysis should be part of an overall appraisal of your professional capabilities. But you must also be flexible, Comstock says. For example, five years ago, few professionals predicted the growth of management and support positions in the information center. Career plans need to be adjustable to allow for adding skills to meet the requirements of new, attractive opportunities.

Begin a self-evaluation by listing your strengths and weaknesses as objectively as possible. Then, note your goals for the future. Match the goals against your self-evaluation to see if your strengths and goals coincide. Then, Larkin says, "start generating activities with the assistance of your manager that will aim you toward your goal."

A common mistake many professionals make is that they rely too heavily on their managers to provide a satisfactory career path that will meet their needs. While managers can be of assistance, only the professional can decide exactly what he wants in his future. "The individual must take responsibility. You cannot count on the company," Comstock says. "People must be aware of what the possibilities are in a company."

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>
> JUDITH LARKIN
> CANISIUS COLLEGE

For you to be satisfied in the long term with your present company, the career options offered must mesh with the goals you plan.

Staying with one company is not everyone's preference, though. There are many professionals who attach themselves to the best job opportunity at the time, regardless of the changes of corporate environment required. The advantage of this approach is usually more rapid movement up the MIS ranks, both in income and position. However, this method sometimes leads you away from your true desires.

"There is a point where frequent leaps from one company to another help, but eventually, they hurt your long-term goals," Comstock says. Employers view constant job changers as people who lack stability, even when the moves are for higher positions and higher pay. Managers are concerned that the prospective employee will lack the commitment to the company and that their investment in the person will be lost as soon as the next hot offer arrives.

But there are times when a move provides long-lasting career benefits. For example, an MIS professional working in an area where the economy is depressed will benefit by finding a job in a more active, major-market area. The major markets offer greater opportunities, and the increase in pay will help you garner more income at future jobs — even if you return to your original region for work. Other reasons to move are less than desirable work conditions and restricted upward growth.

Management vs. technical

A further distinction in planning depends on one major goal option — management or technical. Many professionals enjoy the challenges on the technical side of MIS, but their salary or career growth may be restricted. "Most companies still have a policy that states the only way to achieve greater income is to be promoted to management," Comstock says.

Management promotions can expand a professional's growth potential, but they may not be best for personal goals. Professionals who move to management will find much less time to spend on the technical skills they spent years developing.

Planning an MIS career is one of those things people say they need but rarely do. The benefits of planning your future are the same as planning a software project: The effort is made easier, the problems can be anticipated before becoming major, and the final goal is more achievable.

You may need to adjust goals or time frames, but the final result is a better career. The steps are not difficult. Analyze what you want and what you need to do to attain your goal.

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Circulation plus projected pass-along audience

	EAST	MIDWEST	WEST	TOTAL U.S.
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Subtotal	**573,358**	**405,542**	**311,174**	**1,290,074**
Digital News	106,468	52,252	53,280	212,000
Federal Computer Week	74,412	20,883	25,083	120,378
Computer Currents Northern California Edition			225,000	225,000
Southern California Edition			234,000	234,000
Boston Edition	120.000		120,000	
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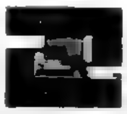

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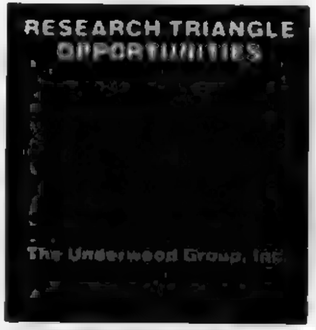

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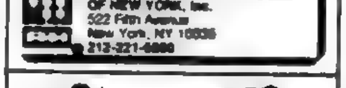

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APPLIED MATHEMATICIAN/ COMPUTER PROGRAMMER: Astronautics Corporation of America is looking for an applied mathematician/computer programmer to work in the Thermo-Magnetic Devices Department. The position requires development of mathematical methods for the calculation of magnetic fields and forces of superconducting magnets. The forces and fields must be calculated throughout the magnet windings so that internal stresses on the form and wires can be assessed. The geometry of the windings must also be completely general so that solenoids, ellipses, toroids, racetracks, dipoles, quadrupoles, etc. can be modeled. The methods must be able to calculate magnetic forces among several coils and between coils and shielding or other magnetic material. It is expected that an interactive computer code with graphics output will be produced for operation on a VAX 11/780 computer. Strong interaction with other members of a new product design team will be expected.

A Masters Degree in applied mathematics or mathematical physics is required. Four years experience in Applied Math or Applied Physics is required. The four years must include: at least three years experience with magnetic materials, super conducting magnets, and cyrogenics. At least three years experience with computer operating systems, i.e. the VAX 11/780 experience with Maxwell's equation or similar field equations. The job consists of a 40 hour work week.

The successful candidate for the position will be expected to become an integral part of a design team on new magnetic refrigerators for a variety of cooling applications. At least three years experience with magnetic materials, superconducting magnets and cyrogenics is required. Starting salary is $38,500

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The Director reports to the Assistant Superintendent for technology and media services. Responsibilities of the Director include department administration, budget preparation and monitoring, strategic planning, personnel selection and development, and routine re-evaluation of services and resources.

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Programmer/Analyst: Investigate, design and evaluate systems for administration records, admissions, accounts receivable, and student loans. Design and maintain data bases and on-line systems by utilizing such system utilities as IMAGE/QUERY, QUIZ, VPLUS, on HP3000. Work with the Data Processing Manager to develop and design standard and procedures for programming for use by the programming employees. Must have a Bachelor's Degree in Computer Science plus 2 years exp. in the job offered or 2 years exp. as a Programmer/Analyst. The 2 years exp. as Programmer/Analyst must include exp. in the investigation, design, and evaluation of administration system, financial system, and accounting system. $26,000/ year, 40 hours/wk, 8am-5pm. Send resume with Social Security # to Indiana State Employment & Training Services, 10 N. Senate Ave, Indianapolis, IN 46204, Attn: W.F. Shepherd, I.D. 3085818

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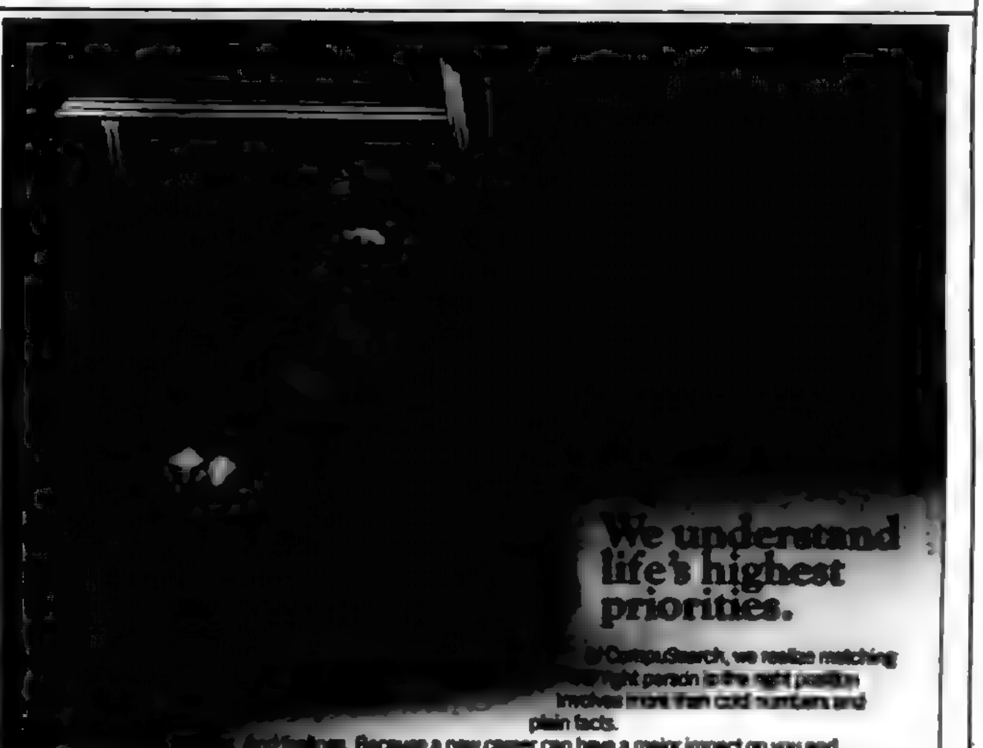

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S/38-300	0.58	6 to 8
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4341-1	0.88	2 to 4
S/38-600	0.98	8 to 16
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●9375-60	1.2	8 to 16
4381-11	1.4	4 to 16
4361-5	1.45	2 to 12
4341-2	1.5	2 to 16
4341-12	1.85	2 to 16
†4381-21	1.9	8 to 16
4381-1	2.1	4 to 16
●9377-90	2.5	8 to 16
4381-2	2.7	4 to 32
4381-12	2.7	8 to 32
†4381-22	3.2	16 to [illegible]
4381-13	3.8	[illegible]
3083EX	4.4	[illegible]
4381-3	4.5	[illegible]
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SYSTEMS	MIPS (Millions of Instructions Processed Per Second)	MEGABYTES
3033-UP	[illegible]	4 to 24
4381-14	[illegible]	[illegible] to 32
3083BX	[illegible]	[illegible] to 32
●3090-120E	[illegible]	[illegible] to 128
†438[illegible]	[illegible]	16 to 64
30[illegible]	[illegible]	8 to 32
3090[illegible]	[illegible]	32 to 64
3081D	[illegible]	16 to 32
●3090[illegible]	[illegible]	32 to 64
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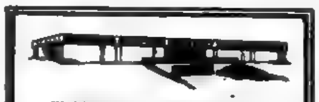

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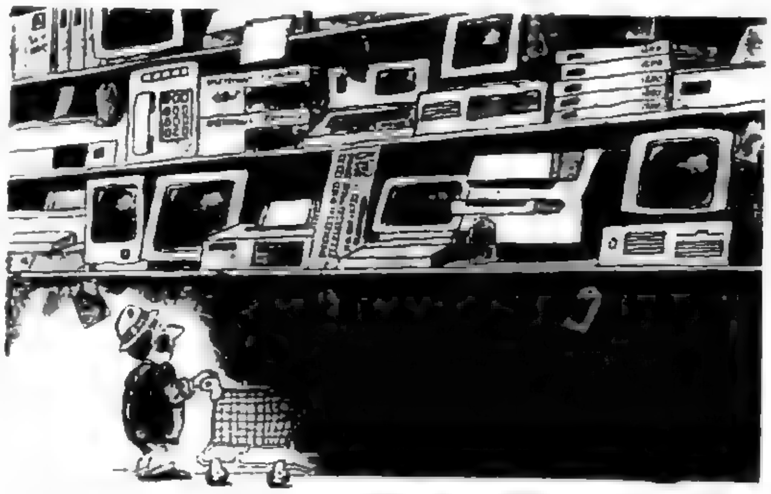

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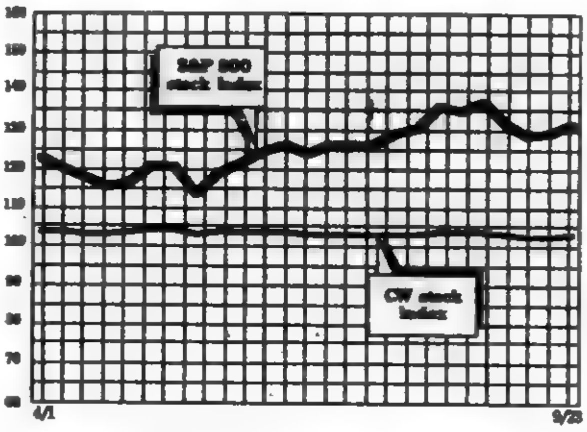

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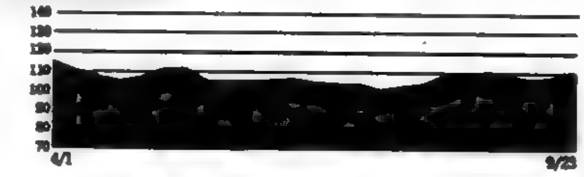
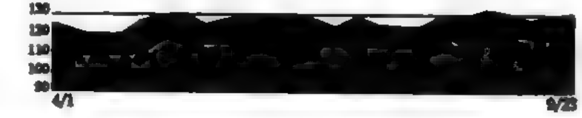
Communications



Computer Systems



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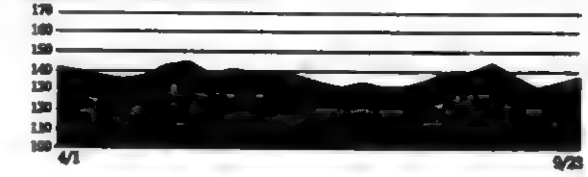
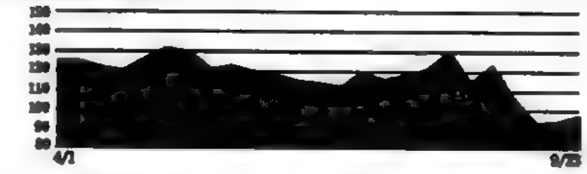


Semiconductors



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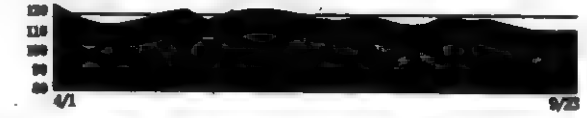
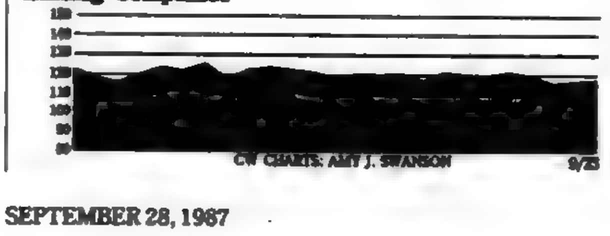


Leasing Companies



CW CHARTS: AMY J. SWANSON

Computerworld Stock Trading Summary

CLOSING PRICES WEDNESDAY, SEPT. 23, 1987

Communications and Network Services

EXCH		52-WEEK RANGE (1)		PRICE CLOSE SEPT 23 1987	WEEK NET CHNGE	WEEK PCT CHNGE
N	AMERICAN INFO TECHS CORP	100	77	96.88	+2.8	+2.8
Q	ANDREW CORP	19	14	15.25	-0.8	-4.7
Q	ARTEL COMM CORP	5	2	2.75	-0.1	-4.3
N	AT&T	36	22	34.00	+2.4	+7.5
Q	AVANT GARDE COMP INC	7	3	4.75	+0.0	+0.0
Q	AVANTEK INC	19	13	15.88	+0.1	+0.8
N	AYDIN CORP	38	18	34.63	+2.4	+7.4
N	BELL ATLANTIC CORP	80	62	79.13	+4.5	+6.0
N	BELLSOUTH CORP	44	35	41.88	+2.3	+5.7
Q	BRIDGE COMMUNICATION	29	11	28.00	+0.1	+0.4
Q	COMPRESSION LABS INC	8	4	5.25	-0.1	-2.3
Q	COMPUTER NETWORK TECH	6	3	3.88	+0.9	+29.2
O	CONTEL CORP	40	27	38.13	-0.1	-0.3
Q	DATA SWITCH CORP	9	5	7.38	+0.4	+5.4
Q	DIGITAL COMM ASSOC	49	19	43.00	+0.8	+1.8
Q	DYNATECH CORP	44	27	27.25	-2.8	-9.2
Q	EQUATORIAL COMM CO	5	2	3.25	+0.1	+4.0
Q	GANDALF TECHNOLOGIES	11	5	7.25	+0.4	+5.5
N	GENERAL DATACOMM INDS	14	7	7.25	-0.4	-4.9
N	GTE CORP	45	34	41.75	+1.4	+3.4
Q	INFOTRON SYS CORP	12	7	8.25	-0.8	-8.3
N	ITT CORP	66	47	61.88	+1.1	+1.9
N	M A COM INC	16	12	14.25	-0.6	-4.2
Q	MCI COMMUNICATIONS CORP	10	5	9.88	+0.6	+6.8
Q	MICOM SYS INC	18	10	11.00	-0.8	-6.4
Q	NETWORK SYS CORP	19	9	10.25	+0.3	+2.5
N	NORTHERN TELECOM LTD	24	14	22.88	+0.9	+4.0
Q	NOVELL INC	27	10	25.50	+1.5	+6.3
N	NYNEX CORP	77	58	75.75	+2.1	+2.9
N	PACIFIC TELESIS GROUP	32	23	31.00	+2.0	+6.9
N	PARADYNE CORP	9	4	7.25	+0.1	+1.8
A	PENRIL CORP	6	4	4.25	+0.0	+0.0
N	PLESSEY PLC	41	24	34.63	+2.1	+6.5
N	SCIENTIFIC ATLANTA INC	20	9	17.38	+0.3	+1.5
N	SOUTHWESTERN BELL CORP	44	33	42.75	+3.6	+9.3
Q	3 COM CORP	24	10	20.13	+0.1	+0.6
N	TIMEPLEX INC	41	15	28.88	+0.6	+2.2
Q	UNGERMANN BASS INC	16	8	8.50	-0.5	-5.6
N	US WEST INC	59	45	56.50	+3.9	+7.1

Computer Systems

EXCH		52-WEEK RANGE (1)		PRICE CLOSE SEPT 23 1987	WEEK NET CHNGE	WEEK PCT CHNGE
Q	ALLIANT COMPUTER SYS	37	15	16.75	+0.3	+1.5
Q	ALPHA MICROSYSTEMS	7	3	4.75	-0.1	-2.6
Q	ALTOS COMPUTER SYS	17	10	13.88	+0.0	+0.0
A	AMDAHL CORP	48	19	48.25	+5.8	+13.5
Q	APOLLO COMPUTER INC	25	12	20.00	-0.1	-0.6
Q	APPLE COMPUTER INC	56	16	56.25	+3.5	+6.6
N	BOLT BERANEK & NEWMAN	30	19	20.75	+0.3	+1.2
Q	BRITTON LEE INC	5	3	3.75	-0.1	-1.7
N	COMPAQ COMPUTER CORP	62	15	61.13	+3.6	+6.3
Q	COMPUTER AUTOMATION INC	17	2	14.00	+1.5	+12.0
A	COMPUTER CONSOLES INC	12	4	5.13	-0.4	-6.8
Q	CONCURRENT COMP CORP	24	13	19.25	-0.3	-1.3
N	CONTROL DATA CORP DEL	37	24	36.63	+2.6	+7.7
Q	CONVERGENT TECH	12	4	7.13	-0.3	-3.4
Q	CONVEX COMPUTER CORP	22	8	14.25	-0.1	-0.9
N	CRAY RESH INC	135	69	93.75	-2.8	-2.8
Q	DAISY SYS CORP	13	7	7.75	+0.4	+5.1
N	DATA GEN CORP	39	26	31.63	+1.1	+3.7
N	DATAPOINT CORP	9	4	8.38	+0.6	+8.1
N	DIGITAL EQUIP CORP	199	89	186.38	+2.5	+1.3
N	FLOATING POINT SYS INC	17	8	8.63	-0.5	-5.5
N	GOULD INC	28	16	23.13	+0.0	+0.0
N	HARRIS CORP	43	28	39.25	+0.0	+0.0
N	HEWLETT PACKARD CO	70	37	70.00	+6.3	+9.8
N	HONEYWELL INC	91	58	80.25	-0.5	-0.6
N	IBM	176	118	154.25	-2.4	-1.5
Q	INFORMATION INTL INC	17	13	13.00	+0.0	+0.0
Q	IPL SYS INC	3	2	2.88	-0.1	-2.1
Q	MASS COMPUTER CORP	13	5	11.00	-0.5	-4.3
N	MATSUSHITA ELEC INDL LTD	189	99	177.00	-2.3	-1.3
Q	MEGADATA CORP	7	2	5.50	-0.5	-8.3
Q	MENTOR GRAPHICS CORP	37	13	34.13	+0.0	+0.0
N	NBI INC	14	8	10.88	+0.0	+0.0
N	NCR CORP	87	42	81.88	+2.8	+3.5
N	PRIME COMPUTER INC	31	16	27.13	+0.3	+0.9
Q	PYRAMID TECHNOLOGY	12	4	8.50	-0.1	-1.4
Q	STRATUS COMPUTER	41	18	29.50	+1.3	+4.4
Q	SUN MICROSYSTEM INC	46	13	36.38	+0.8	+2.1
Q	SYMBOLICS INC	7	4	3.88	-0.1	-3.1
N	TANDEM COMPUTERS INC	39	17	31.75	+1.6	+5.4
N	TANDY CORP	58	31	50.38	+2.8	+5.8
N	ULTIMATE CORP	35	12	35.00	+4.1	+13.4
N	UNISYS CORP	48	23	44.75	+1.3	+2.9
A	WANG LABS INC	19	11	17.50	-0.1	-0.7

Software & DP Services

EXCH		52-WEEK RANGE (1)		PRICE CLOSE SEPT 23 1987	WEEK NET CHNGE	WEEK PCT CHNGE
Q	ADVANCED COMP TECH	5	3	4.25	+0.4	+11.5
N	ADVANCED SYS INC	29	12	27.00	-0.5	-1.8
N	AGS COMPUTERS INC	22	9	21.38	+0.1	+0.6
Q	AMERICAN MGMT SYS INC	19	7	17.00	+0.0	+0.0
Q	AMERICAN SOFTWARE INC	22	8	12.88	-0.3	-1.9
N	ANACOMP INC	11	3	10.38	+0.8	+7.8
Q	ANALYSTS INTL CORP	9	3	8.00	+0.3	+3.2
Q	ASHTON TATE	30	14	26.25	+2.3	+9.4
Q	ASK COMPUTER SYS INC	17	10	14.50	+1.1	+8.4
Q	AUTODESK INC	34	10	29.25	+0.5	+1.7
N	AUTO DATA PROCESSING	58	32	52.50	+3.3	+6.6
Q	BOOLE & BABBAGE INC	12	4	10.50	+0.3	+2.4
N	COMPUTER ASSOC INTL INC	35	11	34.38	+2.4	+7.4
Q	COMPUTER HORIZONS CORP	15	10	11.63	+0.1	+1.1
N	COMPUTER SCIENCES CORP	66	30	64.88	+6.5	+11.1
N	COMPUTER TASK GROUP INC	18	12	15.25	+0.9	+6.1
Q	COMSHARE INC	28	11	23.00	-1.0	-4.2
N	CULLINET SOFTWARE INC	14	8	12.75	+0.0	+0.0
Q	CYCARE SYS INC	11	7	9.75	+0.3	+2.6
Q	DUQUESNE SYS INC	33	14	16.25	+0.8	+4.8
Q	ENDATA INC	16	8	16.50	+0.1	+0.8
N	GENERAL MTRS (CLS E)	48	24	48.13	+0.4	+0.8
Q	HOGAN SYS INC	17	8	8.13	+0.5	+6.6
Q	INFORMIX CORP	23	7	23.25	+1.0	+4.5
Q	INTELLICORP INC	11	4	5.75	-1.3	-17.9
Q	KEANE INC	10	5	8.38	+0.3	+3.1
Q	LOTUS DEV CORP	37	12	33.25	+3.3	+10.8
Q	MANAGEMENT SCI AMER	21	11	13.00	+0.8	+6.1
Q	MICRO PRO INTL CORP	8	2	6.00	-0.2	-3.0
Q	MICROSOFT CORP	64	14	60.25	+1.9	+3.2
Q	NATIONAL DATA CORP	34	19	29.75	-2.9	-8.8
Q	ON LINE SOFTWARE INTL INC	22	6	17.38	-2.3	-11.5
Q	ORACLE SYS CORP	30	7	29.75	+2.3	+8.2
N	PANSOPHIC SYS INC	23	12	21.88	+1.0	+4.8
Q	POLICY MGMT SYS CORP	30	15	26.25	+1.0	+4.1
Q	PROGRAMMING & SYS INC	13	8	12.50	+0.3	+2.0
Q	REYNOLDS & REYNOLDS CO	39	27	31.25	-2.5	-7.4
Q	SEI CORP	18	8	16.00	-0.5	-3.0
Q	SHARED MED SYS CORP	53	23	27.00	+1.4	+5.4
Q	SOFTWARE AG SYSTEMS INC	19	10	12.50	+0.3	+2.0
Q	SOFTWARE PUBG CORP	17	5	9.50	+0.3	+2.7
A	STERLING SOFTWARE INC	16	9	10.88	+2.1	+24.3
Q	SUNGARD DATA SYS INC	21	10	17.75	+0.8	+4.4
Q	SYSTEMATICS INC	30	14	27.25	-0.1	-0.5
N	URS CORP	23	13	20.25	-1.9	-8.5
Q	VM SOFTWARE INC	48	14	15.00	-0.8	-4.8

Semiconductors

EXCH		52-WEEK RANGE (1)		PRICE CLOSE SEPT 23 1987	WEEK NET CHNGE	WEEK PCT CHNGE
N	ADV MICRO DEVICES INC	25	13	22.38	+1.5	+7.2
N	ANALOG DEVICES INC	24	14	17.50	-1.8	-9.1
Q	ANALOGIC CORP	13	10	11.38	-0.6	-5.2
Q	INTEL CORP	58	18	58.00	+4.0	+7.4
Q	LSI LOGIC CORP	17	8	13.13	+0.4	+2.9
N	MOTOROLA INC	72	34	70.63	+5.8	+8.7
N	NATL SEMICONDUCTOR	19	8	16.88	+1.9	+11.0
N	TEXAS INSTRS INC	79	35	77.38	+5.5	+7.7
A	WESTERN DIGITAL CORP	33	13	23.63	+0.6	+2.7

Peripherals

EXCH		52-WEEK RANGE (1)		PRICE CLOSE SEPT 23 1987	WEEK NET CHNGE	WEEK PCT CHNGE
N	AM INTL INC	8	5	7.63	+0.1	+1.7
Q	AST RESH INC	23	11	19.13	+0.3	+1.3
Q	AUTO TROL TECH CORP	9	3	5.75	-0.2	-3.2
Q	BANCTEC INC	16	7	12.25	+0.0	+0.0
Q	CIPHER DATA PRODS INC	18	9	11.13	-0.4	-3.3
A	COGNITRONICS CORP	5	2	4.00	+0.0	+0.0
N	COMPUGRAPHIC CORP	27	19	26.50	+1.0	+3.9
N	COMPUTERVISION CORP	23	13	14.13	-0.3	-1.7
A	DATAPRODUCTS CORP	16	10	12.00	+0.8	+6.7
A	DATARAM CORP	9	7	7.75	+0.1	+1.6
N	DECISION INDS CORP	13	7	11.38	+0.4	+3.4
N	EASTMAN KODAK CO	108	53	101.00	+2.0	+2.0
Q	E M C CORP MASS	29	9	23.00	-2.8	-10.7
Q	EMULEX CORP	10	6	7.25	+0.4	+5.5
Q	EVANS & SUTHERLAND	40	21	28.25	+0.8	+2.7
Q	ICOT CORP	13	5	6.38	+0.3	+4.1
Q	INTERLEAF INC	20	8	16.88	+0.0	+0.0
Q	IOMEGA CORP	8	2	2.75	-0.1	-4.3
Q	LEE DATA CORP	16	5	5.38	-0.3	-4.6
Q	MASSTOR SYS CORP	6	3	4.00	+0.2	+4.9
Q	MAXTOR CORP	34	10	12.13	+1.3	+10.5
Q	MICROPOLIS CORP	44	15	27.63	-1.6	-5.6
Q	MINISCRIBE CORP	18	7	14.88	+1.0	+7.2
N	MINNESOTA MNG & MFG CO	84	50	80.13	+4.4	+5.8
A	MSI DATA CORP	24	10	22.88	+0.4	+1.7
Q	PRIAM CORP	6	2	2.63	-0.1	-4.5
Q	PRINTRONIX INC	13	10	11.38	+0.0	+0.0
N	QMS INC	28	11	25.63	+0.6	+2.5
Q	QUANTUM CORP	35	15	16.25	1.0	-5.8
Q	RAMTEK CORP	6	4	5.38	+0.4	+7.8
N	RECOGNITION EQUIP INC	27	12	16.38	-0.1	-0.8
Q	REXON INC	14	5	7.25	-0.8	-9.4
Q	SCAN TRON CORP	17	11	13.00	+0.3	+2.0
Q	SEAGATE TECHNOLOGY	48	14	19.75	-2.3	-10.2
N	STORAGE TECH CORP	5	2	3.00	+0.0	+0.0
Q	TANDON CORP	7	2	3.13	+0.1	+4.2
A	TEC INC	7	3	4.88	+0.3	+5.4
N	TEKTRONIX INC	43	30	34.38	-1.1	-3.2
Q	TELEVIDEO SYS INC	3	2	2.75	-0.2	-6.4
N	TELEX CORP	102	46	45.88	-5.5	-10.7
Q	WYSE TECH	35	13	33.50	-0.4	-1.1
N	XEROX CORP	85	51	79.63	+1.1	+1.4
Q	XIDEX CORP	16	11	11.75	+0.5	+4.4

Leasing Companies

EXCH		52-WEEK RANGE (1)		PRICE CLOSE SEPT 23 1987	WEEK NET CHNGE	WEEK PCT CHNGE
N	COMDISCO INC	35	15	32.75	+0.3	+0.8
N	CONTINENTAL INFO SYS	14	7	10.13	+0.1	+1.3
Q	PHOENIX AMERN INC	8	3	4.63	+0.1	+2.8
Q	SELECTERM INC	7	5	5.00	-0.1	-2.4
N	U S LEASING INTL	55	42	46.75	+0.3	+0.5

EXCH: N—NEW YORK, A—AMERICAN; Q—NATIONAL;
O—OVER-THE-COUNTER; S—SPLIT

O-T-C PRICES ARE BID PRICES AS OF 3 P.M. OR LAST BID
(1) TO NEAREST DOLLAR

Bulls return

Compaq posts new high; Microsoft marks 2-for-1 split

A record-setting week for the Dow Jones industrial average saw the bulls return ferociously to the computer industry.

The Dow gained a record 75.23 points last Tuesday, but the run-up in most leading computer stocks lasted throughout the first four trading days. Among the big winners was Compaq Computer Corp., which this week will announce two new highly touted micros and the bundling of Microsoft Corp. Windows. Compaq closed at a new high of 65⅞ Thursday, up 7⅛ points for the week and 4¾ points on Thursday alone.

Microsoft registered its previously announced 2-for-1 split and closed Thursday at 61¼. Lotus Development Corp. was up 2¼ points in four days to 33¼, and Ashton-Tate rose 3⅛ points to 27⅜.

Among New York Stock Exchange issues reaching new highs for the year in Thursday's trading were AGS Computers, Inc., 23; Computer Sciences Corp., 67½; Control Data Corp., 37; Data Design Associates, 9⅜; and Ultimate Corp., 36.

Despite a big surge Tuesday, IBM gained only half a point in four days to 155⅜. Digital Equipment Corp. rose 2⅜ to 189⅜.

CLINTON WILDER

Network Systems offers Ethernet

BY ELISABETH HORWITT
CW STAFF

MINNEAPOLIS — Seeking to expand out of host channel-to-channel networking into the smaller system market, Network Systems Corp. recently announced interfaces between its proprietary network Hyperchannel and networks complying with CCITT 802.3 Ethernet and Transmission Control Protocol/Internet Protocol (TCP/IP).

"Our Ethernet-TCP/IP products will perform two functions," said Harold Durrett, the company's vice-president of information systems. "They will connect hosts on Hyperchannel to Ethernet networks, and they will allow Hyperchannel to be used as a backbone for Ethernet networks."

Network Systems' IP Router provides access to Hyperchannel-connected hosts for systems too small to cost-justify a direct link to Hyperchannel, Durrett noted. Hyperchannel is a 50M bit/sec. proprietary network designed to support bulk data transfer between multiple hosts.

> "OUR GOAL is to provide Hyperchannel interfaces to TCP/IP for all major mainframes."
>
> HAROLD DURRETT
> NETWORK SYSTEMS CORP.

Network Systems provides direct Hyperchannel links for Sun Microsystems, Inc. and Apollo Computer, Inc. computers at a cost of $10,000 per workstation.

This was hard for customers to accept, since these systems have built-in Ethernet interfaces, according to Durrett.

Customers who want a low-cost, high-speed connection between a computer-aided design and engineering workstation and a host on Hyperchannel can dedicate an Ethernet to each workstation and route up to eight networks through the IP Router, Durrett said. The IP Router is priced at $45,000, making the networking cost per workstation a little more than $5,600. Interface cost is much lower for workstations whose lower speed networking needs allow Ethernet sharing, Durrett noted.

The company's decision to support Ethernet and TCP/IP reflects its realization that "Ethernet is an industry standard, and TCP/IP will be around for at least four or five years," Durrett stated. Network Systems has developed Hyperchannel drivers for TCP/IP implementations on a variety of computers, including IBM MVS and VM systems, Digital Equipment Corp. VAX/VMS and Ultrix systems and AT&T Unix System V hosts. "Our goal is to provide Hyperchannel interfaces to TCP/IP for all major mainframes," Durrett said.

"Network Systems has obviously fixed an important gap in their product line — they have recognized TCP/IP as a de facto standard, where for a long time they thought *they* were a de facto standard," said Bart Stuck, a vice-president at Morristown, N.J., firm Probe Research, Inc.

Design issues

However, Network Systems still "has to think through certain design issues" related to the fact that Hyperchannel interfaces are designed specifically to handle large file transfers, Stuck pointed out. "Hyperchannels can only support the transfer of one data block at a time, and because of the way they handle buffering, a 50M bit/sec. link has an effective end-to-end throughput of well under 10M bit/sec."

According to Stuck, this degradation problem is likely to be compounded if, in addition to hosts performing bulk data transfer, multiple workstations are transmitting queries to the hosts — particularly since Hyperchannel was not designed to handle short queries.

The IP Router will route transmissions from a 10M bit/sec. Ethernet to either a host residing on Hyperchannel or a system residing on another Ethernet. The IP Router's multiprocessor architecture is said to support a total throughput of 100M bit/sec. Volume shipments are scheduled for March 1988, according to Network Systems.

Network Systems also announced three bridges. The Ethernet Bridge for Hyperchannel-10 is said to allow multiple Ethernets to pass data back and forth over a 10M bit/sec. Hyperchannel. Priced at $8,500, it is available immediately.

The Ethernet Bridge for Hyperchannel-50 uses a 50M bit/sec. Hyperchannel as backbone. Priced at $13,500, it is scheduled for December shipment.

The Ethernet Bridge for T1 links connects to Ethernet local-area networks across a 2M bit/sec. T1 link, as specified by the European T1 standard. It is available now, priced at $12,500.

Net management highlights TCA '87

Telecom vendors and users meet to iron out difficulties of larger systems

BY KATHY CHIN LEONG
CW STAFF

SAN DIEGO — After a year of frantic one-upmanship in the network management arena, telecommunications vendors will move the battle directly into the users' arena at this week's Tele-Communications Association show, TCA '87.

According to Lionel Gillerman, TCA president, the growing size of networks and the complexity of integrating voice and data on communications lines are the reasons network management is this year's hot button. "People are looking for new ways of managing their networks, and vendors are getting a lot more responsive," he said.

Some 15,000 attendees are expected to crowd the show's aisles. Among them, Hal Terry, telecommunications manager at California First Bank in San Francisco, will be looking for help managing the transmission of data over T1 lines. "We are just starting to take advantage of T1, and the crux of the subject is how to control and manage these networks effectively," he said last week.

Dugal Easton, a regional TCA president based in Seattle, agreed. "Since I work for a school district where money is tight, there is a pretty small data communications staff. If we make any network moves, we will need to order a huge number of data lines, and we will need sophisticated network management tools to manage our network well."

Vendors said they are planning to showcase a variety of products in hopes of capitalizing on the demand for network management aids.

Micom Systems, Inc. in Simi Valley, Calif., will introduce an IBM Personal Computer-based network management system for its CCITT X.25 packet-switching product line. The Micom X.25 Control Center (XCC) is a $5,500 software package that is said to help users manage their Micom packet-switching network from one PC.

According to Micom officials, XCC software allows users to download billing information and statistics. In addition, it offers an alarm feature that graphically alerts the user when the network is in trouble. Micom will also announce a new packet switch and two packet assembler/disassemblers.

Avanti Communications Corp. in Newport, R.I., will be adding to the show's collection of network management products with its Open Network Management System, a $69,000 hardware and software tool that manages the company's T1 Open Network Exchange processor and Ultramux T1 multiplexer.

According to George Kirching, Avanti's senior vice-president of marketing, the network management system is based on a Sun Microsystems, Inc. workstation. The product will offer graphics representations of user networks and will provide automatic trouble-ticketing, a data base, long-term statistics recording and network alarms.

Exchange alliance

Racal-Milgo, based in Sunrise, Fla., has announced an alliance to link its network management system with that of T1 and modem vendor Digital Communications Associates, Inc. (DCA) in Alpharetta, Ga. Under the pact, the companies will exchange products and services, specifically the DCA/Cohesive System 9000 T1/T3 multiplexer and Racal-Milgo's customer support services.

The Racal-Milgo marketing plan, according to company marketing executive Jim Norman, includes focusing efforts on multivendor network management.

To fulfill that same goal, Micom has developed a software package called CMS/View that integrates the Micom CMS proprietary network management system with IBM's Netview.

The ability to integrate products into the IBM Netview environment will be a popular act at the show. Aside from showing its new line of synchronous modems, Racal-Vadic in Milpitas, Calif., is scheduled to demonstrate how its Uplink/N software links the Racal-Vadic MDS II Dial Access Network Management System to Netview. Uplink/N lets a Netview user monitor the MDS network as MDS messages appear on the Netview screen, Racal-Vadic said.

T1 additions rife

Several TCA '87 exhibitors will show additions to their T1 switch lines. Among the 19 products and enhancements that General Datacom Systems, Inc. said it plans to unveil at the show is the Megaswitch Compact, a low-end addition to the company's Megamux family of T1 multiplexers that targets customer sites with modest data traffic.

General Datacom is also slated to announce a gateway that allows the company's T1 switches to interface with carrier services that are compatible with AT&T's Digital Access and Cross Connect System.

Other General Datacom announcements will include a series of diagnostic modems and a second-generation data-over-voice product that can access public packet networks.

Racal-Milgo, which is seeking to establish itself as a full-service networking company, will begin manufacturing its own T1 multiplexers for the first time. Its first mid-range T1 Omnimux switch is slated to be released in the first quarter of next year.

Major packet-switching vendors will also be showing their wares at TCA '87. Among them will be Western Union Corp. in Upper Saddle River, N.J., which said it will announce an 800-number dial-up service for its packet-switching data network. With 800 Data, Western Union users' customers can dial a single 800 number to tap the network without incurring charges for the local call.

Modem makers work overtime for TCA

While the focus at the Tele-Communications Association show will be on network management, modem makers are expected to launch several major products.

- Concord Data Systems, Inc. in Marlboro, Mass., is scheduled to expand its 2.4K bit/sec. modem line with announcements of the 224 Autodial Plus and the 224 Autodial Plus-E error-correcting model, priced at $425 and $595, respectively. The modems are said to feature Microcom, Inc.'s Microcom Network Protocol Class 4 error protection and to support asynchronous and synchronous operation.
- Concord and rival modem manufacturer Cermetek Microelectronics, Inc. in Sunnyvale, Calif., will both announce a dramatic drop in the price ceiling of 9.6K bit/sec. dial-up modems, which have generally cost $2,400. Priced at $1,795, Concord's 296 Trellis modem is an asynchronous 9.6K bit/sec. modem supporting the CCITT V.32 modem standard with full-duplex communications capabilities.
- Cermetek is also slated to preview its low-cost dial-up asynchronous V.32 9.6K bit/sec. modem, priced at $1,595. The Cermetek 9600DA features echo cancellation, autodial and autoanswer capabilities and supports most personal computer communications packages.
- Case Communications, Inc. in Columbia, Md., is slated to demonstrate a 4.8K bit/sec. modem that supports full-duplex transmission over dial-up lines.

Moving out

FROM PAGE 1

their data centers out of the downtown area. Everyone is looking for cheaper space somewhere else," says William Tuite, senior vice-president of Drexel Burnham Lambert, Inc., whose firm has begun construction on a northern New Jersey site that it hopes to occupy in 1989.

"People are outgrowing their 1960s-vintage buildings. And the 16th floor is not the best location for a data center," says A. S. "Migs" Damiani, president of Com-Site International, Inc., a Beltsville, Md., firm specializing in data center construction.

Damiani describes the ideal spot for a data center as a low-rise building with plenty of space and room for expansion. It should be near a labor pool with reliable workers who need not be paid exorbitant wages. The lower the rent, the better.

Fewer and fewer cities offer those conditions, especially the low rents. In some areas of New York, for example, 20-year leases signed in the 1960s are expiring.

Originally set at $10 per square foot, those leases are being rewritten in the $40 per square foot range, Damiani says. Tenants can rent for half that amount in New Jersey.

More space, less money

Paine Webber, Inc. and Drexel Burnham are two companies that chose the lower cost and more spacious accommodations of the suburbs. Both firms have relocated their data centers in Lincoln Harbor, a development under construction on the western bank of the Hudson River, in New Jersey.

Drexel liked the idea of building a new data center from the ground up, Tuite says. "We could have a data center with 36-foot column spacing so [an IBM 3090 Model] 400 or 600 can be put up in a day."

"There was just no more room to grow in the [old] building," says Jim Yee, corporate vice-president and director of technology at Paine Webber. "There was no [uninterruptible power supply] or raised floor in the old facility either," he says. Paine Webber's new, four-story facility offers 140,000 square feet of usable data center space.

The Chase Manhattan Corp. is planning a new data center in Holmdel, N.J., a township some 50 miles from New York. Chase selected Holmdel for its one-hour commuting distance from New York; its demographics, which were conducive to attracting financial services employees; its quality of life; and the 50 acres of land that were available, according to a Chase Manhattan spokeswoman.

Although Chicago's downtown rents are more reasonable than New York's, some companies are still moving to the suburbs in an attempt to avoid higher taxes and space restrictions.

The major difference between urban and suburban rents in the Chicago area is city taxes, says Cynthia Frank, vice-president of office properties at Rubloff, Inc., a Chicago real estate firm. Rents only differ by $2 to $3 per square foot, while taxes in the city are as much as $10 per square foot compared with only a few dollars per square foot in the suburbs.

Controlling costs

Floral Network, Inc., a Chicago subsidiary of Florists' Transworld Delivery Association, was looking for more space — and greater control over costs — when it decided to move from a building in downtown Chicago built in 1909 to a two-story building in the western suburb of Downers Grove, Ill. The $1 million move, completed during the July 4th weekend, more than doubled Floral Network's computer room floor space to 7,000 square feet.

"We are the only tenant here," said Dennis Blondell, assistant director of operations at Floral Network, "so we have total control of the environment." The company's previous building at 165 N. Canal St. was a multitenant building in a congested portion of the city.

The move, for all its improvements, caused a temporary setback in staffing. Because the new site is not accessible by Chicago's rapid-transit system, many workers without cars were stranded in the city.

Floral Network lost 95% of the part-time personnel who had answered phoned-in floral orders and 40% of its supervisory and full-time employees. But now, three months later, overall employment is greater than it was in downtown Chicago, with a total staff of 153 compared with 115 previously.

THE IDEAL spot for a data center is a low-rise building with room for expansion. The lower the rent, the better. Few cities offer those conditions.

Com-Site's Damiani says Philadelphia, like Chicago, boasts reasonable rents for computer operations. In addition, the wages that must be paid for reliable data processing personnel there are not out of line. "Philly is not as bad as New York overall," he says.

However, San Francisco has seen several data processing operations pull up stakes in recent years. Two years ago, McKesson Corp. established a data center in Rancho Cordova, Calif., a suburb more than an hour away from the company's headquarters in San Francisco. According to Jack Pfiefer, McKesson director of information systems, the data center costs in Rancho Cordova about half what it would in downtown San Francisco.

"There's no question that moving outside the city is less expensive," Pfiefer said. "With data communications so sophisticated, there's no reason to keep a data center at the headquarters."

Although MCI Telecommunications Corp.'s activities are also centered in San Francisco, the company also decided to house its computer billing facilities in Rancho Cordova near McKesson in October 1983.

TED CHIN & CO.

Mayor Koch *wants to block the escape from New York.*

Bankamerica Corp. last year established the Bank of America Technology Center, a backup site in the suburb of Concord, Calif.

Damiani says that in Washington, D.C., buildings downtown are subject to height restrictions of 12 to 13 stories so that they not detract from landmarks. Builders have made the stories unusually short, making it difficult to put in the raised floors needed by computer rooms.

However, Washington rents are much more attractive than those in New York. "You can't compare New York and D.C.," Damiani says. Washington rents are about $24 per square foot, while those in New York are $40 and up. Even so, Washington rents are too high for some organizations.

Too much money

"It's just too expensive downtown," says Jim Draper, director of the computer services group for the U.S. Department of Housing and Urban Development. Draper is currently examining real estate outside Washington's Beltway; where he plans to build a second data center.

"Real estate costs are one-third higher [in the District of Columbia] than elsewhere [in the Beltway area]," offered William Ringler, senior vice-president of First American Bancshares, Inc., which recently consolidated three Capitol-area data centers into one Reston, Va., location. Reston, he says, is a good location from which to recruit DP professionals, although it is not as good for finding clerical employees.

Bob Cunningham, vice-president of Spaulding and Slye Co., a Boston real estate firm, says the major DP exodus in that city took place in the 1970s, when State Street Bank & Trust Co. moved south to Quincy, Mass., and Bank of Boston Corp. moved to suburban Malden, Mass.

"They went to fringe areas with good transportation to downtown," Cunningham says.

Now, Boston-area firms are eyeing East Cambridge, Mass., an industrial area near Harvard University and MIT that has been attracting high-technology companies, most notably Lotus Development Corp.

Faced with the outflow of DP shops, which represent jobs and tax money, as well as prestige, New York has been fighting back. The city is offering a feast of incentives for companies that lease space at the Metropolitan Technology Center [Metrotech], a 16-acre office complex slated to be built in downtown Brooklyn.

Metrotech will consist of 11 buildings and 4.2 million square feet. Ground breaking is expected by year's end, with initial occupancy scheduled for 1990.

The Securities Industry Automation Corp. (SIAC), the data processing company jointly owned by the New York and American Stock Exchanges, has agreed to build a second DP site at Metrotech. SIAC is currently housed in offices in Manhattan's financial district.

If SIAC were to remain at its Water Street offices for the next 10 years, the cost over that period would be about $171 million, SIAC estimated. By reducing its space at Water Street and moving 800 of 1,100 people to Metrotech, the cost would be $191 million. The result, SIAC calculated, was that for an additional $2 million annually for 10 years, SIAC would gain about 80,000 square feet of space and a second processing site.

Staying put

Morgan Stanley Group, Inc. also took the city up on a set of incentives and, in February 1988, will move its operations department and data center to a 16-story office building in downtown Brooklyn adjacent to Metrotech. Morgan Stanley will initially occupy roughly one-third of the 600,000-square-foot building, called One Pierrepoint Plaza, which is being built by the same developers as Metrotech.

Merrill Lynch & Co. was also offered substantial incentives to keep a data center in New York. Last July the firm disclosed that it would relocate its Capital Markets data centers to Staten Island in a development called Teleport, a high-tech office complex in which the company is a partner.

Teleport, a Merrill Lynch joint venture with the Port Authority of New York and New Jersey, New York City and Western Union Communications Systems, Inc., is billed as a satellite communications center and intelligent commercial park incorporating a 150-mile regional fiber-optic network. Construction began in August on the 6.5-acre site, where Merrill Lynch is to occupy a two-story, 126,500-square-foot building in mid-1989.

Not all financial services firms are abandoning lower Manhattan, however. Last November, Shearson Lehman Brothers, Inc. moved into a spanking-new $200 million data center at the north end of the financial district, bordering Soho [CW, March 9].

Shearson Lehman wanted to stay in Manhattan, despite its higher costs, in order to be close to Wall Street, says William O'Neil, vice-president of technical planning. "If you can get market information faster than your competitor, you stand to make more money. In this business, 30 seconds is too long a wait."

Despite the city's inducements, the wise choice for most firms is still to move out, says Com-Site's Damiani. "Even though Mayor Koch is trying, the economic incentives are not comparable," he says.

West Coast Bureau Manager Kathy Chin Leong and Midwest Correspondent Jean S. Bozman contributed to this report.

Software AG offers DEC-specific tool

BY ROSEMARY HAMILTON
CW STAFF

RESTON, Va. — Software AG of North America, Inc. plans to announce today a networking utility that is its first product designed specifically for Digital Equipment Corp. hardware.

Network is intended to provide users with access to Software AG's data base management system in a distributed DEC environment, but the networking utility can also provide access across IBM and DEC platforms, according to Michael Schowalter, director of DEC programs for Software AG.

The company is also slated to announce today the availability of Predict, a data dictionary, and Super Natural, an end-user development environment, for the DEC VAX platform.

All three products introduced this week reportedly will come under Software AG's recently implemented graduated pricing structure.

The company currently offers two other products for the DEC market: its Adabas DBMS and Natural fourth-generation language development environment. Both products had originally been designed for IBM mainframes.

Network was designed to work with DEC's networking system, Decnet, Schowalter said. The utility is said to automatically locate data requested by users, enabling them to update data without knowledge of where it actually resides.

The network utility is available now and ranges in price from $2,500 for low-end Microvaxes to $20,000 for high-end VAXs.

Super Natural is set to be available in November, with prices starting at $3,130. Predict is shipping now, and its license fee also starts at $3,130, the company said.

Long wait

FROM PAGE 1

The first units of the 950 were delivered last Monday to a U.S. division of Canada-based Northern Telecom Ltd., a longtime HP customer. HP officials thanked users for their patience during what they called the company's "probationary period."

"While we've been a little slow, we think we're headed in the right direction," said John Young, HP's president and chief executive. "We have arrived at the finish line; at least we're declaring victory."

Although HP trailed many other vendors in developing 32-bit superminicomputers, Young said many competitors are now exploring the route that HP chose. "They are now investigating RISC architecture, which used to be considered too avant-garde to be a real machine," he said.

Young said sales of the Series 950 will not affect revenue this fiscal year. Already, however, demand for the 950 is outstripping orders for the 930, he said.

Additionally, HP revealed performance results from beta tests conducted the past several months at user sites. Users tested HP's 16-bit HP 3000 Series 70 against the 950 in a number of different applications.

In traditional applications, the 950 performed as much as three times better than the Series 70 in batch applications and up to two times better than the 70 in interactive applications, HP officials said. They said the 950 achieves better performance in compute-intensive applications than in interactive applications.

User findings

HP said users at McDonnell Douglas Corp. found that the 950 performed 20 times better than the Series 70 in SQL applications. At Pepsico, Inc., according to HP, users found that the 950 outperformed the 70 by slightly more than four times in a compute-intensive application in which Pepsico was compiling sales and marketing information.

Performance levels will be slightly lower for applications ported from the Series 70 to the 950 in the new system's compatible mode, HP said.

Original shipments of the 930 and 950 were scheduled for late 1986 and early this year, respectively. Those dates were later amended, with the 930 slated for mid-1987 shipment and the 950 projected for the fourth quarter of this year.

The first units of the 930 were delivered in August. HP officials said "early" shipment of the 950 resulted from better than expected performance by the system during beta testing.

While HP's RISC-based HP 3000 line has been well received by industry analysts and users, some observers have questioned whether HP possesses the marketing expertise to sell those systems against more aggressive competitors like Digital Equipment Corp.

Young dismissed the criticism. "Basically, when you have a few clouds over your product line, it's hard to go out there and sell aggressively," he said. "We're going to be much more aggressive in the marketplace."

CORRECTIONS

The SQL in Release 8 of Applied Data Research, Inc.'s relational data base management system, Datacom/DB [CW, Sept. 21], will support the most commonly used extensions of IBM's SQL in DB2. The product is compatible with ANSI-standard SQL.

Printer Systems Corp. [CW, Aug. 24] is located at Suite 200, 9055 Comprint Court, Gaithersburg, Md. 20877.

Raj Jaswa [CW, Aug. 10] is senior product marketing manager at Chips and Technologies, Inc.

Richard Fisher and Kalthoff-Fisher Associates [CW, Aug. 24] are located in Los Gatos, Calif., and Cincinnati.

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I N S I D E   L I N E S

Better late than never. Fifteen months after IBM first announced it, Enhanced Connectivity Facility began shipping last week. The software, which provides a "uniform structure" for IBM Personal Computers to access data, applications and peripherals on IBM 370 hosts, is part of IBM's Systems Application Architecture.

Such a bargain. The first IBM 3090 Model 120E shipped last week, bound for the University of Illinois at Chicago. Introduced in May as a tuned-down, sub-$1-million entry point for the 3090 mainframe family, the Model 120E was scheduled for October delivery.

The greening of Emerald Bay. Migent, the firm that hired enough Ashton-Tate employees to prompt a lawsuit, has its data base engine — dubbed Emerald Bay — in beta test. The product, which employs an SQL-compatible engine with an Ashton-Tate Dbase-compatible module, may be released by year's end, one beta-tester said. The product is, however, a tad late. It was originally promised by the end of this past March.

Dbase Jr.? Sources report that Ashton-Tate may be close to acquiring Frontrunner, a RAM-resident mini Dbase, from Apex Software. If acquired, the package will be bundled with Dbase IV and will serve as a utility for users who may not want to fire up the complete package, which is expected to be a very large program.

Chipping in. AST Research will announce Oct. 19 in New York its Premium/386 micro using the 20-MHz 80386 version, according to a company official. The 386 will feature IBM Extended EGA graphics, an undetermined hard-disk capacity of anywhere from 30M to 70M bytes and a 5¼-in. floppy disk drive as standard, with a 3½-in. microfloppy available upon request. A 386 accelerator board for Premium/286 micros and other IBM AT compatibles is expected as well this fall.

By the way. . . Maybe Cray didn't throw the baby out with the bathwater when key designer Steve S. Chen left the company in hopes of continuing his work on a new supercomputer elsewhere. Last week, the company revealed that a second development team has been working quietly since earlier this year in parallel to Chen's team and will continue that work on the computer informally known as the MP.

The third party. A second independent servicer of Hewlett-Packard minicomputers has filed suit against HP, claiming unfair trade practices against the third-party maintenance market. Cleveland-based Hypoint Technology followed the lead of a suit filed last year by a firm with the ironic name of Datagate. Hypoint's case centers on the HP service policy change of Aug. 1 that eliminated four-hour response time for HP service customers contracted for time and materials rather than full HP service. Attorney Ronald Katz, who also represents Datagate, says the policy was changed to drive third-party competitors out of business.

Megaflop. Midland Bank PLC has discontinued plans with Hogan Systems to develop a "megabank" integrated software system. Hogan said the cancellation will have no negative effect on this year's financial results. The company is predicting a loss of between $2.5 million and $3 million for the current quarter (see story page 95).

Not bleedin' likely, mate. Harris last week denied published reports that it had agreed to be acquired this summer by English telecommunications giant Plessey Co. but that the deal had stalled because of U.S. Department of Defense concerns. "We are not in, and have not been in, negotiations of this nature with anyone," Harris CEO John Hartley said in a prepared statement. We "believe that the interest of shareholders, customers and employees can best be served by Harris remaining independent."

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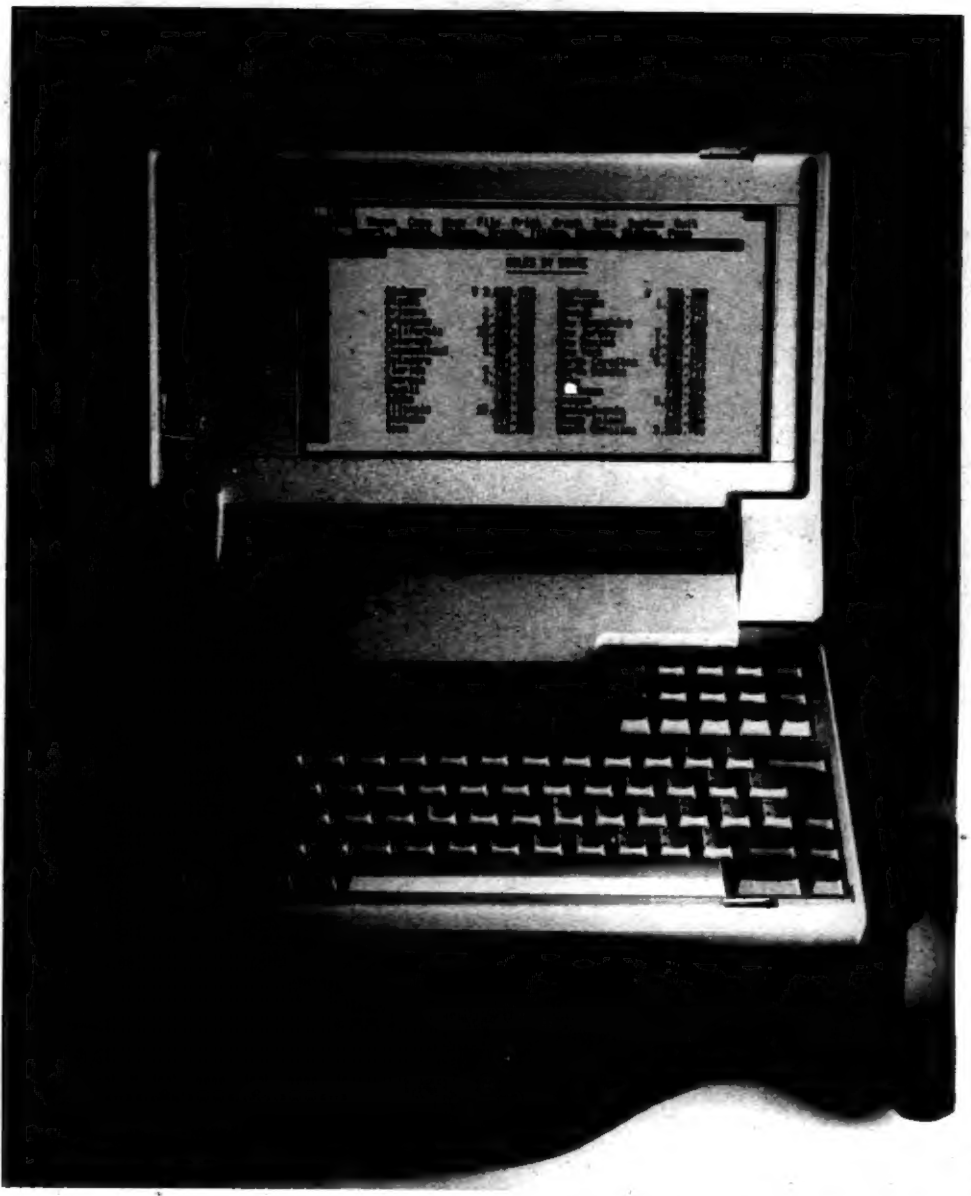

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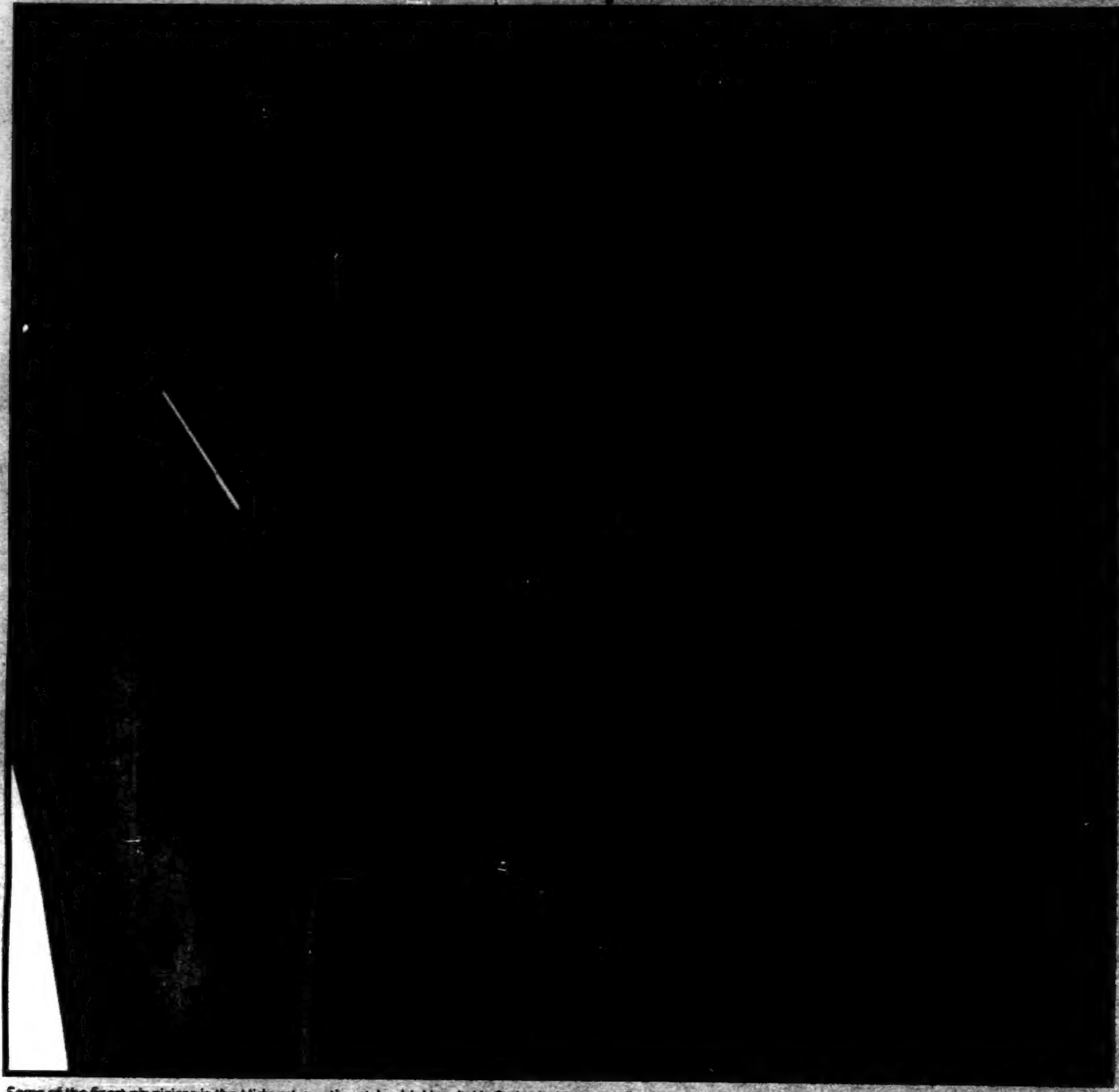

Some of the finest physicians in the Midwest practice at Jewish Hospital in St. Louis. It's an excellent hospital with an excellent reputation. But it *is* a business, and recently, due to a desire for better information access and control, Jewish Hospital found a need to convert from a shared computer system to a private one.

So after very careful consideration, Jewish Hospital converted to Financial, Human Resource and Materials Management software systems from Management Science America, Inc.

"Initially, we looked at 15 software companies," said John McGuire, executive vice president of the hospital. "In making our evaluation, we considered solicitations and talked with the users of various systems. We then considered five finalists who gave presentations. Then we narrowed our choice down to two, and ultimately went with MSA."

Why MSA over all the other software companies?

"User satisfaction with their products," was one of the reasons McGuire cited. "Also, MSA's customer service reputation was very good. We feel we made the right choice by going with MSA."

Now that MSA and Jewish Hospital are working together, the hospital is integrating its operational and financial information. According to McGuire, "MSA is helping us take better care of the business side of our hospital...and that lets us take better care of our patients."

If you would like to know more about what we're doing for Jewish Hospital, or what we can do for your business, contact Robert Carpenter in Atlanta at (404) 239-2000.

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